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INFORMATIONAL REGULATION, THE ENVIRONMENT, AND THE PUBLIC

KATRINA FISCHER KUH*

Informational Regulation, the Environment, and the Public generates a typology to analyze how public disclosure functions in informational regulation. In the environmental context, informational regulation compels the public disclosure of environmental information without mandating substantive environmental outcomes in the expectation that disclosure itself will prompt beneficial change in the environmental context. Application of the Article's typology reveals that the emperor has no clothes: Communication of environmental information to the public is considered central to policies employing informational regulation, but the information produced pursuant to these measures largely fails to reach or be understood by lay individuals. For example, empirical data shows that corporations required to publicly report releases under the Toxic Release Inventory (TRI) do change their conduct to reduce those releases despite being under no legal obligation to do so. Most people, however, are wholly unaware of the information disclosed under the TRI and, even if made aware of it, unable to comprehend its significance. This insight calls into question oft-cited normative bases for environmental information regulation, including that it supports individual autonomy (by informing choice about exposure to risk) and enriches civic perspective (by enhancing participation in administrative process and other civic behaviors). Critical examination of how informational regulation works and the effects it produces is timely and important. Environmental law increasingly embraces policies that employ informational regulation—it is, for example, central to current proposals to require greater disclosure of climate change risk under securities laws and constitutes a core element of many Environmental, Social, and Governance (ESG) protocols. Yet, close analysis suggests that the success of public disclosure at prompting upstream effects (changing the behavior of regulated entities) masks its general failure to speak

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to the lay public. Improving informational regulation requires a clear-eyed assessment of its limitations and a recognition that information cannot simply be pumped into the public domain and expected to enlighten individuals.

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I. INTRODUCTION

How best to generate and strategically deploy information to support environmental regulation (informational regulation) has emerged as an area of

sustained interest in environmental scholarship and policy.¹ Approaches grounded in the disclosure of information are now an established policy tool in some contexts and heralded as a promising policy tool in others.² Two EPA

1. ROBERT V. PERCIVAL, CHRISTOPHER H. SCHROEDER, ALAN S. MILLER & JAMES P. LEAPE, ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 279–98 (9th ed. 2021) (describing the development of “regulation through revelation”). See also Daniel C. Esty & Quentin Karpilow, *Harnessing Investor Interest in Sustainability: The Next Frontier in Environmental Information Regulation*, 36 YALE J. ON REG. 625, 634 (2019) (considering how to adapt environmental information regulation in the context of sustainable investing). The use of informational regulation extends beyond the environmental realm to other policy arenas. Cass R. Sunstein, *Informational Regulation and Informational Standing: Akins and Beyond*, 147 U. PA. L. REV. 613, 618–19 (1999) (describing informational regulation simply as “regulation through disclosure” and noting that informational regulation is “far from new to American law” and that disclosure of information has been a pervasive regulatory strategy dating to the New Deal, and that its usage increased significantly following the rights revolution of the 1960s and 1970s); MARY GRAHAM, DEMOCRACY BY DISCLOSURE: THE RISE OF TECHNOPOLISM 4, 21–60 (2002) (“In the last decade, government by disclosure has emerged as a third wave of modern risk regulation.”). The term “informational regulation” is used broadly here to encompass the strategic use of information to achieve environmental benefits without mandates or direct market intervention and information disclosure incorporated into regulatory schemes that include such mandates. See Thomas Dietz & Paul C. Stern, *Exploring New Tools for Environmental Protection*, in NEW TOOLS FOR ENVIRONMENTAL PROTECTION 5 (Thomas Dietz & Paul S. Stern eds., 2002) (describing “new tools” of environmental policy that “all have one or both of two features. They use education and the provision of information to try to change behavior, and the changes in behavior are voluntary in the sense that they are not driven by specific regulatory directives, externality taxes, or permit markets.”). See also Clifford S. Russell & Christopher D. Clark, *The Provision of Environmental Information as a Regulatory Instrument*, in ENVIRONMENT, INFORMATION AND CONSUMER BEHAVIOR, at 114 (Signe Krarup & Clifford S. Russell eds., 2005) (describing types and variations of information disclosure); compare David W. Case, *Corporate Environmental Reporting as Informational Regulation: A Law and Economics Perspective*, 76 U. COLO. L. REV. 379, 383 (2005) (defining informational regulation narrowly to mean “government mandated public disclosure of information on the environmental performance of regulated entities.”).

2. E.g., PERCIVAL, SCHROEDER, MILLER & LEAPE, *supra* note 1, at 279–98; Sunstein, *supra* note 1, at 618–24; JASON J. CZARNEZKI, EVERYDAY ENVIRONMENTALISM: LAW, NATURE & INDIVIDUAL BEHAVIOR 141 (2011) (observing that “two overwhelming themes emerge for promoting everyday environmentalism, both relying on information as a driver for change”); Case, *supra* note 1, at 384 (observing that “[u]se of information disclosure as a regulatory tool is described as the ‘third phase’ in the evolution of pollution control policy, following initial phases of traditional legal regulation (i.e., command-and-control) and market-based approaches (such as tradable permits and emission charges.”). See generally Eric W. Orts, *Reflexive Environmental Law*, 89 NW. U. L. REV. 1227, 1268, 1272 (1995) (describing “reflexive” environmental law, which often uses information strategies such as environmental labels). Important research identifies how traditional regulation can burden regulators with information-gathering demands and frustrate the development and effective use of environmental information. E.g., Bradley Karkkainen, *Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm?*, 89 GEO. L.J. 257, 285 (2001); Wendy E. Wagner, *Commons Ignorance: The Failure of Environmental Law to Produce Needed Information on Health and the Environment*, 53 DUKE L.J. 1619, 1625 (2004); Wendy E. Wagner, *Choosing Ignorance in the Manufacture of Toxic Products*, 82 CORNELL L. REV. 773, 776 (1997).

officials highlighted the expanding role of such approaches, noting that “[t]he mandatory disclosure of information to the public is an increasingly pervasive and important regulatory tool that has become ‘one of the most striking developments in the last generation of American law.’”³ As of this writing, the Securities and Exchange Commission is contemplating adopting new guidance about whether, when, and how securities laws require disclosures relating to climate change.⁴ And, notably, disclosure also features prominently in private environmental governance approaches, often constituting a core aspect of voluntary private standard regimes and labeling.⁵

Most iterations of informational regulation in the environmental context function through the generation and public disclosure of information,⁶ and technological advance continues to increase the capacity to develop and disseminate environmental information.⁷ Moreover, advances in monitoring

Many scholars have detailed the benefits of informational regulation, particularly as compared to traditional approaches in some contexts; others note not only the potential benefits of informational regulation, but also the potential for better environmental information to improve other modalities of environmental regulation. E.g., Daniel C. Esty, *Environmental Protection in the Information Age*, 79 N.Y.U. L. REV. 115, 119 (2004); Bradley Karkkainen, *Bottlenecks and Baselines: Tackling Information Deficits in Environmental Regulation*, 86 TEX. L. REV. 1409, 1435–38 (2008) (reviewing the benefits of the Toxics Release Inventory and lamenting that “state and local governments have been slow to embrace environmental baseline reporting and monitoring systems based on the TRI model.”); Bradley Karkkainen, *Framing Rules: Breaking the Information Bottleneck*, 17 N.Y.U. ENV’T. L.J. 75, 80–81 (2008).

3. David A. Hindin & Jon D. Silberman, *Designing More Effective Rules and Permits*, 7 GEO. L.J. OF ENERGY & ENV’T. L. 103, 118 (2016) (citing Sunstein, *supra* note 1, at 613).

4. SECURITIES AND EXCHANGE COMMISSION, PUBLIC STATEMENT: PUBLIC INPUT WELCOMED ON CLIMATE CHANGE DISCLOSURES (Mar. 15, 2021), <https://www.sec.gov/news/public-statement/lec-climate-change-disclosures> [<https://perma.cc/W2M6-WPYN>].

5. Michael P. Vandenbergh, *Private Environmental Governance*, 99 CORNELL L. REV. 129, 147–61 (2013) (providing an overview of private environmental governance approaches and describing numerous ways in which they incorporate information disclosure, including by observing that “[s]everal private organizations have emerged in the last two decades to gather and disseminate environmental information” including the Global Reporting Initiative and the Carbon Disclosure Project and explaining that the Equator Principles “are a set of environmental assessment and disclosure requirements that major banks agree to impose on project finance borrowers for projects around the world”).

6. Paul Reindorfer & Eric W. Orts, *Informational Regulation of Environmental Risks*, 18 RISK ANALYSIS 155, 157 (1998) (emphasizing the role of “public opinion” in environmental informational regulation).

7. While there is a recognized paucity of at least some types of environmental information, Eric Biber, *The Problem of Environmental Monitoring*, 83 U. COLO. L. REV. 1, 21–22 (2011); Wagner, *Commons Ignorance*, *supra* note 2, at 1624. Many observe that technology is poised to significantly increase its availability and use. E.g., Esty, *supra* note 2, at 118; Gregg Macey, *The Architecture of Ignorance*, 2013 UTAH L. REV. 1627, 1639–40 (2013); see generally David L. Markell & Robert L. Glicksman, *Dynamic Governance in Theory and Application*, Part I, 58 ARIZ. L. REV. 563 (2016).

capacity have begun to change the regulatory landscape⁸ as, increasingly, the public is able to generate information through its own monitoring efforts.⁹ The dynamic character of informational regulation opportunities, in tandem with their growing use and, more generally, sharpening concerns about public reception of (in particular, scientific) information,¹⁰ highlights the importance of developing a more robust understanding of this piece of the “environmental policy toolkit.”¹¹

Much of the analysis of how informational regulation functions has focused on use of such regulation in specific environmental contexts—such as with respect to specific statutes or types of statutes,¹² with respect to the

The increasing availability and accessibility of many types of environmental information on EPA’s website, including graphic and visual, attests to this; the capacity to map environmental justice areas is particularly notable. *EJSCREEN: Environmental Justice and Mapping Tool*, ENV’T. PROT. AGENCY, <https://www.epa.gov/ejscrecn> [<https://perma.cc/YG69-6WJV>].

8. For treatment of these issues, see Robert L. Glicksman, David L. Markell & Claire Monteleoni, *Technological Innovation, Data Analytics, and Environmental Enforcement*, 44 ECOLOGY L.Q. 41 (2016).

9. While early forms of informational regulation were based primarily on the disclosure or accessibility of information to the public from various sources (e.g., the government and regulated parties), we also believe that informational regulation includes reliance on the public to generate information. *E.g.*, Markell & Glicksman, *supra* note 7, at 613–14 (discussing EPA’s Next Generation Compliance initiative, which includes increased reliance on citizen monitoring capacity); Case, *supra* note 1, at 383 (explaining that informational regulation in the environmental context functions by “enlist[ing] the aid of non-governmental forces, particularly economic markets and public opinion, to either complement or substitute for traditional regulatory strategies of government standard setting and enforcement.”).

10. *E.g.*, Salman Bin Nacem & Rubina Bhatti, *The Covid-19 ‘Infodemic’: A New Front for Information Professionals*, HEALTH INFO LIBR. J. 10.1111/hir.12311 (June 2020), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7323420/> [<https://perma.cc/3S83-22YZ>] (describing the public’s reaction to information relating to the Covid-19 pandemic as an “infodemic”).

11. Clifford S. Russell, Signe Krarup & Christopher D. Clark, *Environment, Information and Consumer Behaviour: An Introduction*, in ENVIRONMENT, INFORMATION AND CONSUMER BEHAVIOUR (Signe Krarup & Clifford S. Russell eds., 2005) (“It seems fair to say that over the past two decades . . . [t]he provision of environmental information about products, processes that lead to the products, and producers of the products (owners of the processes) has become an accepted, if by no means fully understood, part of the environmental policy toolkit.”).

12. *E.g.*, Alexander Volokh, *The Pitfalls of the Environmental Right-to-Know*, 2002 UTAH L. REV. 805 (2002) (critiquing public engagement under environmental right to know laws, primarily reporting under the Emergency Planning & Community Right-to-Know Act); Clifford Rechtschaffen, *The Warning Game: Evaluating Warnings Under California’s Proposition 65*, 23 ECOLOGY L.Q. 303 (1996) (critiquing the communication of warnings to the public under Proposition 65); Jonathan Poisner, *A Civic Republican Perspective on the National Environmental Policy Act’s Process for Citizen Participation*, 26 ENV’T. L. 53 (1996) (critiquing public disclosure under NEPA).

communication of risk,¹³ for the purpose of influencing individual behaviors,¹⁴ or in the context of corporate disclosure.¹⁵ Less effort has been made, however, to broadly assess and focus on the *public's* role¹⁶ in environmental informational regulation through a contextual analysis of the use of informational regulation across multiple legal regimes.¹⁷ The term “public” is used to mean lay people (individuals) and the disclosure mechanisms analyzed make (or seek to make) information available to individuals broadly, although it is clear that it is often only some subset of the public (such as environmental groups or other sophisticated intermediaries) that in fact access and use the disclosed information.¹⁸ Developing a better understanding of how informational environmental regulation functions vis à vis the public across different contexts is important; all of the informational regulation measures examined are justified as means to provide information to the public so as to support individual autonomy or enrich civic perspective, identify communication with the public as an express purpose, and seek to use information to change public behavior.¹⁹ This Article offers such a contextualized broader review.

In Part II, this Article proposes a typology for conceptualizing the varied purposes and mechanisms of environmental governance schemes that rely on informational disclosure approaches, focusing on how these schemes position

13. E.g., Brenda J. Nordenstam & Joseph F. DiMento, *Right-to-Know: Implications of Risk Communication Research for Regulatory Policy*, 23 U.C. DAVIS L. REV. 333 (1989) (analyzing how risk communication research could improve laws that disclose environmental hazards to the public); Wip Viscusi, *Predicting the Effects of Food Cancer Risk Warnings on Consumers*, 43 FOOD DRUG COSM. L.J. 283, 288 (1988) (analyzing consumer response to risk information, in particular information about small risks, and concluding in part that “when individuals are informed of small risks there will be a tendency for them to over-react to the information and to treat the risk as being greater than it actually is. It will be very difficult to convey information to people in a meaningful fashion about very low probability risks. Perhaps the major danger from any risk-communication effort is that instead of informing people these programs will serve to unduly alarm them.”).

14. Russell, Krarup & Clark, *supra* note 11, at 1.

15. Esty & Karpilow, *supra* note 1, at 634; Hari M. Osofsky, Jacqueline Peel, Brett McDonnell & Anita Forester, *Energy Re-Investment*, 94 IND. L. J. 595, 621 (2019).

16. This Article returns to the importance of the definition of the “public” and the distinction between lay citizens and organized groups in Part IV.

17. Other efforts to better understand the public's role in environmental informational disclosure include *New Tools for Environmental Protection*, which focuses on the use of communication and diffusion to change individual environmental behaviors and has chapters addressing *inter alia* household energy conservation, household recycling, eco-labels and environmental education. Dietz & Stern, *supra* note 1, at 49–104, 147–60. See also Kleindorfer & Orts, *supra* note 6, at 155, 157 (1998); Sunstein, *supra* note 1, at 618–24; Tom Tietenberg, *Disclosure Strategies for Pollution Control*, 11 ENV'T & RES. ECON. 587, 587–88 (1998); Esty, *supra* note 2, at 119.

18. See *infra*, Part IV.

19. See *infra*, Part II.

individuals (the public). It suggests that most informational regulation schemes in the environmental context disclose information for the purpose of engaging the public in one or more of three ways. One purpose of public information disclosure is to inform individuals, including their civic or consumer choices (public as audience). A second is to prompt upstream third parties (*e.g.*, government agencies, emitters, companies, and consumer product producers) to take actions relevant to the environment (public as a catalyst for upstream changes). The third is to directly change environmental behaviors of individuals in a desired direction (public as target).

Part III applies this typology to different environmental governance contexts in which informational regulation occupies an important role: The Toxics Release Inventory (TRI) program,²⁰ Proposition 65,²¹ the National Environmental Policy Act (NEPA),²² eco-labeling (specifically, the United States Department of Agriculture (USDA) Organic Seal),²³ and behavioral interventions (such as fish advisories).²⁴

Part IV concludes by synthesizing findings from the case studies in Part III and exploring their implications. The key findings are relatively straightforward: Information disclosure catalyzes upstream behavior in all of the settings studied in which disclosure was intended to have that effect. On the other hand, informational regulation generally fails to educate the public as an audience for environmental information.²⁵ This Article identifies and explores several important governance questions suggested by the struggle of informational regulation to educate the public as an audience and the apparent disconnect between its relative success as a catalyst and relative failure as an audience strategy. The difficulty of using informational regulation to effectively educate the public as audience calls into question justifications for informational regulation grounded in enhancement of personal autonomy or civic engagement. The disconnect between the failure of disclosed information to meaningfully educate the public and its apparent success at achieving upstream catalyst effects encourages greater awareness and scrutiny of the

20. 42 U.S.C. §§ 11001–11050 (2012).

21. Safe Drinking Water and Toxic Enforcement Act of 1986, Proposition 65, 1986 Cal. Stat. A-219, *codified at* Cal. Health & Safety Code §§ 25249.5–13.

22. 42 U.S.C. §§ 4321–4370(f).

23. 7 U.S.C. § 6501 *et seq.*

24. See *infra* notes 238–83 and accompanying text.

25. A healthy dose of humility should accompany these conclusions given a host of challenges, including determining metrics and data limitations. These findings should not be overstated—especially for some of the case studies, the literatures concerning outcomes are at a nascent stage and very much still developing; further, in some cases these literatures are much more impressionistic than comprehensive.

dynamics producing upstream catalyst effects. This disconnect also cautions that information disclosure should not be assumed to necessarily enhance alignment of civil society norms and regulated party behavior.

II. HOW INFORMATIONAL REGULATION STRATEGIES POSITION THE PUBLIC: AUDIENCE, CATALYST, TARGET

Informational regulation strategies are likely to have one or more of three primary purposes. First, informational regulation in the environmental context can position the public as the audience for disclosed information for the purpose of improving public understanding of an environmental fact or issue.²⁶ Often, the hope is that improved public understanding will inform individual choice and thereby strengthen the exercise of personal autonomy. For example, Proposition 65 mandates the labeling of products containing specified substances that may present health risks in part to allow individuals to choose whether to accept a risk arising from exposure to those substances.²⁷ Improved public understanding can also be a means to enhance deliberative democracy by “enabl[ing] citizens to oversee government action and also to assess the need for less, more, or different regulation” by “inform[ing] them of both private and public activity.”²⁸

Disclosure of environmental information to the public can also serve as a catalyst for influencing the behavior of a wide range of upstream actors, including parties traditionally regulated under the environmental laws (e.g., industrial facilities), producers of consumer products (e.g., food producers), and the government.²⁹ For example, public disclosures required under the Toxics Release Inventory (TRI)³⁰ and National Environmental Policy Act (NEPA)³¹

26. OMRI BEN-SHAHAR & CARL E. SCHNEIDER, MORE THAN YOU WANTED TO KNOW: THE FAILURE OF MANDATED DISCLOSURE 34 (2014). In their book critiquing mandated disclosure, Omri Ben-Shahar and Carl E. Schneider appear to assess disclosure primarily through the lens of whether it achieves this audience function, beginning from the twin premises that mandated disclosure “principally seeks to help people confronting unfamiliar and complex decisions in transactions with knowledgeable people with interests of their own” and succeeds by “providing information that equips disclosees to understand their choice well enough that they analyze it and make a well-informed, well-considered decision.” *Id.*

27. CAL. CODE REGS. tit. 27, § 25601 (2018). *See also infra* Part III.B (describing Proposition 65’s purposes and disclosures requirements).

28. Sunstein, *supra* note 1, at 625–26.

29. Michael P. Vandenbergh, *From Smokestack to SUV: The Individual As Regulated Entity in the New Era of Environmental Law*, 57 VAND. L. REV. 515, 531 (2004) (“Even in the new field of informational regulation, however, the principal focus of the regulatory debate and of existing environmental regulations has been on large industrial firms.”).

30. 42 U.S.C. §§ 11001–11050 (2006).

31. 42 U.S.C. §§ 4321–4370(f) (2006).

are designed in part to influence, respectively, the environmental performance of entities subject to TRI reporting requirements³² and the consideration of the environment in government decision making.³³ Similarly, the Organic Seal program, which sets national standards for organic certification, is intended in part to influence producers of such products.³⁴ **The mere fact that the information is or will be publicly available can motivate upstream entities to change course, based in part on predicted or actual public reaction (among other reasons).³⁵ The predicted or actual public response to the disclosed information thereby functions as a catalyst for the upstream private or governmental action.³⁶**

Finally, the public can also be the *target* of informational regulation. Informational regulation treats the public as a target where the governance effort seeks to use information disclosure to persuade individuals to change their behavior in a particular direction for a public health or environmental [] on.³⁷ Sometimes, the goal is to protect public health by reducing public exposure to environmental harms (as, for example, in the case of fish consumption advisories).³⁸ Regulation can also seek to use information disclosure to encourage individuals to take actions that benefit the environment and avoid actions that harm the environment. Examples include stenciling storm drains to indicate the receiving water body to discourage individuals from

32. Memorandum for the Administrator of the Environmental Protection Agency and the Heads of Executive Departments and Agencies, Expediting Community Right-to-Know Initiatives, 60 Fed. Reg. 41,791 (Aug. 11, 1995).

33. 42 U.S.C. § 4321.

34. 7 U.S.C. § 6501.

35. As noted below, companies' perceptions concerning the nature and likelihood of citizen responses to disclosures may differ from the reality. *See infra* note 105 and accompanying text. Regulated entities and others may be motivated to change their behavior for other reasons in addition to possible citizen response. *See infra* note 100 (noting that some companies reduced their release of TRI chemicals because the TRI disclosures were the first time the companies' highest-level officials became aware of the scope of such releases).

36. *See infra* Part III.

37. Others have described positioning the public as a target of informational regulation as a tool of communication and diffusion that employs a "social marketing" strategy. *See* Dietz & Stern eds., *supra* note 1, at 45 ("A target behavior is identified on the basis of its presumed environmental benefits, and communication and diffusion instruments are mobilized to increase the prevalence of the target behavior in a target population. . . . It normally focuses on behaviors that have fairly direct impacts on environmental quality—behaviors such as recycling of household wastes, use of private or public transport, and household appliance purchases and maintenance, rather than on behaviors that may affect the environment indirectly by influencing public policy.").

38. *See infra* Part III; ENV'T PROT. AGENCY & FOOD AND DRUG ADMIN., WHAT YOU NEED TO KNOW ABOUT MERCURY IN FISH AND SHELLFISH (Mar. 2004); Env't Prot. Agency & Food and Drug Admin., Advice About Eating Fish: Availability of Draft Update, 79 Fed. Reg. 33559 (June 11, 2014).

contributing harmful materials³⁹ and providing individuals with better data about their energy use to encourage conservation.⁴⁰

There is overlap between the concepts of audience, catalyst, and target. Disclosure may be designed to educate the public and motivate the public to act in certain ways and thereby catalyze changes in the behavior of upstream actors. The separate categories for catalyst, audience, and target strategies, however, capture important distinctions between these purposes of public disclosure. With respect to the audience and target strategies, for example, while the former can be agnostic as to a particular result, the “target” policy seeks to encourage the public to act in a specified manner.⁴¹ If, for example, an individual encountered and understood a fish advisory but nonetheless chose to consume fish at higher-than-recommended levels, the advisory would have succeeded as an audience measure (by educating individuals and allowing the exercise of informed choice) but failed as a target measure (to the extent that it sought to encourage individuals to avoid levels of risk deemed unacceptable).

39. National Pollutant Discharge Elimination System—Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges, 64 Fed. Reg. 68722, 68755 (1999) (requiring small MS4 operators to adopt stormwater management programs that include public outreach and observing that “[c]xamples of strategies include distributing brochures or fact sheets, sponsoring speaking engagements before community groups, providing public service announcements, implementing educational programs targeted at school age children, and conducting community-based projects such as storm drain stenciling, and watershed and beach cleanups.”). See also ENV’T PROT. AGENCY, STORMWATER PHASE II FINAL RULE: PUBLIC EDUCATION & OUTREACH MINIMUM CONTROL MEASURE (2018), https://www.epa.gov/sites/default/files/2018-12/documents/epa_stormwater_phase_ii_final_rule_factsheet_2.3_public_education_12-04-18.pdf [https://perma.cc/6FPP-BJHJ].

40. Energy Independence and Security Act of 2007, 42 U.S.C. §§ 17381–17388 (2006) (funding research and development of the smart grid); *Centerpoint Energy and U.S. Deputy Secretary of Energy Daniel Poneman Announce Results of Pilot Project on Home Energy Use*, DEP’T OF ENERGY, (July. 26, 2011), <https://www.energy.gov/articles/centerpoint-energy-and-us-deputy-secretary-energy-daniel-poneman-announce-results-pilot> [https://perma.cc/5RC9-G7KV] (describing increased energy efficiency behaviors by consumers using smart grid technology funded through the Recovery Act).

41. By requiring the provision of risk information associated with exposures to consumers, for example, Proposition 65 does not seek to dictate the level of risk exposure that consumers should prefer or demand, but instead recognizes that consumers may prefer less risk than that permitted by regulators and empowers them to exercise that preference. See *infra* notes 107–09 and accompanying text, discussing the legislative history of Proposition 65. See also SUSAN G. HADDEN, A CITIZEN’S RIGHT TO KNOW 15–17 (1989) (describing different types and objectives of right to know). The distinction between positioning the public as an audience versus a target is not always precise as informational regulation often seeks to educate individuals in order to change (or at least in order to enable individuals to choose whether to change) their behaviors. For present purposes, the key distinction is whether information is provided for the purpose of changing behavior in a specific of desired direction. Using this metric, the USDA Organic Seal positions the public primarily as an audience (because it seeks to enable consumers to identify and choose organic products, but does not seek to persuade them to do so) and fish consumption advisories and energy conservation, recycling, and similar measures position the public primarily as a target (because they seek to encourage individuals to behave in environmentally salutary or health-protective ways).

III. CASE STUDIES OF THE USE OF INFORMATIONAL REGULATION

This Part surveys the use of informational regulation in different contexts, ranging from primarily “extra-regulatory” to serving as an important feature of an elaborate regulatory scheme.

A. *The Toxic Release Inventory (TRI)*

The Toxics Release Inventory (TRI), adopted as section 313 of the Emergency Planning and Community Right to Know Act,⁴² is widely viewed as an example of innovative and successful informational regulation in the environmental context because of the significant number of companies that have changed their operations to reduce their generation of pollution, at least in part because of TRI.⁴³ Assessments of TRI, however, also suggest that while the law’s required public disclosure has had a significant impact as a catalyst—i.e., influencing upstream (especially private, commercial) behavior—it often fails to engage the public effectively as an audience for environmental information, in this context primarily information about environmental health risk.

1. How TRI works

TRI requires “covered entities”⁴⁴ to prepare and submit annual toxic chemical release forms⁴⁵ that disclose, *inter alia*, information about the use, disposal and release of listed chemicals.⁴⁶ Covered entities submit toxic

42. Superfund Amendments and Reauthorization Act of 1986, Title III, Pub. L. No. 99-499, 100 Stat. 1613, 1728–58, *codified as 42 USC § 11001 (2006)*.

43. E.g., Karkkainen, *Bottlenecks and Baselines*, *supra* note 2, at 1435–38; MICHAEL E. KRAFT, MARK STEPHAN & TROY D. ABEL, COMING CLEAN: INFORMATION DISCLOSURE AND ENVIRONMENTAL PERFORMANCE 10 (2011) (noting that TRI “has become something of a poster child for the efficacy of environmental information disclosure requirements”); *see also id.* at 54 (“Policy scholars continue to cite the TRI program as perhaps the premier example of a federal nonregulatory environmental program that has worked fairly well.”) (citations omitted). *But see Volokh, supra* note 12, at 807 (critiquing TRI and concluding that “environmental information, as required under current law, is often misleading and provides a distorted picture of the health and environmental effects of chemical use.”).

44. Covered entities are essentially large facilities that use toxic chemicals above threshold amounts. 42 U.S.C. § 11023(b) (“[O]wners and operators of facilities that have 10 or more full-time employees and that are in Standard Industrial Classification Codes 20 through 39 (as in effect on July 1, 1985) and that manufactured, processed, or otherwise used a toxic chemical listed under subsection (c) of this section in excess of the quantity of that toxic chemical established under subsection (f) of this section during the calendar year for which a release form is required.”).

45. 42 U.S.C. § 11023(b).

46. 42 U.S.C. § 11023(g)(C) (“[P]rovide for submission of each of the following items of information for each listed toxic chemical known to be present at the facility: (i) Whether the toxic

chemical release forms to the EPA and a designated state official,⁴⁷ and the forms are (with some exceptions) publicly available.⁴⁸ EPA is required by the statute to maintain TRI data in a publicly accessible computer data base.⁴⁹

The statute does not require that the data generated be user-friendly. It directs EPA to “establish and maintain in a computer data base a national toxic chemical inventory based on data submitted” through the TRI program.⁵⁰ For many years, the EPA TRI database was unwieldy and difficult to navigate.⁵¹ The Agency has made significant improvements and, although many available tools for accessing TRI data still require specialized knowledge,⁵² some data are now available in more lay-user-friendly formats, described as “TRI Tools for Most Users.”⁵³ Using these tools, anyone can identify TRI facilities and a host of related information (including the volume and content of reported releases from a facility) by entering a city, zip code, street address, etc.⁵⁴

However, although the data is now more readily available, understanding its meaning and significance remains challenging. The site identifies Potential Risk based on a Risk-Screening Environmental Indicators (RSEI) score.⁵⁵ The

chemical at the facility is manufactured, processed, or otherwise used, and the general category or categories of use of the chemical. (ii) An estimate of the maximum amounts (in ranges) of the toxic chemical present at the facility at any time during the preceding calendar year. (iii) For each wastestream, the waste treatment or disposal methods employed, and an estimate of the treatment efficiency typically achieved by such methods for that wastestream. (iv) The annual quantity of the toxic chemical entering each environmental medium.”).

47. 42 U.S.C. § 11023(a).

48. 42 U.S.C. § 11023(h); 42 U.S.C. § 11044(a).

49. 42 U.S.C. § 11023(j) (“The Administrator shall establish and maintain in a computer data base a national toxic chemical inventory based on data submitted to the Administrator under this section. The Administrator shall make these data accessible by computer telecommunication and other means to any person on a cost reimbursable basis.”).

50. 42 U.S.C. § 11023(j).

51. Bradley P. Hartman, *Toxic Chemical Release Inventory Database*, 1 ENV’T L. 941, 947–54 (1995) (describing the then-existing process for accessing information from EPA’s TRI database). Beginning in 1998, the Environmental Defense Fund sponsored a private website, scorecard.org, that provided a similarly user-friendly means of accessing TRI data. *Online “Chemical Scorecard” Puts Pollution on Display* in EDF LETTER VOL. XXIX, NO. 3 (Env’t Def. Fund), June 1998, at 1, 5, https://www.edf.org/sites/default/files/178_Jun98.pdf [https://perma.cc/KH8U-FDD4] (describing scorecard.org as a “unique new Internet service launched by EDF [that] allows anyone to enter a zipcode and see a map highlighting local sources of pollution.”). The Right-to-Know Network also hosted a now defunct site providing access to TRI data, previously available at <https://rtk.rjifuture.org/>.

52. *TRI Data and Tools*, ENV’T PROT. AGENCY, <https://www.epa.gov/toxics-release-inventory-tri-program/tri-data-and-tools> [https://perma.cc/92VV-CC67].

53. *Id.*

54. *TRI Search*, ENV’T PROT. AGENCY, <https://edap.epa.gov/public/extensions/newTRISearch/newTRISearch.html?> [https://perma.cc/A6DD-8932].

55. *Id.*

meaning and significance of the associated value is somewhat inscrutable, at least to a lay audience. EPA developed RSEI to assist the development of regulatory priorities based on TRI data; it was meant to enable a “focus on chemicals, industry sectors, and facilities with the greatest potential for chronic human health risk.”⁵⁶ Facilities appear in a color that corresponds to a range of RSEI scores (with darker colors and higher scores presumably signaling more risk); in the Potential Risk section, users see a numerical RSEI score.⁵⁷ The site explains that the “RSEI Score is a unitless value that accounts for the size of the chemical release, how the chemical degrades and moves through the environment, the size and location of the exposed population, and the chemical’s toxicity;”⁵⁸ under a “More Info” button, the site explains further that RSEI scores are “calculated as a toxicity weight multiplied by the exposed population multiplied by the estimated dose. RSEI Scores are only meaningful in comparison to other RSEI Scores.”⁵⁹ For example, “[a] RSEI Score that is 10 times higher than another RSEI Score suggests that the relative potential for risk is 10 times greater.”⁶⁰ EPA also publishes a PDF guide on the TRI site map entitled “Factors to Consider When Using Toxics Release Inventory Data.”⁶¹ Although written in accessible language, the Guide’s length (39 pages) and content attest to the challenges for lay public encountering TRI data. The guide explains that not all toxic chemicals fall within the TRI framework, that not all TRI chemical releases are required to be reported, and that a release of TRI chemicals does not necessarily mean that hazards are present in a community.⁶² The guide also explains that the TRI is fundamentally inadequate to assess risk for its lack of information about toxicity, bioconcentration, and methods of exposure, among other missing factors. The guide emphasizes the limitation of a RSEI score for evaluating individual risk and encourages users to access the “myRTK” mobile application to assess risk, with an embedded

56. *How RSEI Should Be Used*, ENV’T PROT. AGENCY, <https://www.cpa.gov/rsei/how-rsei-should-be-used> [<https://perma.cc/935P-MFBV>].

57. ENV’T PROT. AGENCY, *supra* note 54.

58. *Toxics Release Inventory, Potential Risks*, ENV’T PROT. AGENCY, <https://cdap.epa.gov/public/extensions/newTRISearch/newTRISearch.html?> [<https://perma.cc/ECB8-93U7>].

59. *Id.*

60. *Understanding RSEI Results*, ENV’T PROT. AGENCY, <https://www.cpa.gov/rsei/understanding-rsei-results> [<https://perma.cc/XC45-XAUL>].

61. ENV’T PROT. AGENCY, FACTORS TO CONSIDER WHEN USING TOXICS RELEASE INVENTORY DATA (2019), https://www.cpa.gov/sites/production/files/2019-03/documents/factors_to_consider_march_2019.pdf [<https://perma.cc/8RMB-XYY8>].

62. *Id.*

link to download the app.⁶³ The link directs the user to a webpage informing the user that the app is no longer available.⁶⁴

2. Purposes

As evidenced by its text, legislative history, and exhortations throughout its implementation, TRI disclosure is understood both as a means to educate individuals as an audience and to catalyze changes in the behavior of upstream regulated entities and policymakers. Embodying TRI's goal of educating individuals as an audience, the statute provides that TRI data "are intended to provide information to . . . *the public, including citizens of communities surrounding covered facilities . . . to inform persons about releases of toxic chemicals to the environment . . .*"⁶⁵ President Clinton observed that the statute was designed to "provide a basic informational tool to encourage informed community-based environmental decision making [audience] and provide a strong incentive for businesses to find their own ways of preventing pollution [catalyst]."⁶⁶

EPA explains that the TRI program's objectives include educating the public (audience) and empowering the public to work with others to reduce releases (catalyst):

The goal of EPA's Toxics Release Inventory (TRI) Program is to empower citizens and other TRI stakeholders through information about how toxic chemicals are managed. Using TRI data and EPA's suite of TRI-related tools, one can: Identify potential environmental concerns and gain a better understanding of potential risks; Identify priorities and opportunities to work with industry, government and communities to reduce toxic chemical releases and potential risks associated with them; Provide the members of your community with information and insights regarding toxic chemical releases and waste management practices in the community; Make informed decisions on the consequences of

63. *Id.*

64. *Id.*

65. 42 U.S.C.A. § 11023(h) (emphasis added).

66. Memorandum for the Administrator of the Environmental Protection Agency and the Heads of Executive Departments and Agencies, Expediting Community Right-to-Know Initiatives, 60 Fed. Reg. 41791 (Aug. 11, 1995). See also Jeanne Herb, Susan Helms & Michael J. Jensen, *Harnessing the "Power of Information": Environmental Right to Know as a Driver of Sound Environmental Policy*, in *NEW TOOLS FOR ENVIRONMENTAL PROTECTION* 254 (Thomas Dietz & Paul C. Stern eds., 2002) (highlighting TRI's audience function, noting that TRI was "based on the philosophic underpinnings that citizens who are informed about hazardous chemicals in their communities can make more educated decisions about their own protection.").

such practices and take action; and Establish reduction targets and measure progress toward those targets.⁶⁷

Although proponents anticipated and hoped that an informed public would have instrumental value as a catalyst for upstream change (by creating pressure for voluntary improvements by polluting entities and more robust laws and enforcement), informing the public was also understood to have independent “moral and ethical value” grounded in individuals’ “right-to-know” the risks they face.”⁶⁸ Informing the public as an audience⁶⁹ was, in short, an important rationale motivating TRI’s enactment, in addition to influencing upstream behavior.⁷⁰

3. Results

a. Audience

Several commentators have concluded that TRI has not proven to be a particularly effective tool for directly informing the lay public (individuals) as an audience. They suggest that TRI has done little to foster the public’s understanding of the nature and significance of toxic substances in communities.⁷¹ As William Pederson put it, “TRI in its present form does not and cannot achieve its ostensible goal of accurately informing the public about toxic releases.”⁷²

The difficulties TRI encounters communicating effectively to individuals can be grouped into three broad categories: (1) the means by which TRI provides data to the public; (2) the content of the data that TRI generates; and

67. ENV’T PROT. AGENCY, *supra* note 61.

68. David W. Casc, *The Law and Economics of Environmental Information as Regulation*, 21 ENV’T L. REP. 10773, 10776 (2001).

69. There certainly seems to be some expectation that access to TRI data could influence, in particular, individuals’ civic behaviors, and TRI’s disclosure can thus be understood as positioning the public as both an audience and a catalyst. TRI does not position the public as a target because the goal of disclosure is not to persuade individuals to take a particular action, but instead to inform individuals to allow them to better discern and act upon their own preferences.

70. Herb, Helms & Jensen, *supra* note 66, at 254 (observing that while TRI “data is intended to drive environmental performance at industrial facilities by affecting a host of sectors in society” the “political rhetoric surrounding EPCRA was on empowering local citizens to make personal decisions.”).

71. Nordenstam & DiMento, *supra* note 13, at 345–46; Herb, Helms & Jensen, *supra* note 66, at 260 (“A recommitment needs to be made to have policymakers, the environmental community, and industry come together to reexamine how best to provide the public with a full understanding of the nature of information to which the public has a right to know.”).

72. William F. Pederson, *Regulation and Information Disclosure: Parallel Universes and Beyond*, 25 HARV. ENV’T L. REV. 151, 152 (2001).

(3) limitations in and characteristics of individuals' capacities to effectively comprehend and use TRI data ("receiver" problems).⁷³

Beginning in 1998, the Environmental Defense Fund sponsored a private website that provided a more user-friendly means of accessing TRI data.⁷⁴ And, as noted above, EPA now hosts its own more user-friendly tools for accessing TRI data which are discussed in greater detail below.⁷⁵ Fundamentally, however, even when more readily available in user-friendly form, individuals must still seek out TRI data. This presents a significant obstacle to communicating TRI data to the public as "American consumers are not, in general, information seekers. Only ten to twenty percent of Americans seek information A risk communication program which requires active information seeking by the consumer will reach only a small minority of the intended audience."⁷⁶ One study of TRI revealed that "contrary to the expectations that policymakers had for the TRI program, relatively few people and community groups have made much direct use of the TRI data" and "currently the [TRI] information is not reaching the public for one reason or another."⁷⁷

The content of TRI data also frustrates efforts to position the public as an audience for TRI data and to use TRI to advance individuals' understanding of toxics in their communities.

TRI fails to inform the public of the true extent of either toxic releases or the toxic risks that they face. The most important weaknesses are: (1) the failure to cover all sources of listed TRI chemicals; (2) the failure to include in TRI all chemicals that match or exceed the hazard posed by chemicals already listed; and (3) the failure to characterize either the hazards or the risks of TRI releases.⁷⁸

This critique of TRI has been developed at length elsewhere.⁷⁹ For present purposes, the relevant point is that even when an individual seeks out or encounters TRI data in a reasonably accessible format, the data may confuse (because data about the volume of a chemical stored, disposed of or released

73. See generally Nordenstam & DiMento, *supra* note 13, at 346–50 (describing source, message, channel and receiver problems in risk communication).

74. Online "Chemical Scorecard" Puts Pollution on Display, *supra* note 51.

75. See *supra* notes 52–64 and accompanying text.

76. Nordenstam & DiMento, *supra* note 13, at 353, 373 (encouraging policymakers to "seriously consider the implications of risk communication research to create effective information disclosure requirements in right-to-know programs.") (internal citations omitted).

77. KRAFT, STEPHAN & ABEL, *supra* note 43, at 55, 136–37.

78. Pederson, *supra* note 72, at 164.

79. *Id.* at 165–74.

often has little bearing on health or environmental impacts), mislead (because similar or more pernicious chemicals or releases may not be included in the data set because they do not fall within the TRI framework), or simply leave the individual nonplussed (because the individual does not know what to make of the mere presence of the release of particular chemicals in particular volumes) about the nature and significance of toxic substances in their community.⁸⁰

Finally, not only is information about the environmental and health impacts of toxic releases complex (raising questions about whether individuals possess the literacy necessary to comprehend the information),⁸¹ but the challenge of educating or informing individuals through release of TRI information is magnified because individuals receive and digest information in complicated and often irrational ways. A rich body of social science, communications, and psychology research provides insights into how individuals respond to information, particularly as it relates to complex scientific information and risk, and identifies a host of factors, ranging from reading literacy and numeracy to cognitive biases and heuristics, that shape how individuals understand information.⁸² For example, the public is “much less sensitive than the experts to fundamental considerations of dose and exposure,” “generally tend[s] to view chemicals as either safe or dangerous, and [] appear[s] to equate even small exposure to toxic or carcinogenic chemicals with almost certain harm.”⁸³ Individuals tend to greatly fear risks to which they are involuntarily exposed,⁸⁴ to overreact to small or low probability risks but to “react insufficiently to changes in quantitative estimates of environmental harm . . . such as gallons of

80. There is no readily identifiable easy “fix” in terms of how to structure disclosure to educate the public as a means to meaningfully inform individual choice about toxics exposure. Individuals may lack the “sectoral literacy” and numeracy necessary to comprehend risk data; providing additional information runs the risk of overload, and simplification (to avoid overload) would present distinct challenges. BEN-SHAHAR & SCHNEIDER, *supra* note 26, at 55–137.

81. *Id.* at 79–93 (discussing how reading literacy, numeracy, and sectoral literacy can affect the capacity of individuals to understand disclosures).

82. E.g., W. KIP VISCUSI, RATIONAL RISK POLICY: THE 1996 ARNE RYDE MEMORIAL LECTURES (1998); Daniel J. Fiorino, *Environmental Risk and Democratic Process: A Critical Review*, 14 COLUM. J. ENV’T L. 501, 512–17 (summarizing literature addressed to environmental risk perception and communication). See also Omri Ben-Shahar & Carl E. Schneider, *The Failure of Mandated Disclosure*, 159 U. PA. L. REV. 647, 704–29 (2011) (describing characteristics and proclivities of disclosees that prevent them from benefiting from disclosed information); Nordenstam & DiMento, *supra* note 13; Anthony Patt & Richard Jeckhauser, *Behavioral Perceptions and Policies Toward the Environment*, in JUDGMENTS, DECISIONS AND PUBLIC POLICY 265 (Rajeev Gowda & Jeffrey C. Fox eds. 2002).

83. Nancy Kraus, Torbjörn Malmfors & Paul Slovic, *Intuitive Toxicology: Expert and Lay Judgments of Chemical Risks*, in THE PERCEPTION OF RISK 309 (Ragnar E. Löfstedt ed., 2000).

84. Frank B. Cross, *The Public Role in Risk Control*, 24 ENV’T L. 887, 919 (1994).

discharge or fractional concentrations,”⁸⁵ to dismiss information that “creates dissonance or internal conflict in their life,”⁸⁶ and to apply preexisting cultural belief systems to their interpretation of factual data.⁸⁷ This research demonstrates that care must be taken about how information is presented to individuals—“[i]f information is not provided in a clear and usable form, it may actually make people less knowledgeable than they were before.”⁸⁸ However, neither in its text nor in its implementation does TRI appear to incorporate these insights into its mechanisms for communicating TRI data to the public.

This criticism should not be taken to suggest that TRI should or could be expected to singlehandedly educate the public about nuanced aspects of environment risk or consequence; there are likely outer bounds on the capacity to use informational policy to educate individuals, in particular about environmental risk.⁸⁹ And even where individuals do not understand the nature or extent of risks to the community posed by releases documented in TRI data, that data may provide a basis for individuals to form an impression of relative risk based on total volume of releases in their community as compared to others.⁹⁰ However, at present, TRI appears to simply “ensure[] that data are available” while leaving the “burden . . . on the citizen to acquire, understand,

85. Patt & Zeckhauser, *supra* note 82, at 273–74.

86. Cross, *supra* note 84, at 912.

87. Dan M. Kahan & Donald Braman, *Cultural Cognition and Public Policy*, 24 YALE L. & POL'Y REV. 149, 170 (2006).

88. Cass R. Sunstein, *Informing America: Risk, Disclosure and the First Amendment*, 20 FLA. ST. U. L. REV. 653, 667–69 (1993) (describing difficulties arising from information processing, heuristics, motivational bias, and overload).

89. John H. Sims & Duane D. Baumann, *Educational Programs and Human Response to Natural Hazards*, 15 ENV'T AND BEHAV. 165, 182–83 (1983) (“Although clearly much can be accomplished if the work is sophisticated and well informed, some acknowledgement should be made that it is unrealistic to see the possibilities of hazard education and warning as unlimited. The weight of the evidence is convincing that there are factors involved in determining public response that, practically speaking, will continue to escape efforts at control.”). See also BEN-SHAHAR & SCHNEIDER, *supra* note 26, at 7 (arguing that mandated disclosure fails often “[c]xactly because the choices for which it seeks to prepare disclosees are unfamiliar, complex, and ordinarily managed by specialists, [and therefore] novices cannot master them with the disclosures that lawmakers usually mandate.”); *id.* at 47 (“The evidence does *not* say that no disclosure ever improves disclosees’ understanding. *Many* studies show some improvements. But repeatedly even strenuous efforts to educate discloses do not bring them near the level of understanding needed to make good decisions.”).

90. Archon Fung & Dara O'Rourke, *Reinventing Environmental Regulation from the Grassroots Up: Explaining and Expanding the Success of the Toxics Release Inventory*, 25 ENV'T MGMT. 115, 120 (2000) (arguing that it is irrelevant that “ordinary people” cannot interpret TRI data because “[s]omeone who lives next to a particularly noxious facility is concerned about relative, not absolute risk. What they know is all they need to know; they suffer higher health risks from living next to one of the worst polluters than others who live elsewhere. Even if that level of additional risk is low, it is considered unjust and inequitable.”).

and act upon the information.”⁹¹ Yet, TRI aims to “[p]rovide . . . [community members] with information and insights regarding toxic chemical releases and waste management practices in the community” so as to allow them to “[m]ake informed decisions on the consequences of such practices and take action.”⁹² Where the “purpose of RTK is to allow citizens to make better decisions about hazardous materials in the community,” “[t]his purpose requires not only that information be available but that it be understandable and appropriate. Thus, government may have to help citizens interpret or manipulate the data they obtain in order to make it germane to community decisions, not just to ensure its availability.”⁹³

Even if the government itself does not perform these functions, it is of course possible that TRI would have value in informing the public about toxics if others stepped into the breach. Advocacy groups and the media can and do serve as intermediaries helping to communicate TRI data to the public.⁹⁴ By serving this intermediary function, advocacy groups and the media can offset the reality that most people will not independently seek out TRI data. Problems may nonetheless persist about the content of the information provided and the capacity of individuals to understand that information.⁹⁵ Many news accounts simply restate TRI data—relating the volume of release and reporting entity—

91. HADDEN, *supra* note 41, at 15 (characterizing this function as satisfying only “the most basic purpose of [Right to Know].”).

92. ENV’T PROT. AGENCY, *supra* note 61, at 3.

93. HADDEN, *supra* note 41, at 16.

94. ENV’T PROT. AGENCY, THE TOXICS RELEASE INVENTORY IN ACTION: MEDIA, GOVERNMENT, BUSINESS, COMMUNITY AND ACADEMIC USES OF TRI DATA 4, 6–10 (2013). In a presentation, Sarah Swenson, a Communications Specialist at the Office of Chemical Safety and Pollution Prevention in the Environmental Protection Agency, commented that EPA does seek to reach individuals with TRI data but that they “rely on information intermediaries very much.” U.S. EPA, *Toxics in the Community: Toxic Release Inventory (TRI) for Local and Tribal Governments*, LGEAN (Oct. 6, 2021), <https://lgean.nct/wcbinars.php> [<https://perma.cc/4ZTZ-TNYA>]. Moreover, other provisions of the Emergency Planning and Community-Right-to-Know-Act that require facilities to disclose the presence of certain extremely hazardous substances to local emergency planning committee who must then develop emergency response plans might also be expected to increase community awareness of chemicals being used by local facilities. 42 U.S.C.A. §§ 11001–11002 (2021).

95. Indeed, advocacy groups and the media may not themselves understand the limitations and significance of TRI data and, moreover, have incentives to characterize TRI to provoke public concern. For a discussion of the motivations and behavior of public interest groups, including ways in which they may sometimes depart from the interests of affected individuals, see Mark Seidenfeld, *Empowering Stakeholders: Limits on Collaboration As the Basis for Flexible Regulation*, 41 WM. & MARY L. REV. 411, 466 (2000) (noting that large national or regional environmental groups often bring and benefit financially from citizen suits under the Clean Water Act and observing that “citizen suits that are brought by nonlocal environmental organizations actually undermine the empowerment of local residents, who feel both the pinch of pollution and the impact of cutbacks in plant operation that CWA enforcement might prompt.”).

without providing much (if anything) in the way of context or explanation about the meaning of those releases.⁹⁶ And where an intermediary interprets the underlying TRI data, the public's understanding is then indexed to the filter of that intermediary, including any biases or inaccuracies.⁹⁷

b. Catalyst Results

Beyond being intended to inform the public as audience, TRI-required disclosure is also meant to (and does) spur voluntary changes in the behavior of some (upstream) covered entities, generating (on average) significant reductions in the release of listed chemicals.⁹⁸ The reasons for changes in the behavior of TRI reporting entities are complex and not fully understood.⁹⁹ The

96. E.g., Aaron Besecker, *WNY Is Home to 7 of Top State Polluters*, THE BUFFALO NEWS, Dec. 28, 2010, at B1, B2 (listing top “polluters” and, at most, noting the total volume of “waste” reported. “Finch Paper in Glens Falls released nearly 3.8 million pounds of waste into the environment in 2009 and was the state’s biggest polluter, according to the data. Eastman Kodak’s Eastman Business Park in Rochester ranked second in 2009, releasing more than 2.9 million pounds of waste.”). Of note, EPA has recently engaged in outreach that seems designed to enlighten media reporting on TRI data, holding training sessions for journalists. ENV’T PROT. AGENCY, MEDIA ADVISORY: EPA TRAINING ON TOXIC RELEASE INVENTORY FOR THE MEDIA (2014) (“The training will provide a brief overview of the TRI program, discuss highlights of the most recent TRI data on toxic chemical releases and pollution prevention activities, and illustrate how the public can use TRI tools to find out what releases are occurring in the areas in which they live. The webinar is open to credential media only.”).

97. This, in turn, raises questions about the value of public response to TRI data as a means of catalyzing upstream policy change that reflects public preference. See Seidenfeld, *supra* note 95, at 432 (discussing pathologies of interest group dynamics and observing that “although in theory competition among groups for members should constrain against group leaders advocating extreme positions that do not best serve the interests of members, in actuality imperfections in the ‘market’ for interest representation may cause competition to exacerbate rather than mollify leaders’ extremist tendencies” and that “imperfections in members’ decisions about whether to exit the group may induce leaders to take extreme positions in order to generate publicity.”).

98. KRAFT, STEPHAN & ABEL, *supra* note 43, at 55 (reporting the results of an extensive study of TRI’s effects and concluding that “on average facilities have indeed lowered the amount of their toxic releases, but there is a quite varied pattern across the nation—both from state to state and from one industrial facility to another.”). But see Volokh, *supra* note 12, at 814–38.

99. E.g., Mark A. Cohen, *Information as a Policy Instrument in Protecting the Environment: What Have We Learned?*, 31 ENV’T L. REV. 10425, at 10425 (2001) (reviewing mechanisms that may induce voluntary emissions reductions, including benchmarking, cooperation with regulators, and the response of shareholders and lenders) (“Empirically it has been shown that mandatory disclosure programs such as TRI can have a significant effect on the environmental performance of firms. What is not fully understood, however, is the mechanism by which these programs induce firms to voluntarily reduce emissions beyond any legal requirement.”); See also Karkkainen, *Information as Environmental Regulation*, *supra* note 2, at 294–331 (reviewing mechanisms by which TRI can improve environmental performance, including self-monitoring, peer monitoring, empowering regulators as monitors, community monitoring, informal regulation, and markets, and concluding that “[g]iven the breadth, depth, and rapidity of reductions in TRI-monitored pollutants, the variety of

information generated and disclosed through TRI can educate reporting entities about their own releases and thereby motivate them to act to reduce the same;¹⁰⁰ educate regulators and thereby help them to assess the adequacy of regulatory action and the existence of regulatory gaps;¹⁰¹ empower more sophisticated environmental nongovernmental organizations and community groups, allowing them to exert pressure on emitters;¹⁰² and inform financial institutions and investors, serving as an external signal of facility or organizational health.¹⁰³ An oft-offered explanation for why TRI-reporting entities voluntarily reduce releases is that they are concerned about public reaction to disclosures about releases,¹⁰⁴ although the connection is hard to empirically demonstrate.¹⁰⁵ Some firms have engaged in “anticipatory self-regulation” as a result of the “bare possibility” that TRI information will prompt community action and a demand for more stringent environmental regulation.¹⁰⁶ In other words, the mere possibility of public engagement with and response to TRI data may exert an influence (and allow the public disclosure to serve as a catalyst influencing upstream actions), even if, for the reasons described above, there is unlikely to

circumstances under which those improvements appear to have occurred, and the apparently interlocking and mutually reinforcing character of the various strands of explanation, it seems far more likely that causation is multiple, consisting of a number of interdependent elements that may nonetheless be present in differing quantities from case to case.”). Other provisions of the EPCRA, such as the requirement to engage in emergency planning with local communities, 42 U.S.C.A. §§ 11001, 11002, and concerns related to terrorism may also exert an influence on corporate choices decisions chemical use and releases.

100. ENV’T PROT. AGENCY, *supra* note 94, at 5–6, 10.

101. Karkkainen, *Information as Environmental Regulation*, *supra* note 2, at 310.

102. Fung & O’Rourke, *supra* note 90, at 118, 120–21.

103. Cohen, *supra* note 99, at 10425–26.

104. E.g., Volokh, *supra* note 12, at 815 (“Environmental information laws work in two ways: they *inform* people of risks, and they work to *change* companies’ behavior (either because of public pressure or because companies will preemptively change their processes to avoid having to face such pressure.”); Fung & O’Rourke, *supra* note 90, at 120–21 (characterizing TRI as “populist maxi-min regulation” where “pressure comes from ordinary people” and describing the public pressure created by “environmental blacklisting” based on TRI data); Karkkainen, *Information as Environmental Regulation*, *supra* note 2, at 316–23 (describing how TRI information can support informal regulation).

105. KRAFT, STEPHAN & ABEL, *supra* note 43, at 55 (identifying “regulation and concern about potential financial liability” as having a stronger effect on chemical management decision than community pressure, but arguing that “the TRI has had a greater impact than one might suppose, albeit an indirect one that is related more to industry knowledge of its chemical releases and responses to changing public expectations for corporate environmental behavior as well as the use of TRI data by state and federal regulatory to improve their oversight of chemical management.”); *id.* at 40–41 (describing the mechanisms by which TRI information could cause facilities to take action in light of anticipated community response); *id.* at 139–40 (explaining that even where media coverage and resulting community concern about releases is episodic the threat may cause facilities to “preempt any undesired attention through anticipatory performance in their toxic releases.”).

106. Karkkainen, *Information as Environmental Regulation*, *supra* note 2, at 309–12, 317.

be a significant public reaction. Additionally, reporting entities are sometimes responding to a hypothesized public reaction, one that they may well understand has the potential to be uninformed and irrational in light of the difficulties of communicating TRI data to the public as an audience.

In short, one interesting insight from applying this Article's typology in the TRI context is that TRI has positioned disclosure to the public as a catalyst for upstream action, even though there is significant doubt about the extent to which disclosure to the public, directly or indirectly (with the intervening translating and publicizing efforts of intermediary advocacy groups or media), achieves one of its core purpose: the use of disclosure to accurately inform the broader lay public (as an audience) about toxics in the community. This raises several interesting issues about use of information disclosure as a regulatory strategy, which are revisited in Part IV.

B. Proposition 65

1. How Proposition 65 Works

In 1986, California voters approved Proposition 65 by ballot initiative.¹⁰⁷ Proposition 65 requires, in relevant part, that “[n]o person in the course of doing business shall knowingly and intentionally expose any individual to a chemical known to the state to cause cancer or reproductive toxicity without first giving clear and reasonable warning to such individual.”¹⁰⁸ The “Analysis by the Legislative Analyst” for Proposition 65 that appeared in the California Ballot Pamphlet for the November 4, 1986, general election explained that Proposition 65 would “require . . . businesses to warn people before knowingly and intentionally exposing them to chemicals that cause cancer or reproductive toxicity.”¹⁰⁹

The measure identifies (and sets out a process for identifying) carcinogens and reproductive toxins.¹¹⁰ The statute requires that warnings be “clear and reasonable” and, as specified by regulation, a warning meets that requirement “if the name of one or more of the listed chemicals in the consumer product or affected area for which the warning is being provided is included in the text of

107. *Proposition 65*, Cal. Office of Env’t Health Hazard Assessment, <https://oehha.ca.gov/proposition-65> [<https://perma.cc/SHEX-LN6C>].

108. CAL. HEALTH & SAFETY CODE § 25249.6 (West 1987).

109. March Fong Eu, *California Ballot Pamphlet: General Election November 4, 1986*, 52 (1986), https://repository.uchastings.edu/cgi/viewcontent.cgi?article=1970&context=ca_ballot_papers [<https://perma.cc/RGT5-M2FQ>].

110. CAL. HEALTH & SAFETY CODE § 25249.8 (West 1987). The updated list is available in the Code of Regulations, CAL. CODE REGS. tit. 27, § 27001 (2022).

the warning.”¹¹¹ The regulations go on to provide examples of warnings¹¹² that satisfy this standard in the context of consumer,¹¹³ environmental,¹¹⁴ and occupational exposures.¹¹⁵

A warning meets the requirements of Proposition 65 for consumer exposure if it contains specified elements:

(2) The word “WARNING:” in all capital letters and bold print, and:

(A) For exposures to listed carcinogens, the words, “This product can expose you to chemicals including [name of one or more chemicals], which is [are] known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.”

(B) For exposures to listed reproductive toxicants, the words, “This product can expose you to chemicals including [name of one or more chemicals], which is [are] known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.¹¹⁶

And a warning meets the requirements of Proposition 65 if it contains the following elements:

(2) The word “WARNING:” in all capital letters and bold print.

(3) For exposures to listed carcinogens, the words, “Entering this area can expose you to chemicals known to the State of California to cause cancer, including [name of one or more chemicals], from [name of one or more sources of exposure]. For more information go to www.P65Warnings.ca.gov.¹¹⁷

...
(4) For exposures to listed reproductive toxicants, the words, “Entering this area can expose you to chemicals known to the State of California to cause birth defects or other reproductive harm, including [name of one or more chemicals], from [name of one or more sources of exposure]. For more information go to www.P65Warnings.ca.gov.¹¹⁷

111. CAL. CODE REGS. tit. 27, § 25601 (2022).

112. These are considered safe harbors, in that warnings that comply with the examples provided are deemed to satisfy the statutory requirement that the warning be clear and reasonable.

113. CAL. CODE REGS. tit. 27, § 25603 (2022).

114. CAL. CODE REGS. tit. 27, § 25605 (2022).

115. CAL. CODE REGS. tit. 27, § 25606 (2022).

116. CAL. CODE REGS. tit. 27, § 25603 (2022).

117. CAL. CODE REGS. tit. 27, § 25605 (2022).

The Proposition 65 website¹¹⁸ provides information about Proposition 65 as well as some information about listed chemicals.¹¹⁹ Approved methods to transmit a consumer product warning include a label on the product, “a posted sign, shelf tag, or shelf sign, for the consumer product at each point of display of the product,” and “[a] product-specific warning provided via any electronic device or process that automatically provides the warning to the purchaser prior to or during the purchase of the consumer product, without requiring the purchaser to seek out the warning.”¹²⁰ The approved methods to transmit an environmental exposure warning are posting a sign in the affected area, mailing a quarterly notice to occupants of the affected area, or issuing the warning quarterly via public media announcements which target the affected area.¹²¹ The regulations further direct that environmental exposure warnings for indoor or outdoor spaces must “[b]e provided in a conspicuous manner and under such conditions as to make it likely to be seen, read, and understood by an ordinary individual in the course of normal daily activity[,]” and reasonably associated with the location and source of the exposure.¹²² The regulations also provide guidelines for warnings tailored to specific products (such as alcohol) and locations (such as dental offices).¹²³

2. Purposes

Proposition 65 was intended to inform Californians about toxic risks so that they could make their own decisions about exposure (audience).¹²⁴ In addition, the law was intended to motivate regulated entities to voluntarily make changes to reduce public exposure (catalyst).¹²⁵ In the section of the Ballot Pamphlet offering the “Argument in Favor of Proposition 65,” the discussion included the explanation that “Proposition 65 . . . tells businesses: Don’t expose us to any of these same chemicals without first giving us a clear warning. We each

118. PROPOSITION 65 WARNINGS WEBSITE, www.P65Warnings.ca.gov [<https://perma.cc/XT5A-5K3C>].

119. *Id.* For most listed chemicals there is very limited information provided, simply a notation about the health harm (cancer or reproductive toxicity) and a brief indication of the reason for listing. There are also, however, fact sheets providing more information about some listed chemicals.

120. CAL. CODE REGS. tit. 27, § 25602 (2022).

121. CAL. CODE REGS. tit. 27, § 25604 (2022).

122. *Id.*

123. See CAL. CODE REGS. tit. 27, § 25607 (2022).

124. Paulette L. Stenzel, *Right-to-Know Provisions of California’s Proposition 65: The Naivete of the Delaney Clause Revisited*, 15 HARV. ENV’T L. REV. 493, 497 (1991).

125. Rechtschaffen, *supra* note 12, at 319 (“[B]eyond simply informing people, Proposition 65 was intended to provide a ‘compelling incentive’ for industry to remove nonessential carcinogens and reproductive toxins from its products and processes.”).

have a right to know, and to make our own choices about being exposed to these chemicals.”¹²⁶ In the words of one scholar:

In passing Proposition 65, Californians hoped to achieve at least two interrelated objectives. First, the proposition was designed to provide a more effective means for protecting the public from toxics than the mechanisms already employed by state and federal administrative agencies. A second objective, which supplements the first, was to inform the public about risks of everyday products. The drafters intended such information to enable citizens to evaluate for themselves the risks associated with the use of a particular product.

Proposition 65 purported to take a new approach to toxic substance control by giving each individual, rather than regulators, the power to choose which risks he or she would each accept. Proposition 65 tries to establish a communication mechanism for consumers to get the information required to make decisions about product use. In addition to empowering citizens, Proposition 65 attempts to use market pressures as an alternative or a supplement to government regulation.¹²⁷

Proposition 65’s purpose to “enable citizens to evaluate for themselves the risks associated with the use of a particular product”¹²⁸ shows how it positions the public as an audience for disclosed information; its purpose to “use market pressures . . . [to] supplement . . . government regulation”¹²⁹ illustrates how it seeks to use disclosure to the public as a catalyst for influencing the upstream behaviors of regulated entities.

3. Results

a. Audience

By many accounts, Proposition 65 has had limited success in informing the public as an audience for consumer and environmental (in this case, risk) information.¹³⁰ In the words of one commentator, “Proposition 65’s consumer

126. *Id.* at 318.

127. Stenzel, *supra* note 124, at 497–98 (internal citations omitted).

128. *Id.*

129. *Id.* at 498.

130. *E.g., Id.* at 526 (“Proposition 65’s provisions cannot educate the public about risk in general, nor provide information about specific risks that will enable citizens to make rational individual decisions whether to accept or avoid those risks.”); Michael Barsa, *California’s Proposition 65 and the Limits of Information Economics*, 49 STAN. L. REV. 1223, 1235 (1997) (“[I]nformation economics

product, environmental, and occupational warnings have been of very limited informational value. Many warnings go unnoticed, fail to inform the public adequately about its exposure to listed chemicals, and fail to communicate effectively the risk levels involved.”¹³¹ Criticisms of Proposition 65 consumer product labels include that they are inconspicuously placed, employ ineffective design and wording, do not provide a basis for evaluating the risk arising from an exposure, fail to take account of risk communication research,¹³² and, as compared to Proposition 65’s environmental exposure warnings, invite a mistaken impression of (comparatively) elevated risk.¹³³ Criticisms of Propositions 65’s environmental exposure warnings include that they often go unread because they are buried in the classified section of newspapers or are otherwise inconspicuous, are worded in a manner that imparts little useful information, and lack “explanatory information about the level or nature of risk caused by exposures.”¹³⁴ “Rather than warn, almost all environmental warnings impart a message that is uninformative, personally irrelevant, and potentially confusing to the reader.”¹³⁵

Because of concerns of the type referenced above, the California Office of Environmental Health Hazard Assessment (OEHHA) engaged in regulatory proceedings to change Proposition 65 regulations governing warning requirements with the goal of “improving how the public is warned about dangerous chemicals.”¹³⁶ In its Pre-regulatory Draft Initial Statement of Reasons, OEHHA conceded that:

[C]oncerns have been voiced for many years about the lack of specificity in the current safe harbor warning language . . . [and that] . . . [m]embers of the public currently have no simple process for obtaining information about the

analysis suggests that Proposition 65 is a disaster”). For a critique of warning labels, generally, see Cross, *supra* note 84, at 958–67. Even those who understand Proposition 65 to have some value at communicating with individual consumers recognize that function is limited as compared to the impact on businesses. Claudia Polsky & Megan Schwarzman, *The Hidden Success of A Conspicuous Law: Proposition 65 and the Reduction of Toxic Chemical Exposures*, 47 ECOLOGY L.Q. 823, 839 (2020) (arguing that “there are unquestionably instances in which particular warnings are salient to consumers and promote personal autonomy vis-à-vis risk acceptance—the familiar concept of prior informed consent” while recognizing the critiques of Proposition 65 warnings and emphasizing the law’s benefits in influencing upstream business conduct).

131. Rechtschaffen, *supra* note 12, at 340.

132. *Id.* at 324, 326–30.

133. Viscusi, *supra* note 13, at 292.

134. Rechtschaffen, *supra* note 12, at, 336.

135. *Id.* (emphasis omitted).

136. Press Release, Office of Governor Edmund G. Brown, Jr., Governor Brown Proposes to Reform Proposition 65 (May 7, 2013).

chemical(s) that are present, whether or how they are actually being exposed to a significant amount of the chemical, the specific toxic hazard (cancer or birth defects or other reproductive harm[,] . . . or ways that they can reduce or eliminate these exposures.¹³⁷

OEHHA explained that a “key objective of the proposed regulation is to provide consistent, understandable information concerning exposures to listed chemicals.”¹³⁸

OEHHA amended its regulations to require that safe harbor warnings provide both on-label specificity about chemicals posing exposure risks and links to off-label information.¹³⁹ Additionally, the wording and presentation of warnings have been changed in an effort to better communicate risk.¹⁴⁰ For example, instead of stating that a product “contains” a listed chemical, warnings must now state that the product “can expose you” to a chemical known to cause cancer or reproductive toxicity.¹⁴¹

It remains to be seen whether or to what extent these changes will enhance consumer comprehension and most of the critiques of Proposition 65’s communication of risk pre-date the regulatory changes. Notably, however, the OEHHA’s rulemaking is evidence of the widespread recognition that, while Proposition 65 had sometimes powerful upstream catalyst effects, it has, to date, been far less useful as a tool to educate the public as an audience.

b. Catalyst

Entities subject to Proposition 65’s warning requirement¹⁴² have voluntarily changed products and practices to avoid issuing the required warning.¹⁴³

137. CALIFORNIA OFFICE OF ENV’T HEALTH HAZARD ASSESSMENT, PRE-REGULATORY DRAFT INITIAL STATEMENT OF REASONS: TITLE 27, CALIFORNIA CODE OF REGULATIONS, ARTICLE 6 (Mar. 7, 2014), <http://ochha.ca.gov/prop65/warnings/pdf/ISORWarningrcg030714.pdf> [<https://perma.cc/P3RK-EL6U>].

138. *Id.*

139. See CAL. CODE REGS. tit. 27, § 25603 (2022).

140. *Id.*

141. CAL. CODE REGS. tit. 27, § 25603 (2022).

142. The requirement applies to a “[p]erson in the course of doing business,’ [which] does not include any person employing fewer than 10 employees in his or her business.” CAL. CODE REGS. tit. 27, § 25249.11(b) (2022).

143. PERCIVAL, SCHROEDER, MILLER & LEAPE, *supra* note 1, at 285; see also *Proposition 65 Enforcement Reporting Frequently Asked Questions*, <https://oag.ca.gov/prop65/faq> [<https://perma.cc/9LPT-LG2F>] (“Proposition 65 has motivated businesses to eliminate or reduce toxic chemicals in numerous consumer products. Products that have been reformulated as a result of notices of violation or litigation include ceramic tableware, artificial turf, household faucets, children’s jewelry, potato chips, candy, and vitamin supplements.”). Proposition 65 contains a citizen suit

Although there are many questions about how much of this voluntary action Proposition 65 prompts and the extent to which it in fact reduces risk,¹⁴⁴ observers conclude that the disclosure required by Proposition 65 informs and influences the behavior of at least some entities to which it applies due in part to “industry concerns about liability and consumer reaction to warnings,”¹⁴⁵ suggesting that Proposition 65’s disclosure to the public does serve as a catalyst for upstream behavior.¹⁴⁶ The adoption, implementation, and effects of California’s Proposition 65 thus largely track the above-described experience with TRI.¹⁴⁷ Adopted to use public disclosure as a catalyst to influence private commercial behavior and to inform the public as an audience, Proposition 65 shows some success in the former—at influencing the behavior of upstream businesses and other private entities, but more limited value as the latter—as a means of informing individuals.¹⁴⁸

C. NEPA

Like TRI and Proposition 65, NEPA mandates information disclosure (in this case, about the environmental impacts of federal action) in an effort to

provision that authorizes “any person in the public interest” to bring an action against persons violating Proposition 65 after filing a notice of alleged violation and satisfying other requirements. CAL. CODE REGS. tit. 27, § 25249.7(d) (2022). Product reformulations are sometimes made in response to the filing of a notice to sue under these provisions or after a lawsuit. PERCIVAL, SCHROEDER, MILLER & LEAPE, *supra* note 1, at 285 (“Significant lawsuits continue to be brought under Proposition 65, although many firms who received notice of an intention to sue have chosen to alter their practices so as to avoid the need to produce warning labels.”). See also Polksy & Schwarzman, *supra* note 130, at 837 (documenting various instances of product reformulation or reduced emissions in response to Proposition 65 litigation).

144. PERCIVAL, SCHROEDER, MILLER & LEAPE, *supra* note 1, at 285 (“Fear of adverse consumer reactions to warning labels has encouraged some manufacturers to reformulate their products to remove carcinogens and reproductive toxins. . . . It is impossible to tell how frequently products have been reformulated. While some companies have released products with ‘new formulas’ they can now tout as safer—and sometimes even more effective . . . [o]ther companies are reformulating quietly to avoid calling attention to chemicals in their old products.”) (quoting Randolph B. Smith, *California Spurs Reformulated Products*, WALL ST. J., Nov. 1, 1990, at B1).

145. Rechtschaffen, *supra* note 12, at 341 (“Despite the prevalence of poor warnings, Proposition 65’s warning requirement has stimulated significant consumer-product reformulation, due to a combination of industry concerns about liability and consumer reaction to warnings.”).

146. Polksy & Schwarzman, *supra* note 130, at 841–83 (presenting the results of empirical work demonstrating numerous ways that Proposition 65 shapes upstream business and regulatory decisions).

147. See *supra* Part III.A.3.

148. As discussed above, the distinction between positioning the public as an audience versus a target is not always precise. While Proposition 65 provides information to individuals in part to inform and enable changes in their behaviors (choices about risk exposure, consumer choices, perhaps even civic behaviors), because it does not seek to persuade individuals and instead seeks to allow individuals to express their own preferences, we would characterize it as positioning the public as an audience as opposed to a target.

inform the public as an audience and to influence upstream behavior (the decision making of federal agencies and project applicants), thereby positioning the public as a catalyst. And, as with TRI and Proposition 65, although NEPA is subject to numerous criticisms, by most accounts it generally succeeds in using disclosure as a catalyst for influencing (upstream) agency behavior and decisions.¹⁴⁹ However, NEPA, as with TRI and Proposition 65, has had more limited utility for directly informing and engaging individuals as an audience for environmental information.

1. How it Works

NEPA is intended to encourage federal agencies to consider environmental issues as part of their decision-making processes. The Senate Report accompanying NEPA observes that “[t]he cumulative influence of each individual upon the environment is of such great significance that every effort to preserve environmental quality must depend upon the strong support and participation of the public,” and laments that “[p]ublic desires and aspirations are seldom consulted” in the development of policy.¹⁵⁰ The statute specifically builds in opportunities for public engagement. NEPA includes the general command that in interpreting and administering “the policies, regulations, and public laws of the United States,” agencies shall “make available to . . . individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment.”¹⁵¹ Further, NEPA provides that its centerpiece requirement, preparation of an Environmental Impact Statement (EIS) that discusses “the environmental impact” of proposed “major Federal actions significantly affecting the quality of the human environment,”¹⁵² “be made available . . . to the public”¹⁵³ Close examination of the legislative history of NEPA supports the view that requiring the disclosure of information to the public to allow for oversight of agency decisions was a central purpose of the statute.¹⁵⁴

The Council on Environmental Quality (CEQ) regulations implementing NEPA have long required public notice and comment as well. Prior to recent

149. Karkkainen, *Framing Rules*, *supra* note 2, at 86 (“[W]hen all is said and done, it appears that NEPA does in fact change the information environment in which agency decisions are made, leading to environmentally salutary results.”).

150. S. REP. NO. 92-296, at 5, 19 (1969).

151. 42 U.S.C. § 4332(C), (G).

152. 42 U.S.C. § 4332.

153. 42 U.S.C. § 4332(2)(C).

154. Brigham Daniels, Andrew P. Follett, James Salzman, *Reconsidering NEPA*, 96 IND. L.J. 865, 909 (2021) (“Rather than force action through research and findings alone, this section became a means of policing agency actions with review by other sectors of government and the public.”).

amendments, CEQ's regulations,¹⁵⁵ in describing the purposes of NEPA, noted that "NEPA procedures must insure that environmental information is available to . . . citizens before decisions are made and before actions are taken" because "public scrutiny [is] essential to implementing NEPA."¹⁵⁶ The regulations exhorted agencies to "[i]mplement procedures to make the NEPA process more useful to . . . the public" and to "[e]ncourage and facilitate public involvement in decisions which affect the quality of the human environment."¹⁵⁷ The regulations provided that "[a]fter preparing a draft environmental impact statement and before preparing a final environmental impact statement the agency shall . . . [r]equest comments from the public, affirmatively soliciting comments from those persons or organizations who may be interested or affected."¹⁵⁸ The regulations also instructed agencies to circulate both draft and final EIS's to any person upon request as well as to any person who has submitted a substantive comment.¹⁵⁹

In a 2010 Presidential Proclamation marking the fortieth anniversary of NEPA, President Obama underscored NEPA's focus on public involvement, remarking that NEPA "emphasiz[es] public involvement to give all Americans a role in protecting our environment" and reaffirming "NEPA's role in protecting public health, safety, and environmental quality, and in ensuring

155. CEQ's regulations have been characterized as expanding NEPA's emphasis on public participation. Poisner, *supra* note 12, at 79 ("The evolution of NEPA's citizen participation provisions under the 1973 Guidelines and 1978 CEQ regulations . . . went far beyond the textual mandate of NEPA."). Notably, the CEQ regulations implementing NEPA were significantly amended in 2020, Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act, 85 Fed. Reg. 43304 (July 16, 2020), although many of those changes were legally challenged and CEQ has since proposed new rules, National Environmental Policy Act Implementing Regulations Revisions, 86 Fed. Reg. 55757 (Oct. 7, 2021). This discussion cites to the pre-amendment CEQ regulations in light of this uncertainty and also because the pre-amendment regulations accurately reflect the orientation toward public involvement for much of NEPA's history.

156. 40 C.F.R. § 1500.1 (2019). The regulations now provide that "[t]he purpose and function of NEPA is satisfied if Federal agencies have considered relevant environmental information, and the public has been informed regarding the decision-making process. . . ." 40 C.F.R. § 1500.1 (2020).

157. 40 C.F.R. § 1500.2 (2019).

158. 40 C.F.R. § 1503.1 (2019). Of note, these provisions remain the same in the new regulations, which still require "affirmatively soliciting comments those persons or organizations who may be interested in or affected." 40 C.F.R. § 1503.1 (2020). See, e.g., 40 C.F.R. pt. 6 (setting forth EPA's NEPA compliance regulations).

159. 40 C.F.R. § 1502.19 (2019). Of note, these requirements remain the same in the new regulations, 40 C.F.R. § 1502.19 (2020). The regulations required (and continue to require) public participation during scoping as well, the process by which an agency sets the boundaries and extent of its environmental review, and upon the preparation of a draft EIS. 40 CFR §§ 1501.7, 1502.9, 1503 (2019); 40 CFR §§ 1501.9, 1502.9, 1503 (2020).

transparency, accountability, and public involvement in our Government.”¹⁶⁰ Courts that have interpreted NEPA have affirmed the statute’s goal of informing the public and obtaining public input.¹⁶¹

2. Purposes

NEPA’s legislative history and its implementation indicate that NEPA is intended to encourage agencies that are making decisions subject to the statute to provide information to the public to educate it (audience function). For example, in promoting transparency and accountability, NEPA is intended to educate the public about the environmental consequences of different decisions. This includes educating the public about alternative approaches to implementing different types of projects (new roads, etc.) and the environmental consequences of each.¹⁶²

In addition, by providing the public with opportunities to participate at various stages of the NEPA process, the statute seeks to allow the public to serve as a catalyst to influence upstream behavior by project applicants and agency decision-makers, and to equip them to provide input that will enrich that decision-making (catalyst function).¹⁶³ In terms of who or what is meant by the “public” in this context—the lay public (individuals) or NGOs and other interest groups—“environmental NGOs and other organized interest groups typically play a far more prominent role in the NEPA process than does the public at large” and some posit that this is consistent with NEPA’s purpose as NEPA’s public disclosure requirement should be understood to reflect “a late twentieth-century pluralist or interest group representation model.”¹⁶⁴

160. Barack Obama, Presidential Proclamation—40th Anniversary of the National Environmental Policy Act, 2010 WL 11179, at *1 (Jan. 4, 2010).

161. *E.g.*, *Sierra Club v. U.S. Army Corps of Eng’rs*, 701 F.2d 1011, 1029, 1034 (2d Cir. 1983) (“In order to fulfill its role, the EIS must set forth sufficient information for the general public to make an informed evaluation. . . . Only if such a document [EIS] is forthcoming can the public be appropriately informed. . . .”); *Calvert Cliffs Coordinating Comm. v. U.S. Atomic Energy Comm’n*, 449 F.2d 1109, 1114 (D.C. Cir. 1971) (“The apparent purpose of the ‘detailed statement’ is to . . . aid . . . the public of the environmental consequences of planned federal action” and NEPA “allows those removed from the initial process to evaluate and balance the factors on their own.”).

162. *Calvert Cliffs Coordinating Comm.*, 449 F.2d at 1114.

163. Keith H. Hirokawa & Elizabeth J. Porter, *Aligning Regulation with the Informational Need: Ecosystem Services and the Next Generation of Environmental Law*, 46 AKRON L. REV. 963, 970 (2013) (“Informational laws and regulations seek a variety of results, including the facilitation of a more informed and participatory public and more informed decision makers, both of which could operate to avoid poor natural resource decisions. NEPA, as an example of an informational law, was initially adopted to insert a planning component into the normal progression of governmental decision-making.”) (citations omitted).

164. Bradley C. Karkkainen, *Toward A Smarter NEPA: Monitoring and Managing Government’s Environmental Performance*, 102 COLUM. L. REV. 903, 913 (2002).

However, while it is true that NEPA often communicates to individuals through these mediating groups, the text of the statute and CEQ's implementing regulations refer to "persons"¹⁶⁵ and "individuals"¹⁶⁶ as synonyms for the public. And, as indicated in the preceding analysis, the way in which NEPA is discussed and understood by political actors ("all Americans"¹⁶⁷), actors in the NEPA process (including lead agencies and CEQ), and interpreted by courts ("In order to fulfill its role, the EIS must set forth sufficient information for the *general public* to make an informed evaluation . . ."¹⁶⁸) all suggest that NEPA is now generally understood as seeking to engage with the public at least in addition to if not primarily as individuals (the lay public).

3. Results

a. Audience

While NEPA is credited with allowing "a new level of public information and input into the environmental decision-making process,"¹⁶⁹ a close examination suggests that, as with TRI and Proposition 65, NEPA often fails to communicate effectively with individuals. Many of the obstacles to public engagement encountered with respect to the TRI program are likewise obstacles to public education through NEPA. Only a subset of individuals will actively seek out the information that NEPA is at pains to make publicly available—"few citizens skim the Federal Register looking for proposed EISs that arouse their interest."¹⁷⁰ Further, while agencies make efforts to notify and involve affected communities,¹⁷¹ and NEPA information is now often readily available online, even those who become aware of the availability of information

165. 40 C.F.R. § 1503.1 (2019).

166. 42 U.S.C. § 4332.

167. Barack Obama, *supra* note 160, at 2.

168. *Sierra Club v. U.S. Army Corps of Eng'rs*, 701 F.2d 1011, 1034 (2d Cir. 1983) (emphasis added).

169. COUNCIL ON ENV'T QUALITY, THE NATIONAL ENVIRONMENTAL POLICY ACT: A STUDY OF ITS EFFECTIVENESS AFTER TWENTY-FIVE YEARS 18 (Jan. 1997). CEQ's characterization of public information and input as "the extent to which an agency takes into account the views of the surrounding community and other interested members of the public during its planning and decision-making process" reflects Congress's intent that the public play a catalyst role. *Id.* at 17.

170. Poisner, *supra* note 12, at 91.

171. EPA's NEPA regulations, for example, instruct the agency to use "reasonable efforts to involve the potentially affected communities." 40 C.F.R. § 6.203 (2020). Some agencies do engage in creative outreach; the Bureau of Reclamation, for example, has product YouTube videos to engage the public with environmental reviews. *See, e.g.*, Bureau of Reclamation, *Boise River Basin Feasibility Study—Proposed Action*, YOUTUBE (Aug. 5, 2020), https://www.youtube.com/watch?v=2ST_k0zdHIQ [<https://perma.cc/M72D-3NXV>].

required to be disclosed under NEPA are likely to struggle to understand the process and information that is provided.

The chief information product of NEPA's process, the EIS, often comprises hundreds to thousands of pages of "information presented in a technically unintelligible format."¹⁷² Scholars observe that "the heavy emphasis on scientific analysis makes it difficult for lay citizens to engage in meaningful dialogue regarding EIS substance."¹⁷³ Indeed, one study that gave subjects the project description portion of an EIS and then tested their comprehension of that material found that subjects did not adequately understand the proposed project's basic features or its likely environmental effects; in fact, many subjects who read the EIS understood no more about the project than individuals who had *not* read the EIS.¹⁷⁴ A CEQ study seems to acknowledge the impenetrability of NEPA documents and the difficulties individuals experience in connection with the NEPA process.¹⁷⁵ It reveals that "[c]itizens report that they often feel overwhelmed by the resources available to proponents and agencies."¹⁷⁶ In its *Citizens Guide to the NEPA*, which "was developed to explain the National Environmental Policy Act (NEPA), how it is implemented, and how people outside the Federal government—individual citizens, private sector applicants, members of organized groups, or representatives of Tribal, State, or local government agencies—can better participate in the assessment of environmental impacts conducted by Federal agencies,"¹⁷⁷ CEQ essentially advises individuals navigating NEPA to obtain expert guidance:

Being active in the NEPA process requires you to dedicate your resources to the effort. Environmental impact analyses can be technical and lengthy. Active involvement in the NEPA

172. Poisner, *supra* note 12, at 86, 90. See also Nicholas A. Fromherz, *From Consultation to Consent: Community Approval as a Prerequisite to Environmentally Significant Projects*, 116 W. VA. REV. 109, 137 (2013) ("Those who have repeatedly engaged in the [EIA] process know two things: (1) it is not user-friendly, and (2) many comments seem to fall on deaf ears. EISs typically range from 200 to more than 2,000 pages in length. . . . [T]hey invite review by experts and attorneys, not lay persons.") (internal citations omitted).

173. Poisner, *supra* note 12, at 86.

174. William C. Sullivan, Frances E. Kuo & Mono Prabhu, *Assessing the Impact of Environmental Impact Statements on Citizens*, 16 ENV'T IMPACT ASSESSMENT REV. 176–78 (1996).

175. COUNCIL ON ENV'T QUALITY, *supra* note 169 ("At the same time that some citizens feel unable to participate effectively in the NEPA process, agencies have expressed concern about the difficulty of obtaining constructive input from the public (and other federal and state agencies) early in the planning and scoping process.").

176. *Id.*

177. COUNCIL ON ENV'T QUALITY, *A CITIZEN'S GUIDE TO THE NEPA: HAVING YOUR VOICE HEARD* 30 (Dec. 2007).

process requires a commitment of time and a willingness to share information with the decisionmaking agency and other citizens. . . . Another way to participate is to check with local experts such as biologists or economists at a university to assist with your review of the NEPA analyses and documents. You can also form study groups to review environmental impact analyses and enlist experts to review your comments on the documents.¹⁷⁸

Individuals do engage with the NEPA process—it is not uncommon for agencies to receive thousands (even hundreds of thousands) of public comments during the NEPA process.¹⁷⁹ However, interest groups often filter the information that individuals receive and guide individuals' comments:

In practice, environmental NGOs and other organized interest groups are usually much better situated than the public at large to exploit NEPA's public comment process. Thus once again, NEPA's procedural reforms appear to do more to advance interest group pluralism than direct democracy. . . . [I]t appears that relatively little NEPA-generated information is transmitted unfiltered from government to the citizenry and back again. Far more frequently, organized groups serve as a mediating agent, repackaging and translating the often highly technical information contained in an EIS for dissemination to the broader citizenry, and offering their services as the vehicle through which citizens may attempt to hold their government accountable.¹⁸⁰

The thousands of public comments agencies receive often take the form of interest group-authored and solicited form letters.¹⁸¹ One scholar observes that “citizen participation [in NEPA] tends to occur indirectly through groups.”¹⁸²

178. *Id.* at 23.

179. In addition to submitting written comments to formal NEPA documents (FONSI, DEIS, EIS, SEIS), individuals may participate in public hearings as part of the NEPA process. Critiques of the format and content of these hearings suggest that they often likewise fail to promote understanding of disclosed information. Poisner, *supra* note 12, at 86.

180. Karkkainen, *supra* note 164, at 914–16.

181. E.g., Magnuson-Stevens Act Provisions; Environmental Review Process for Fishery Management Actions, 73 Fed. Reg. 27998 (May 14, 2008) (“NMFS received a total of 1,660 comments, all but 8 of which were form letters . . .”); Notice of Availability of a Draft Environmental Impact Statement (DEIS) for New Corporate Average Fuel Economy Standards; Notice of Public Hearing, 73 Fed. Reg. 37922 (July 2, 2008) (“NHTSA received 1,748 comment letters in response to its scoping notices. NHTSA received 11 individual letters commenting on the scope of its NEPA analysis from federal and state agencies, automobile trade associations, environmental organizations, and individuals. The remaining comment letters are form letters from individuals.”). See also Poisner, *supra* note 12, at 91.

182. Poisner, *supra* note 12, at 91.

In short, intermediaries often shape public access to, understandings of, and responses to information disclosed under NEPA. That role seems to be one that CEQ acknowledges and accepts.¹⁸³

Thus, while some NEPA information does make its way to individuals and some input from individuals does make its way back to agencies, that information is often simplified, mediated by interest groups, and of uncertain value in educating the public about a project. Numerous scholars have offered withering critiques of the quality of public participation in the NEPA process.¹⁸⁴ Pulling again from an established literature, it seems fair to characterize NEPA as having had limited success in engaging the public (defined as lay individuals) as an audience for environmental information.

b. Catalyst

In contrast, as noted above, the disclosure and processes mandated by NEPA have influenced many agency decisions¹⁸⁵ and it seems clear that NEPA,

183. COUNCIL ON ENV'T QUALITY, *supra* note 169, at 5 (defining the public to include “any entity outside the federal government, including (1) academicians, (2) nongovernmental organizations (NGOs), (3) citizens, and (4) businesses” In soliciting “public advice” for its report, the CEQ hosted “meetings with NGOs,” “a survey of businesses, and a survey of academicians,” as well as undertaking a “citizen survey.”). *Id.* Reliance on intermediaries has significant implications. See Seidenfeld, *supra* note 95 (discussing distinctions in motivation and otherwise between and among these different parts of the public).

184. E.g., Jeremy Firestone, Christine Hirt, David Bidwell, Meryl Gardner & Joseph Dwyer, *Fairing Well in Offshore Wind Power Siting? Trust, Engagement and Process Fairness in the United States*, 62 ENERGY RES. & SOC. SCI. 1 (2020); 3 Jeremy Firestone, Ben Hoen, Joseph Rand, Debi Elliott, Gundula Hübner & Johannes Pohl, *Reconsidering Barriers to Wind Power Projects: Community Engagement, Developer Transparency and Place*, 20 J. ENV'T POL'Y & PLAN. 370 (2018); Fromherz, *supra* note 172, at 136–37; Marc B. Mihaly, *Citizen Participation in the Making of Environmental Decisions: Evolving Obstacles and Potential Solutions Through Partnership with Experts and Agents*, 27 PACE ENV'T L. REV. 151, 206 (2010) (“In this environment, citizen testimony exists without effect, and neither constitutes a successful element of democracy nor serves the purpose of legitimization.”); Poisner, *supra* note 12, at 55 (“NEPA citizen participation generates more heat than light, creating citizen participation pathologies that leave both citizens and agencies frustrated by the process.”); Fiorino, *supra* note 82, at 526 (“Although NEPA may have been important in promoting substantive democratic values, I argue that it did not promote the procedural values of democracy. It reinforced a conception of participation as confrontation and opposition. It strengthened the reliance on litigation as a political tool. It established the precedent for elaborate written documentation that became ‘an instrument of legal and political warfare.’”) (internal quotation and citation omitted).

185. ROBERT G. DREHER, NEPA UNDER SIEGE 4–7 (2005), <https://www.scierraforestlegacy.org/Resources/Conservation/LawsPoliciesRegulation/ForestPlanningRegulations/NEPA/NEPA-UnderSiege.pdf> [<https://perma.cc/3KNV-LRDZ>] (listing projects and outcomes influenced by the NEPA process); ENV'L INST., NEPA SUCCESS STORIES: CELEBRATING 40 YEARS OF TRANSPARENCY AND OPEN GOVERNMENT (2010), https://ceq.doe.gov/docs/get-involved/NEPA_Success_Stories.pdf [<https://perma.cc/LNU6-8BKJ>] (providing a series of case studies illustrating NEPA’s impact).

despite not compelling a substantive outcome, serves as a catalyst to influence agency behavior and decision making.¹⁸⁶ Commentators offer different explanations for how NEPA serves this catalyst function. Disclosure and public participation can sometimes generate new information that educates agencies.¹⁸⁷ Agencies, anticipating the need to publicly explain and justify actions, may decline to put forward indefensible projects.¹⁸⁸ And the prospect of judicial review may encourage agencies to develop better information about environmental impacts and to more carefully consider alternatives.¹⁸⁹

An extensive literature explores, and offers different conclusions about, the normative value of the NEPA process, including its mandated public disclosures.¹⁹⁰ Criticisms range from pointing out how agencies may strategically navigate NEPA's requirements in ways that defeat the purpose of disclosure (for example, by producing complex analyses designed to provide litigation-proof support for predetermined courses of action as opposed to exploring impacts and soliciting input¹⁹¹) to questioning whether the costs of

186. PERCIVAL, SCHROEDER, MILLER & LEAPE, *supra* note 1, at 893–97 (summarizing assessments of NEPA's performance).

187. ENV'T L. INST., *supra* note 185, at 6.

188. DREHER, *supra* note 185, at 6 ("NEPA's most significant effect has been to deter federal agencies from bringing forward proposed projects that could not withstand public examination and debate.").

189. See ENV'T L. INST., *supra* note 185, at 7.

190. E.g., Karkkainen, *supra* note 164, at 917 ("NEPA in practice turns out to be a less elegant, efficient, and effective engine for producing and transmitting information than its proponents suppose.").

191. COUNCIL ON ENV'T QUALITY, *supra* note 169, at iii ("[T]his NEPA Effectiveness Study finds that agencies may sometimes confuse the purpose of NEPA. Some act as if the detailed statement called for in the statute is an end in itself, rather than a tool to enhance and improve decision-making The Study finds that agencies sometimes engage in consultation only after a decision has — for all practical purposes — been made This may in turn lead to agencies seeking 'litigation-proof' documents, increasing costs and time but not necessarily quality."). Other critiques about strategic manipulation of the NEPA process include the use of mitigated FONSI's to avoid EIS preparation and the absence of adequate post-approval monitoring of project implementation. Ronald Bjorkland, *Monitoring: The Missing Piece: A Critique of NEPA Monitoring*, 43 ENV'T IMPACT ASSESSMENT REV. 129, 130–31 (2013) (noting that agencies are not required to incorporate monitoring into the NEPA process and rarely do, and suggesting that monitoring a project during all phases of the NEPA processes would provide a much needed "scorecard" of NEPA performance); Karkkainen, *supra* note 164, at 933 (noting that mitigated FONSI's offer an opportunity for the agency to avoid triggering an EIS by incorporating mitigation measures into the project; however, mitigated FONSI's and EA's are not reported and are not tracked, so there is little detailed information on the number and kinds of mitigated projects). See also Larry Canter & Ray Clark, *NEPA Effectiveness—A Survey of Academics*, 17 ENV'T IMPACT ASSESSMENT REV. 313, 317 (1997) (concluding that, based on a study of NEPA academics to determine the strengths and weaknesses of NEPA, the concern of greatest importance to the academics was that "post project monitoring for mitigation and evaluation is rarely

NEPA compliance (time, expense, delays, the potential for NIMBY efforts to use the NEPA process to derail sound projects) justify the benefits.¹⁹² Few, however, would question that—whether for good or bad—NEPA significantly influences agency behavior and decision making, suggesting that disclosure serves as a powerful catalyst.

D. Eco-labelling

Eco-labels also constitute informational regulation.¹⁹³ As described in greater detail below, eco-labels can be understood to position the public in different roles—as an audience for product information to inform consumer choice; as a target, if the goal is to change consumer purchasing behavior; and as a catalyst to change the upstream choices made by commercial entities. Interestingly, as illustrated through an analysis of organic food labeling, there is some evidence that, as in the case of TRI, Proposition 65, and NEPA, eco-labeling may struggle to educate consumers despite its capacity to influence consumer and producer behaviors.

1. How It Works

Eco-labels communicate attributes about a product or the process by which it is produced and can advise the consumer about both private benefits that accrue directly to the consumer (the potential health benefits of avoiding exposure to certain chemicals, the “warm glow” of knowing one has chosen a product with reduced environmental impact) and public benefits that accrue more broadly (the broader environmental benefits of aggregated environmental-friendly consumer choices, e.g., the long term environmental benefits of reduced pesticide use).¹⁹⁴ Under the theory of eco-labelling:

[L]abels may cause consumers to place a higher value on ‘environmentally superior’ products and . . . firms might react to this change in consumer preferences by improving the

conducted.”). The lack of information about project implementation, in particular with respect to mitigated FONSIs, might thus be viewed as raising questions about the efficacy of the *ex ante* catalyst role of citizens.

192. Karkkainen, *supra* note 164, at 905 (observing that “[f]rom the critics’ vantage point, NEPA appears to demand burdensome procedural formalities while accomplishing little or nothing of substance.”); Linda Luther, *CRS Report for Congress*, THE NATIONAL ENVIRONMENTAL POLICY ACT: STREAMLINING NEPA at CRS-2-3 (2007) (summarizing concerns about NEPA implementation that motivate a desire to streamline its provisions), <https://fas.org/sgp/crs/misc/RL33267.pdf> [<https://perma.cc/HDR5-E9BK>].

193. Kleindorfer & Orts, *supra* note 6, at 157 (listing eco-labels as an example of informational regulation).

194. Margot J. Pollans, *Bundling Public and Private Goods: The Market for Sustainable Organics*, 85 N.Y.U. REV. 621, 646–47 (2010).

environmental quality of their products.... [Information provision may also lessen environmental damage by] allow[ing] consumers with preferences for environmentally superior goods to alter their consumption in accordance with these preferences, reducing the consumption of environmentally inferior goods and increasing the consumption of environmentally superior goods. Thus, one might argue that environmental labels have the potential to open a second front in the regulation of environmental externalities—not only inducing manufacturers to produce cleaner products or employ cleaner processes, but also inducing consumers to purchase more of the cleaner products and less of the others.¹⁹⁵

Some eco-labeling appears to influence consumer behavior,¹⁹⁶ although many questions remain about whether, how, and why eco-labels influence consumers and, in turn, firm behavior. An extensive body of research explores consumer response to eco-labels.¹⁹⁷ Where the requirements to obtain an eco-label require firms to change processes and as a result charge higher prices for a good,¹⁹⁸ that price increase may temper consumer response.¹⁹⁹ The nature of the source (government, private third party) that offers or certifies the label, whether the source's contact information is listed, the level of detail of information provided on the label, and numerous other aspects of label design

195. Russell & Clark, *supra* note 1, at 114–15.

196. Christopher D. Clark & Clifford S. Russell, *Public Information Provision as a Tool of Environmental Policy*, in ENVIRONMENT, INFORMATION AND CONSUMER BEHAVIOUR 112 (Signe Krarup & Clifford S. Russell eds., 2005) (summarizing studies suggesting that “environmental labels have prompted changes in consumer behaviour.”); Russell, Krarup & Clark, *supra* note 11, at 8 (observing that while “[e]mpirical evidence on whether or not consumers are actually willing to incorporate environmental information into their consumption decisions is still scarce . . . the very existence of green products and the accompanying ‘green advertising’ imply that companies (or at least their marketing departments) believe that consumers are willing to consider environmental issues when making purchasing decisions.”).

197. E.g., ENV’T PROT. AGENCY, DETERMINANTS OF EFFECTIVENESS FOR ENVIRONMENTAL CERTIFICATION AND LABELING PROGRAMS (1994).

198. John M. Crespi & Stephan Marette, *Eco-Labelling Economics: Is Public Involvement Necessary?*, in ENVIRONMENT, INFORMATION AND CONSUMER BEHAVIOUR 94 (Signe Krarup & Clifford S. Russell eds., 2005) (“[E]co-labels aim at increasing profits by attracting environmentally responsible consumers who are willing to pay a premium in order to support a costlier production process.”).

199. *Id.* at 98 (reporting that “very few consumers are ready to pay more than 5–10 per cent compared to the price of a standard product” and “the niche eco market is likely to be a stable one even if it is small.”). *But see supra* notes 195–97 and accompanying text (evidencing growth in the market for organic goods).

can all impact consumer response.²⁰⁰ It is clear that cognitive biases and other interpretation challenges can influence consumer response to labels and that labels can readily be misunderstood;²⁰¹ it is also clear that decisions about what product attributes labels communicate significantly impact the potential environmental benefits associated with labeling schemes and disputes abound about what information labels should capture to maximize their environmental benefits.²⁰² Overall, the efficacy of eco-labels, the precise mechanisms by which they function, and their normative value remain somewhat uncertain.²⁰³

For present purposes, what is most relevant is that eco-labels have the potential to position the public in all three capacities that we discuss in this Article—as an audience, target, or catalyst.²⁰⁴ By informing “conscientious consumers” as an audience, eco-labels can support personal autonomy by allowing consumers to match consumption decisions to personal preference.²⁰⁵ In addition, eco-labels can be used to promote greater consumer uptake of environmentally-friendly products (target) and to encourage upstream producers to adopt processes and sell products that match consumer preferences (catalyst).²⁰⁶ Russell, Krarup, and Clark explain that, by providing information about the environmental attributes of a product or company, eco-labels may

200. Mario F. Teisl & Brian Roe, *Evaluating the Factors that Impact the Effectiveness of Eco-Labeling Programmes*, in ENVIRONMENT, INFORMATION AND CONSUMER BEHAVIOUR, at 74–83 (Signe Krarup & Clifford S. Russell eds., 2005).

201. Jason J. Czarnezki, K. Ingemar Jonsson & Katrina Kuh, *Crafting Next Generation Eco-Label Policy*, 48 ENV’T L. 409, 431 (2018) (explaining how eco-label design can influence consumer understanding and behavior); Ben-Shahar & Schneider, *supra* note 82, at 675–76 (describing studies illustrating consumer difficulty interpreting and applying mandated nutrition labels); Howard Latin, “Good” Warnings, Bad Products, and Cognitive Limitations, 41 UCLA L. REV. 1195, 1198, 1206–41 (1994).

202. E.g., CZARNEZKI, *supra* note 2, at 80–83 (suggesting improvements to the design of food labels).

203. Russell & Clark, *supra* note 1, at 113 (“[W]hile we know that some consumers are willing to pay more for goods labelled as environmentally friendly, we do not know why.”) (emphasis omitted); *id.* at 135 (“The framework proffered in this chapter has been used to show that there is no general, theoretic basis for concluding that the ability of environmental labelling to influence both product design and production processes and consumer choice of competing products holds more promise as a means of achieving static efficiency than more traditional market-based environmental policy instruments.”).

204. Notably, as with TRI, some suggest that eco-labels can also change producer behavior simply by providing information to businesses regardless of the reaction of consumers. Orts, *supra* note 2, at 1272 (characterizing environmental labels as “strongly reflexive” and observing that they attempt to “generate internal self-reflective processes within business.”). “The reflexive aim is not to constrain or dictate behavior, but rather to provide mechanisms or structures to increase the amount of self-reflection and social communication concerning serious environmental issues.” *Id.* at 1268.

205. CZARNEZKI, *supra* note 2, at 74–75.

206. Russell, Krarup & Clark, *supra* note 11 at 7–8.

cause individuals to “alter their consumption patterns” and “[t]o the extent that consumers do so, or to the extent that firms alter their product design or production methods in response to, or in anticipation of, such actions, then consumer action, or the threat of consumer action actually induces the change in polluter behaviour”²⁰⁷ Eco-labels can thus educate the public and thereby support informed consumer choice (public as audience), provide information to encourage the public to purchase environmentally-superior goods (public as target), and influence the practices of producers (public as catalyst for changes in upstream behavior).²⁰⁸

There are many types of eco-labels, including voluntary and private labeling regimes; evaluating eco-labels as a form of informational regulation, however, suggests a focus on government supported or mandated eco-labels.²⁰⁹ A review of the experience with the National Organic Program’s USDA Organic Seal implemented under the Organic Foods Production Act, one of the most prominent domestic eco-label protocols, provides a useful foil to evaluate the use of government eco-labels.²¹⁰

The Organic Foods Production Act establishes a nationally uniform labeling program for organic products and provides that for an agricultural

207. *Id.* at 5.

208. Although EPA did not use the same terms, it aptly described these various functions of eco-labels in a 1994 report:

As a provider of independent product endorsement, a labeling program can offer companies a selling point that is more credible than the manufacturers’ own claims. As a consumer protection tool, labeling can provide product information that is not readily apparent or easily discerned As a policy instrument, labeling can influence marketplace behavior, guiding consumers and manufacturers to act in ways that further public policy goals.

ENV’T PROT. AGENCY, DETERMINANTS OF EFFECTIVENESS OF ENVIRONMENTAL CERTIFICATION AND LABELING PROGRAMS, 8 (1994). Notably, “not all consumers in a market need to be affected by the information programme to alter markets; only a subset of consumers need to respond to the information to impact producer behaviours.” Teisl & Roe, *supra* note 200, at 65. See also Christine Moorman, *Firm Responses to Consumer Information Policy*, 120, in HANDBOOK OF MARKETING AND SOCIETY 120 (2001) (“What remains interesting about the impact of consumer behavior on competitive activity is the view that not all consumers in relevant markets need to change their search and choice behaviors. Instead, only a subset of ‘activist’ consumers need to respond to the information.”). There is also a possibility that producers overestimate the impact of disclosure on consumers, the “tell-tale heart” effect. George Loewenstein, Cass R. Sunstein & Russell Golman, *Disclosure: Psychology Changes Everything*, 6 ANN. REV. ECON. 391, 396 (2014).

209. CZARNEZKI, *supra* note 2, at 42–44, 74, 82 (describing different eco-label systems); ENV’T PROT. AGENCY, ENVIRONMENTAL LABELING: ISSUES, POLICIES, AND PRACTICES WORLDWIDE (1998) (surveying eco-label systems). Proposition 65 consumer exposure warnings, discussed above in our analysis of the Proposition 65 program, are a form of eco-label.

210. 7 U.S.C § 6501(2)–(3). The Energy Star label is another well-established U.S. government-sponsored eco-label. CZARNEZKI, *supra* note 2, at 42–43 (describing the Energy Star program).

product to be sold or labeled as organic (using the USDA Organic Seal) it must “have been produced and handled without the use of synthetic chemicals” and in accordance with an organic plan.²¹¹ Although there are numerous specific requirements for obtaining and using one of the Act-approved organic labels,²¹² core requirements include that products are not irradiated or genetically modified,²¹³ crops are not (directly) sprayed with pesticides,²¹⁴ healthy livestock are not treated with antibiotics or growth hormones,²¹⁵ and livestock living conditions meet a minimum standard.²¹⁶ The USDA Organic Seal signifies that a product meets the requirements of the National Organic Program.²¹⁷ Some consumers and others would prefer different, and in some cases, more comprehensive, requirements.²¹⁸ The label does not communicate performance regarding numerous other environmental attributes of labelled products, such as carbon intensity,²¹⁹ nor does it make a representation regarding the food safety or nutritional value of labeled products.²²⁰

2. Purposes

The Organic Foods Production Act was adopted *inter alia* “to assure consumers that organically produced products meet a consistent standard” and “to facilitate interstate commerce in fresh and processed food that is organically produced.”²²¹ Because the National Organic Program does not purport to recommend or promote products bearing the USDA Organic Seal and instead embodies an effort to avoid consumer confusion about the environmental attributes of labeled products, the Program’s primary aim appears to situate the

211. 7 U.S.C § 6504(1), (3).

212. For the USDA’s regulations implementing the statute, see the National Organic Program, C.F.R. § 205.100 (2021).

213. 7 C.F.R. § 205.105 (2021); 7 C.F.R. § 205.2 (2021) (“Excluded methods. A variety of methods used to genetically modify organisms or influence their growth and development by means that are not possible under natural conditions or processes and are not considered compatible with organic production. Such methods include cell fusion, microencapsulation and macroencapsulation, and recombinant DNA technology (including gene deletion, gene doubling, introducing a foreign gene, and changing the positions of genes when achieved by recombinant DNA technology).”).

214. 7 C.F.R. § 205.206 (2021).

215. 7 C.F.R. § 205.238(c) (2021).

216. 7 C.F.R. § 205.239 (2021).

217. Jason J. Czarnezki, *The Future of Food Eco-Labeling: Organic, Carbon Footprint, and Environmental Life-Cycle Analysis*, 30 STAN. ENV’T L.J. 3, 16 (2011).

218. *Id.* at 48.

219. *Id.* at 30–31.

220. USDA, USDA OVERSIGHT OF ORGANIC PRODUCTS (2012) (“The USDA organic regulations do not address food safety or nutrition.”). *See also* CZARNEZKI, *supra* note 2, at 71.

221. 7 U.S.C. § 6501(2)–(3).

public as an audience for information about the environmental attributes of products bearing the USDA Organic Seal in order to support informed consumer choice. The National Organic Program also expressly situates the public as a catalyst but for a quite limited purpose—to promote upstream uniformity in organic practices to facilitate interstate commerce in organic goods.²²² While individual producers may hope that the Program operates as a target mechanism by encouraging consumers to change their purchasing behaviors to purchase more USDA Organic Seal-labelled products, increasing the purchase of organic products is not a stated policy aim. Similarly, although supporters of organic foods may value the Seal for its potential to prompt more environmentally-friendly upstream practices in food production (public as catalyst), that is not an express purpose of the law.

3. Results

The National Organic Program has had a significant impact both with respect to situating the public as a target (influencing purchasing behavior) and a catalyst (prompting more upstream producers to adopt practices consistent with the requirements to obtain the Seal). The market for organic products is robust. U.S. sales of organic products rose to nearly \$62 billion in 2020 and organic food sales grew faster than conventional food sales.²²³ The USDA organic label appears to be influencing both consumer and producer behaviors in ways consistent with the theory of eco-labelling.²²⁴ Notably, these target and catalyst outcomes—increased purchases of organic products and growing the organics industry—are not those adopted by the statute. The growth in the organics industry suggests, however, that the statute's narrower catalyst goals of inducing uniformity and facilitating interstate commerce in organic goods are also being met, although it should be noted that there is enormous debate

222. *Id.*

223. Russell Redman, *Organic Food Sales Jump Nearly 13% To Record High in 2020*, SUPERMARKET NEWS (May 25, 2021), <https://www.supermarketnews.com/produce-floral/organic-food-sales-jump-nearly-13-record-high-2020> [https://perma.cc/ZV3L-ANVP] (reporting on data from the Organic Industry Report 2021); CAROLYN DIMITRI & CATHERINE GREENE, RECENT GROWTH PATTERNS IN THE U.S. ORGANIC FOODS MARKET (2002); USDA Economic Research Service, Organic Market Summary and Trends, <https://www.ers.usda.gov/topics/natural-resources-environment/organic-agriculture/organic-market-summary-and-trends> [https://perma.cc/6D2P-K4Z7].

224. USDA, *USDA Reports Record Growth in U.S. Organic Producers, \$1 Billion in USDA Investments Boost Growing Markets for Organic Products and Local Foods*, Release No. 084-16 (Apr. 4, 2016) (reporting a significant increase in the number of certified organic operations).

about whether the producer practices and resulting organics industry supported by the Seal are normatively desirable.²²⁵

The USDA Organic Seal has been notably less effective at situating the public as an audience. The Seal appears to be influencing consumer and producer behavior even though there is widespread confusion amongst consumers about the meaning and function of the label.²²⁶ In one study, cookies labeled as organic were perceived to be more nutritious and have fewer calories; other studies have revealed that some consumers mistakenly believe that organic signifies local and that many concede that they simply don't know what organic means.²²⁷ Indeed, one scholar observes that the above-described confusion may explain the apparent success of organic labels: “[I]t may be that the recent success of organic labels can be attributable to their ability to represent different things to different people.”²²⁸ “Individuals buy organic products to promote sustainable and chemical-free agriculture [(public benefit)], as well as to keep their bodies free of synthetics and pesticides [(private benefit)].”²²⁹ Considerable research suggests that consumers are motivated to buy organic products primarily because of perceived (private) health benefits, as opposed to public (environmental) benefits.²³⁰ Yet, those

225. E.g., Megan S. Houston, *Ecolabel Programs and Green Consumerism: Preserving A Hybrid Approach to Environmental Regulation*, 7 BROOK. J. CORP. FIN. & COM. 225, 240–41 (2012), and CZARNEZKI, *supra* note 2, at 71–73.

226. Houston, *supra* note 225, at 240 (“Many [mistakenly] believe the organic label means that the product is free from residual amounts of banned products that unintentionally contaminated the product, that buying organic products supports small farms, that organic farms are local farms, or that organic livestock promotes animal welfare.”); Pollans, *supra* note 194, at 644 (citing studies and observing that “[c]onsumers also have insufficient knowledge about the meaning of the current organic label and the environmental impacts of organic farming. Many consumers unjustifiably believe that organic foods are better for the environment and have substantial health benefits.”) (internal citations omitted). See also CZARNEZKI, *supra* note 2, at 72 (“For many, the organic label means healthy, environmentally friendly, safe, and pesticide free. While in some cases these characteristics are true, they are not elements of the legal definitions of organic.”).

227. Joe Pinsker, *Millennials Like ‘Organic’—Even If They Have No Idea What It Means*, ATLANTIC (Nov. 23, 2014), <https://www.theatlantic.com/business/archive/2014/11/millennials-like-organiceven-if-they-have-no-idea-what-it-means/383006/> [<https://perma.cc/D4L8-CM9D>].

228. Russell, Krarup & Clark, *supra* note 11, at 14.

229. CZARNEZKI, *supra* note 2, at 71.

230. Pollans, *supra* note 194, at 646–47 (“Although consumer studies find that strong environmental concerns do correlate with willingness to pay higher prices for organic foods, environmental interests fall far behind the other motivating values of health, including safety and nutrition, taste, and price. Health is consistently identified as the primary factor.”) (internal citations omitted). Ramu Govindasamy, Marc DeCongelio & Sanjib Bhuyan, *An Evaluation of Consumer Willingness To Pay for Organic Produce in the Northeastern U.S.*, J. FOOD PRODS. MKTG., Jan. 2006, at 3, 4; Renée Shaw Hughner, Pierre McDonagh, Andrea Prothero, Clifford J. Shultz II & Julie Stanton,

perceived private health benefits are disputed²³¹ and, moreover, are not an attribute that the USDA Organic Seal purports to advance (at least not directly).²³² Awareness of the mismatch between the consumer beliefs underlying “organic” purchases and what the USDA Organic Seal signifies has led to backlash,²³³ including allegations that organic marketers have purposefully encouraged public association of organic with healthy.²³⁴

From the perspective of interface with the public, then, the experience with eco-labeling through the National Organic Program seems to parallel the experience with TRI, NEPA and Proposition 65 in that public information disclosure through the USDA Organic Seal program has influenced public (consumer) and upstream (in this case market) behaviors, but has been somewhat less effective in its audience function of using disclosure to meaningfully inform choice. Providing the public with information in the form of the USDA Organic Seal serves a clear instrumental end—it has shaped consumer and producer behavior and undergirds a thriving market for organic-certified products.²³⁵ The USDA Organic Seal effectively situates the public as

Who Are Organic Food Consumers? A Compilation and Review of Why People Purchase Organic Food, 6 J. CONSUMER BEHAV. 94, 103 (2007); Mette Wier, Laura Mørch Andersen & Katrin Millock, *Information Provision, Consumer Perceptions and Values—the Case of Organic Foods*, in ENVIRONMENT, INFORMATION AND CONSUMER BEHAVIOR 176.

231. For example, while research suggests that children eating organic as opposed to conventional diets have lower exposure to some synthetic pesticides, see, e.g., Cynthia L. Curl, Richard A. Fenske & Kai Elgethun, *Organophosphorus Pesticide Exposure of Urban and Suburban Preschool Children with Organic and Conventional Diets*, 111 ENV’T HEALTH PERSP. 377–82 (Mar. 2003), questions have been raised about *inter alia* whether exposure to synthetic pesticides through a conventional diet in fact harms health and the potential health effects of natural pesticides permitted for use in the production of organic products. See generally Carl K. Winter & Josh M. Katz, *Dietary Exposure to Pesticide Residues from Commodities Alleged to Contain the Highest Contamination Levels*, 2011 J. TOXICOLOGY 6 (May 15, 2011).

232. See 7 C.F.R. § 205.311 (2021).

233. E.g., Melinda Wenner Moyer, *Organic Shmorganic: Conventional Fruits and Vegetables Are Perfectly Healthy for Kids*, SLATE (Jan. 28, 2014), <https://slate.com/human-interest/2014/01/organic-vs-conventional-produce-for-kids-you-dont-need-to-fear-pesticides.html> [https://perma.cc/TP4R-SNW7].

234. ACADEMICS REVIEW, ORGANIC MARKETING REPORT (2014) (describing “pervasive” “organic marketing campaigns that imply or directly assert food health and safety risks with foods produced using competing conventional practices” and concluding that because of consumer reliance on the USDA Organic Seal “the American taxpayer funded national organic program is playing an ongoing role in misleading consumers into spending billions of dollars in organic purchasing decisions based on false and misleading health, safety and quality claims.”).

235. Calorie labeling provides another similar example. Requiring that certain restaurants reveal calorie counts to consumers appears to have caused restaurants to make their offerings less calorie-heavy, but evidence is mixed regarding whether calorie counts cause individuals to choose lower calorie options. Jason J. Czarnezki, *New York City Rules! Regulatory Models for Environmental and*

a catalyst because the public's response to the Seal supports the market for goods bearing the Seal. From the perspective of organic producers, the USDA Organic Seal effectively situates the public as a target because its presence encourages some portion of the public to purchase goods bearing the Seal. However, as with TRI, Proposition 65, and NEPA, the USDA Organic Seal arguably is not as effective in situating the public as an audience, at least with respect to supporting accurate, meaningfully-informed consumer choice. Indeed, it appears that the *failure* of the USDA Organic Seal as an audience measure (the extent to which consumers misunderstand its significance and erroneously ascribe health and exaggerated environmental benefits to the Seal) may actually *enhance* its power to influence the public as a target and catalyze upstream producer behavior.²³⁶

The program thus successfully deploys the disclosure of information about food production methods to consumers so as to allow the public to serve as a catalyst for upstream producer behavior (encouraging through a growing consumer market increased production of organic products) and also to target the public's consumption behaviors (spurring demand for food produced through what at least some members of the public perceive to be more environmentally sensitive methods). However, although the Organic Foods Production Act was aimed in part at alleviating consumer confusion regarding the meaning of organic claims,²³⁷ it is far less clear that the USDA Organic Seal functions effectively when the public is viewed as an audience to be educated about the environmental facts of food production and consumption. Some

Public Health, 66 HASTINGS L.J. 1621, 1657 (2015) ("[I]t is not clear that calorie labeling has been directly effective in reducing caloric consumption. That said, there may be substantial ancillary benefits.... [D]ue to labeling, the evidence suggest that existing menus will likely be modified to include healthier, low-calorie items.").

236. The way that erroneous understandings of what the USDA Organic Seal signals about the health and environmental attributes of labelled products can spur an exaggerated public response and correlated upstream (market) behavior is reminiscent of the documented potential for public misunderstandings about small risks from chemical exposure to cause the public to overreact to disclosures under TRI and Proposition 65, thereby enhancing the catalyst effects of disclosure under those measures, see *supra* note 13 and *infra* note 274 and accompanying text. The potential for slippage between fact and public understanding after information disclosure is perhaps especially pronounced in the environmental context where the public has little first-hand knowledge and the underlying questions may require scientific explanation. See generally Anthony Patt & Richard J. Zeckhauser, *Behavioral Perceptions and Policies Toward the Environment*, in JUDGMENTS, DECISIONS AND PUBLIC POLICY 273 (Rajeev Gowda & Jeffrey C. Fox eds., 2002) ("Many environmental problems are abstract and are recognized as problems only because scientists tell us about them. People cannot directly sense ozone holes, increased climate variability, or the relationship between toxic waste and cancer rates. Thus they are readily subject to manipulating tales and images.").

237. 7 U.S.C. § 6501(2)–(3).

evidence suggests that the information communicated through the National Organic Program has done little to help consumers understand how their consumption decisions impact the environment or health.²³⁸ Experience with the USDA Organic Seal—often misunderstood by consumers, but supporting a booming market—again illustrates the difficulty of educating the public as an audience and the potential for disconnect, i.e., for disclosure to support upstream catalyst effects even in the absence of public understanding of disclosed information.

E. Behavioral Interventions

Some environmental policies attempt to use informational regulation to directly influence the behaviors of individuals in desired directions, thereby situating the public as a target. Because these measures seek to steer individuals toward or away from specific behaviors, they differ from measures that situate the public simply as an audience, i.e., provide information to empower individual autonomy and choice while remaining agnostic as to the choices individuals ultimately make. Informational regulation in service of behavioral interventions typically, however, anticipates successfully speaking to the public as an audience as a means to achieve the desired behavior change, resting on the assumption that providing information or education will lead to the desired changes in behavior. In short, these approaches seek to educate individuals to encourage a specified, public policy favored change in individual behavior. For example, municipal authorities may stencil images of fish and text explaining that the collection area drains to a watershed that in the hopes that, so informed (audience), individuals will choose not to send harmful toxics into the drain (target). Or utilities may provide customers with new information revealing how their use of power compares to similarly situated neighbors to educate the customer (audience) in the hopes of encouraging energy conservation behavior (target).

Two notable types of behavioral interventions are risk avoidance policies and persuasive campaigns. Risk avoidance signifies “a regulatory approach

238. Notably, one study suggests that in Denmark, which coupled organic labeling efforts with public information campaigns explaining the public good attributes of organic farming (environmental and animal welfare), consumers “have a good understanding of the organic rules” but nonetheless are motivated to purchase food with organic labels in large measure as a result of the perceived private goods associated with organic foods (health, taste and freshness) which are not part of the labeling scheme. Wier, Andersen & Millock, *supra* note 230, at 166, 176–77 (“Consequently, even though the Danish organic label and the associated public campaigns lay emphasis on public-good attributes exclusively, consumers seem to create their own perceptions on top of this information. They have a good understanding of the organic production rules, but they perceive the consequences of employing these partly independently of the information provided.”).

that addresses environmental risks by asking those whose practices or lifeways expose them to contaminants to alter their ways to avoid exposure.”²³⁹ It includes measures such as fish and wildlife consumption advisories, ozone alerts, beach advisories and closures, and boil-water notices.²⁴⁰ Persuasive campaigns use information disclosure as one means to persuade individuals to voluntarily change environmentally significant individual behaviors to achieve environmental benefits. Examples include, *inter alia*, efforts to encourage individuals to reduce energy consumption,²⁴¹ recycle,²⁴² and limit storm drain runoff.²⁴³ The use of informational regulation for risk avoidance and as part of persuasive campaigns are analyzed below.

1. Risk Avoidance

The concept of risk avoidance as well as many of the examples that follow are borrowed from an article by Catherine O’Neill, *No Mud Pies: Risk Avoidance as Risk Regulation*.²⁴⁴ That article critically analyzes risk avoidance as a means to augment traditional controls on environmental harms where those controls have not succeeded in reducing risk to acceptable levels.²⁴⁵ Although O’Neill does not frame risk avoidance policies as a form of informational regulation *per se*, many of the risk avoidance policies she examines constitute informational regulation because they disclose information about risk to

239. Catherine A. O’Neill, *No Mud Pies: Risk Avoidance As Risk Regulation*, 31 VT. REV. 273, 274 (2007).

240. Proposition 65’s produce warning labels arguably also fall within this category, although because of its orientation toward influencing firm behavior, Proposition 65 was discussed with the previous group.

241. Matto Mildenberger, Leah Stokes, Beth Savan, Brian Kolenda & Dan Dolderman, *Beyond the Information Campaign: Community-Based Energy Behavioral Change at the University of Toronto*, ENV’T PRAC. 1–2 (noting that many efforts to reduce energy consumption have consisted of public education campaigns).

242. Ann E. Carlson, *Recycling Norms*, 89 CAL. REV. 1231, 1235 (2001) (“New York City, for example, uses ad campaigns featuring Oscar the Grouch and Yankee manager Joe Torre to encourage household recycling; many states exhort their residents to recycle through persuasive mailers sent to individual households; state recycling curricula aimed at young children are commonplace.”); *see also id.* at 1269–70.

243. ENV’T PROT. AGENCY, *supra* note 39.

244. O’Neill, *supra* note 239. For an interesting assessment of hazard communication and individual responses, see Sims & Baumann, *supra* note 89, at 170 (“In sum, the evidence supporting the causal link between hazard awareness and protective responses is minimal, and correspondingly, the evidence documenting the failure of such educational efforts is considerable.”).

245. O’Neill, *supra* note 239, at 274 (“Risk avoidance stands in contrast to risk reduction, which addresses environmental risks by requiring contaminants to be prevented, reduced, or cleaned up at the source. Risk avoidance leaves contamination unabated, in whole or in part. It places responsibility on those exposed to avoid the fish, water, soils, or air left polluted.”).

individuals to encourage those individuals to voluntarily avoid risk.²⁴⁶ Risk avoidance strategies thus position the public as a target of information disclosure—they seek to use information disclosure to persuade individuals to behave in ways that limit exposure to environmental risk.²⁴⁷ Fish consumption advisories provide a particularly useful exemplar.

According to the EPA, in 2011, there were 4,821 fish advisories in effect covering 42% of the nation's total lake acreage and 36% of the nation's total river miles.²⁴⁸ The vast majority of these advisories—94%—involved five bioaccumulative chemical contaminants: Mercury, PCBs, chlordane, dioxins, and DDT.²⁴⁹ Fish consumption advisories are typically developed by state public health and environmental agencies,²⁵⁰ although EPA and the Federal Drug Administration have issued a joint federal advisory for mercury in fish.²⁵¹ EPA compiles access to advisories issued by states, territories, and tribes.²⁵² Fish advisories provide individuals with information about the levels of contaminants in fish and about the amount of fish it is safe to eat in an effort to spur individuals to voluntarily limit their consumption of fish to safe amounts:

246. *Id.*

247. O'Neill, *supra* note 239, at 278–79. One might conceive of fish consumption advisories as situating the public as an audience in the sense that advisories could be viewed as providing individuals with information about the risks fish consumption so as to enable informed consumption choices. However, fish consumption advisories start from the proposition that certain levels of fish consumption are likely to result in exposures established as unsafe and seek to protect the citizenry from such unsafe exposures. This is in contrast to Proposition 65, for example, which was initially explained in part as an effort to allow individuals to select an exposure to risk that was more protective than that settled upon as acceptable by regulators, see *supra* notes 124–27 and accompanying text, discussing the legislative history of Proposition 65. Although this distinction is somewhat fine, it is significant. Fish consumption advisories are best characterized as measures that situate the public as a target whose behavior the advisories seek to influence in specific directions.

248. National Listing of Fish Advisories: General Fact Sheet 2011, ENV'T PROT. AGENCY, <http://water.epa.gov/scitech/swguidance/fishshellfish/fishadvisories/generalfs2011.cfm> [<https://perma.cc/WUR9-LAE7>].

249. *Id.*

250. See, e.g., W. VA. BUREAU FOR PUB. HEALTH, W. VA. DIV. ENV'T PROT., & W. VA. DIV. NAT. RES., WEST VIRGINIA FISH CONSUMPTION ADVISORY INTERAGENCY AGREEMENT (2000). There does not appear to be a single (federal) authority compelling the production of state fish consumption advisories, although fish advisories may sometimes be issued as an institutional control under CERCLA or RCRA and states often identify water bodies as impaired on the lists required to be submitted under section 303(d) of the Clean Water Act because the water body does not support the fish consumption use as a result of a restricted or no consumption fish advisory.

251. ENV'T PROT. AGENCY & FOOD AND DRUG ADMIN., *supra* note 38. A proposed update to has been published and made available for public comment. Env't Prot. Agency & Food and Drug Admin., Advice About Eating Fish: Availability of Draft Update, 79 Fed. Reg. 33559 (June 11, 2014).

252. *State, Territorial and Tribal Fish Consumption Advisories*, ENV'T PROT. AGENCY, <https://www.epa.gov/fish-tech/state-territorial-and-tribal-fish-consumption-advisories> [<https://perma.cc/XC4Q-885L>].

Fish consumption advisories are directed to people who would consume fish from contaminated waters, particularly those subpopulations likely to suffer adverse effects given the contaminants at issue.

Advisories typically provide information about the nature and extent of the contamination (e.g., indicating the water bodies affected and the fish species implicated) and its adverse health effects (e.g., noting whether the contaminants of concern are carcinogens, neurodevelopmental toxins, etc.). Advisories then recommend avoidance by one or more of several means (e.g., refraining altogether from eating a particular species; reducing the amount of fish over a certain size or age that is consumed; substituting alternate fishing sites; or altering preparation methods).²⁵³

There is no established protocol for the design and communication of fish consumption advisories, which are often developed by individual states, localities, and government agencies, although there is some evidence of a growing consensus around best fish advisory practices.²⁵⁴ The considerations involved in designing and distributing advisories are complex—for example, how to communicate the risks of toxics as well as the health benefits of fish consumption, and how best to reach different audiences. Questions about content, presentation, format, and distribution methods (e.g., signs posted near water bodies, mass media public service announcements, wallet cards and refrigerator magnets) can generate disagreement.²⁵⁵ EPA, for example, relied primarily on health care professionals and public service announcements to publicize its 2004 FDA/EPA Consumer Advisory: “What You Need to Know About Mercury in Fish and Shellfish”;²⁵⁶ many have been critical of EPA’s

253. O’Neill, *supra* note 239, at 278–79.

254. T. BRUCE LAUBER, NANCY A. CONNELLY, JEFF NIEDERDEPPE & BARBARA A. KNUTH, WHAT WE KNOW ABOUT FISH CONSUMPTION ADVISORIES: INSIGHTS FROM EXPERTS AND THE LITERATURE (Sept. 2013).

255. *Id.* at 4–31 (describing the results of a survey of fish advisory practitioners).

256. U.S. ENV’T PROT. AGENCY, BACKGROUNDER FOR THE 2004 FDA/EPA CONSUMER ADVISORY: WHAT YOU NEED TO KNOW ABOUT MERCURY IN FISH AND SHELLFISH (Mar. 2004), <https://archive.epa.gov/cpa/sites/production/files/2018-12/documents/backgrounder-2004-fda-cpa.pdf> [<https://perma.cc/EQ33-Z8R5>] (“FDA and EPA are planning a comprehensive educational campaign to reach: women who might become pregnant; pregnant women; nursing mothers; and young children. The agencies will work with state, local and tribal health departments to get information out into their communities. Physicians, other health professionals, and health care associations will be sent information to distribute through their offices. Extensive outreach through the media is also planned. Radio and television stations, health editors at newspapers, magazines, and other popular media will be contacted to encourage them to carry the public service message. The methylmercury advisory will also be an important part of a comprehensive food safety education program to be used by educators of pregnant women. FDA plans to launch the comprehensive education program later this year.”).

dissemination effort and suggested that the advisory would have been much more useful if EPA had provided it at the point of sale.²⁵⁷

Significant questions remain about the extent to which the fish consumption advisories are received and understood and succeed in convincing individuals to change their behavior to avoid the risks of excess consumption of contaminated fish, although there is reason to be doubtful about their performance. A 2013 study prepared by the Human Dimensions Research Unit in Cornell University's Department of Natural Resources, which set out to "synthesize existing knowledge about effective fish consumption advisory practice,"²⁵⁸ concludes that little is known about the effect of advisories on public consumption:

The existing literature has yielded insights into how key audiences interpret fish consumption advisory materials. However, little evidence exists to demonstrate the degree to which these [fish consumption advisory] materials actually influence behavior and reduce the exposure of target audiences to contaminants in fish. The types of evidence that would be worthwhile to collect fall into two areas: (1) If target audiences receive advisory materials . . . , to what degree do these materials increase awareness and knowledge, influence fish consumption behavior, and reduce exposure to contaminants? (2) What delivery mechanisms are effective for getting these materials to a large enough segment of a target audience to influence the behavior of that audience?²⁵⁹

257. E.g., Katherine Renshaw, *Sounding Alarms: Does Informational Regulation Help or Hinder Environmentalism?*, 14 N.Y.U. ENV'T L.J. 654, 683–84 (2006) ("The FDA advisory fails to reach numerous consumers because there is no way of guaranteeing that a consumer is aware of such a warning at the time of purchase."). Notably, California has successfully required that Proposition 65 warning related to the mercury content of seafood be posted in restaurants, Proposition 65 Fish Cases, Consent Judgment, Case Nos. CGC-03419292, BC-293749 (Sup. Ct. Jan. 2005), and many supermarkets have voluntarily posted mercury seafood warnings while a Proposition 65 case against supermarkets is pending, Jane Kay, *Grocers Post Mercury Warnings on Fish/Safeway and Others Respond to State Suit*, S.F. CHRONICLE, Feb. 21, 2003, at A17. The California AG was unable, however, to require that point of sale or label warnings be applied to canned tuna based on a court finding that mercury in tuna is naturally occurring and thus exempt from Proposition 65 disclosure. People *ex rel.* Brown v. Tri-Union Seafoods, LLC, 171 Cal. App. 4th 1549, 1576, 90 Cal. Rptr. 3d 644, 664 (2009) ("We affirm the judgment on the narrow ground that substantial evidence supports the trial court's finding that methylmercury in tuna is naturally occurring, and thereby removing the Tuna Companies from the reach of Proposition 65.").

258. LAUBER, CONNELLY, NIEDERDEPPE & KNUTH, *supra* note 254, at i.

259. *Id.* at iii, 45. The report acknowledges that there are many recommendations for how to communicate fish advisory information. Building on knowledge from the literature and practitioners with expertise in fish consumption advisory communication, the report offers numerous

Other research concludes that fish consumption advisories, at least as historically constituted and distributed, are often unnoticed, misunderstood, or disregarded:

There is ample evidence that advisories and warnings often do not reach their intended audience. For example, a recent study showed that half of those consuming fish caught on the Great Lakes were unaware of the relevant fish consumption advisories. Similarly, another study found that only 45% of those fishing the Newark Bay Complex were aware of the relevant fish and crab consumption advisories Even if risk avoidance measures are completely effective in each of these two respects—they reach and are understood by their intended audiences and they are maintained in perpetuity—it is enormously difficult to effect behavior changes in people. . . . According to one recent survey, of the 48.5% of respondents who were aware of the relevant fish consumption advisories for the San Francisco Bay, only 60.3% reported reducing their fish intake as a result. Indeed, health and environmental agencies have emphasized the difficulty of getting risk-bearers to “comply” with fish consumption advisories by altering their preparation and consumption practices.²⁶⁰

Thus, although fish consumption advisories are expressly intended to “[e]nable target audiences to make informed choices about eating fish”²⁶¹ and avoid harms associated with excessive consumption of contaminated fish, they often fail to inform a large number of individuals and do not appear to be particularly successful at influencing public behavior.²⁶² This is so even though the individuals to whom the information is directed may face significant personal health risks by failing to heed the relevant warnings.²⁶³

Where individuals receive and comprehend advisories but nonetheless choose to consume fish in contraindicated ways, the advisories do inform choice and thereby satisfy the audience function (i.e., individuals may understand but nonetheless choose to accept risks from the consumption of

recommendations about how to design fish consumption advisories to effectively communicate information to the public. *Id.* at i–ii. A literature review suggested that it is important *inter alia* to keep messages simple and include information about risks and benefits. *Id.* at 32–42. A survey of experts in the field yielded agreement that advisories should, *inter alia*, be concise, use simple and readily understood language, communicate easily-followed recommendations, provide balanced information about risks and benefits, and be limited in number. *Id.* at 4–9.

260. O’Neill, *supra* note 239, at 312, 314–15 (internal citations omitted).

261. LAUBER, CONNELLY, NIEDERDEPPE & KNUTH, *supra* note 254, at 44.

262. O’Neill, *supra* note 239, at 312–13, 315.

263. *Id.*

contaminated fish); the advisory would still, however, fail to satisfy the target function of keeping consumption within levels of acceptable risk. Where individuals fail to become aware of or comprehend an advisory, it would fail both the audience and target functions. Although knowledge about the efficacy of fish consumption advisories is incomplete, existing learning signals difficulties both in use of such advisories to reach and educate the individuals (audience) and prompt them to change their behavior as a result of the received information (target).

2. Persuasive Campaigns

Information strategies are also often used—individually, or in conjunction with economic incentives or other inducements—to persuade individuals to voluntarily change environmentally significant individual behaviors to achieve environmental benefits.²⁶⁴ These information strategies thus position the public as a regulatory target.²⁶⁵ Sometimes these efforts take the form of relatively unadorned information disclosure (such as stenciling storm drains to indicate the water body receiving run off to serve as educational reminders to the public that storm drains often discharge untreated runoff directly into rivers and lakes and discourage individuals from dumping litter, oil, etc.²⁶⁶). At other times, campaigns to change individual environmental behaviors not only include the disclosure of information (for example, publicizing the environmental benefits of and possibilities for recycling), but also deploy jingles, endorsements, or appeals to social norms in an effort to persuade.²⁶⁷ In the context of energy demand reduction, for example, peer-based comparative feedback seeks to tap into the power of social norms to motivate individuals to reduce energy use by providing information about how

264. E.g., Vandenbergh, *supra* note 29, at 613–15.

265. By way of distinction from risk avoidance strategies, where the motivation is to help individuals obtain a private health benefit (reduced exposure to a health risk), these persuasive measures are typically motivated by a desire to change behavior to achieve a public benefit (minimizing solid waste, decreasing energy consumption, reducing pollutants in stormwater runoff). Of note, however, where there are both public and private benefits associated with conduct (reducing energy consumption may save an individual money, acting in a “green” way may make individuals feel good (give them a “green halo”) or have positive reputational effects), persuasive campaigns may highlight those private co-benefits to spur greater behavior change. Czarnezki & Kuh, *supra* note 201, at 450 (proposing improvements to eco-labels to improve efficacy grounded in evolutionary psychology, including emphasis on private consumer benefits).

266. *Storm Drains & Stenciling*, CLEAN OCEANS ACTION, <https://cleanoceanaction.org/education-programs/storm-drain-stenciling> [https://perma.cc/4YCY-6ZDE].

267. For an overview and critique of the use of persuasive campaigns to influence individual behaviors in the environmental context, see Vandenbergh, *supra* note 29, at 610–17.

an individual's energy consumption compares to that of similarly situated peers.²⁶⁸ In part because of feasibility and other concerns about alternate methods of regulating individual behavior (for example, mandates),²⁶⁹ informational approaches are viewed as an important tool for influencing environmentally significant individual behaviors.²⁷⁰ Although the sophistication of communicating with individuals in this context is growing,²⁷¹ experience and research to date attest to the challenges of relying on information to change environmentally significant individual behaviors, particularly outside of the consumer context.²⁷²

It is generally understood to be quite difficult to change individual behaviors using information strategies alone; significant challenges exist in formulating information disclosure strategies that lead individuals to voluntarily change behavior in desired ways.²⁷³ As in the context of risk

268. ENERGY & ENV'T ECONS., OVERVIEW OF RESIDENTIAL ENERGY FEEDBACK AND BEHAVIOR-BASED ENERGY EFFICIENCY 18–20 (Feb. 2011).

269. For example, “[a]gencies have begun to develop regulations and policies that reflect the insights of behavioral economics, and the Office of Information and Regulatory Affairs (OIRA) within the Office of Management and Budget (OMB) has introduced behavioral economics to White House review of agency regulations.” Michael P. Vandenbergh, Amanda R. Carrico & Lisa Schultz Bressman, *Regulation in the Behavioral Era*, 95 MINN. REV. 715, 716–17 (2011) (analyzing *inter alia* how regulation designed to influence individual behavior, including through public information campaigns, can become more effective by taking into account psychological and behavioral insights, such as the effects of motivational crowding, framing, and pluralistic ignorance).

270. Folke Ölander & John Thøgersen, *Informing Versus Nudging in Environmental Policy*, 37 J. CONSUMER POL'Y 341, 342 (2014) (observing that other instruments for changing behavior, such as economic measures and legal regulation, “are often met by public and political resistance that can block them from being decided and implemented and alone, they are often insufficient.”); Carlson, *supra* note 242, at 1235 (“When numerous people must act to solve a collective problem and lack the economic incentive to do so, traditional government regulation, such as formal law, may be infeasible, ineffectual, or politically difficult. The costs of monitoring and enforcement can be prohibitively expensive or may raise privacy concerns.”).

271. See Mildenberger, Stokes, Savan, Kolenda & Dolderman, *supra* note 241, at 3–8 (describing community-based social marketing).

272. And, as discussed *supra*, although in the consumer context eco-labels sometimes can and do change some individual purchasing decisions and thereby occasion market effects, significant questions remain about the extent to which the information provided on labels results in meaningfully informed choice with respect to purchasing decisions.

273. Ölander & Thøgersen, *supra* note 270, at 342–43 (reviewing relevant studies and concluding that “all in all, what emerges about the possibilities to achieve behavioural change in the environmental field by means of mass media communication is not very heartening.”); Paul C. Stern, *Information, Incentives, and Proenvironmental Consumer Behavior*, 22 J. CONSUMER POL'Y 461, 464–66, 468 (1999) (“In short, information alone can, if carefully designed and delivered, change certain kinds of environmentally significant consumer behaviors to a modest extent. However, little or no effect has been achieved when there are important barriers to action external to the individual,

avoidance, difficulties inhere both in effectively communicating relevant information to individuals (audience) and generating behavior changes in response (target). With respect to the former, individuals often do not receive and respond to information in “rational” ways—a host of cognitive biases, perspectives informed by cultural worldview, personal and social norms and competing values, and other motivations and variables inform how individuals comprehend and respond to information.²⁷⁴ With respect to the latter (translating information into behavior change), individual behaviors amenable to change are often limited to those where there are low “barriers” to change (e.g., they do not impose significant monetary costs, they are not inconvenient, and there is infrastructure such as public transportation to support the change).²⁷⁵ Frustration with or simply recognition of the limitations of

such as significant financial cost or inconvenience.”); Carlson, *supra* note 242, at 1236 (reviewing research demonstrating that increasing convenience is much more effective at increasing recycling behaviors than norm management (using informational strategies) and concluding that “[t]hough social norms can, and sometimes do, play a role in encouraging cooperative behavior to resolve large-number, small-payoff problems, if recycling is any indication, their force is fairly limited.”).

274. E.g., Paul C. Stern, *Toward a Coherent Theory of Environmentally Significant Behavior*, 56 J. SOC. ISSUES 407, 416–18 (2000); Amanda R. Carrico, Michael P. Vandenbergh, Paul C. Stern, Gerald T. Gardner, Thomas Dietz & Jonathan M. Gilligan, *Energy and Climate Change: Key Lessons for Implementing the Behavioral Wedge*, 2011 J. ENERGY & ENV'T L. 61–67 (2011); Kahan & Braman, *supra* note 87, at 170; Vandenbergh, Carrico & Schultz, *supra* note 269, at 716–17. For example, a sign posted in the Petrified Forest National Park in Arizona as part of a research study that read, “Many past visitors have removed the petrified wood from the park, changing the state of the Petrified Forest,” appeared to encourage the theft of petrified wood, perhaps by “signal[ing] to park visitors who would otherwise not have stolen that stealing the petrified wood was a common behavior.” Kesten C. Green & J. Scott Armstrong, *Evidence on the Effects of Mandatory Disclaimers in Advertising*, 31 J. PUB. POL'Y & MKTG. 293, 295–96 (2012) (concluding that “attempts to change behavior using mandatory disclaimers are often ineffective and, in many cases, lead to effects that are opposite to those intended.”).

275. Stern, *supra* note 274, at 464–66 (“The chief implication for policy is that the extent to which behavior can be changed by interventions in the personal domain, such as education or information, depends on the strength of contextual forces: There are times and places when personal-domain interventions are likely to be effective and others when they will predictably fail.”); *id.* at 468 (“[E]ven information programs that are carefully designed to achieve these objectives produce only modest short-term behavioral changes. The most carefully crafted informational interventions have produced reductions of 10–20% in certain targeted consumer behaviors, such as littering, electricity consumption during peak-load periods, and electricity use for home cooling. The behaviors that change to produce these effects are almost always simple behaviors that can be changed with little inconvenience or expense—that is, behaviors for which external constraints are weak.”); Carlson, *supra* note 242, at 1295–1300 (describing lessons from empirical data on recycling participation for efforts to change individual behaviors with respect to “large-number, small-payoff collective action problems,” including that measures to increase the convenience of a behavior may be particularly important for “high-effort” behaviors and that simply providing individuals with information without more is often not sufficient to achieve behavior change). See generally Michael P. Vandenbergh, Jack

information-driven efforts to influence individual behaviors causes some scholars to recommend a focus on other approaches as a means to influence environmentally significant individual behavior.²⁷⁶ On the other hand, there is some optimism that more carefully crafted and better funded public information campaigns may prove more effective.²⁷⁷ Further, there is evidence that providing individuals with information has significant potential to complement and enhance efforts to influence behavior using other modalities (economic incentives, mandates, etc.).²⁷⁸ Overall, however, experience with persuasive campaigns likewise reveals difficulties both in communicating information effectively to individuals (audience) and prompting individuals to change their behavior in response (target).

This Part reviews use of informational regulation in different environmental policy settings, applying a three-part typology characterizing how the public operates in informational regulation regimes in different potential capacities, as an “audience,” “catalyst,” or “target.” The survey across a wide array of settings suggests that, in terms of efficacy, such regulation in the environmental context appears to function best when the public is positioned as a catalyst for influencing upstream agency, corporate or market behaviors. Broadly speaking, informational regulation in the environmental context has leveraged

Barkenbus & Jonathan Gilligan, *Individual Carbon Emissions: The Low-Hanging Fruit*, 55 UCLA L. REV. 1701, 1715–16 (2008) (suggesting that there is the best possibility to influence “low-hanging fruit” individual GHG emission behaviors, meaning *inter alia* those that present low costs and few other barriers to individuals, although observing that “if the perception that catastrophic climate change is likely becomes widespread, then personal cost constraints may become less important to behavior change efforts” and that “barriers can be overcome.”).

276. Stephanie M. Stern, *Smart-Grid: Technology and the Psychology of Environmental Behavior Change*, 86 CHI.-KENT L. REV. 139, 155 (2011) (arguing for increased reliance on technology and automation to reduce energy demand); Cass R. Sunstein & Lucia A. Reisch, *Automatically Green: Behavioral Economics and Environmental Protection*, 38 HARV. ENV’T L. REV. 128 (2014) (advocating for the use of “green defaults” in some contexts); BEN-SHAHAR & SCHNEIDER, *supra* note 26, at 121–37 (criticizing information disclosure as a regulatory approach in part on the grounds that even improved communication approaches incorporating behavioral insights cannot overcome numerous identified difficulties posed by disclosure vis-à-vis individuals).

277. Vandenberghe, Barkenbus & Gilligan, *supra* note 275, at 1722 (“Public information campaigns directed at environmentally significant behaviors have had mixed success in the past, but many of them were severely underfunded. Recent literature reviews have concluded that more than half of the well-designed and funded programs have resulted in significant and positive behavior change, with changes in the targeted behaviors of 7 to 30 percent.”).

278. Stern, *supra* note 273, at 469 (“[T]he effectiveness of incentive programs depends on factors in the personal domain and can be increased markedly by combining the incentives with appropriate informational interventions.”); Carrico, Vandenberghe, Stern, Gardner, Dietz & Gilligan, *supra* note 274, at 64 (“Although simply providing information to consumers is rarely sufficient to change behavior, accurate and actionable information is often a necessary component to achieving this end.”).

disclosure to the public into (often beneficial)²⁷⁹ changes in commercial and such behaviors. With respect to influencing individual knowledge and behaviors when the public is positioned as an audience or target, to date, efforts to engage the public through informational regulation in the environmental context are less well understood and of decidedly mixed efficacy.²⁸⁰ It has proved difficult to use information strategies (alone) to change individual environmental behaviors,²⁸¹ protect individuals from environmental risks,²⁸² support environmental consumer choices,²⁸³ or educate the public about environmental issues.²⁸⁴ Policies aimed at changing targeted public environmental behaviors in desired ways, such as fish consumption advisories and persuasive campaigns aimed at individual environmental behaviors, can succeed in certain contexts, but must be supported by sophisticated research and careful implementation. The next Part offers several tentative insights about the role of the public in informational regulation based on the experience in these settings.

279. Karkkainen, *Framing Rules*, *supra* note 2, at 86 (discussing the benefits of NEPA). While many reductions in releases under TRI have been considered beneficial, there are situations in which that may not be the case (e.g., releases of non-TRI chemicals increase, and situations in which the social value of reductions is outweighed by the social value of activity that produced these releases that was curtailed). For a discussion of unintended negative consequences of mandated environmental disclosure, see Volokh, *supra* note 12, at 814–38.

280. E.g., O'Neill, *supra* note 239, at 275 (describing and critiquing “the rise of risk avoidance as a regulatory tool”); *id.* at 312 (“Risk avoidance is often ineffective . . . There is ample evidence that advisories and warnings often do not reach their intended audience.”); Lucia A. Reisch & Cass R. Sunstein, *Redesigning Cockpits*, 37 J. CONSUMER POL’Y 333, 336 (2014) (commenting on the acknowledgment by others that “information has not been proven to be a very successful means of promoting voluntary behavior change to protect the environment.”).

281. E.g., Stern, *supra* note 276, at 155 (“Decades of information provision and behavior change initiatives have made only limited headway in reducing electricity consumption—and those gains have been virtually obliterated by the proliferation of energy-draining appliances such as computers and flat-screen televisions.”).

282. O'Neill, *supra* note 239.

283. Lowenstein, Sunstein & Golman, *supra* note 208, at 413 (reviewing studies assessing disclosure and concluding that “[a]s a result of limited attention and many other psychological factors . . . , disclosure requirements appear to have been less effective in changing recipient behavior than their most ardent proponents seem to assume they are, or should be.”). See also Reisch & Sunstein, *supra* note 280, at 335 (“When, for example, do disclosure policies actually affect consumers? On that question, the most substantial questions are unanswered, with some evidence that at least in some contexts consumers are often not much affected, but that producers do alter their offerings.”).

284. See generally Kahan & Braman, *supra* note 87, at 170 (explaining how cultural cognition shapes individuals’ acceptance of facts about climate change).

IV. INSIGHTS FOR INFORMATIONAL REGULATION

A clear but somewhat puzzling phenomenon emerges from comparing how informational regulation functions vis à vis the public across a variety of environmental programs: Mandated public disclosure often fails to meaningfully inform the lay public as an audience while nonetheless catalyzing sometimes significant responses by upstream actors. Considerable commentary characterizes many of the information regulation approaches discussed in Part III as successful examples of the genre because they have influenced the behavior of upstream private sector and government entities in ways beneficial to the environment.²⁸⁵ Although no definitive research establishes precisely the extent of the change in behavior attributable to public disclosure or precisely how and why regulated entities and agencies change their behavior because of public disclosure,²⁸⁶ broadly speaking, informational regulation in the environmental context successfully leverages disclosure to the public into (often beneficial)²⁸⁷ changes in commercial and agency behaviors—i.e., successfully deploys public disclosure as a catalyst for influencing upstream commercial and agency behaviors.

Although the mechanism(s) by which the laws analyzed in Part III prompt upstream catalyst effects are, like the extent of those effects, difficult to quantify precisely, the mandated disclosure of information to the public is

285. See *supra* notes 98, 125–27, 163, 185–85, 196 and accompanying text.

286. E.g., KRAFT, STEPHAN & ABEL, *supra* note 43, at 40–41, 55, 139–40 (discussing the results of an empirical study examining the means by which TRI disclosure prompts voluntary changes in releases); Cohen, *supra* note 99, at 2. Laws mandating disclosure may also influence behavior for reasons unrelated to public disclosure of information; for example, the requirement to generate the information disclosed may alert entities to previously unrecognized inefficiencies or concerns. *Id.* In the context of NEPA, agencies may make projects less environmentally harmful to avoid having to engage in NEPA’s costly disclosure mechanisms, chiefly production of an EIS. Karkkainen, *Framing Rules*, *supra* note 2, at 86 (“The widespread use of EAs, FONSI, and mitigated FONSI suggests that NEPA has indeed changed the terms of decision-making in federal agency actions, generally elevating the role of environmental considerations, albeit through a circuitous and unexpected backdoor route. By imposing heavy administrative and procedural costs (those associated with EIS production) on agency projects or programs that will cause severe adverse environmental impacts, NEPA backhandedly creates an incentive for agencies either to design projects ab initio to reduce their expected environmental impacts below the EIS-triggering threshold, or to add mitigation measures to keep the environmental costs down, obviating the need to produce a costly EIS. In most cases it is unlikely that agencies would have investigated, much less implemented, these environmentally benign design alternatives or mitigation measures absent the incentives created by NEPA.”).

287. Karkkainen, *Framing Rules*, *supra* note 2, at 86 (discussing the benefits of NEPA). While many reductions in releases under TRI have been considered beneficial, there are situations in which that may not be the case (e.g., releases of non-TRI chemicals increase, and situations in which the social value of reductions is outweighed by the social value of activity that produced these releases that was curtailed). For a discussion of unintended negative consequences of mandated environmental disclosure, see Volokh, *supra* note 12, at 814–38.

generally seen as an important part of the efficacy of these laws in changing upstream entities' environmental behaviors. Disclosure may shape behavior as regulated entities and agencies respond substantively to public input (whether through NEPA comments, consumer decisions, or in the form of public or political pressure).²⁸⁸ Regulated entities and agencies may also change behavior preemptively because they *anticipate* that the disclosure of environmental information will harm their reputation, generate civic opposition, give rise to legislative or regulatory obstacles or tort suits, or occasion bad market effects as individuals (or investors) shun their services or products.²⁸⁹ Interestingly, public disclosure appears to exert a powerful influence despite the fact that individuals typically remain largely unaware of [§] 15 to understand the information subject to disclosure. These laws generate public disclosure without widespread public comprehension—although they all purport to engage or educate the public in some fashion, they all largely fail to do so in a meaningful way.²⁹⁰ Yet, disclosure nonetheless prompts significant upstream catalyst effects.

The role of intermediary groups in reacting to disclosed information (community or interest groups, sophisticated investors), some prevalent tropes in lay risk perception and related cognitive biases, simple overestimation, and factors ancillary to disclosure mandates may all help explain the power of disclosure *sans* widespread public comprehension.²⁹¹ Organized interest or community groups can effectively use disclosed information and publicize (or threaten to publicize) the information to a broader public audience and use the

288. See Esty & Karpilow, *supra* note 1, at 631–36 (describing the internal and external mechanisms through which disclosure can shape behavior). See also generally JOHN F. MANNING & MATTHEW C. STEPHENSON, LEGISLATION AND REGULATION 542–44 (2d ed. 2013) (discussing the benefits of notice and comment rulemaking).

289. Esty & Karpilow, *supra* note 1, at 631–36; Klindorfer & Orts, *supra* note 6, at 155, 159 (1998) (“Dissemination of information about environmental performance can influence public opinion, which can affect a business’s social franchise as well as its economic franchise. In an approach emphasizing IR, rewards and punishments for environmental performance are given to businesses not just by government, but by economic markets and the public opinions of society-at-large”); Russell, Krarup & Clark, *supra* note 11, at 7; Rechtschaffen, *supra* note 12, at 341–54.

290. This failure of environmental disclosure statutes to function when the public is positioned as an audience appears consistent with Ben-Shahar and Schneider’s critique of mandated disclosure (when its goal is to treat the public as an audience and inform public choice) across a variety of substantive subjects and statutes. BEN-SHAHAR & SCHNEIDER, *supra* note 26 (“[N]ot only does the empirical evidence show that mandated disclosure regularly fails, failure is inherent in it.”).

291. See *supra* notes 94–97, 132–33 and accompanying text. In addition, TRI information has prompted company decision makers to act on their own accord because it signaled inefficiencies and opportunities to reduce waste. THOMAS GRAEDEL & JENNIFER HOWARD-GRENVILLE, GREENING THE INDUSTRIAL FACILITY: PERSPECTIVES, APPROACHES, AND TOOLS 31 Text Box 3.1 (2005) (describing Monsanto’s response to TRI data about releases).

resulting public concern (or threat of the same) as currency to pressure commercial entities or agencies.²⁹² In some cases, the failure of the public to accurately comprehend the information disclosed may work to enhance the effect of disclosure.²⁹³ Various psychological factors may lead individuals to overestimate the level of risk indicated by the disclosure and, accordingly, magnify upstream incentives to avoid public backlash;²⁹⁴ public misunderstanding of the meaning of the Organic Seal may broaden its appeal.²⁹⁵ Finally, entities subject to disclosure requirements may simply overestimate the extent of public awareness of and sensitivity to disclosed information. Some scholars refer to this as “the telltale heart effect”:

Why are providers changing their products in response to disclosures that their customers are largely ignoring? . . . We suspect that sellers may well have an inflated sense of the public salience of disclosures, in a phenomenon related to the spotlight effect, by which people exaggerate how much other people are looking at them.²⁹⁶

This scenario is analogous to Edgar Allen Poe’s 1843 short story “The Telltale Heart” in which the murderous protagonist . . . “imagines that the police can hear the heartbeat of the man he has killed and buried beneath the floorboards of his apartment.”²⁹⁷ Factors ancillary to disclosure mandates may also prompt upstream effects.²⁹⁸ Entities potentially subject to disclosure requirements may change course to avoid triggering disclosure mandates because the disclosure

292. Rechtschaffen, *supra* note 12, at 318 (“[O]nly a small number of motivated persons—e.g., attentive, information-seeking consumers, unions, or environmental organizations—actually needs to use information to accomplish some of the desired benefits of information disclosure laws. A small group’s energetic attention to warnings or other information can force product reformulation, safer workplace conditions, or reductions in community exposures that benefit large numbers of consumers, workers, or other individuals.”).

293. *Id.*

294. Viscusi, *supra* note 13, at 288 (“[W]hen individuals are informed of small risks there will be a tendency for them to over-react to the information and to treat the risk as being greater than it actually is. It will be very difficult to convey information to people in a meaningful fashion about very low probability risks. Perhaps the major danger from any risk-communication effort is that instead of informing people these programs will serve to unduly alarm them.”).

295. See *supra* note 226 and accompanying text.

296. Locwenstein, Sunstein & Golman, *supra* note 208, at 404.

297. *Id.* at 403.

298. Khan M. R. Taufiqur, Kristian S. Nielsen, Thomas Dietz, Rachael Shwom, Paul C. Stern & Michael P. Vandenberghe, *Revisiting the Promise of Carbon Labelling*, 12 NATURE CLIMATE CHANGE 132–40 (2022) (reporting that carbon labels seem to produce clear upstream catalyst effects on companies despite limited evidence of significant uptake by consumers and positing that “even absent major shifts in consumer behavior, the process of gathering and analyzing the data for labeling and the prospect of publicly disclosing product emissions can create corporate incentives for emissions reductions.”).

process itself (for example, preparation of an EIS) is burdensome.²⁹⁹ Engaging in disclosure may reveal new information to disclosing entities, prompting changes in behavior unrelated to any external pressures.³⁰⁰ The possibility that disclosing information about chemical exposures will lead to litigation (in the form of common law toxic tort or nuisance suits) could provide one such external pressure that prompts a voluntary reduction of releases in response to disclosure mandates. Regardless of the mechanism, it seems that these laws employ informational regulation to influence upstream commercial and government behavior without needing to or succeeding at consistently and meaningfully advancing broader public understanding of the information that they require to be disclosed.

The failure of environmental informational regulation to educate the public as an audience while nonetheless supporting upstream catalyst effects suggests some important insights. First and most plainly, disclosure is not functioning well to directly inform or engage the lay public.³⁰¹ The comparative analysis underscores that this occurs across different statutes and policies that employ informational regulation in the environmental context. None of the laws or policies studied appears particularly effective in engaging the public as an audience.³⁰² Yet TRI, Proposition 65, NEPA and the USDA Organic Seal all aspire to position the public as an audience for environmental information to inform choice about exposure to risk or enrich civic perspective; public disclosure in these contexts is often justified or characterized as autonomy or democracy enhancing.³⁰³ One contribution of the typology offered herein is to separate out the audience and catalyst functions of disclosure, thereby preventing the efficacy of disclosure at catalyzing upstream effects from obscuring its struggle to inform the public.³⁰⁴

299. Karkkainen, *Framing Rules*, *supra* note 2, at 86 (explaining why agencies may reduce the environmental impacts of proposals to avoid the need to prepare an EIS).

300. Esty & Karpilow, *supra* note 1, at 631 (Explaining how disclosure mandates can generate internal pressure to change behavior: “First, the data may reveal production inefficiencies that were previously unknown to corporate management. Such insights may stem from the firm’s analysis of its own data. Or they may come when a firm uses the data to compare its environmental performance to those of its competitors.”) (citations omitted).

301. See *supra* Part III.

302. See *id.*

303. See *id.*

304. See generally Joshua Dunsby, *Measuring Environmental Health Risks: The Negotiation of a Public Right-to-Know Law*, 29 SCI., TECH., & HUM. VALUES 269, 280–84 (2004) (revealing through a close examination of implementation of California’s Air Toxics “Hot Spots” Information and Assessment Act that success at disclosure of prompting catalyst changes in releases blunted demands to orient disclosure toward public understanding, thereby illustrating the “potential conflict of

Going forward, it will be important to clarify whether these broad audience goals are, in fact, important. It may be that the audience justifications for, characterizations and goals of these measures are largely hortatory or at least secondary to achieving the desired upstream catalyst effects. It may also be that the audience goal is important, but more limited in the sense that what we value is protecting the right of every member of the lay public to know (should they so choose), which makes it less troubling that the public largely chooses not to exercise the right to know, leaving as the true audience for disclosed information sophisticated actors such as intermediary groups and researchers. If so, then perhaps the judgment should be simply to accept the limitations of these disclosure measures in terms of communicating with the public. And also, perhaps, to sharpen focus on how to improve the efficacy of disclosure for creating desirable upstream catalyst effects.³⁰⁵

If, however, broad audience goals (meaning real public elucidation) are deemed important (and, of note, in some contexts audience goals may be central, for example with respect to the satisfaction of rights to information to support environmental democracy as expressed in Principle 10 of the 1992 Rio Conference on Environment and Development, the Aarhus Convention, and the Escazú Agreement),³⁰⁶ then ensuring not just the technical availability of information but real opportunity for understanding is imperative.³⁰⁷ The next questions would be where and how communication strategies could be improved³⁰⁸ while recognizing that there may be contexts (for example, with

regulatory goals . . . that is, the democratic dissemination of knowledge and the reduction of air toxins.”). Of note, recent scholarship argues that the upstream catalyst effects of Proposition 65 are more varied and powerful than previously recognized. Polsky & Schwarzman, *supra* note 130, at 827.

305. Taufique, Nielsen, Dietz, Shwom, Stern & Vandenberghe, *supra* note 297, at 137 (explaining that while carbon labels have limited effect on consumers they appear to exert more notable influence on companies and emphasizing “the need to prioritize corporate responsiveness in future work” because “more needs to be known about corporations’ responses to labeling and about the types of labels that may induce corporations to change the products offered to retail consumers even if consumer responsiveness is limited.”).

306. David Takacs, *Environmental Democracy and Forest Carbon (Redd+)*, 44 ENV’T L. 71, 79–86 (2014).

307. *Id.*

308. See generally Adena R. Rissman, Jessica Owley, Andrew W’Roc, Amy Wilson Morris & Chloé B. Wardrop, *Public Access to Spatial Data on Private-land Conservation*, 22 ECOLOGY & SOC’Y (June 2017), <https://www.jstor.org/stable/pdf/26270141.pdf> [<https://perma.cc/64P8-846D>] (advocating for better public disclosure and availability of data about conservation lands including in part by integrating data geospatial data into information networks because “[s]imple disclosure may not necessarily increase accountability because large datasets can be difficult to comprehend and require technical skills,” and “[i]nformation is useful for organizations and citizens when it increases learning, including social learning through informal networks and formal learning forums.”); Amy Wilson Morris & Adena R. Rissman, *Public Access to Information on Private Land Conservation*:

respect to the communication of chemical risk) in which audience goals are too difficult to achieve. Going forward, care should be taken not to assume that the public disclosure of information necessarily advances individual autonomy or enriches civic perspective.³⁰⁹ And policymakers should approach proposals to employ disclosure to engage the lay public as an audience for environmental information with caution, cognizant of the challenges of doing so effectively.

A second insight of this Article's typology is that upstream catalyst effects from disclosure do not appear to be a direct response to informed public will. This phenomenon—the use of disclosure to achieve changes in upstream behavior without meaningfully advancing understanding by individuals—should caution us against presuming that behavior change achieved through disclosure necessarily aligns with individual or public preference. Put another way, while informational regulation pours information into the public domain, that public disclosure is often somewhat narrow in its function—it often serves as a mechanism for influencing upstream behaviors without permeating the public consciousness or changing the public's behaviors.³¹⁰ This finding raises questions about the normative underpinnings of informational regulation strategies and should encourage deeper analysis of how and why public disclosure causes or contributes to upstream effects as well as of the normative value of the upstream effects it produces. If public disclosure is not effectively engaging the public as an audience, then it is questionable whether it should be justified as enhancing individual autonomy or enriching individual civic perspective. Moreover, that the upstream effects prompted by disclosure are not a response to expressions of public preference (at least as unmediated by intermediary groups) suggests that those effects should not be presumed to reflect public preferences. Policymakers should carefully analyze the upstream catalyst effects achieved through disclosure to understand whether they are, in fact, normatively desirable.

This may be particularly important because of the outsized role of intermediary groups in utilizing disclosed information.³¹¹ While individuals

Tracking Conservation Easements, 2009 WIS. REV. 1237, 1280 (2009) (explaining the effort and expense involved to make information about conservation easements accessible to the lay public in a meaningful way and concluding that “[t]he amount of public money that should be invested in making the data user friendly is, in the end, a public-policy decision that has to be made based on budget priorities and the level of public interest in accessing data.”).

309. Morris & Rissman, *supra* note 308, at 1280.

310. Nordenstam & DiMento, *supra* note 13, at 345 (critiquing the implementation of right-to-know laws and observing that “[t]he formal act of conveying risk information has taken precedence over the information’s actual impact in reducing health risks.”).

311. For an explanation and critique of the role of intermediary groups in statutory participation mechanisms, see Fiorino, *supra* note 82, at 531 (“Citizen participation came to be equated with interest

may not be directly edified or engaged by information disclosure approaches, organizations and organized groups often are.³¹² One scholar suggests that “[c]urrent environmental information disclosure programs are generally designed to provide information to environmentally knowledgeable people rather than to the average citizen attempting to learn about the environment.”³¹³ A third insight from application of the typology to the informational regulation schemes discussed in Part III is to highlight the important role of intermediary groups in informational regulation schemes that rely on information disclosure. Intermediary groups actively seek out and utilize disclosed information and, in many contexts, appear to play an important role in shaping upstream catalyst effects.³¹⁴ These groups can repackage and disseminate disclosed information to strategically chosen segments of the lay public, thereby exerting significant control over who in the public receives the information as well as the content of that information. In thinking about the design and efficacy of environmental information regulation, greater attention should be paid to the role of these intermediary groups in deploying and shaping the response to publicly disclosed environmental information.

It may be that we are comfortable with having disclosure measures function in a pluralist manner with disclosed information largely mediated through intermediary groups because we understand the goals of these groups to roughly align with overall social utility or the public interest, or at least outcomes as a result of their involvement roughly align with the same.³¹⁵ Beyond traditional pluralist accounts of the role of interest groups, quasi- and non-governmental groups and actors can contribute to the development and implementation of environmental law and policy in beneficial ways such that empowering these

group participation Citizens did not participate—they joined or otherwise supported interest groups that participated on their behalf.”).

312. *Id.* at 529 (“Effective participation requires organization, resources, and professional representation. Participation at the national level typically is indirect, because it is mediated through voluntary associations organized to assert related interests The process concedes a marginal role to the individual citizen.”).

313. Cohen, *supra* note 99, at 10427.

314. For example, environmental groups have played an active role in enforcement under the Clean Water Act through the filing of citizen suits using information contained in discharge monitoring reports. David L. Markell & Robert L. Glicksman, *A Holistic Look at Agency Enforcement*, 93 N.C. REV. 1, 24 (2014) (explaining that private enforcement has the potential to undermine national consistency in addressing compliance challenges). See generally Seema Kakade & Matt Haber, *Detecting Corporate Environmental Cheating*, 47 ECOLOGY L.Q. 771, 804 (2020) (proposing a greater role for corporate self-monitoring and reporting to support enforcement and commenting on the value of public disclosure and enforcement mechanisms under the Clean Water Act and acid rain provisions of the Clean Air Act).

315. For a defense of deliberative democracy and a critique of NEPA as advancing pluralist and synoptic discussion, see Poisner, *supra* note 12.

groups and individuals with information is normatively desirable. Interesting work evaluates the role of “boundary organizations,” less formal “knowledge networks,”³¹⁶ and consultants³¹⁷ in the environmental context. But some clear-eyed analysis and clarity in this regard seems prudent.

V. CONCLUSION

As compared to other regulatory tools, informational regulation is generally understood to impose low implementation costs.³¹⁸ It is also understood to offer little assurance of achieving specific environmental goals because disclosing entities ultimately decide whether or how to change behaviors and, as explained above, the nature and cause of upstream effects from mandated disclosure are difficult to predict and quantify.³¹⁹ In part for this reason, informational regulation is typically conceded to function best as a supplement to other, more traditional forms of regulation that afford greater government control over environmental outcomes.³²⁰ However, the relatively low cost of informational regulation (in terms of political ease of adoption, government administration, and regulated entity compliance) and its observed (if not well understood) benefits make it an attractive policy approach.

316. Sonya Ziaja, *Role of Knowledge Networks and Boundary Organizations in Coproduction: A Short History of a Decision Support Tool and Model for Adapting Multiuse Reservoir and Water-Energy Governance to Climate Change in California*, 11 WEATHER, CLIMATE, AND SOC’Y 823, 842 (2019) (presenting a case study illustrating the value of knowledge networks and boundary groups in the context of adapting water-energy governance to climate change). See also Scott E. Kalafatis, Maria Carmen Lemos, Yun-Jia Lo & Kenneth A. Frank, *Increasing Information Usability for Climate Adaptation: The Role of Knowledge Networks and Communities of Practice*, 32 GLOB. ENV’T CHANGE 30 (2015) (explaining the role of knowledge networks in the dissemination, understanding, and use of information about climate change in the Great Lakes Community); Margaret Chon, *Recasting Intellectual Property in Light of the U.N. Sustainable Development Goals: Toward Global Knowledge Governance*, 34 AM. U. INT’L L. REV. 763, 771 (2019) (evaluating the role of boundary organizations in the development of intellectual property governance from the perspective of advancing the Sustainable Development Goals).

317. Dave Owen, *Consultants, the Environment, and the Law*, 61 ARIZ. REV. 823, 868 (2019) (evaluating the role of environmental consultants in the implementation of environmental law and policy and observing that “public-choice theory predicts that the consulting sector will be particularly well-positioned to influence administrative policy.”).

318. E.g., OFFICE OF TECH. ASSESSMENT, ENVIRONMENTAL POLICY TOOLS: A USER’S GUIDE 199 Table 4–9 (1995).

319. *Id.* at 152 (“Most of these [information reporting] programs have no mechanism for forcing less pollution from sources and thus cannot assure the public that goals will be met if they are implemented.”).

320. Esty & Karpilow, *supra* note 1, at 635 (“[W]hile information regulation can play an important role in furthering environmental goals, most scholars and policymakers see it as enhancing, rather than displacing, more traditional forms of environmental regulation.”).

By surfacing the extent which disclosure fails as a public audience measure even while catalyzing upstream behavior effects, this Article's typology suggests some additional considerations in evaluating informational regulation as a regulatory tool in the environmental context. First, the low implementation costs for informational regulation may, in part, reflect a lack of effort in existing disclosure regimes to effectively communicate disclosed information to the lay public. A stronger governmental role in communicating disclosed information to the lay public could enhance informational regulation's ability to effectively engage the public in some contexts, but would likely increase implementation costs.

Second, with respect to the role of government in regulation, this Article suggests that, despite the perception that informational regulation largely preserves the status quo in terms of control over environmental outcomes, government in fact cedes some control when it engages in environmental informational regulation. Under informational regulation regimes, regulated entities retain authority over whether and how to change environmental behaviors (and there is not a shift of that authority to the government), suggesting that such approaches maintain the status quo. However, informational regulation significantly empowers intermediary groups by equipping them with information. When it engages in informational regulation in the environmental context, the government thus *cedes* authority to define what goals are to be pursued once information is disclosed. For all of these reasons, as policymakers refine existing environmental informational regulation regimes and consider incorporating mandated disclosure in new contexts, they should do so mindful of the difficulty of positioning the public as an audience for disclosed information despite the potential for disclosure to prompt upstream catalyst effects.

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