

WATER JUSTICE AND TECHNOLOGY

THE COVID-19 CRISIS, COMPUTATIONAL RESOURCE CONTROL,
AND WATER RELIEF POLICY

NORTH AMERICA AND CENTRAL AMERICA



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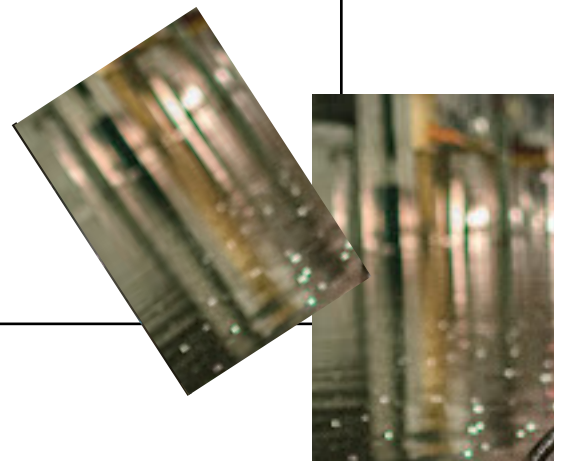
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WATER TRANSITION

INTRODUCTION

WATER TRANSITION AND TECHNOLOGY

INTRODUCTION

Theodora Dryer, Ph.D.

Since March 2020, government and private entities in North America, Central America, and around the world have enacted a wave of water relief policies¹—predominantly in terms of monetary assistance and funding—in response to the extreme crisis conditions of the COVID-19 pandemic. These policy agendas that generally define water relief along the four axes of water security,² water affordability,³ water access,⁴ and water scarcity⁵ overwhelmingly neglect how conditions of water injustice and environmental racism⁶ affect their implementation. In a survey analysis of COVID-19 water re-

1 *Water transition* is a framework used in policy agendas. It relates to the concept of “ecological transition” that came to prominence in environmental policy in the 1970s. *Transition* denotes a plan from present into the future that includes new social and economic agendas enacted to fulfill it. It matters who controls transition frameworks and how the past or histories of water contexts are acknowledged or not in these plans. Presently, the crisis-and-relief framework dominates water transition agendas around the world with the limitations and stakes discussed in this report.

2 *Water security* relates to the notion of safeguarding sufficient amounts of water for a population. Rachel Cooper, “Water Security Beyond Covid 19”, *K4d Helpdesk Report*, April 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/803_Water_security_beyond_C19.pdf.

3 *Water affordability* is largely defined as affordable water relative to household income. “Governor Hochul Announces Nearly \$70 Million in Water Utility Assistance for Low-Income New Yorkers,” *New York State*, November 29, 2021, <https://www.governor.ny.gov/news/governor-hochul-announces-nearly-70-million-water-utility-assistance-low-income-new-yorkers>; “COVID-19 Moratorium on Utility and Municipal Shutoffs,” *New York State*, December 17, 2021, <https://www3.dps.ny.gov/W/AskPSC.nsf/All/D3BB77AFE92D6FFF852585EE0051A13E>.

4 *Water access* is generally defined as an accessible source of safe water within a mile of a home dwelling. Elise Gout and Cathleen Kelly, “Bridging the Water Access Gap through COVID-19 Relief,” Center for American Progress, August 5, 2020, <https://www.americanprogress.org/article/bridging-water-access-gap-covid-19-relief>.

5 *Water scarcity* is the notion of scarce and depleting water resources for a population. In this report, we show how declarations of water scarcity have been used to bolster extractive economic agendas. The White House, “Fact Sheet: President Biden’s New Executive Actions Deliver Economic Relief for American Families and Businesses Amid the COVID-19 Crises,” January 22, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/22/fact-sheet-president-bidens-new-executive-actions-deliver-economic-relief-for-american-families-and-businesses-amid-the-covid-19-crises>.

6 See NAACP, “Water/Color: A Study of Race & The Water Affordability Crisis in America’s Cities,” A Report by The Thurgood Marshall Institute at the NAACP Legal Defense and Educational Fund, Inc., 2019,

lief agendas, we see that in a majority of these cases, there is a lack of serious engagement with water justice needs, as well as a lack of adequate consultation with Indigenous and local government leaders and water-use communities.⁷ Instead, relief funding is being rapidly funneled into tech development, which means that tech enterprises are using the COVID-19 crisis to expand their dominion over the future of water resources. This contributes to a “relief” policy landscape and legal apparatus that privileges technological innovation and extractive economic growth over the environment and human life.⁸

https://www.naacpldf.org/wp-content/uploads/Water_Report_FULL_5_31_19_FINAL_OPT.pdf. In his book *Dumping in Dixie*, environmental justice leader Robert Bullard defines environmental racism as “any policy, practice, or directive that differentially affects or disadvantages (whether intended or unintended) individuals, groups, or communities based on race.” See Bullard, *Dumping in Dixie: Race, Class, and Environmental Quality*, 3rd ed. (New York: Routledge, 2000); Dorceta Taylor, *Toxic Communities: Environmental Racism, Industrial Pollution, and Residential Mobility* (New York: New York University Press, 2014); Commission for Racial Justice, *Toxic Wastes and Race in the United States: A National Report on the Racial and Socio-Economic Characteristics of Communities with Hazardous Waste Sites* (New York: United Church of Christ Commission for Racial Justice, 1987), <https://www.nrc.gov/docs/ML1310/ML13109A339.pdf>; Max Liboiron, M. Tironi, and N. Calvillo, “Toxic Politics: Acting in a Permanently Polluted World,” *Social Studies of Science* 48, no. 3 (2018): 331–349, <https://journals.sagepub.com/doi/full/10.1177/0306312718783087>.

7 In policy definitions, *water justice* relates to equitable water distribution and the right of people to collectively control local water resources. It further relates to questions of sovereignty, race, democracy, and citizenship. See Farhana Sultana, “Water Justice: Why It Matters and How to Achieve It,” *Water International* 43, no. 4 (2018): 483–493; Rose Francis, “Water Justice in South Africa: Natural Resources Policy at the Intersection of Human Rights, Economics, and Political Power” *Georgetown International Environmental Law Review* 18, no. 1 (2005): 149–196; Rutgerd Boelens, Jeroen Vos, and Tom Perreault, eds., *Water Justice* (Cambridge: Cambridge University Press, 2018).

8 Thank you to so many for their engagement and care with this text including Amrah Salomón, Sage Gerson, Meredith Whittaker, Bruno Seraphin, April Anson, Patrícia Martins Marcos, Hi’il-ei Julia Hobart, and Nantina Vgontzas. Thank you to the report contributors for their inspiring work and critical thought that made this project possible: Fushcia-Ann Hoover, J.T. Roane, Elena Sobrino, Dean Chahim, and Matthew Henry. Thank you to Caren Litherland for her indispensable editorial work and Molly de Blanc and Nicole Weber for their brilliant research assistance. The AI Now Institute team gave us much encouragement and administrative support for this project; thank you to Meredith Whittaker, Alejandro Calcaño, Amba Kak, Varoon Mathur, Heather Wiggins, and Crystal Kelley.

The AI Now Institute at New York University is located on the traditional territory of the Lenni-Lenape, called “Lenapehoking.” “The Lenape People lived in harmony with one another upon this territory for thousands of years. During the colonial era and early federal period, many were removed west and north, but some also remain among the continuing historical tribal communities of the region: The Nanticoke Lenni-Lenape Tribal Nation; the Ramapough Lenape Nation; and the Powhatan Renape Nation, The Nanticoke of Millsboro Delaware, and the Lenape of Cheswold Delaware. We acknowledge the Lenni-Lenape as the original people of this land and their continuing relationship with their territory. In our acknowledgment of the continued presence of Lenape people in their homeland, we affirm the aspiration of the great Lenape Chief Tamanend, that there be harmony between the indigenous people of this land and the descendants of the

Our report intervenes by clarifying the political functions of “relief” in COVID-19 water policy agendas through grounded analyses of harmful technological solutions in local contexts throughout North America and Central America.⁹ We find that crisis-and-relief water transition policies, and their corresponding technological solutions, work against possibilities for water justice as they do not address the realities of racial capitalism¹⁰ and settler colonialism¹¹ in water governance.

COVID-19 Relief Stimulus

Currently, in the US context, the two major COVID-19 relief packages are the Coronavirus Aid, Relief, and Economic Security (CARES) Act, passed in March 2020 (\$2.2 trillion),¹² and the American Rescue Plan (ARP) Act, passed

immigrants to this land, “as long as the rivers and creeks flow, and the sun, moon, and stars shine.” Nanticoke Lenape Tribal Nation, “Land Acknowledgement,” accessed December 21, 2021, <https://nlltribe.com/land-acknowledgement>.

For additional sources on land acknowledgements see Dr. Cutcha Risling Baldy, “What Good is a Land Acknowledgement,” July 3, 2020, <https://www.youtube.com/watch?v=-Wgxfu-gOtAY>; Elisa J. Sobó, Michael Lambert, and Valerie Lambert, “Land acknowledgements meant to honor Indigenous people too often do the opposite—erasing American Indians and sanitizing history instead,” *The Conversation*, October 7, 2021, <https://theconversation.com/land-acknowledgments-meant-to-honor-indigenous-people-too-often-do-the-opposite-erasing-american-indians-and-sanitizing-history-instead-163787>.

9 This report is the product of collective thought and work and is a collective accomplishment. As an individual author, I am a settler scholar. This term clarifies my position in academic research and policy work. I am committed to anti-racist and anti-colonial knowledge production. I believe that this commitment requires ongoing work to unlearn the systems and social norms that I’ve been tacitly conditioned to understand as acceptable and natural and prioritize critical reflexivity in my research and relationships.

For additional reading see Taylor N. Johnson and Danielle Endres, “Decolonizing Settler Public Address: The Role of Settler Scholars,” *Rhetoric and Public Affairs* 24, no. 1-2 (Spring-Summer 2021): 333-348; Eve Tuck and K. Wayne Yang, “Decolonization Is Not a Metaphor,” *Decolonization: Indigeneity, Education and Society* 1 (2012): 1-40.

10 “*Racial Capitalism* the process of deriving value from the racial identity of others, harms the individuals affected and society as a whole”; Nancy Leong, “Racial Capitalism,” *Harvard Law Review: Race and the Law* 126, no. 2151 (2013), <https://harvardlawreview.org/2013/06/racial-capitalism/>; Cedric Robinson, *Black Marxism: The Making of the Black Radical Tradition* (Durham: UNC, 1983).

11 See Roxanne Dunbar-Ortiz, *Not “A Nation of Immigrants”: Settler Colonialism, White Supremacy, and a History of Erasure and Exclusion* (Boston: Beacon Press, 2021).

12 Jim Tankersley and Michael Crowley, “Biden Outlines \$1.9 Trillion Spending Package to Combat Virus and Downturn,” *New York Times*, January 14, 2021, <https://www.nytimes.com/2021/01/14/business/economy/biden-economy.html>.

in March 2021 (\$1.9 trillion).¹³ Under this umbrella stimulus, agendas written in the broader COVID-19 relief policy landscape either explicitly include water plans or neglect to include water plans. In COVID-19 relief policies that *include* water plans, it is evident that digital innovation and tech-led water development programs are gaining prominence as a primary “solution” to the crisis resulting in policies that are funneling relief resources directly or indirectly to expanding tech enterprise.

The COVID-19 water relief policy landscape is not easy to map out, especially as it relates to tech. Water relief agendas often converge with other relief policies responsive to the climate crisis,¹⁴ infrastructure collapse,¹⁵ and economic failure.¹⁶ These agendas take the form of new legislation, regulatory guidance and enforcement, and institutional and government recommendations. Water relief interventions occur across a variety of tech and infrastructure domains that include energy plans (hydropower, electricity),¹⁷ wastewater management guidance (desalination; Water, Sanitation, and Hygiene [WASH]),¹⁸ and public and private access directives (utilities and municipal management).¹⁹ These agendas also include

13 See US Department of the Treasury, “Covid-19 Economic Relief,” accessed December 19, 2021, <https://home.treasury.gov/policy-issues/coronavirus>; and Emily Cochrane and Sheryl Gay Stolberg, “\$2 Trillion Coronavirus Stimulus Bill Is Signed Into Law,” *New York Times*, March 27, 2020, <https://www.nytimes.com/2020/03/27/us/politics/coronavirus-house-voting.html>.

14 Lucas Thompson, “Major Climate Change Measures Included in COVID Aid Bill,” NBC News, December 28, 2020, <https://www.nbcnews.com/science/environment/major-climate-change-measures-included-covid-aid-bill-n1252422>.

15 “Wastewater Is the Infrastructure Crisis People Don’t Want to Talk About,” PBS NewsHour, April 9, 2021, <https://www.pbs.org/newshour/health/wastewater-is-the-infrastructure-crisis-people-dont-want-to-talk-about>.

16 The White House, “Fact Sheet: President Biden’s New Executive Actions Deliver Economic Relief for American Families and Businesses Amid the COVID-19 Crises.”

17 Dominique Ristori, “The Role of Water in the EU Clean Energy Transition,” *European Files*, December 7, 2018, <https://www.europeanfiles.eu/energy/role-water-eu-clean-energy-transition>; Amanda Binks et al., “The Transition to Improved Water-Related Energy Management: Enabling Contexts for Policy Innovation,” *Water* 12, no. 2 (2020), <https://doi.org/10.3390/w12020557>.

18 World Bank, “WASH (Water, Sanitation & Hygiene) and COVID-19,” April 6, 2020, <https://www.worldbank.org/en/topic/water/brief/wash-water-sanitation-hygiene-and-covid-19>.

19 See, for example, United States Environmental Protection Agency, “Water Utility Resources for the COVID-19 Pandemic,” accessed December 15, 2020, <https://www.epa.gov/coronavirus/water-utility-resources-covid-19-pandemic>.

a broad suite of tech-led water development and management programs.²⁰

What is clear is that within the surge of COVID-19 water relief policies and funding initiatives, there is overwhelming neglect of water justice considerations despite the vast resources and information available to prioritize them.²¹ Water justice considerations include equitable access to clean water that, in March 2020, the World Health Organization (WHO) declared an urgent need against the novel coronavirus.²² Yet the implementation of relief policy repeatedly fails to meaningfully address the social and environmental injustices that prevent safe water access for millions of people.

For example, Flint, Michigan's recent \$94.7 million relief stimulus package, as part of the American Rescue Plan,²³ was passed with wide media coverage, but has yet to be spent because of the work required for local community leaders to navigate outdated compliance guidelines.²⁴ Here the inequitable conditions underlying Flint's water crisis are exacerbated by a stimulus bureaucracy that undermines the decision-making authority of local actors and thus clogs the distribution of relief funding.

20 Charley Locke, "How the \$4 Trillion Flood of Covid Relief Is Funding the Future," *New York Times Magazine*, November 24, 2021, <https://www.nytimes.com/2021/11/24/magazine/pandemic-aid.html>.

21 As detailed throughout this report, water justice and Indigenous resistance movements have been in effect for centuries and have generated an extensive resource base for local policy interventions, water knowledge, community needs, and more. Additional recent policy findings on water justice include Miriam Seemann, *Water Security, Justice and the Politics of Water Rights in Peru and Bolivia* (London: Palgrave MacMillan, 2016); Stacey Delgaard, "New Report Elevates Water Justice in Oregon," *Oregon Environmental Council*, September 2, 2021, <https://oeconline.org/new-report-elevates-water-justice-in-oregon>; Jonathan J. London and Sara Watterson, "The Struggle for Water Justice," *UC Davis Center for Regional Change*, February 7, 2018, <https://regionalchange.ucdavis.edu/report/the-struggle-for-water-justice>; Amanda Abrams, "The Connection Between Water, Justice, and Health," *Shelterforce*, March 26, 2019, <https://shelterforce.org/2019/03/26/the-connection-between-water-justice-and-health>; Juliet Amy Vanderwarker, "Water and Environmental Justice," in Christian-Smith et al., eds., *A 21st Century U.S. Water Policy* (Oakland: Pacific Institute 2013), https://pacinst.org/wp-content/uploads/2013/02/water_and_environmental_justice_ch3.pdf; "Water Justice, Management and Governance," Australia National University, accessed December 17, 2021, <https://programsandcourses.anu.edu.au/course/EMDV8079>.

22 World Health Organization, "Water, Sanitation, Hygiene, and Waste Management for SARS-CoV-2, the Virus That Causes COVID-19," July 29, 2020, accessed December 19, 2021, <https://www.who.int/publications/i/item/WHO-2019-nCoV-IPC-WASH-2020.4>.

23 The White House, "American Rescue Plan: President Biden's Plan to Provide Direct Relief to Americans, Contain COVID-19, and Rescue the Economy," accessed December 19, 2021, <https://www.whitehouse.gov/american-rescue-plan>.

24 Amy Diaz, "Flint Is Getting Millions in COVID-19 Relief Funds. How Will It Be Spent?" *Flint Beat*, October 19, 2021, <https://flintbeat.com/flint-is-getting-millions-in-covid-19-relief-funds-how-will-it-be-spent>; City of Flint, Michigan, "ARPA Spending Categories," accessed December 15, 2020, <https://www.cityofflint.com/wp-content/uploads/ARPA-Spending-Categories-DRAFT.pdf>.

What this means is that instead of the COVID-19 crisis becoming a turning point toward water justice and a catalyst for deep and meaningful change, these relief policies overwhelmingly reinforce inequitable water governance contexts and corresponding decision-making processes.²⁵

Furthermore, these crisis policies have stifled water justice work and perpetuated conditions of harm and violence against water protectors. Over the past centuries, Black, Indigenous, Latinx, migrants, refugees, working-class people, and others at the frontlines of climate change fallout have led the fight for a livable future that includes resistance actions, ongoing policy and legal interventions, anticolonial environmental impact statements, local and global organizing, equitable community care and development, local water resource initiatives, mutual aid programs, and countless other interventions.²⁶ Underscoring this point, the Indigenous Environmental Network recently published a study showing that “Indigenous resistance has stopped or delayed greenhouse gas pollution equivalent to at least one-quarter of annual U.S. and Canadian emissions.”²⁷

This illuminates the fact that water transition expertise of what is needed across water contexts *already exists* and justice-centered change is *already in action*. What stands in the way is a dominant water policy landscape and legal apparatus that privileges technological innovation and extractive economic growth over the environment and human life. Furthermore, this policy context bolsters technological solutions and water commodification systems that often *cause* and exacerbate water crises. In this report, we examine major cases of this: destructive hydrodamming networks, lithium mining, poisoned well and piping systems, inequitable disaster infrastructures, and artificial intelligence programs that were all built in the name of water crisis relief. These cases clarify how tech development interests repeatedly benefit from and control water relief policy, while harming the

25 Arundhati Roy, “The Pandemic Is a Portal,” *Financial Times*, April 3, 2020, <https://www.ft.com/content/10d8f5e8-74eb-11ea-95fe-fcd274e920ca>.

26 The Red Nation, *The Red Deal: Indigenous Action to Save Our Earth* (Red Media, 2021): 38. “We will construct our own policies out of grassroots action that seeks to caretake and support one another. Through organizing around non-reformist reforms for housing, food security and sovereignty, domestic and gender violence justice, suicide prevention, land restoration, and more, we can and will build infrastructures of liberation.” For additional reading, see Nick Estes, *Our History is the Future: Standing Rock versus the Dakota Access Pipeline and the Long Tradition of Indigenous Resistance* (London: Verso Books, 2019); Nick Estes, “Water is Life: Nick Estes on Indigenous Technologies,” *Logic*, December 07, 2019, <https://logicmag.io/nature/water-is-life-nick-estes-on-indigenous-technologies>; Sherrie Baver, “Latinos and Environmental Justice: New York City Cases,” <http://www.jstor.org.proxy.library.nyu.edu/stable/j.ctvpg855d.17>; Open Transcripts, “Racial Capitalism, Designs for Energy Transition, and the Green New Deal,” <http://opentranscripts.org/transcript/racial-capitalism-energy-transition-green-new-deal>; Benjamin J. Pauli, *Flint Fights Back: Environmental Justice and Democracy in the Flint Water Crisis* (Cambridge: MIT Press, 2019), https://bobcat.library.nyu.edu/permalink/f/ci13eu/nyu_aleph005622267.

27 “Indigenous Resistance Against Carbon,” Indigenous Environment Network, last modified August 2021, <https://www.ienearth.org/indigenous-resistance-against-carbon>. Thank you to Bruno Seraphin for pulling this report and quote for us.

people most impacted by these crises.

Water justice is about more than equitable access to clean water. Water justice advances repair and reparations over profit-driven notions of relief. At its center, it addresses the racial and colonial realities of water governance and supports the people's rights to total ownership of their water and water transition. Given the abundant information pertaining to water justice and digital justice work, policymakers are now empowered to integrate this knowledge into their considerations of major relief policies.²⁸

Crisis! and Relief

Water transition agendas fall under the two dialectical frames of *crisis* and *relief*.²⁹ The survey of water relief policies written since March 2020 shows that both “crisis” and “relief” have variegated meanings, none of them justice-centered. Policymakers most often define the COVID-19 crisis in terms of profit loss or “inefficiency” and financial instability related to healthcare costs and worker and resource shortages.³⁰ These definitions of pandemic crisis leak into preexist-

28 Digital and data justice are movements and fields of research study that are deeply interlinked with environmental justice, Indigenous environmental justice, and Black ecologies. For leading research at this nexus see The Civic Laboratory for Environmental Action Research (CLEAR) interrogates these intersections in marine science, <https://civiclaboratory>; The Indigenous Data Sovereignty Network, <https://nni.arizona.edu/programs-projects/policy-analysis-research/indigenous-data-sovereignty-and-governance>; Tech Workers Coalition, <https://techworkerscoalition.org/climate-strike/>; Ida B. Wells Just Data Lab, <https://www.thejustdatalab.com>; Dark Laboratory, <https://www.darklaboratory.com>; The Environmental Data & Governance Initiative, <https://envirodatagov.org/environmental-data-justice/>. For recent EU testimony on this nexus see Theodora Dryer, February 3rd, 2021, Testimony before the European Parliament Greens/EFA Group. A Digital and Green Transition Series: Will Artificial Intelligence Foster or Hamper the Green New Deal? Republished on Medium by the AI Now Institute at New York University; Cathy Gere, “The Drama of the Commons: A new script for the Green New Deal,” *The Point* 22, June 12, 2020, <https://thepointmag.com/politics/the-drama-of-the-commons/>.

29 This report's analysis is informed by critical scholarship on the political and narrative power of climate crisis and the fact that colonialism has caused climate change and water scarcity. See Kyle Whyte, “Against Crisis Epistemology,” in Brendan Hokowitu et al., eds., *Handbook of Critical Indigenous Studies* (Milton Park: Routledge, 2020), <https://kylewhyte.cal.msu.edu/wp-content/uploads/sites/12/2020/07/Whyte-Against-Crisis-Epistemology-2020-1.pdf>; Esme Murdock, “On Telling the Truth Unflinchingly: Climate Catastrophe and Colonialism,” *Atmos*, April 29, 2021, <https://atmos.earth/climate-crisis-colonization-environmental-justice>; Miguel A. de la Torre, *Gonna Trouble the Water* (Cleveland: Pilgrim Press, 2021), https://www.google.com/books/edition/Gonna_Trouble_the_Water/4f4OEAAAQBAJ?hl=en&gbpv=1&dq=esme+murdock+crisis&pg=PT101&printsec=frontcover.

30 See, for example, United States Environmental Protection Agency, “Water Utility Resources for the COVID-19 Pandemic,” accessed December 17, 2021, <https://www.epa.gov/coronavirus/water-utility-resources-covid-19-pandemic>; Larry Levine, “Federal COVID-19 Relief for Water & Sewer Bills,” Natural Resources Defense Council,” April 5, 2021, <https://www.nrdc.org/experts/larry-levine/american-rescue-plan-offers-relief-water-sewer-bills>; and Cristina Tuser, “\$900 Billion

ing policy identifications of water crises defined in terms of drought and scarcity, water insecurity, and water inaccessibility. Policymakers understand these already established water crisis categories to have been exacerbated by resource and labor shortages following from the pandemic.

Yet there are gaps between dominant policy definitions of water crisis and what is needed in local water crisis contexts. This has resulted in rapidly enacted “relief” policy with slow to no actual stimulus distribution. In water crisis contexts including Flint, Michigan, and Navajo Nation, where 1 in 3 homes do not have access to safe water, these distribution failures cost lives.³¹ For example, the US Department of the Treasury’s 2020 CARES Act is a major trillion-dollar package including relief for state, local, and tribal governments to mitigate the impact of COVID-19.³² The allocation categories are 1) families and workers; 2) small businesses; 3) state, local, and tribal governments; and 4) American industry. The funding packages for state, local, and tribal governments are supported with five main funding programs.³³ Eligibility determinations for these recovery funds abide

COVID Relief Measure Includes Utilities,” *Water Waste Digest*, December 23, 2020, <https://www.wwdmag.com/coronavirus-covid-19/900-billion-covid-19-relief-measure-includes-water-utilities>.

31 Sunny Dooley, “Coronavirus Is Attacking the Navajo ‘because We Have Built the Perfect Human for It to Invade’: A traditional Diné storyteller explains how disadvantage and injustice have shaped her people’s encounter with COVID-19,” *Scientific American*, July 8, 2020, <https://www.scientificamerican.com/article/coronavirus-is-attacking-the-navajo-because-we-have-built-the-perfect-human-for-it-to-invade/>. “When a family member dies, we the Diné, whom Spanish conquistadors named the Navajo, send a notice to our local radio station so that everyone in the community can know. Usually the reading of the death notices—the names of those who have passed on, their ages, where they lived and the names of their matrilineal and patrilineal clans—takes no more than five minutes. It used to be very rare to hear about young people dying. But this past week, I listened to 45 minutes of death notices on KGAK Radio AM 1330. The ages ranged from 26 to 89, with most of the dead having been in their 30s, 40s or 50s.”

32 US Department of the Treasury, “Covid-19 Economic Relief,” accessed December 17, 2021, <https://home.treasury.gov/policy-issues/coronavirus>; For an interview with Emma Robbins, founder of the Navajo Water Project see Steve Goldstein, “Struggle to Access Clean Water on Navajo Nation Exacerbated by Coronavirus Pandemic,” July 27, 2020, <https://kjzz.org/content/1602734/struggle-access-clean-water-navajo-nation-exacerbated-coronavirus-pandemic>.

33 US Department of the Treasury, “Coronavirus State and Local Fiscal Recovery Funds,” accessed December 17, 2021, <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/state-and-local-fiscal-recovery-funds>; US Department of the Treasury, “Capital Projects Fund,” accessed December 17, 2021, <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/capital-projects-fund>; US Department of the Treasury, “Homeowner Assistance Fund,” accessed December 17, 2021, <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/homeowner-assistance-fund>; US Department of the Treasury, “Emergency Rental Assistance Program,” accessed December 17, 2021, <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/emergency-rental-assistance-program>; US Department of the Treasury, “State Small Business Credit Initiative,” accessed December 17, 2021, <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/state-small-busi->

the American Rescue Plan Act guidelines.³⁴

For local actors and communities who are most in need of this relief stimulus, this already glitchy web-based application process has uncertain outcomes.³⁵ This is because the decision-making processes for eligibility requirements are hindered by outdated compliance guidelines and other confusing political hurdles. Indeed, in their fact sheet on federal COVID-19 relief for low-income assistance, the National Consumer Law Center notes: “Federal agencies have not yet provided critical details, such as how the program funds will be allocated and how programs will be structured.”³⁶ This means that, for many, the actual receipt of funds is subject to substantial delay and possible denial.

This gatekeeping apparatus for funding determinations corresponds to a lack of acknowledgement of water injustices that affect water funding distribution decisions. These include preexisting water frameworks and laws that have historically excluded local councils in their formulation and implementation.³⁷ The 1922 Colorado River Compact, for example, is still used to guide water policy in the Southwest. Navajo Nation has since March 2020 relied on local water initiatives

ness-credit-initiative.

34 US Congress, “American Rescue Plan Act of 2021” (HR 1319), 117th Congress, 1st session, February 24, 2021, <https://www.congress.gov/bill/117th-congress/house-bill/1319/text>; “Coronavirus State and Local Fiscal Recovery Funds,” *Code of Federal Regulations*, title 26 (2021), <https://www.govinfo.gov/content/pkg/FR-2021-05-17/pdf/2021-10283.pdf>. The Interim Final Rule requires that funds be used to (a) respond to public health emergencies, (b) respond to workers performing essential work, (c) provide government services, and (d) make necessary investments in water, sewer, or broadband infrastructure.

35 For example: “Eligible states, territories, freely associated states, and Tribal governments may now submit applications for the Capital Projects Fund allocation using the Treasury Submissions Portal.” See the US Department of the Treasury, “Capital Projects Fund,” accessed December 17, 2021, <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/capital-projects-fund>.

36 National Consumer Law Center, “Fact Sheet on Recent Federal COVID-19 Relief Funding to Help Consumers with Water and Sewer Bills,” April 5, 2021, https://www.nclc.org/images/pdf/special_projects/covid-19/FS_NRDC_Covid_Water_Sewer.pdf.

37 Navajo Nation Department of Water Resources, “Mission Statement,” accessed December 21, 2021 <https://www.nndwr.navajo-nsn.gov/>. “Water has been the focus of aggressive research and planning by the U.S. Bureau of Reclamation, the Colorado River Basin States and other agencies. Approximately thirty percent of the Navajo Nation population does not have access to clean reliable drinking water. In addition, many improvements are needed for other areas of water use including water for irrigation, livestock, commercial, businesses, health care, schools and other facilities”;

Navajo Water Project, “COVID-19 Response: We’re keeping the clean water flowing during the coronavirus pandemic,” accessed December 20, 2021, <https://www.navajowaterproject.org/covid>.

to offset the inadequacy of the CARES Act implementation.³⁸ This has involved the use of low-energy technologies—enterprise-scale GIS technology and “the suitcase” box that contains a water pump, filtration system, and expansion tank—to help map areas of water needs and distribute safe water. These technologies aid with the current COVID-19 crisis but do not solve the underlying conditions of water inequities and inaccess.³⁹ As a consequence, COVID-19 infection and death rates in Navajo Nation have been disproportionately high.⁴⁰ It is evident that trickle-down relief policies, that don’t explicitly center those most in need, tend to harm more than help.⁴¹

As this report details at length, water relief policies generally function to serve technological innovation and extractive economic agendas. This is for a variety of reasons. Foremost, government bodies can use the urgency and anxiety in their designations of “crisis” and “relief” to rapidly enact decisions that can circumvent established procedures, eliminate due process, and deny decision-making

38 Justine Calma, “The Navajo Nation Faced Water Shortages for Generations — and Then the Pandemic Hit,” *Verge*, July 6, 2020, <https://www.theverge.com/2020/7/6/21311211/navajo-nation-covid-19-running-water-access>.

39 “The adoption of enterprise-scale GIS technology fueled a collaborative push by the US Public Health Service Commissioned Corps, Indian Health Service and partners to address deficiencies in safe water access on the Navajo Nation during the COVID-19 pandemic.” esri, *Expediting Water Relief for the Navajo Nation*, August 24, 2021, <https://www.esri.com/about/newsroom/blog/expediting-navajo-nation-water-relief/>; Caylee Scott, “The Suitcase: A pandemic-era invention is bringing clean water to the Navajo Nation despite COVID-19,” May 29, 2021, <https://www.12news.com/article/news/local/arizona/do-not-publish-the-suitcase-a-pandemic-era-invention-is-bringing-clean-water-to-the-navajo-nation-despite-covid-19-pandemic-restrictions/75-90dba87b-bb52-49f3-9adf-3f1641689912>.

40 Navajo Nation, *Dikos Ntsaaígíí (COVID-19)*, <https://www.ndoh.navajo-nsn.gov/COVID-19>.

41 A number of programs were created to help better distribute CARES resources. See Nathan O’Neal, “How Far Will CARES Act Money Go in Solving the Navajo Nation Water Crisis?” *KOB 4*, September 22, 2021, <https://www.kob.com/albuquerque-news/how-far-will-cares-act-money-go-in-solving-the-navajo-nation-water-crisis/5871063>.

Indian Health Service: The Federal Health Program for American Indians and Alaska Natives, “Increasing Access to Safe Water on the Navajo Nation during the COVID-19 Pandemic,” accessed December 20, 2021, <https://www.ihs.gov/newsroom/ihs-blog/december2020/increasing-access-to-safe-water-on-the-navajo-nation-during-the-covid-19-pandemic/>; “During the COVID-19 pandemic, the Indian Health Service, the Navajo Nation, and other partnering organizations have collaborated on a project using \$5.2 million from IHS-appropriated Coronavirus Aid, Relief, and Economic Security Act funding to increase water access on the Navajo Nation [...] On the Navajo Nation, while many have access to modern day amenities, there are segments of people without running water and bathroom facilities. This clearly poses challenges to following CDC guidance to slow the spread of COVID-19, of which frequent hand washing is a critical part.”

authority to the people most affected by the policy change.⁴² Furthermore, state designations of crisis can harness this urgency toward the fulfillment of prominent “relief” and “solution” tech agendas. For example, the Bureau of Land Management’s recent declaration of water shortage on the Colorado River has moved responsive tech development initiatives to the top of state legislative agendas without consideration of other possibilities.⁴³

Relief—as it is conceptualized in policymaking—does not equate to *repair* or *reparations*.⁴⁴ Relief is a future-oriented decision-making apparatus that defines crisis in terms of profit and loss, missed statistical benchmarks, and supply-chain failures.⁴⁵ This report also captures the fact that there is a much larger historical and present-day context to relief policy, which spans categories of reconstruction, urban renewal, emergency and disaster management, rapid response, and risk policies. Without intentional justice interventions, relief frameworks will likely continue to structure water transition and climate transition agendas far into the future.

At stake are the realities of racial capitalism and settler colonialism that are only worsening under the climate crisis. As J.T. Roane writes in his contribution to this report, necrocapitalist logics are present in inequitable water infrastructure systems. He examines how anti-Black violence and death were value-generating for Jim Crow-era municipalities, water policies that are still impacting lives today.

42 See Naomi Klein, *The Shock Doctrine: The Rise of Disaster Capitalism* (New York: Henry Holt, 2007).

For example, see Bureau of Reclamation, “Colorado River Basin Contingency Plans,” accessed December 21, 2021, <https://www.usbr.gov/dcp/>; Much of the contingency planning relates to the 1922 Colorado River compact between the US states Wyoming, Colorado, Utah, New Mexico, Arizona, and Nevada. See National Integrated Drought Information System, “Colorado River Drought Contingency Planning,” February 12, 2019, accessed December 21, 2021, <https://www.drought.gov/news/colorado-river-drought-contingency-planning>.

43 Karyn Stockdale, “The Entire Colorado River Basin Is in Crisis,” Audubon.org, September 20, 2021, <https://www.audubon.org/news/the-entire-colorado-river-basin-crisis-0>; Will Sarni, “The Colorado River Basin: What’s Wrong and What’s Needed to Make it Right,” GreenBiz, August 26, 2021, <https://www.greenbiz.com/article/colorado-river-basin-whats-wrong-and-whats-needed-make-it-right>.

44 For policy literature on reparations, see William A. Darity Jr. and A. Kirsten Mullen, *From Here to Quality* (Chapel Hill: University of North Carolina Press, 2020), <https://uncpress.org/book/9781469654973/from-here-to-equality>; Ann Marie Cunningham, “Payback for Pain and Loss: Reparations for Relatives of Lynching Victims?” Mississippi Center for Investigative Reporting, November 24, 2020, <https://www.mississippicir.org/perspective/payback-for-pain-and-loss-reparations-for-relatives-of-lynching-victims>; Molly Callahan, “Reparations ‘Essential’ to Addressing Systemic Racial Injustice, Speakers Say,” News@Northeastern, November 17, 2020, http://news.northeastern.edu/2020/11/17/ta-nehisi-coates-angela-y-davis-make-the-case-for-reparations-for-families-of-lynching-victims/#_ga=2.172314795.983566132.1639770298-167461372.1639770298.

45 For example, see Erik Davies, “Managing Supply Chain Water Risk: New Capacities for New Challenges,” BSR, March 5, 2018, <https://www.bsr.org/en/our-insights/blog-view/managing-supply-chain-water-risk-new-capacities-for-new-challenges>.

This relates to a broader context of rural and urban segregationist policies, including inequitable access to housing, healthcare, education, and other resources that were designed—explicitly and implicitly—to benefit white people at the expense of Black lives.⁴⁶ Indeed, much of US infrastructure was built during historical epochs of relief policies that perpetuated anti-Black planning, including reconstruction⁴⁷ and urban renewal.⁴⁸ It is clear that designations of “crisis” and “relief” have had generational impacts on civil liberties.

Finally, technology and energy developers have long used “crisis” and “relief” to subvert water protections and water rights in the advancement of technological expansion. This subversion can take the form of temporary settlement agreements used to manipulate beneficial use clauses in water distribution decisions,⁴⁹ drying up or rerouting monetary resources for local community allocations,⁵⁰ and hindering justice work via legal entanglements, compliance hurdles, and other bureaucratic distractions. Water relief policies that focus on technical solutions benefit tech actors and beneficiaries while harming and excluding marginalized communities.

46 Black codes were restrictive laws designed to limit the freedom of Black people after slavery was abolished that severely limited their rights. There are wide bodies of research on Jim Crow policy and the environment. See, for example, Robert D. Bullard, *Dumping In Dixie: Race, Class, And Environmental Quality*, 3rd ed. (New York: Routledge, Taylor and Francis Group, 2000); Michelle Alexander, *The New Jim Crow* (New York: The New Press, 2012); Sylvia Hood Washington, *Packing Them In: An Archaeology of Environmental Racism in Chicago, 1865–1954* (Bloomington: iUniverse, 2017); Keeanga-Yamahatta Taylor, *Race for Profit: How Banks and the Real Estate Industry Undermined Black Homeownership* (Chapel Hill: University of North Carolina Press, 2019).

47 “Resisting Economic Exploitation,” in Equal Justice Initiative, *Reconstruction in America: Racial Violence after the Civil War, 1865–1876*, accessed December 17, 2021, <https://eji.org/report/reconstruction-in-america/freedom-to-fear/#resisting-economic-exploitation>.

48 Ted Rutland, “A Calibrated Rush for Progress: Urban Renewal, Anti-Blackness, and the Diverse Effects of a Totalizing Planning Project,” in *Displacing Blackness* (Toronto: University of Toronto Press, 2018), <https://www.degruyter.com/document/doi/10.3138/9781487518233-007/html>.

49 S. Hockaday and K.J. Ormerod, “Western Water Law: Understanding the Doctrine of Prior Appropriation,” University of Nevada, accessed December 17, 2021, <https://extension.unr.edu/publication.aspx?PubID=3750>.

50 Mark Armao, “The Colorado River is drying up. Here’s how that affects Indigenous water rights,” *Grist*, October 6, 2021, <https://grist.org/equity/colorado-river-drought-indigenous-water-rights/>. “Indigenous nations have recognized rights to more than one-fifth of the basin’s annual supply — more than a trillion gallons, or nearly enough to cover an area the size of Connecticut in a foot of water. That allocation is likely to increase in the future, because 12 of the tribes in the Colorado River Basin are still engaged in the decades-long process of resolving their water rights claims, according to the Water & Tribes Initiative, a coalition of tribal representatives, water rights attorneys and academics.”

The Water & Tribes Initiative, “Policy Brief #4: The Status of Tribal Water Rights in the Colorado River Basin,” April 9, 2021, <http://www.naturalresourcespolicy.org/publications/policy-brief-4-final-4.9.21-.pdf>.

Water Relief Policy and Technology (AI Won't Solve a Water Crisis)

Digital technology is an expanding feature of water relief policies. Artificial intelligence, machine learning, computer vision, and other digital data systems are currently being promoted and integrated across water domains. These include the use of such technologies in managing watersheds,⁵¹ smart water management systems,⁵² wastewater management,⁵³ agriculture, and much more. Proponents see the integration of newer digital management systems into preexisting water infrastructures, water management systems, and water information contexts as a profitable solution to water crises. Specifically, these systems are designed to “repair” failures in water management systems including scarcity,⁵⁴ inefficiency,⁵⁵ uncontrollability, and leaking profits.⁵⁶ In these advancements, both the “relief” and the “crisis” are encoded in digital-economic terms: cost, profit, efficiency, and optimization.

51 Neelke Doorn, “Artificial Intelligence in the Water Domain: Opportunities for Responsible Use,” *Science of the Total Environment* 755, no. 1 (February 2021), <https://doi.org/10.1016/j.scitotenv.2020.142561>.

52 Hubert Jenny et al., “Using Artificial Intelligence for Smart Water Management Systems,” *ADB Briefs* 143 (June 2020), <https://www.adb.org/sites/default/files/publication/614891/artificial-intelligence-smart-water-management-systems.pdf>.

53 Jay Nelson, “AI in Water: 10 Ways AI is Changing the Water Industry,” *Innovyze.com*, April 7, 2020, <https://www.innovyze.com/en-us/blog/ai-in-water-10-ways-ai-is-changing-the-water-industry>.

54 Will Sarni, “Digital Tools Now Help Address Water Scarcity,” *Techonomy.com*, March 26, 2020, <https://techonomy.com/2020/03/digital-tools-must-help-us-address-water-scarcity>; Will Sarni, “Why I Am Doubling Down on Digital for Water,” *Greenbiz.com*, April 24, 2020, <https://www.greenbiz.com/article/why-i-am-doubling-down-digital-water>; Sanjeev Verma, “Digitizing The Water Sector: An Opportunity to Improve Water Quality,” *WaterOnline.com*, January 6, 2021, <https://www.wateronline.com/doc/digitizing-the-water-sector-an-opportunity-to-improve-water-quality-0001>.

55 Tim van Leeuwen, “How AI is Helping the Water Industry Wash Away Unplanned Downtime,” *Water & Waste Digest*, August 26, 2021, <https://www.wwdmag.com/smart-water/how-ai-helping-water-industry-wash-away-unplanned-downtime>.

56 “By harnessing the power of artificial intelligence algorithms and big data analytics, water utilities can maximize information and data available to make better decisions while enhancing service delivery and reducing costs.” Hubert Jenny et al., “Using Artificial Intelligence for Smart Water Management Systems,” *ADB Briefs* 143 (June 2020), <https://www.adb.org/sites/default/files/publication/614891/artificial-intelligence-smart-water-management-systems.pdf>.

Water itself is computed as a data currency, treated as an abstracted commodity or financial future in water financialization systems, far from its reality as a natural resource and ecology.⁵⁷ Surveys of recent AI technical literature in water domains show how new digital infrastructures abstract water information from older water infrastructures and water body contexts.⁵⁸ Analysts working with water data including the range of agricultural data, wastewater data, and allocation and distribution data, often rely on older analytic models and algorithms grounded in extractive economic assumptions and water policies. In their subsequent processes of data collection and exchange, these digital initiatives move further away from real water body contexts and water sources—rivers, lakes, and aquifers—and are thus designed to neglect contextual histories of water rights and ownership.

Yet COVID-19 water relief policies are flooding investments into AI and other tech-development agendas, usually written as vaguely defined research and development expenditures. This is resoundingly clear in the Biden administration’s billion-dollar proposal for “water infrastructure R & D” and “innovative technology solutions” that are the main staple of the White House climate agenda. Yet, across this water relief policy landscape, the role of technology remains underspecified, even as it is persistently put forward as the *assumed* solution for water crisis. This lack of specificity is precisely what allows for unregulated and unchecked rapid tech development in the water domain.

Increasingly, over the past ten years, AI water management systems have expanded into various water domains to manage and control water information and distribution decisions. These programs are now being bolstered by COVID-19 and the climate relief agendas. For example, in September 2020, the Canadian government—through Sustainable Development Technology Canada (SDTC)—awarded Pani Energy \$2.8 million to develop cloud-based artificial intelligence (AI) to optimize a broad suite of water processes across Canada, from desalination to operating costs. The CEO stated at launch: “The water industry is thirsty for innovation,” and the initiative promised total efficient systemization of Canada’s water.⁵⁹ These innovation programs exacerbate inequities and harms caused by tech-driven water management, especially when funding for AI and cloud technology so drastically outweighs funding for local government and community allocation, and while many struggle for basic access to water and sanitation.

It is necessary to reground policy related to cloud technology like this in

57 Daiva Repeckaite, “Water Futures: The Latest Battleground on the Defense of the Fundamental Right to Water,” *Equal Times*, February 3, 2021, <https://www.equaltimes.org/water-futures-the-latest>.

58 See, for example, Mohammed Hameed et al., “Application of Artificial Intelligence (AI) Techniques in Water Quality Index Prediction: A Case Study in Tropical Region, Malaysia,” *Neural Computing and Applications* 28 (2017): 893–905, <https://link.springer.com/article/10.1007/s00521-016-2404-7>.

59 “AI for Water,” *WaterWorld*, September 29, 2020, <https://www.waterworld.com/drinking-water/infrastructure-funding/press-release/14184344/ai-for-water>; Vi Bui, “Fighting COVID-19 Starts with Universal Access to Water and Sanitation,” *th Council of Canadians*, accessed December 19, 2021, <https://canadians.org/analysis/fighting-covid-19-starts-universal-access-water-and-sanitation>.

the urban and rural environments it is used in, the specific desalination and distribution systems it operates on, and the water policies—past and present—that determine resource ownership and access of the water and water information that feeds the data programs. Otherwise, these tech companies will continue to monopolize water information and control water allocation and distribution decision-making processes, without any incentives either to engage local actors or to prioritize racial, environmental, and ecological justice.

In addressment of this, this report identifies “technology” in water relief policies as the technical, political, and legal stratifications of water infrastructures and decision-making powers that control water access and allocation.⁶⁰ This definition includes artificial intelligence systems and data analysis as well as the older water infrastructures and policies those systems are built on. Undergirding any automated system used in water analysis are locally and environmentally situated water infrastructures that were originally built for specific policy contexts that need to be understood.

By analyzing how digital technologies are used to manage older water infrastructures, we see that relief policies written over the past two years derive from much longer histories of extractive water governance systems. Report contributors consider COVID-19-era policies in relation to older—and still in effect—racial and colonial policies and legal contexts such as General Mining Act of 1872,⁶¹ Jim Crow municipal segregation,⁶² hydrodamming orders, white supremacist vigilantism, inequitable disaster and risk solution systems, and more. Digital tech interests often assert abstract and future-oriented water transition frameworks that obfuscate these living histories.

In fact, digital tech expansion programs most often define “relief” in terms of optimization and efficiency logics. And despite the suggestive promises of a totally efficient water system, it is, for example, impossible for an automated

60 This definition is directly informed by the work and thought of the report contributors. It is also influenced by geographer Ruth Wilson Gilmore’s extensive work infrastructure. See Ruth Wilson Gilmore and Winona LaDuke, “Beyond Pipelines and Prisons: Infrastructures of Abolition,” October 26, 2020, <https://www.youtube.com/watch?v=xT5eTVQAc2g>; Ruth Wilson Gilmore, *Golden Gulag: Prisons, Surplus, Crisis, And Opposition in Globalizing California* (Berkeley: University of California, 2007).

Additionally, there are many scholars who are working on the nexus of environmental justice and digital infrastructure. See Ingrid Burrington, “What and Where Is The Internet” *Observable*, January 1, 2021 <https://observablehq.com/@lifewinning/what-and-where-is-the-internet>.

61 General Mining Act of 1872, the 42nd United States Congress, Session 2, Ch.152, Stat. 91–96. The General Mining Act of 1872 is a United States federal law that authorizes and governs prospecting and mining for economic materials, such as gold, platinum, and lithium on public and Indigenous lands. This Mining Law is part of colonial extraction and genocide.

62 See also Werner Troesken, “The Limits of Jim Crow: Race and the Provision of Water and

decision system (ADS)⁶³ to magically fix water infrastructure designed to appropriate and poison water.⁶⁴ ADS systems are built with data created and extracted from specific policy-laden contexts such as Jim Crow segregation and extractive colonialism and they function to uphold the frameworks and parameters of analysis provided to them.⁶⁵ Technologies like these are the growing focus of research and development expenditure seen across the following COVID-19 water relief agendas.

In the remainder of this introduction, I will detail a survey of COVID-19 relief policies that include water in order to illuminate the tech-centricity of these agendas. This survey and analysis grounds us in the present-day water crisis landscape to reflect on water justice and technology more broadly. The introduction ends with our collective thoughts on water justice and technology toward rethinking relief.

COVID-19 Relief Policies That Include Water

A brief survey of COVID-19 relief legislation, policy, and recommendations that *include* water reveals that water relief agendas are enmeshed with technology and data, economic growth agendas, and profit-led water infrastructure development. Across these agendas, water relief functions in the following ways:

1. Relief is enacted through tech-mediated management structures and water

63 See, for example, A. Cavallo et al., “Automated Fuzzy Decision and Control System for Reservoir Management,” *Journal of Water Supply: Research and Technology-Aqua* 26, no. 4 (2013): 189–204, <https://doi.org/10.2166/aqua.2013.046>.

64 I have conducted research on algorithms used in water appropriation cases along the Colorado River and local resistance to these algorithmically mediated water policies. See Theodora Dryer, “Big Data Stream,” *Logic Magazine* 14, September 30, 2021, <https://logicmag.io/kids/big-data-stream>. In many cases, water appropriation policies are literally encoded into algorithmic design; see, for example Tissa H. Llangasekare and Hubert J. Morel-Seytoux, “Algorithm for Surface/Ground Water Allocation under Appropriation Doctrine,” *Groundwater* 24, no. 2 (1986): 199–206.

65 There is a wide body of legal and academic scholarship on the social function of algorithms, predictive analytics, and automated decision systems in policy and legal decisions and how they do not solve racial and social inequities, but rather encode them into their function, thereby perpetuating egregious harm. This most definitely extends into the water domain. See Desmond Upton Patton et al., “Stop and Frisk Online: Theorizing Everyday Racism in Digital Policing in the Use of Social Media for Identification of Criminal Conduct and Associations,” *Social Media + Society* 3, no. 3 (July 2017), <https://doi.org/10.1177/2056305117733344>; J. Khadijah Abdurahman, “Calculating the Souls of Black Folk: Predictive Analytics in the New York City Administration for Children’s Services,” *Columbia Journal of Race and Law* 11, no. 4 (2021): 75–110; Rashida Richardson, “Confronting Black Boxes: A Shadow Report of the New York City Automated Decision System Task Force,” AI Now Institute, 2019, <https://ainowinstitute.org/ads-shadowreport-2019.pdf>; Virginia Eubanks, *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor* (New York: Picador, 2018); and Ruha Benjamin, *Race After Technology* (Cambridge: Polity Press, 2019).

financialization systems.

2. Relief policies center technological growth agendas including technological innovation research and development that funnels money into artificial intelligence (AI) and other energy expansionist programs.
3. Relief agendas are framed and managed with efficiency and optimization standards that benchmark success against goals of profit and growth.
4. Relief determines safety and regulations standards that affect water domain workers' healthcare and rights.
5. Relief is used to legitimize investment in private computational infrastructures, while implicitly advancing social divestment and neglect.

Legislation Enacts “Relief” Through Tech-Driven Management and Water Financialization Systems

Mapping the enactment plans and processes of COVID-19 water relief policy clarifies how these agendas function within the tech sector. To begin, the 2020 Clean Economy Jobs and Innovation Act (HR 4447) is another major piece of COVID-19-era legislation that purports to address the climate crisis.⁶⁶ Specifically, this bill addresses “energy efficiency, renewable energy, carbon pollution reduction, nuclear energy, electric grid modernization, cybersecurity,” and more. It advances a “Federal Smart Building Program” to operate across different federal agencies, in effect treating the Department of Energy’s wider providence as a smart city.⁶⁷ This means that this is a major legislative order for current and future energy management, across sectors, that prioritizes energy and fossil fuel expansion and technological development—not justice—in the water domain.

Funneling COVID-19 relief funds directly into technological innovation is the norm. Recent implementation guides detail how the CARES Act functions “to

66 For a good overview of the term water financialization used in water policy and infrastructure development, see Alex Loftus, Hug March, and Thomas F. Purcell, “The Political Economy of Water Infrastructure: An Introduction to Financialization” WIREs WATER, November 4, 2018, <https://doi.org/10.1002/wat2.1326>.

US House of Representatives, “Clean Economy Jobs and Innovation Act of 2020,” HR 4447, 116th Cong. §2(d) (2020), <https://www.congress.gov/bill/116th-congress/house-bill/4447/text>.

67 On the limitations and myths of smart cities, see Ben Green, *The Smart Enough City* (Cambridge: MIT Press, 2019); Julian Agyeman, Robert D. Bullard, and Bob Evans, eds., *Just Sustainabilities: Development in an Unequal World* (Cambridge: MIT Press, 2003); and Rodanthi Tzanelli, “Reconfiguring ‘Sustainability’ in Mumbai: From Environmental Racism to Digital Governabilities after *Slumdog Millionaire*,” Centre for Ethnicity & Racism Studies, August 2015, https://cers.leeds.ac.uk/wp-content/uploads/sites/97/2015/11/CERS_MumbaiSust.pdf).

serve citizens with technology.”⁶⁸ And the American Rescue Plan is widely known as the “the technology modernization fund.”⁶⁹ Investments in “green” technology are a major feature of this trend. New York State’s 2019 Climate Leadership and Community Protection Act prioritized funds for innovation in “renewable” and “green” energy system technologies.⁷⁰ And in many cases these agendas are written around central tech development projects. For example, HR 4447’s central project is “an energy storage and microgrid grant and technical assistance program.”⁷¹ This initiative includes water power and water energy development, with the R & D directives to use “water power technologies to improve economic growth and enhance cross-institutional foundational workforce development.”⁷²

This preoccupation with technological solutionism has saturated even more socially conscious recommendations. Some advocates have rightly identified water infrastructure and access as central to addressing the enmeshed COVID-19 and climate crises. For example, the Brookings Institute recommended that federal leaders prioritize water in climate discussions.⁷³ Yet the Institute describes the prioritization of water in terms of financial and technical capacity alone. The recognition that “COVID-19 has exposed the continued neglect of our water infrastructure” does not go far enough. COVID-19 has clarified the fact that water infrastructures are racialized tech-mediated water systems that function to produce profits for some while controlling resources for others, often at the expense of the environment and human life. Without deeper analysis of the social and ecological

68 Rock Solid, “The CARES Act and Technology: A Guide for Local Government,” December 28, 2020, <https://www.rocksolid.com/blog/cares-act-tech-local-government>; Government Technology, “CARES Act Funding and Technology: What State and Local Governments Need to Know,” <https://papers.govtech.com/2020-Security-Outcomes-Study-135341.html/CARES-Act-Funding-and-Technology-What-State-and-Local-Governments-Need-to-Know-200820.html>; Kyle Tuberson and Kim McCarley, “Time Running Out to Use CARES Funds for Tech (Contributed),” *Government Technology*, October 30, 2020, <https://www.govtech.com/opinion/time-running-out-to-use-cares-funds-for-tech-contributed.html>.

69 The Technology Modernization Fund, “American Rescue Plan Guidelines on the American Rescue Plan Funding,” accessed December 19, 2021, <https://tmf.cio.gov/arp>.

70 Climate Leadership and Community Protection Act of 2019 (New York State), A08429 (2019), https://nyassembly.gov/leg/?default_fld=&leg_video=&bn=A08429&term=2019&Summary=Y&Actions=Y&Text=Y.

71 “Clean Economy Jobs and Innovation Act of 2020.”

72 Ibid.

73 Newsha K. Ajami and Joseph W. Kane, “The Hidden Role of Water Infrastructure in Driving a COVID-19 Recovery,” Brookings Institution, October 20, 2020, <https://www.brookings.edu/blog/the-avenue/2020/10/20/the-hidden-role-of-water-infrastructure-in-driving-a-covid-19-recovery>. “Federal leaders must prioritize our water challenges in climate discussions, measure the fiscal impacts to states and localities, and build more financial and technical capacity at the state and local level for water-related adaptation.”

injustices underlying these systems, alarms of “neglect,” “infrastructural failure,” and indeed “crisis” will continue to bolster technological and profit-led solutions that don’t address the root of these problems.

Some COVID-19-era legislation recognizes the deleterious impacts of tech development in the water domain. The End Polluter Welfare Act, geared to end certain subsidies for fossil-fuel production, moves to repeal parts of the Energy Policy Act of 2005 that allowed deep-water drilling in the Gulf of Mexico.⁷⁴ The Health and Economic Recovery Omnibus Solutions (HEROS) Act of 2020 sets aside funds for potable water to vulnerable populations, distributed through state entities like the Bureau of Indian Affairs.⁷⁵ Yet more relief funds went to information technology and broadband infrastructure, deemed essential development during the pandemic.

Water financialization is another major component of water relief programming. Most of the US state level COVID-19 water relief policies center arrearage, late-payment, non-payment, and water-debt guidelines for public water distribution during the pandemic.⁷⁶ For example, the California Water Boards Water and Wastewater Arrearage Payment Program was enacted to provide relief from water debt during the COVID-19 crisis. Its guidelines involve a multilayered application and data-collection process whose design poses significant barriers for non-English speakers, undocumented people, and those without access to computers.⁷⁷

Thus the bureaucratic function of the system overwhelms possibilities for community care and equitable water distribution. A related *Low Income Home Energy Assistance Program* was established to relieve immediate and short-term needs.⁷⁸ Water financialization systems operate in terms of fiscal cycles and deadlines; in this case, the COVID-19 crisis was given a deadline of January 1, 2022—a false termination date, especially given the omicron variant’s current rapid spread. This invokes larger incommensurability between how relief and crisis are

74 End Polluter Welfare Act of 2020, HR. 7781, 116th Cong. §2(d) (2020), <https://www.congress.gov/bill/116th-congress/house-bill/7781/text>.

75 Health and Economic Recovery Omnibus Emergency Solutions (HEROS) Act of 2020, HR 6800, 116th Cong. §2(d) (2020), <https://www.congress.gov/bill/116th-congress/house-bill/6800/text>.

76 California Water Boards, “California Water and Wastewater Arrearage Payment Program,” last modified December 14, 2021, https://www.waterboards.ca.gov/arrearage_payment_program.

77 California Water Boards, “California Water and Wastewater Arrearage Payment Program Guidelines: Water Arrearages,” September 21, 2021, https://www.waterboards.ca.gov/arrearage_payment_program/docs/final_guidelines.pdf.

78 California Department of Community Services & Development, “Low Income Home Energy Assistance Program,” accessed December 19, 2021, <https://www.csd.ca.gov/Pages/LIHEAPProgram.aspx>.

computed, the pace and scope of water policy, and our global reality: How should water be financed under a climate crisis with no end? This premise can only yield continued financial failures and crisis.

Addressing “water infrastructure” solely in terms of technology and water financialization distracts from supporting justice-centered policy.⁷⁹ For example, tech-centric water infrastructure has so far been central to the Biden administration’s climate agenda. After the more overt climate-change denial of the Trump presidency, Biden has centered climate change as a national security issue. Some Biden communications signal interest in Indigenous sovereignty and prioritize clean water access for BIPOC communities disproportionately impacted by corporate pollution. Yet the solutions that backstop these intentions are written in ways that promote technological development and deployment as solutions, along with financialized approaches such as carbon trading. Indeed, taken together, Biden’s plans as of this writing include an approximately \$400 billion investment in tech development in the energy and water sectors, with no clarity on how these programs will support Indigenous sovereignty or BIPOC access to clean water.⁸⁰

While these agendas emphasize innovation in technological R & D, other government-led relief policies advance extensions of increased spending on already established systems. Here we see policy makers using “relief” to legitimize increased funds for new innovation and technology while at the same time bolstering existing tech-centered policies.⁸¹ This means that under the flood of R & D spending for “innovative” water transition, a majority of COVID-19 crisis relief programs did not alter how standing monetary and water access infrastructures work; they reinforced them.

Many relief agendas in the water financialization domain are payment-extension programs. For example, on March 29, 2020, FEMA extended their flood insurance renewal policies by a month.⁸² Attention to monetary relief similarly reinforces existing regimes of water resource control that treat water as a com-

79 COVID-19-era water infrastructure legislation includes: US Senate, America’s Water Infrastructure Act of 2020 (S 3591), 116th Congress, 2nd session, May 4, 2020; US Senate, BUILD GREEN Infrastructure and Jobs Act (S 874), 111th Congress, 1st session, March 18, 2021; US Senate, Energy Infrastructure Act (S 2377), 117th Congress, 1st session, July 19, 2021; US Senate, Energy and Water Development and Related Agencies Appropriations Act, 2022 (S 2605), 117th Congress, 1st session, August 4, 2021.

80 “The Biden Plan for a Clean Energy Revolution and Environmental Justice,” JoeBiden.com, accessed December 15, 2021, <https://joebiden.com/climate-plan>.

81 For example (related to Flint Michigan), see Michigan State House of Representatives, House Concurrent Resolution No. 13, 101st Legislature, October 21, 2021, <http://legislature.mi.gov/doc.aspx?2021-HCR-0013>; see also Texas State House of Representatives, HB 181, 87th Legislature, 2nd session.

82 FEMA, “FEMA Extends Grace Period for Flood Insurance Renewal Premiums,” last updated March 18, 2021, <https://www.fema.gov/news-release/20200726/fema-extiende-el-periodo-de-gracia-para-renovar-polizas-de-seguro-de>.

modity. In October 2020, the International Monetary Fund (IMF) surveyed global COVID-19 water relief policies. The thirty countries that prioritized water policies focused on emergency utility and municipal access.⁸³ This took the form of subsidies, VAT exceptions, and, in some cases, free water. Attention to monetary relief in utility spending and other municipal water domains is a major component of water relief globally.

Finally, major regulatory enterprises use “relief” frameworks to frame safety and health recommendations and guidelines. In March 2020, the EPA outlined its regulatory and compliance standards for the COVID-19 crisis. The EPA functions to oversee governing bodies for compliance with state policies, such as the Safe Drinking Water Act (SDWA).⁸⁴ Much of the COVID-19 crisis relief response has focused on maintaining normalcy across economic and bureaucratic functions, from supply chains to labor to data processing.

Of course, water and waste management and infrastructure depend on workers to maintain these systems. In the EPA’s definition, the COVID-19 crisis is viewed as a problem of unpredictable shortages of sanitation and waste workers, combined with severe supply-chain disruptions. The EPA extends this concern to laboratory workers who work with water to “perform routine compliance monitoring, integrity testing, sampling, laboratory analysis, training, and reporting or certification.”⁸⁵ Beyond the management of labor shortage, there is not much written on the protection and rights of waste, sanitation, and laboratory workers. In one response, the Water Environment Federation (WEF) recommended more research on PPE for waste management workers.⁸⁶ In general, relief guidelines on water domain workers lack serious acknowledgement of their status and needs as essential workers.

Water Relief Policy Is Saturated with Efficiency and Other Technological Growth Standards and Metrics

Seen throughout COVID-19 water relief policies, assessment standards neglect water justice considerations and instead enthrone optimization and efficiency management to guide research development, general management, and policy

83 No Western countries prioritized water subsidies or exceptions.

84 United States Environmental Protection Agency, “Safe Drinking Water Act,” accessed December 15, 2021, <https://www.epa.gov/sdwa>.

85 United States Environmental Protection Agency, “COVID-19 Implications for EPA’s Enforcement and Compliance Assurance Program,” news release March 26, 2020, <https://www.epa.gov/sites/default/files/2020-03/documents/oecamemooncovid19implications.pdf>.

86 Water Environment Federation (WEF), *Protecting Wastewater Professionals From Covid-19 and Other Biological Hazards* (Alexandria: Water Environment Federation, 2020), <https://accesswater.org/?id=-10027929>.

oversight.⁸⁷ For example, in the Clean Economy Jobs and Innovation Act, the central tech development project is an efficient energy microgrid system. While “energy efficiency” and “water efficiency” are not well defined in the text, the terms relate to building code standards, cost analysis, and technological growth.⁸⁸ Efficiency and optimization are two of the most prominent decision-making frameworks and standards in water transition legislation and policy. They are baked into technological provisions and are assumed process standards. This means that these policies are written to fulfill these efficiency provisions rather than interrogate the environmental, social, and human impacts of the agendas.

Efficiency and optimization priorities mean the exclusion of water justice, even under Environmental Justice (EJ) and Indigenous Environmental Justice (IEJ) directives, and this is reflected down to the scale of data and analysis. Notably, in the Clean Economy Jobs and Innovation Act, “race” is named fewer than twenty times in the legislative text, while “efficiency” is named more than 280 times. Furthermore, both “race” and “tribal interests” are relegated to categories of data collection. The act pulls from the 1994 Executive Order, “Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations,” where each federal agency shall “collect, maintain, and analyze information assessing and comparing environmental and human health risks borne by populations identified by race, national origin, or income.”⁸⁹ The directive here is to collect data on these groups or “populations.” Along with this data directive, there is no language in the act that speaks to centering racial justice and Indigenous rights and council in governing directives and funding allocation.

As EJ and IEJ are relegated to footnotes (if mentioned at all) in recent legislation, these agendas uphold extractive economic interests at the expense of justice-centered deliberations. In the Clean Economy Jobs act, “justice” is literally interpreted as a data-collection project rather than as a goal that requires centering historically marginalized communities and ensuring they have funding and support. This isn’t new. Indigenous policymakers and community organizers have long been calling attention to how non-Indigenous statistical data directives work against environmental justice and sovereignty rights in cases of voting, census collection, biometric data, and water data extraction and monopolization.⁹⁰ The right of ownership and access to water information is fundamental for decision-making

87 For a history of optimization and settler water control, see Theodora Dryer, “Big Data Stream,” *Logic*, Issue 14, September 30, 2021, <https://logicmag.io/kids/big-data-stream>.

88 For example, the act states that building code targets be at the “maximum level of energy efficiency that is technologically feasible and lifecycle cost effective.”

89 The President of the United States, “Executive Order 12898 of February 11, 1994. Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations,” *Federal Register*, 59, no. 32, February 16, 1994, <https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf>.

90 See Maggie Walter and Chris Andersen, *Indigenous Statistics: A Quantitative Research Methodology* (London: Routledge, 2013).

power over natural resources and self-governance.

This is also an example of predatory colonial extraction research⁹¹ that is prominent in policy guidelines for EJ and IEJ data collection. Instead, water policy should move toward research justice frameworks.⁹² Indigenous Data Sovereignty is a movement that has intervened into tech policy uses of Indigenous statistics and information; the movement's work should be known in all data programs related to tribal governments. The Indigenous Data Sovereignty Network defines IDS as “the right of a nation to govern the collection, ownership, and application of its own data. It derives from the Tribes’ inherent right to govern their peoples, lands, and resources.”⁹³

Water Protectors and Pipeline Surveillance

Water protectors, climate activists, and other community groups are not only injured by extractive economic policies through the development of fossil fuel infrastructures; they are also actively surveilled, imprisoned, and killed as a result of fossil fuel infrastructure expansion. From this perspective, we understand crisis around water as ongoing colonial violence on unceded Indigenous land and water. This persists today in the forced and often unlawful development of oil pipelines and similar projects in the name of resource extraction, which cut through sovereign Indigenous land and pose significant danger to local communities.

Over the past few months, the Canadian military and Royal Canadian Mounted Police (RCMP) have been illegally occupying Wet'suwet'en homelands following expansion of the Coastal GasLink pipeline, a project that illegally denies Aboriginal title.⁹⁴ Between 2019-2020 alone, the RCMP spent over \$13

91 Please read Waziyatawin Angela Wilson, *Remember This! Dakota Decolonization and the Eli Taylor Narratives* (Lincoln: University of Nebraska Press, 2005).

92 See DataCenter, “DataCenter Closed Its Doors on July 31st, 2016,” accessed December 19, 2021, <http://www.datacenter.org>; see also Civic Laboratory for Environmental Action Research (CLEAR), accessed December 19, 2021, <https://civiclaboratory.nl>. Thank you to Amrah Salomón for your engagement with this point.

93 United States Indigenous Data Sovereignty Network, <https://usindigenousdata.org>; Tahu Kukutai, John Taylor, eds., *Indigenous Data Sovereignty: Toward an Agenda* (Canberra: The Australian National University, 2016), <https://press.anu.edu.au/publications/series/caepr/indigenous-data-sovereignty>; Stephanie Carroll Rainie, Tahu Kukutai, Maggie Walter, Oscar Luis Figueroa-Rodriguez, Jennifer Walker, Per Axelsson, “Indigenous Data Sovereignty: – Issues in Open Data,” in Tim Davies, Stephen B. Walker, Mor Rubinstein, and Fernando Perini, eds., *The State of Open Data: Histories and Horizons* (Cape Town and Ottawa: African Minds and International Development Research Centre, 2019), <https://www.stateofopendata.od4d.net/chapters/issues/indigenous-data.html>.

94 Office of the Wet'suwet'en, “Our Territory,” <http://www.wetsuweten.com/territory>; Jillian Kestler-D'Amours, “Understanding the Wet'suwet'en Struggle in Canada,” *Al Jazeera*, March 1, 2020, <https://www.aljazeera.com/news/2020/3/1/understanding-the-wetsuweten-struggle-in-canada>.

million on policing the Coastal GasLink pipeline.⁹⁵

The current occupation of Wet'suwet'en homelands and waters, which has been going on for over a decade, connects to a broader movement of Indigenous peoples defending waterways against fossil fuel infrastructure. This also links to an event known as the Kanesatake Resistance, or the Mohawk Resistance at Kanesatake. In 1990, the Mohawk people took a blockade action against the illegal expansion of a Montreal golf course. The Canadian military, which refers to this as “the Oka Crisis,” took military action against the Mohawk people, resulting in a seventy-eight-day standoff. This 1990 event was a turning point in the rapid employment of lethal military action against First Nations communities in defense of extractive tech infrastructure, that continues today.

Around the world, water protectors continue to fight for ecological and environmental justice under increased surveillance and violence from governing bodies, private militias, and extractive corporations. The Lumbee, Coharie, and Haliwa-Saponi people recently halted the development of the Atlantic Coast Pipeline, which would have devastated water ecologies along the US Eastern seaboard. Currently, the Sioux Tribe at Standing Rock continues the fight against the Dakota Access Pipeline (organizing includes the hashtag #NoDAPL). And the Anishnaabe movement to stop Line 3 continues.⁹⁶ These pipelines destroy ecologies and permanently alter water and land, causing toxic waste, erosion, drought, and flooding. Pipelines also lead to oil spills: since 2010, there have been more than twelve billion gallons spilled in the US alone. The 1991 Line 3 oil spill leaked 1.7 million gallons of crude oil and approximately 383,000 gallons of crude oil have leaked from the Keystone Pipeline.⁹⁷ The data available on oil spills is endless.

Water protectors are leading a fight against colonial extraction and fossil fuel dependency—the root causes of the climate crisis.⁹⁸ Currently, water protectors in Hawai'i are engaged in longstanding legal battles against the US Navy, who have long denied the deadly water crisis caused by their violent occupation, military waste, and currently, there are catastrophic amounts of oil leaking from their tanks on Red Hill into the aquifer that supplies water to half of O'ahu's population.⁹⁹ At time of writing,

95 Chantelle Bellrichard, “RCMP spent more than \$13M on policing Coastal GasLink conflict on Wet'suwet'en territory,” CBC News, October 21, 2020, <https://www.cbc.ca/news/indigenous/rcmp-wetsuweten-pipeline-policing-costs-1.5769555>.

96 Stop Line 3, “Stop the Line 3 Pipeline. For Water. For Treaties. For Climate,” accessed December 19, 2021, <https://www.stopline3.org/#intro>.

97 Hannah Knowles, “Keystone Pipeline Leaks 383,000 Gallons of Oil in Second Big Spill in Two Years,” *Washington Post*, November 1, 2019, <https://www.washingtonpost.com/climate-environment/2019/10/31/keystone-pipeline-leaks-gallons-oil-second-big-spill-two-years/>.

98 Please read Hi'ilei Julia Hobart, “Atomic Histories and Elemental Futures across Indigenous Waters,” *Disaster Media*, April 08, 2021, <https://mediaenviron.org/article/21536-atomic-histories-and-elemental-futures-across-indigenous-waters>.

99 See Council for Native Hawaiian Advancement, “Red Hill Crisis Panel,” December 7, 2021, <https://www.youtube.com/watch?v=X-ACIBGVZd8>.

the Hawaii Department of Health has affirmed the order to shut down Red Hill, despite threats from the US Navy to counter.¹⁰⁰

It is evident that military and government declarations that frame Indigenous resistance as a crisis are used as a pretext to justify increased surveillance and increased military violence. Furthermore, the same digital technologies—ADS, artificial intelligence, cloud computing—that are centered in current policies focused on controlling water resources are increasingly being used to surveil and track those leading the fight against climate change.¹⁰¹ This brings unsettling clarity to the fact that technological surveillance and military power is growing in the water domain. Water protectors and climate activists are more harshly surveilled, arrested,¹⁰² and imprisoned than white supremacist terrorists and murderers, as seen most recently with the US acquittals of Rittenhouse and some of the January 6 Capitol rioters.

Rethinking/Resisting Relief

Relief frameworks currently dominate policy and legislative contexts in water and climate transition agendas. As Matthew Henry writes in his conclud-

“As Oahu residents reel from the news that military families’ drinking water was contaminated with petroleum, and that water for the broader community is also at risk, scrutiny of the nearby Navy’s fuel facility is intensifying. But the crisis is not a surprise to many residents, officials and local environmental advocates. For years, they’ve considered Red Hill an inevitable environmental and public health disaster”; Christina Jedra, “How the Red Hill Fuel System Has Threatened Oahu’s Drinking Water For Decades,” *Civil Beat*, December 12, 2021, <https://www.civilbeat.org/2021/12/how-the-red-hill-fuel-system-has-threatened-oahus-drinking-water-for-decades/>.

100 See Christina Jedra, “Hawaii Health Department Affirms Order To Shut Down Red Hill Fuel Tanks,” *Civil Beat*, January 3, 2022, <https://www.civilbeat.org/2022/01/hawaii-health-department-affirms-order-to-shut-down-red-hill-fuel-tanks/>.

101 Naomi Klein, “How Big Tech Helps India Target Climate Activists,” *Guardian*, March 4, 2021, <https://www.theguardian.com/news/2021/mar/04/how-big-tech-helps-india-target-climate-activists-naomi-klein>; Stephanie Lacambra, “Investigating Law Enforcement’s Possible Use of Surveillance Technology at Standing Rock,” Electronic Frontier Foundation, December 15, 2016, <https://www.eff.org/deeplinks/2016/12/investigating-law-enforcements-use-technology-surveil-and-disrupt-nodapl-water>; Paul Spencer, “Native Americans Are Resisting the Dakota Pipeline with Tech and Media Savvy,” *Vice*, October 29, 2016, <https://www.vice.com/en/article/78kmw4/tech-behind-the-dakota-access-pipeline-protests>; Business & Human Rights Resource Centre, “USA: Police Use Force against Indigenous ‘Water Protectors’ Opposing Dakota Access Pipeline - Human Rights Groups Urge Demilitarisation of Police Response,” November 22, 2016, <https://www.business-humanrights.org/en/latest-news/usa-police-use-force-against-indigenous-water-protectors-opposing-dakota-access-pipeline-human-rights-groups-urge-demilitarisation-of-police-response>.

102 Ella Fassler, “Over 800 Water Protectors Have Been Arrested Since Line 3 Pipeline Was Approved,” *TruthOut*, August 28, 2021, <https://truthout.org/articles/over-800-water-protectors-have-been-arrested-since-line-3-pipeline-was-approved/>.

ing piece: “For the water transition to be truly just, we must rethink the notion of *relief*, which implies reactive, short-term solutions to a deeper set of crises. This does not merely mean a renewed focus on proactivity—the anticipation and management of risk—but rather a shift away from the ephemerality of top-down disaster aid.” This helps us understand “relief” as a core site for intervention in water justice work. Possibilities for repair and reparation follow from accurate identifications of the water policies and water needs in local contexts that center those most impacted by climate change.

In conclusion, we offer definitional clarifications on water relief policy terms and put forward a set of principles for water action. While COVID-19 water relief policies do not prioritize justice-centered water transition, engagement with this context has offered an opportunity to better understand how layered interactions of water policy and technology function in our current systems of governance. This pretext does not have to determine the future, and our hope is that policymakers will benefit from the findings in our report as they rethink relief and support policies that advance water justice.

1. Relief equals neither repair nor reparations.
2. Relief policies function as data-led programs that fuel technological development and extractive economic systems.
3. Invocations of crisis and relief permit state, federal, and private entities to reenact extant racial and colonial water policies under rapid response.
4. We must decolonize climate crisis solutions. This report features the Center for Interdisciplinary Environmental Justice’s guiding principles for Green New Deal supporters. We need to move from decarbonizing to decolonizing
5. Water governance needs to be locally situated, led by the people, and always justice centered—not profit, cost-benefit, or optimization centered.
6. Rethink relief; move toward repair and reparations.

GEOGRAPHY: WATER MAP

This report spans waters in North and Central America. This is not a comprehensive report; it is intended to serve as an introduction to water justice and technology in the context of water relief policy, and to consider the vast differences in water justice needs throughout these regions.

In our detailed engagements with specific water contexts, we see how local justice work interconnects with global movements. As the Center for Interdisciplinary Environmental Justice (CIEJ) concludes in its report: “Cultivating interdependent, sustainable relationships with the local environment and people around us breaks the destructive cycle of globalized extraction-based consumerism. We can and must form both local and global relationships that break colonial and extractivist cycles.”

Our report begins with Amrah Salomón’s work on the lithium-charged New Gold Rush in the Southwest that extends globally. The New Gold Rush, fueled by Silicon Valley’s rapidly expanding tech empire, is a devastating continuation of nineteenth-century colonial mining expansion. Currently, lithium extraction links the US Southwest to Chile, Australia, and beyond.

As Amrah Salomón writes, prior to Spanish and Anglo settler water manipulation and mining, rivers and water sources in the Sonoran desert were abundant enough to support travel across the desert. Migrant deaths in the Sonoran desert are a result not only of racist border violence and militarization, but also of water extraction and environmental destruction. Prior to the construction of dams the Colorado River in Yuma, Arizona, used to

run thirty to forty feet deep and up to a mile wide, a history which is often absent in media reports on drought and the river’s plunging water levels. The nearby Gila River and other southwest rivers have similar histories. Historically, O’odham peoples engineered resilient and large-scale water irrigation and distribution systems in Southern Arizona that did not harm the river or land.

In her piece, Salomón details waterways and sacred places throughout the Southwest including the Ha’Kamwe’, Peehee Mu’huh, and the Salton Sea that are currently being destroyed by the rapid expansion of lithium mining. Now is the time to stop it.

The northwestern United States and Canada are central in this report. April Anson and Bruno Seraphin write about Upper Klamath Lake in southern Oregon. Last year, Klamath Tribe members ended a campaign led by white supremacist militia groups that had asserted a “water crisis” as part of a much longer history of anti-Indigenous violence and resource dispossession in the region. The Klamath Tribes “maintain water rights to protect culturally important species such as salmon and lamprey.”¹ The current “fish versus farm” policies and surrounding militia violence in Oregon connect with the ongoing violent attacks on Mi’kmaq fishermen from the Sipekne’katik First Nation in Nova Scotia, Canada, and the US states of Maine and Massachusetts.²

1 Bruno Seraphin and Dr. April Anson, “De-escalating Water Crisis.”

2 Ron Johnson, “Indigenous Canadians Suffer Abuse, Attacks over Fishing Rights,” *Sierra*,

Sage Gerson details another threat to the Klamath River: hydro-electric damming. This carbon solution technology or “renewable resource” has caused massive destruction as it has permanently altered over 60 percent of the earth’s rivers. Gerson details water locations including Muskrat Falls in Canada, Klamath River, and other places that have been devastatingly altered by megadam development.³

Water cities are a major geographical feature examined in this report. Fuschia-Ann Hoover provides us with a bird’s-eye view of the United States urban landscape. She writes: “Approximately 80 percent of the US population resides in cities, and the number of global residents living in cities is expected to increase to seven billion by the year 2050.” A defining feature of urban flooding infrastructure is that it is built in the context of anti-Black and anti-poor policies, resulting in disproportionate conditions of forced relocation and displacement during weather events.

Hoover highlights the “shrinking cities” of Detroit, Chicago, and New Orleans following the devastation of Hurricane Katrina and Hurricane Maria, which, because of racialized re-

lief policies, *continue* to impact where marginalized people are able to live. She warns that if we fail to address the underlying urban policies, flood-related inequities will continue to worsen under climate change.

Mexico City is a sinking city. Dean Chahim confronts the *operation* of Mexico City’s drainage infrastructures that are built on a patchwork of artificially drained lakes, and that exacerbate the effects of already inequitable flood protection for marginalized residents. Chahim outlines the contextual history of Mexico City’s *sistema de drenaje profundo*, inaugurated in 1975, which has failed to adapt to urban changes over the past fifty years. He responds by proposing *collective sacrifice zones* against the disaster flooding distribution policies that disproportionately sacrifice the poor.

Andrea Ballesterro takes us to the Río Blanco aquifer on Costa Rica’s Caribbean coast, connecting this place with Imperial Valley, California, and Andhra Pradesh, India. She details two water systems: aquifers and groundwater that center in much of the world’s water transition policy. Ballesterro clarifies how groundwater serves technological governance, as it is often abstracted into metrics that serve the ‘scarcity’ narratives that drive crisis response. Aquifers instead “are spatial formations characterized by dynamic movement and deep relations.” Aquifers bring attention to place, community, and interconnection.

J.T. Roane and Elena Sobrino address water distribution infrastructures into cities and communities. Roane analyzes how the legacies of the Jim Crow wellwater system, which led to typhoid fever and death for Black communities along the Georgia coastline, presage poisoned and inaccessible

October 30, 2020, <https://www.sierraclub.org/sierra/indigenous-canadians-suffer-abuse-attacks-over-fishing-rights>.

3 See Murray Lower Darling Rivers Indigenous Nations (MLDRIN) and Northern Basin Aboriginal Nations (NBAN), *Research into how much water is held by First Nations in and Traditional Owner Organisations in the Murray-Darling Basin in 2020: A First Nations Summary*, Published by MLDRIN and NBAN (2021) https://www.mldrin.org.au/wp-content/uploads/2021/07/1342_MILDRIN-16pp-Report-Lana_v3-min-1.pdf.

water in cities throughout the US The necropolitical infrastructure in Jim Crow water policy connects Georgia to Flint, Michigan.

Flint is a widely publicized case of water injustice that has only purportedly been solved. In response, Sobrino details water repair programs including Nestle’s water bottle PODs (points of distribution) and infrastructural bond markets that contribute to the assetization of water in Michigan, and that perpetuate the original harms of the water crisis.

Returning to where we began, Hi’ilei Julia Hobart brings us to Austin, Texas, a city that has been ravaged by COVID-19 and extreme weather events. She confronts the notion of “disaster” in relief responses and how it fails to accurately identify “crisis” in a city fractured by redlining, poverty, and resource inequity. Her descriptions of Storm Uri’s fallout bring us to a place that suffers from infrastructure designed in ways that neglect Black and Latinx lives. Hobart shows us that as extreme weather events increasingly become the norm, the climate crisis requires multiscalar approaches to resiliency.

Matt Henry’s intervention into rethinking relief surveys places in Colorado and Wyoming, where narratives of scarcity and dispossession have long shaped water policy and access. Throughout this report, we detail the heartbreaking impact of colonial extraction on the Colorado River and waterways around the world. As Amrah Salomón clarifies in the next piece, “desert water scarcity is a colonial-made crisis.”

NEW GOLD RUSH

NEW GOLD RUSH, SAME GENOCIDE

Mining and Draining the Southwest is Destroying Indigenous Communities in the Name of Sustainable Development

Amrah Salomón, Ph.D.

The US uses the Sonoran Desert both as a site to force non-white migrants to risk death and as a Hollywood film location to mimic Southwest Asia and North Africa through tropes of treasure hunting and fighting “terrorists,” a racist framing also deployed against Black and Brown migrants. This Western genre of representational imaginary—migration/voyage, treasure hunting, and killing disposable non-white people in the way of plunder—is not new. This is also the imagery of a wasteland full of riches, with only disposable nonhuman others in the way of European progress and self-actualization—imagery that has been used to justify violence and extraction from the Crusades to the colonialism of the Americas.¹ Orientalist plunder, this time in the name of sustainable development instead of the holy cross or Manifest Destiny (though I would argue there is a continuum between these justifications), is now what is fueling the “white gold rush” of lithium

¹ Henry Schaller, “Crusader Orientalism: Depictions of the Eastern Other in Medieval Crusade Writings,” *Summer Research* 327 (2018), https://soundideas.pugetsound.edu/summer_research/327.

extraction and deepening the devastation of colonial water drainage in the Southwest.

Desert Water Scarcity Is a Colonial-Made Crisis

In the 1840s, the gold rush and the US-Mexico War brought thousands of settlers seeking wealth fueled by biblical images of conquest across the Southwest into California, the Yukon, and the Pacific Northwest. Mining has a history of genocide, slavery, and violence in this region that is hidden, distorted, and in many ways unknown outside of Indigenous communities.² Our lands bear the mark of this violence—from abandoned open-pits of toxic sludge that were once sacred mountains in Ajo, Arizona, to suffocating clouds of methane on Navajo Nation, to deforestation and drainage

² Benjamin Madley, *An American Genocide* (New Haven: Yale University Press, 2016); Dunbar-Ortiz, Roxanne Dunbar-Ortiz, *An Indigenous Peoples' History of the United States* vol. 3 (Boston: Beacon Press, 2014); Simon J. Ortiz, *From Sand Creek*, vol. 42 (Tucson: University of Arizona Press, 2000).

of water systems so extreme that the ground is collapsing in central California.³ The combination of mining, water drainage, and colonial development has led to massive deforestation and ecosystem collapse across the Southwest. These extractive processes are what has turned the Sonoran Desert, a region that has held Indigenous cities, vast agricultural societies, and continental trade routes since time immemorial, into a scene of death, a Devil's Highway, for migrants who have no other safe alternatives.⁴

3 Conrad J. Bahre, *A Legacy of Change: Historic Human Impact on Vegetation in the Arizona Borderlands* (Tucson: University of Arizona Press, 1991); Arizona Superfund Research Center, "Community Outreach Effort: Ajo, AZ," February 16, 2005, accessed December 15, 2021, <https://superfund.arizona.edu/highlights/community-outreach-effort-ajo-arizona>; Lois Henry, "The Central California Town That Keeps Sinking," *High Country News*, May 25, 2021, <https://www.hcn.org/articles/south-water-the-central-california-town-that-keeps-sinking>; Klee Benally, "Covid-19, Resource Colonialism & Indigenous Resistance," *Indigenous Action*, April 22, 2021, <https://www.indigenousaction.org/covid-19-resource-colonialism-indigenous-resistance>.

4 Winston P. Erickson, *Sharing the Desert: The Tohono O'odham in History* (Tucson: University of Arizona Press, 2021); see also the following historical and anthropological museums: Huhugam Heritage Center (<http://www.grich-hc.org>), Pueblo Grande Museum (<https://www.phoenix.gov/parks/arts-culture-history/pueblo-grande>), Casa Grande Ruins National Monument (<https://www.nps.gov/cagr/index.htm>), and "Hostile Terrain 94" at the Museum of Us (<https://museumofus.org/exhibits/hostile-terrain-94>). For the renaming of the sacred Hia Ced O'odham route to Devil's Highway, and the impacts of colonialism on the water resources along the route and the risk to migrants, see Bill Broyles, Gayle Harrison Hartmann, Thomas E. Sheridan, Gary Paul Nabhan, and Mary Char-

lotte Thurtle, *Last Water on the Devil's Highway: A Cultural and Natural History of Tinajas Altas* (Tucson: University of Arizona Press, 2014); see also Luis Alberto Urrea, *The Devil's Highway: A True Story* (New York: Back Bay Books, 2008).

Indigenous peoples did engage and build upon the land, creating complex systems for food and technology trading, travel, cultural exchange, knowledge production, art, and religious practices. The difference between Indigenous engineering and colonial development is stark. Indigenous engineering often amplifies the diversity and complexity potential of the ecosystem to make it more resilient because the land is us and this relationship is sacred. Colonial development functions through resource extraction and depletion, destroying ecosystems because human supremacy dominates the land and nonhuman beings.⁵ You can see this in how Indigenous peoples relate to water, especially in the desert. The rivers throughout Arizona were massive before colonial water extraction through dams, pipelines, and diversion into mines, plantations, and cities. The rivers and Indigenous water systems made the region a critical beaver habitat. Anglo colonizers first came here as fur trappers and destroyed river ecosystems by overhunting.⁶ Imagine the Phoenix metropolitan area two hundred

lotte Thurtle, *Last Water on the Devil's Highway: A Cultural and Natural History of Tinajas Altas* (Tucson: University of Arizona Press, 2014); see also Luis Alberto Urrea, *The Devil's Highway: A True Story* (New York: Back Bay Books, 2008).

5 See M. Kat Anderson, *Tending the Wild* (Berkeley: University of California Press, 2005); Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants* (Minneapolis: Milkweed Editions, 2013); and Erickson, *Sharing the Desert*.

6 Robert Sauder, *The Yuma Reclamation Project: Irrigation, Indian Allotment, and Settlement along the Lower Colorado River* (Lincoln: University of Nevada Press, 2009).

years ago, a lush river wetland within the desert, lined with miles of forests and streams created by beaver dams.

Akimel O’odham people built massive irrigation systems to bring water into villages and farms through hundreds of miles of canals that were among the world’s most advanced engineering feats, considered far superior to European technology when Anglo settlers arrived in the mid-1800s. O’odham water systems allowed seeds to travel and trees such as native palms, ironwood, and mesquite to flourish. These trees replenish soil nutrients, boosting crops and the ecosystem. Plantation and corporate agriculture drain water and soil, leaving behind monocrops, methane clouds, and endangered species. White settlers attacked Indigenous access to water to colonize the desert. In 1870, settler diversion of the Gila river launched a forty-year famine that decimated O’odham and Pii-pash peoples.⁷ Settler demands for resources pushed many Indigenous peoples devastated by the water extraction-induced famine to the logging, mining, and farmworker industries, which all furthered the problem of water drainage and deforestation. Colonialism creates coercive situations where Indigenous and oppressed peoples must engage with extractive

⁷ See John Philip Wilson, *Peoples of the Middle Gila: A Documentary History of the Pimas and Maricopas 1500s–1945* (Gila River Indian Community, Cultural Resource Management Program, 2014); David H. DeJong, *Stealing the Gila: The Pima Agricultural Economy and Water Deprivation, 1848–1921* (Tucson: University of Arizona Press, 2009); David H. DeJong, “Forced to Abandon Their Farms: Water Deprivation and Starvation among the Gila River Pima, 1892–1904,” *American Indian Culture and Research Journal* 28, no. 3 (2004): 29–56.

projects to survive. This tension is at the heart of the “jobs versus the environment” problem we still navigate.

My family is O’odham from Yuma, Arizona, where the Colorado River and the Gila River converged before dams limited their flows. Near Yuma, the Colorado River used to run thirty to forty feet deep and up to a mile wide.⁸ The Gila River was also massive in the 1800s. My elders have passed down oral histories of these sacred waters. I grew up with the river’s sweetness in my mouth through the nostalgia of my grandfather’s stories, which were actually his grandparents’ experiences told to him as a boy, of how the Colorado tasted on a hot day when poured from a clay olla very carefully so as not to stir the ruddy sediments resting at the bottom of the pot. Hence the river’s name in Spanish, *colorado*, the color of red earth. These were waters that held six-foot-long fish that weighed nearly a hundred pounds.⁹ But my elders passed down stories of the mid-1800s, before the dams and colonial diversion when fish in the Gila or Colorado could be almost twice that size. My generation may never know a fish that big in Southern Arizona because there are simply no longer rivers deep or wide enough to allow them to

⁸ See Eric Boime, “Navigating the Fluid Boundary: The Lower Colorado River Steamboat Era, 1851–1877,” *Southern California Quarterly* 93, no. 2 (2011): 175–200; and Richard E. Lingenfelter, *Steamboats on the Colorado River, 1852–1916* (Tucson: University of Arizona Press, 1978).

⁹ Upper Colorado River Endangered Fish Recovery Program, “About the Endangered Fish,” accessed December 15, 2021, <https://www.coloradoriverrecovery.org/general-information/about-fish.html>.

live. We pass these stories down as a form of mourning, weaving together current and scale so the fish may swim again, if only in our memories. We restore the rivers in story and action, just as my Northern California Indigenous friends talk about their ancestors' June hogs, chinook salmon larger than a grown man that they are fighting dams and ranchers to see again.¹⁰

The US water grid depends on dams, reservoirs, lakes, wells, desalination factories, wastewater treatment factories, and a complex system of pipes that bring water that used to flow above and below ground into fields, homes, decorative landscaping, and businesses. The colonial water system can be in many ways defined by the modern toilet, where millions of people shit into fresh, potable water and flush it away as if drinking water too were merely waste and not the sacred source of life. This “shit in drinking water” mentality defines how water is managed and used throughout society, from natural gas fracking and lithium mining to needlessly maintaining endlessly thirsty golf courses and lawns. To be able to shit in drinking water is what the river and groundwater systems, the veins of North America, have been bled dry for.¹¹

10 See ODU Admin, “June Hogs - The Legend of the Super Salmon,” *ODU Magazine*, January 16, 2016, <https://www.odumagazine.com/june-hogs-the-legend-of-the-super-salmon>; and *Dancing Salmon Home*, directed by Will Doolittle (Eugene, OR: Moving Image Productions, 2013), <https://dancingsalmonhome.com>.

11 This “shit in drinking water” mentality was revealed to me through many conversations with Gustavo Esteva and other compas at Universidad de la Tierra Oaxaca and Unitierra CIDECI in Chiapas creating convivial tools and

Spanish colonizers first came to this region seeking minerals and enslaved Indigenous and African peoples in mines, missions, and plantations. Spanish and US colonizers drained, built over, or contaminated most of the natural water sources in the region. Colonial mining and farming techniques brought massive deforestation and water depletion. Mining requires vast amounts of water that becomes polluted by toxins in the extraction process. The gold rush brought hydromining and toxic metals and chemicals we are still dying from exposure to.¹² And military bases, bombing ranges, freeways, mines, wind farms, solar farms, and racist border walls continue to drain aquifers and destroy sacred Indigenous archaeological areas, sacred sites, burial grounds, ecosystems, and scarce desert water sources. But a new gold rush is coming that threatens to suck the most arid regions of the Southwest dry for a short-lived technology marketed as a carbon solution that may not have much impact on climate change at all.

Lithium Mining: How False Climate Solutions Are Sucking the Desert Dry

Lithium is a metal inspiring what *Forbes Magazine* has called a

Indigenous land-based autonomy.

12 See Pratap Chatterjee, “The Gold Rush Legacy: Greed, Pollution and Genocide.” *Earth Island Journal* 13, no. 2 (1998): 26; and Pratap Chatterjee, *Gold, Greed and Genocide: Unmasking the Myth of the '49ers* (Berkeley: Project Underground, 1998).

white gold rush, decimating water sources around the globe for its current use in high-capacity batteries and military technologies.¹³ Lithium minerals naturally exist within rocks, clays, seawater, and saline brines. Over millennia, rain and runoff from thermal hot springs near ancient volcanoes leach lithium particles out of the rocks and soil and into pools, where the lithium sinks into clay basins. When the water in ancient lakes and springs evaporates, lithium also becomes part of the salty brine left behind. Many of the sites of naturally occurring lithium, such as primordial salt lakes, clay fields, and ancient hot springs, are sacred to local and Indigenous peoples. The body's contact with lithium-infused waters and clays can be powerfully healing—spiritually, emotionally, mentally, and physically.¹⁴ In Western medicine, for example, lithium is prescribed for Alzheimer's disease, bipolar disorder, and depression. It is also added to drinking water to lower regional suicide rates.¹⁵

13 Brendan I. Koerner, "The Saudi Arabia of Lithium" (originally titled, "The Lithium Gold Rush"), *Forbes Magazine*, November 6, 2008, <https://www.forbes.com/forbes/2008/1124/034.html>. See also Keith Kohl, "The Lithium Gold Rush Is Underway: Tesla Is the Tip of the Iceberg," *Energy And Capital*, May 6, 2016, <https://www.energyandcapital.com/articles/the-lithium-gold-rush-is-underway/76552>; and Todd C. Frankel and Peter Whoriskey, "Tossed Aside in the 'White Gold' Rush: Indigenous People Are Left Poor as Tech World Takes Lithium from under Their Teet," *Washington Post*, December 19, 2016, <https://www.washingtonpost.com/graphics/business/batteries/tossed-aside-in-the-lithium-rush>.

14 Jaime Lowe, *Mental: Lithium, Love, and Losing my Mind* (New York: Penguin Books, 2017).

15 Ibid.

The healing power of lithium is part of sacred creation stories. This mineral that scientists say comes from star stuff is considered an ancestor to Indigenous peoples.¹⁶

The transition from fossil fuels to lithium-ion batteries in electric vehicles is a continuum of the process of colonial development's theft and burning up of our sacred ancestors. Indigenous resistance to lithium extraction has been exploding across the globe, from the Andean Atacama to Australia and now the US Southwest, as Indigenous water protectors step up to defend the sacred from a colonial gold rush driven by military and technological interests.¹⁷ But lithium is only a temporary transitional step toward whatever the long-term replacement for

16 M. Brito-Millán, A. Cheng, L. Quintanilla, E. Harrison, R. Sugla, and A. Martinez, "No comemos baterías: Solidarity Science against False Climate Change Solutions," *Science for the People* 22, no. 1 (2019): 33, <https://magazine.scienceforthepeople.org/vol22-1/agua-es-vida-solidarity-science-against-false-climate-change-solutions/>; Lowe, *Mental: Lithium, Love, and Losing my Mind*; Center for Interdisciplinary Environmental Justice and Sofie Wang, "Salt to Stars: The Environmental and Community Impacts of Lithium Mining," accessed December 19, 2021, <http://www.the-ciej.org/salt-to-stars-comic.html>.

17 See *En el nombre de lithio*, directed by Tian Cartier and Martín Longo (Argentina: Calma Cine and Farn, 2021), <https://enelnombredel-litio.org.ar>. I also encourage readers to explore the coalition Yes to Life, No to Mining (<https://yestolifenotomining.org>) and the partner organizations for case studies and information on Indigenous and community resistance to lithium extraction around the globe, including Australia, Serbia, and the US. Full disclosure: my collective the Center for Interdisciplinary Environmental Justice is an active member of Yes to Life, No to Mining.

fossil fuels will be. The technology sector is already working on alternatives to lithium-ion batteries because they are too environmentally damaging to produce.¹⁸ Demand for lithium is driven by electric vehicles, which do not, in the long run, make a significant reduction to carbon emissions when you include their manufacturing processes and the electrical grid the cars need to charge up. At best, electric vehicles could only reduce global CO₂ emissions by 6 percent, when they need to be reduced by 80 percent to mitigate global warming.¹⁹ The rush for lithium is not about environmental sustainability or mitigating climate change. The dash to destroy sacred Indigenous sites and finite desert water sources for lithium mining is merely a momentary blip in the consumption cycle, which will move on to a new product in a decade or two, leaving irreversible damage and water loss in its wake.

There are currently two main methods of mining lithium: hard rock mining and brine evaporation. Hard rock lithium mining involves drilling holes and blasting away mountains to remove lithium-containing rocks from the landscape. The rocks are roasted and covered in sulfuric acid to leach out the lithium. This is how current lithium mines in Australia operate, and

18 Victoria Corless, “What Comes after the Lithium-Ion Battery?” *Advanced Science News*, July 24, 2020, <https://www.advancedscience-news.com/what-comes-after-the-lithium-ion-battery>.

19 Rishi Sigla, “How Green is Green Technology?” *Tomorrow Unlocked*, accessed December 15, 2021, <https://www.tomorrowunlocked.com/green-rebound-effect>; Brito-Millán et al., A. Cheng, L. Quintanilla, E. Harrison, R. Sugla, and A. Martinez., “No comemos baterías.”

it is the process proposed in Serbia that would destroy farms, historical sites, and rivers.²⁰ Hard rock mining destroys the land surface, disrupts ecosystems, and creates toxic waste. It may also disturb groundwater, poison, or reduce access to water for farms and wells. Brine evaporation lithium extraction involves pumping ancient, salty, mineral-rich water from underground into shallow pools on the surface, where it evaporates under intense sunlight and dryness. This process is used in the Andean highlands of Chile, Bolivia, Argentina, and Nevada.²¹ Pumping and evaporation drain non-renewable groundwater and change the balance of brine and freshwater that the fragile desert ecosystem and traditional Indigenous lifeways rely on.

Proposed lithium mines in Nevada and California intend to introduce new mining methods: clay leaching and brine ion exchange. Lithium-containing

20 Yes to Life, No to Mining Coalition, “On the Frontlines of Lithium Extraction: YLNM Lithium Communique #1,” September 21, 2021, accessed December 15, 2021, <https://yestolifenotomining.org/latest-news/ynm-lithium-communique>; Lorena Allam, “Failures at Every Level: Changes Needed to Stop Destruction of Aboriginal Heritage after Juukan Gorge,” *Guardian*, October 18, 2021, <https://www.theguardian.com/australia-news/2021/oct/19/failures-at-every-level-changes-needed-to-stop-destruction-of-aboriginal-heritage-after-juukan-gorge>; Daniel Boffey, “Rio Tinto’s Past Casts a Shadow over Serbia’s Hopes of a Lithium Revolution,” *Guardian*, November 18, 2021, <https://www.theguardian.com/global-development/2021/nov/19/rio-tintos-past-casts-a-shadow-over-serbias-hopes-of-a-lithium-revolution>.

21 Rennie B. Kaunda, “Potential Environmental Impacts of Lithium Mining,” *Journal of Energy & Natural Resources Law* 38, no. 3 (2020): 237–244.

clays have previously not been profitable enough for companies to mine. Now, projects in Nevada and Arizona propose to extract lithium from clay by leaching it with sulfuric acid, killing ecosystems and sacred waterways. Producing the sulfuric acid on-site would emit toxic sulfur dioxide, polluting the air for local living beings. Radioactive material (such as naturally occurring uranium) underlining the mining sites could be exposed and released into the air, water, or soil. Brine ion exchange is another new risky extraction process proposed to mine lithium in the Salton Sea in California. Geothermal brine would be pumped from underground to flow past specialized beads that remove lithium ions from the solution. Then the beads are washed with an acid to remove the lithium and form a lithium-ion solution in a process that changes the water's chemistry, potentially releasing toxic metals into fragile desert water systems, ground, and air.

Indigenous people in the Southwest have been here, standing between their sacred lands and waters and a surge of mining violence, before. This might be a new gold rush, but in many ways it is the same genocide. Indigenous worldviews work through a complex set of spiritual interrelationships that do not separate body from community or people from land and nonhuman beings. We understand that violence against the ecosystem is violence against the people. Ecocide and genocide are coconstituted and mutually reinforcing. If lithium mining causes the extinction of plant and animal species, it will also harm human life. What good is a fast battery if we cannot breathe air or drink water? A technocrat may respond that we could build battery-operated filtration systems to survive. But a justice-centered

response would then ask the question: To whom and what will we be chained if we are not free to breathe or free to drink water without purchasing these machines? Can we call that kind of “survival”—without clean air, water, land, and ecosystem—a good life?

Ha'Kamwe'

Ha'Kamwe' is a sacred site of springs, creeks, homes, and arid mountains with iconic rock formations and ancient cacti within Cholla Canyon Ranch near Wikieup, Arizona, where the Mojave and Sonoran Deserts meet within the Big Sandy River basin. The ranch is managed by the Hualapai Tribe. The ancestral homelands of the Hualapai people surrounding the site are managed by the Bureau of Land Management (BLM). *Ha'Kamwe'* means “warm spring” in the language of the Hualapai people.²² Ha'Kamwe' and the surrounding Big Sandy River Valley and adjacent mountains, hills, and deserts are part of the ancestral homelands of the Hualapai Tribe, as well as the Yavapai-Apache Nation, the Yavapai-Prescott Tribe, the Fort McDowell Yavapai Nation, the Fort Mojave Indian Tribe, the Chemehuevi Indian Tribe, the San Juan Southern Paiute Tribe, the Hopi Tribe, and the Colorado River Indian Tribes.²³

²² For information directly from Hualapai land and water protectors, see Protect Ha'Kamwe' (<https://www.protecthakamwe.org>) and the related Instagram account (<https://www.instagram.com/protecthakamwe>).

²³ Hualapai Tribe, Office of the Chairperson, “Comments on Sandy Valley Exploration Project (Phase 3) Environmental Assessment, NEPA Number DOI-BLM-AZ-C010-2021-0029-EA,” June 10, 2021, accessed December

Ha'Kamwe' Spring is fed by water naturally stored underground in volcanic rocks that seal it off from the land surface above (a confined volcanic aquifer). Under pressure, water flows underground along a geologic fault and emerges from the spring. This sacred spring is a place for healing. In the words of a Hualapai elder, "this is holy ground."²⁴

Hawkstone Mining Ltd, an Australian company, is developing the Big Sandy Lithium Project to mine lithium-containing clay. The next stage of exploration drilling would surround tribal land, including Ha'Kamwe', on three sides, destroying cultural sites and blocking access to the oasis for desert wildlife. Exploration drilling is less than seven hundred feet from the spring. The proposed mine includes a massive open-pit mine, a sulphuric acid plant, a fifty-mile slurry line to transport toxic material from the mine to Kingman, and intense pumping of finite groundwater in an extremely arid desert region for the slurry line. The extraction process will destroy many adjacent residents, tribal members, and farmers' wells. The mine would also require the construction of numerous access roads and drill pads. Twenty-four-hour lights and loud noise will devastate the fragile wildlife system that depends on Ha'Kamwe' Spring and Burro Creek for the only water sources in the region, such as bats,

owls, eagles, foxes, deer, pollinators, and migratory birds. Other companies like Bell Copper Corporation and Bradda Head Holdings Limited, are also moving in to set up mines in the Hualapai region. The Hualapai people fear they will soon be surrounded with toxic sludge and pit mines instead of the majesty of the pristine Grand Canyon region, where they rely on tourism from visitors eager to see natural beauty, not the marks of environmental racism.

The Hualapai people look at existing open-pit mines in nearby Bagdad, Arizona, as a sign of what the lithium gold rush could bring to their sacred springs. Several generations ago, a non-native rancher planted a grove of Middle Eastern date palms around the spring, transforming Indigenous Hualapai lands into his orientalist vision of an oasis. Much of the drive for lithium extraction stems from the military-industrial complex in optics, lubricants, and space technology. The electronics industry fuels the second-largest lithium demand for batteries that charge computers, cell phones, and a myriad of cheap throwaway gadgets. Like the colonial quest for oil that drove the bombing of Bagdad in Iraq, this nexus of military, electronic, and transportation consumption seeks to destroy the Indigenous desert that colonists have tried to remake as a new orientalist frontier. Meanwhile, Indigenous peoples in both places bear the brunt of resource colonialism in lost lives and ecosystems.

In 2018, Big Sandy Inc. started exploratory drilling to estimate lithium reserves and potential profits in the area. They drilled almost fifty times in exploration phases with no tribal or community consultation, no environmental or cultural impact assessment,

15, 2021, <https://static1.squarespace.com/static/60fb36c796a4113520cf78ab/t/611dcfe5ce0f38366ca3227d/1629343726546/Hualapai+Comments+-+EA+for+Sandy+Valley+Exploration+Project.pdf>.

24 This statement by a tribal elder appears on the Protect Ha'Kamwe' website (<https://www.protecthakamwe.org>).

which is allowed under the 1872 federal mining law. In June 2020, the Bureau of Land Management invited Hualapai Tribe to participate in consultation. The Hualapai tribal government accepted the offer and requested to serve as a cooperating agency, but the BLM did not respond. Then in November 2020, the BLM denied the tribe's request to participate as a cooperating agency. In March 2021, the BLM released an environmental assessment for the mining project's next exploration phase and now the Hualapai, other impacted Indigenous nations, residents, businesses, and farmers anxiously await the BLM's decision. Meanwhile, the Hualapai caretaker of Ha'Kamwe' Spring has observed more drilling farther from the site. **This lithium project is still in the exploration phase at time of writing. NOW is the time to stop it!**

Peehee Mu'huh

The connection between the white gold rush for lithium and the genocide of the nineteenth-century gold rush is direct for Paiute and Shoshone peoples. Peehee Mu'huh is the site of an 1865 massacre of Paiute and Shoshone people by US cavalry and a settler paramilitary death squad organized around Fort McDermitt. The settlers named the area Thacker's Pass for Charley Thacker, a perpetrator of the massacre who also stole two Indigenous babies from the camp after murdering their sleeping families.²⁵

25 Big Bill Haywood, the International Workers of the World (IWW) labor organizer, recorded testimony he heard directly from the massacre survivors in his memoir, which documents the brutality of the mining industry and other fields he worked to organize. See Haywood, *Bill*

But to the Paiute and Shoshone people, this area is sacred Peehee Mu'huh, place of the rotten moon, where traditional medicines and obsidian used to make tools are still gathered, and where endangered plants and animals reside. It is also a burial site that would be extremely painful to disturb for the descendants of the massacre survivors and their larger community.

But the lithium mining proposal threatens to destroy the area forever, including the massacre site, burial grounds, and the habitat of the critically endangered Crosby's buckwheat and Kings River pyrg. The proposed mine at Peehee Mu'huh would have similar impacts to the project proposed at Ha'Kamwe', such as an open-pit strip mine two miles wide and a mile long that would burn about 22,600 gallons of diesel fuel per day for both on- and off-site daily operations.²⁶ The mine would also require an immense factory that would burn nearly one hundred semitruck loads of oil refinery waste sulfur daily to make the 5,800 tons of sulfuric acid the mine would need for daily operations.²⁷

The irony of environmentalists driving the lithium gold rush by claiming it is a sustainable energy source is strikingly absurd and Orwellian.

Haywood's book: The Autobiography of William D. Haywood (Auckland, NZ: Pickle Partners Publishing, 2018).

26 See "Information," Protect Thacker Pass, accessed December 15, 2021, <https://www.protectthackerpass.org/info-2>; and "Thacker Pass Mine Fact Sheet," Protect Thacker Pass, accessed December 15, 2021, <https://www.protectthackerpass.org/wp-content/uploads/2021/02/Fact-Sheet-v3.pdf>.

27 "Information," Protect Thacker Pass.

Daranda Hinkley, a young Paiute and Shoshone water protector, explains that “the country believes they need to transition to ‘green energy,’ to save the planet and cut down carbon emissions. They do not realize that in return for electric car batteries, aggressive lithium mining will harm the planet more in the process.”²⁸ Proponents of electric vehicles claim that they will reduce carbon emissions. But the Thacker Pass mining project is an example of why this claim is problematic. The mine will produce more than 150,000 tons of carbon emissions annually, meaning it will create roughly 2.3 tons of carbon emissions for every ton of lithium it makes.²⁹ The math for lithium as a climate change solution doesn’t add up.

Nevada is the driest state in the US. Residents fear the impact of mega-mining projects on their already overtaxed water tables. The mine would need to extract “more than 5000 acre-feet (1.7 billion gallons) of water annually from an aquifer in the Quinn River Valley which is already over-allocated by more than 30,000 acre-feet per year” to function.³⁰ This amount of water extraction could dry local wells and springs, further impacting residents and endangered species. It will also reduce groundwater levels to create dust bowl conditions. The area is home to pronghorn antelope, bighorn sheep, deer, sage grouse, golden eagles, and

²⁸ Daranda Hinkley, “Peehee Mu’huh Speaks,” *This is Reno*, August 31, 2021, <https://thisisreno.com/2021/08/peehee-muhuh-speaks-opinion>.

²⁹ “Thacker Pass Mine Fact Sheet,” Protect Thacker Pass.

³⁰ Ibid.

critically endangered species of snail and trout. Among the medicinal plants and traditional foods of the Paiute and Shoshone peoples that require this land to continue are exceedingly rare desert wildflowers and old-growth sagebrush. The mine will probably leach uranium, antimony, sulfuric acid, and other toxins. For the original peoples, ancestors, land, and nonhuman beings, this is a fight *against* genocide and ecocide, *for* an end to gold rush violence at long last.

Salton Sea

The current Salton Sea was created in 1905 when settlers attempted to drain the Colorado River into the California desert, but instead sent river water into an ancient salt basin for over a year. Once created, the salty inland sea gained additional water from agricultural runoff, which also contained tons of toxic fertilizers, nitrates, arsenic, and pesticides. The Salton Sea began to shrink in the 1990s when contaminated runoff flows slowed down. The water became stagnant; toxic algae blooms killed off the artificial lake’s fish and migratory birds. Ongoing evaporation is reducing the sea to a thick salt slurry surrounded by thousands of acres of dried toxic dust that causes alarming rates of respiratory illness such as asthma for the local population. The attempt to extract agricultural value from the desert created both an ecological and public health disaster.

But there is a deeper history to this sea, which long ago was an ancient lake connected to the Colorado River. Over many thousands of years, the lake expanded and evaporated, leaving behind salt flats and creating sand dunes sacred to the Cahuilla, Kumeyaay, and

Cocopah people. The area of the lake still contains significant archeological sites for Indigenous peoples and evidence of long-term habitation. Cahuilla peoples live in the communities around the Salton Sea, along with marginalized low-income migrants and communities of color who are priced out of urban centers like Los Angeles. Indigenous people and people of color form the front lines of those who will be most impacted by lithium extraction.

Lithium mining in the Salton Sea basin would require the construction of enormous toxic steam and waste-emitting factories, pilings, and geothermal energy plants. Mining companies also envision covering the desert, currently one of the last remaining inland water sources in the region for many of California's migrating birds, with additional toxic battery and solar panel manufacturing plants.³¹ Another layer of risk for the region is that all of these facilities would be placed on active earthquake fault lines. Tampering with the groundwater and extracting deep underground geothermal reservoirs will undoubtedly increase earthquake activity, with potentially deadly impacts for local residents.

Lithium gold rush extractors often try to frame their environmentally destructive work with terms such as *green energy*, *a just transition*, *sustainable development*, and a variety of other deceptive and meaningless phrases to disguise what is, in essence,

31 Aaron Miguel Cantú, "In Search of 'Lithium Valley': Why Energy Companies See Riches in the California Desert," *Guardian*, September 27, 2021, <https://www.theguardian.com/us-news/2021/sep/27/salton-sea-california-lithium-mining>.

raw disaster capitalism.³² The white gold rush is motivated by a strange mix of environmentalists and progressives demanding these greenwashing catchphrases and corporate, tech, mining, and military industrialist profiteers who care little for the environment, justice, or Indigenous communities that stand in the way of potential profits, no matter how fleeting the lithium consumption economic moment is. In the Salton Sea, and its abandoned water resort communities such as Bombay Beach, these disaster colonizers see a new "Orient," just as the military expeditions that mapped overland routes to the goldfields in the mid-1800s imagined biblical oases awash with orientalist images of Arab and Asian money in the great plains and deserts of the West. To Indigenous peoples, this might be a new gold rush, but the health and spiritual impacts feel like a repeat of the same old genocide.

32 See Cantú, "In Search of 'Lithium Valley'"; Brito-Millán et al., "No comemos baterías"; and Emma Harisson, "Electrification Will Not Stop Climate Change. It Will Displace Thousands of Indigenous People," Medium, April 22, 2021, <https://ejharri1.medium.com/electrification-will-not-stop-climate-change-it-will-displace-thousands-of-indigenous-people-45dd7fa8dbcf>; and Amrah Salomón, "Decolonizing the Disaster: Defending Land & Life During Covid-19," Political Theology Network Symposium, October 24, 2020, <https://politicaltheology.com/decolonizing-the-disaster-defending-land-life-during-covid-19>.

Mines, Freeways, and Dams: The Nexus of Resource Extraction, Product Transportation, and Industrial Development

Thousands of years ago, Indigenous peoples built many of the road systems used today to traverse the continent. But people often misunderstand the ways Indigenous peoples moved and lived their lives. The stereotypes of Indigenous peoples are either of isolated, static villages fixed in time and space that never really existed or of romanticized simplistic forest sprites frolicking in a biblical Eden that also never existed. The historical reality is that Indigenous peoples lived much as we do today, going camping during fishing season, going to the beach in the summer, checking out cool events in nearby communities or enjoying the mix of cultures in dense social centers, traveling for business or adventure, and living a life that was at once very local but also influenced by regional and continental economics, politics, and cultures. The new world that emerges from the crisis of climate change will probably continue these timeless social practices, as Indigenous peoples have always done.

The difference between Indigenous ways of living with the land and colonial development is the scale and purpose for which movement happens. Indigenous peoples didn't destroy entire rivers or flood whole valleys with dams that benefited the profits of a small minority.³³ Nor did we blow up

33 Fuck dams. Blaine Harden, "The Grand Coulee: Savior For Whites, Disaster For Indi-

sacred mountains so that trucks could move goods ten minutes faster than they did before or cover sacred sites in excrement-snow just so rich people could ski on them.³⁴ Mining is not new to the Americas, but the scale of it a thousand years ago was different than the scale of colonial invasion: slavery, oppression, man camps that disappear Indigenous women and two-spirits, and environmental catastrophe. The lesson of scale is also that instead of focusing on how to make the same extractive means work through mitigation, which often is just displacement of impacts onto those who are less valued, we need to move from reactionary defense against disaster colonialism to an offen-

ans," The Alicia Patterson Foundation, 1993, <https://aliciapatterson.org/stories/grand-coulee-savior-whites-disaster-indians>; Indigenous resistance to dams for hydroelectricity schemes and extractive development is a global crisis. See a few examples here: Nova Robbins-Waldstein, "Indigenous Resilience To Resource Extraction: Igorot Resistance To Large-Scale To Hydroelectric Dam Development In The Cordillera Region Of The Northern Philippines," May 3, 2021. <https://storymaps.arcgis.com/stories/02a8791a0d4b4dbfa24f82fa0571a8d6>; and Analy Nuño, "Guajirío Culture Is Dying: Mexican Dam Poised to Displace The Living And Flood Ancestors' Graves," *The Guardian*, August 4, 2020, <https://www.theguardian.com/global-development/2020/aug/04/mexico-bicentenario-los-pilares-dam-indigenous>

34 See Akimel O'odham Youth Collective, "O'odham Zombies March against the 202," *Censored News*, June 25, 2013, accessed December 15, 2021, <https://bsnorrell.blogspot.com/2013/06/oodham-zombies-march-against-loop-202.html>; and Akimel O'odham Youth Collective, "ADOT Is Racist! O'odham Resistance against the Loop 202," *Akimel O'odham Youth Collective Blog*, November 17, 2014, accessed December 15, 2021, <https://aoycblog.wordpress.com/2014/11/17/adot-is-racist-oodham-resistance-against-the-loop-202>.

sive strategy of disaster decolonization.

It is time to imagine a world that centers Indigenous relations to land and refuses extractive energy and development as the goals of human life. The time is ripe for a return to the radical antidevelopment thinking of the 1960s and the Mayan Zapatista movement that advocates for convivial technologies, autonomy, and degrowth as part of an anti-colonial, anti-imperialist praxis.³⁵ These antidevelopment critiques have been taken up by Indigenous peoples but have largely not merged with environmental and economic justice movements in colonial societies, where demands are often still focused on jobs, shortsighted mitigation, and assimilation into colonial development—not its abolition. It is still highly discouraged for scientists, even those who center activism, social justice, and climate justice in their work, to imagine alternatives to energy and industrial development as the goals of science and technology. We need to ask: What if our world was no longer extraction-centered? Would energy even matter so much? Would we really need so much of it? Could we live with fewer jobs and more land-based autonomy? Probably, if we radically transformed the oppressive structures of our societies.

35 See Ivan Illich and Anne Lang, *Tools for Conviviality* (New York: Harper & Row, 1973); Gustavo Esteva and W. Sachs, “Development. The Development Dictionary: A Guide to Knowledge as Power,” *Population and Development Review* 18 (1992): 1; Gustavo Esteva and Madhu Suri Prakash, *Grassroots Postmodernism: Remaking the Soil of Cultures* (London: Zed Books, 2014); Gustavo Esteva and Carlos Perez, “The Meaning and Scope of the Struggle for Autonomy,” *Latin American Perspectives* 28, no. 2 (2001): 120–148.

These big questions are difficult to work through for most folks, who feel like they need to take action now to address climate change and are lured by the ease of supporting the false solutions offered by extractionists instead of struggling for real change. It’s easier to buy a Prius for your miserable commute instead of abolishing shitty jobs and collectively organizing to transform the structure of the economy and people’s relationship to land. For folks who find the larger transformative work paralyzing, I offer instead an approach to policy as a middle ground. Start to focus on reforms that would dismantle the colonial state, racial capitalism, and their apparatuses instead of reinforcing them. And don’t fall for the ruse of putting a brown face on the problem, as if representation will change the nature of the colonial hydra. Consider how effectively that has worked for the third-world decolonization movement, which moved toward liberating nation-states in the twentieth century only to find that colonial debt, structural adjustment, disaster colonialism, and imperialism have maintained their structural colonial positionalities even though they now have leaders who look like them. Systems require systemic changes, not different representatives.

A concrete example of this is the limited policy focus of Green New Deal advocates. Many of these advocates focus on policies to reduce carbon emissions, such as transferring the energy grid to lithium and solar panels that are created through horrifically destructive mining and child slavery in Africa.

These demands leave the structures of extraction and colonial overconsumption intact. Frontline Indigenous communities are calling for a policy agenda that works toward

dismantling the colonial and extractive relationship between the state and land. The Paiute, Shoshone, Hualapai, and many O’odham, Kumeyaay, and Cahuilla people are united in their demand to reduce the Bureau of Land Management’s colonial and extractive function over their homelands. The BLM controls much of the open space and natural lands surrounding tribal reservations and constitutes one of the largest public land managers. But the BLM has long been structured to serve the interests of capital and extractionists over the public and has a violent historical relationship with Indigenous peoples. Frontline Indigenous peoples who engage in policy advocacy have focused on strategies to shift the BLM’s responsibility from extractionists such as mining companies and developers to the people, especially Indigenous caretakers of the land and their neighbors, who will bear the brunt of environmental impacts.

The movement against lithium mining is demanding the repeal of the US Mining Law of 1872, which governs most of the West and Alaska and established hard rock mining as the primary use of all public lands unless the land is specifically protected (like a national park).³⁶ The law gives miners the right to dig on up to five acres of public land without notifying the government, avoid taxes or royalties, and only pay a very minimal extraction cost per acre. The law allows mines to avoid environmental protections and all requirements to clean up toxins or repair the land when the mine stops

36 Earthworks, “The General Mining Law of 1872. Polluter of water, provider of pork,” accessed December 15, 2021, <https://www.patagoniaalliance.org/wp-content/uploads/2019/08/1872MiningLaw.pdf>.

operation. The law also requires the government to prioritize mining claims over all other proposals for the land, regardless of impact. Ha’Kamwe’ and Peehee Mu’huh are both on BLM lands governed by the 1872 Mining Law.

So far, Green New Deal advocates and mainstream environmental groups have failed to get behind the demand to repeal the 1872 mining law. But this demand builds on the policy demands of the Standing Rock Sioux Tribe, which launched a historic defense against the Dakota Access Pipeline in 2016. Standing Rock was demanding the right of consultation, which included the right of refusal, on development projects in their historic homelands, not just within the boundaries of their reservation. This reform would have enabled the tribal government to reject the plans for the pipeline that has resulted in damage to burial grounds, farmlands, and the Missouri River. The right of consultation *with enforcement of the right of refusal* would allow Indigenous tribal nations a legal structure to fulfill their traditional vocation as caretakers and protectors of their homelands. If the federal government moved to allow Indigenous nations this right, many of the land defense struggles would have a different set of tools available to preserve sensitive ecosystems and confront environmental racism. This wouldn’t resolve all these struggles, in large part because federally recognized tribal governments since the 1934 Indian Reorganization Act have a long and complex history of corruption and complicity with mining and environmentally damaging development. But opening the door for a tribal right of refusal of projects that would negatively impact their environment or risk their public health would be an important step forward.

It would also push non-Indigenous environmental groups to develop better relationships with Indigenous peoples, who could kick in enforcement and mitigation mechanisms that other front-line communities, such as low-income Black and Brown communities, would not have access to. These kinds of coalitions must be developed if our end goal is to stop environmental racism, rather than just move its impacts from one place to another.

Disaster Decolonization

My good friend and accomplice in the Center for Interdisciplinary Environmental Justice, Emma Harrison, sums up what all of us, both Indigenous and non-Indigenous, must do in the face of this crisis: “Climate change and colonialism go hand in hand. That’s why decolonization is a better climate change solution than greenwashed energy technologies.”³⁷ All over the world, Indigenous peoples are resisting mega infrastructure projects that benefit colonial development at the cost of destroying sacred lands, waters, and traditional lifeways. It is not traditional Indigenous peoples in rural reservation communities who need factories, space rockets, drones, bombs, hummers, disposable gadgets, and millions of electric cars. The need for massive electrification is not actually a basic human need—but clean water, healthy soils, and a thriving ecosystem are. We have lived since time immemorial without electrification. In *Bill Haywood’s Book: The Autobiography of Big Bill Haywood*, the radical union organizer related firsthand accounts

of the Thacker Pass massacre. He also talked about his awe and amazement at seeing where the giant tracks of a pre-historic mastodon were followed in the fossilized mud by an equally ancient footprint of an Indigenous Paiute and Shoshone ancestor in the floor of the Carson Penitentiary prison yard when he visited political and Paiute prisoners later in his life. There is a lot of deep, intersectional work we need to do to bridge the struggles that Haywood and his International Workers of the World comrades represented—labor exploitation, migrants’ rights, racial and social justice, gender equity—with the decolonial struggles of Indigenous and formerly enslaved peoples. But the footprint of the mastodon hunter reminds us that climate change is not new. Indigenous peoples have been in these situations before because we have always been here, in our sacred places of creation. We will live through this, but only if we respect the land, as our traditional religions and teachings instruct us. These were lessons formed through other times—when the mastodons roamed our lands and we endured different crises, such as the birthing and death of the other worlds we acknowledge in our creation stories. They are our compass now as many of us find our paths back home and other communities in resistance come forward to forge new relationships with us through sacred site defense. Let us follow the steps of mastodon hunters in our roadmap to disaster decolonization; let us learn to live *with* the land instead of *on* the land once again.

37 Harisson, “Electrification Will Not Stop Climate Change.”

Links

<http://www.the-ciej.org/index.html>

The Center for Interdisciplinary Environmental Justice

<https://www.protecthakamwe.org/>

Protect Ha'Kamwe'

<https://peopleofredmountain.com/>

The People of Red Mountain, movement to protect Pee-Hee Mu'hah

<https://www.taylorfreesolorees.com/project/sal-y-cielo>

A film in progress on the impacts of lithium extraction on Indigenous communities that the Center for Interdisciplinary Environmental Justice is collaborating on

<https://defendoodhamjewed.org>

Defend O'odham Jewed, O'odham water and land defense movement



Image: Indigenous land and water protectors make a spiritual pilgrimage to protect the sacred Hualapai site of Ha'Kamwe' springs, photography by Jessica Ng.

Permissions: Indigenous ceremonial leaders have approved publication of this image of ceremony and sacred items for the purpose of educating others on the critical importance of protecting the land. We ask readers to respect this image and limit use to educational and advocacy purposes.

Many ideas for this article have been contributed to by members of the Center for Interdisciplinary Environmental Justice (CIEJ) <https://the-ciej.org>.

WATER CITIES

JUSTICE IN WATER INFRASTRUCTURE

Engineers and planners must include water and flooding management in climate action planning. Moreover, planning practitioners should critically interrogate metrics that are based on cost of investment exclusively and, instead, consider the increased economic benefits of a social justice framework.

Fushcia-Ann Hoover, Ph.D.

Social and environmental justice are critical to water infrastructure and technology; without them, climate action relief is impossible. Approximately 80 percent of the US population resides in cities, and the number of global residents living in cities is expected to increase to seven billion by the year 2050.¹ In the United States and in many countries around the world, anti-Black and anti-poor policies have historically restricted low-income, poor, Black, and brown residents to floodplains and areas of lower elevation. As a result, these communities are often at greater risk of and exposure to flooding, receive little to no investment in updated and maintained water infrastructure, and have fewer resources to dedicate to recovery when their homes and communities inevitably flood. In fact, this has led to massive relocation

1 Hannah Ritchie and Max Roser, “Urbanization,” *Our World in Data*, September 2018 (revised November 2019), <https://ourworldindata.org/urbanization>.

and displacement over time. Remembering Hurricanes Maria (2017) and Katrina (2005), in addition to the estimated \$161 billion USD (Katrina)² and \$90 billion USD (Maria)³ in damages, 44 percent of Black residents who left New Orleans never returned,⁴ displaced to Texas (25.5 percent), elsewhere in Louisiana, or elsewhere in the South. Relatedly, in Chicago, insurance claims

2 National Oceanic Atmospheric Agency, Office for Coastal Management, “Fast Facts: Hurricane Costs,” n.d., accessed November 10, 2021, <https://coast.noaa.gov/states/fast-facts/hurricane-costs.html>.

3 Richard J. Pasch, Andrew B. Penny, and Robbie Berg, *Tropical Cyclone Report: Hurricane Maria (AL152017)*, February 14, 2019, https://www.nhc.noaa.gov/data/tcr/AL152017_Maria.pdf.

4 Narayan Sastry and Jesse Gregory, “The Location of Displaced New Orleans Residents in the Year after Hurricane Katrina,” *Demography* 51, no. 3 (March 6, 2014): 753–775, <https://doi.org/10.1007/s13524-014-0284-y>.

for flooding damage increase as households of color increase.⁵

As climate change continues to escalate the frequency and intensity of massive storms resulting in flooding, Black and brown communities will continue to be displaced, exacerbating neighborhood decline and human, social, and economic capital loss in places like Detroit, Chicago, St. Louis, and other “shrinking cities.” Furthermore, persistent population loss and migration means a loss of the cultures and characteristics that shaped these cities in the first place. It means loss of employment for those displaced, closure of businesses, and an inability to fill open positions where businesses remain. At a macro level, it means a decline in tax revenue and city budgets.

One of the ways cities are trying to manage the increases in stormwater is with green infrastructure (GI). Frequently, GI appears along streets or sidewalks, integrated with the right-of-way, or as larger installations in parks, schools, or trails. While GI may be part of the solution, it’s also critical to recognize the historic and contemporary processes that drive GI more broadly. An analysis of 119 city planning documents for locating GI, intentionally designed vegetation, technology and materials for an intended purpose, and criteria and rationale from nineteen US cities showed 84 percent of the cities including criteria related to existing floodplains and other hydrology. However, while all cities in the sample emphasize criteria related to cost, land, or economic development, less than 1.2

5 Marcella Bondie Keenan, Preeti Shankar, and Peter Haas, “Assessing Disparities of Urban Flood Risk for Households of Color in Chicago,” *Illinois Municipal Policy Journal* 4, no. 1 (2019): 1–18.

percent of criteria mentioned environmental justice—a pattern that spells trouble for marginalized communities. Given that non-white residents make up 43 percent of residents in urban areas,⁶ ignoring the increased likelihood

SOCIAL AND ENVIRONMENTAL JUSTICE ARE CRITICAL TO WATER INFRASTRUCTURE AND TECHNOLOGY; WITHOUT THEM, CLIMATE ACTION RELIEF IS IMPOSSIBLE.

of flooding and the populations it will most impact is bad economics and bad climate policy.

6 U.S. Department of Agriculture, Economic Research Service, “Racial and Ethnic Minorities Made Up about 22 Percent of the Rural Population in 2018, Compared to 43 percent in Urban Areas, 2018, updated October 13, 2020, <https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=99538>.

THE LEGACIES OF JIM CROW WATER INFRASTRUCTURE

J. T. Roane, Ph.D.

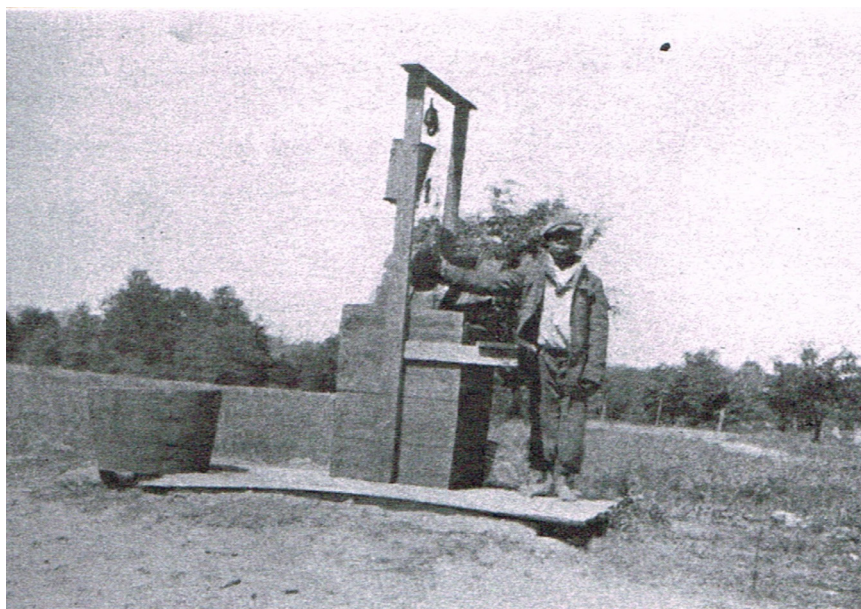


Image: Ernest B. Wilson, “The Water Supply of the Negro,” *Bulletin of the University of Georgia* 31, no. 3a (1931).

In November 2021, the Flint water crisis was resolved from the state’s legalistic perspective. A federal judge awarded city residents a \$626 million-dollar settlement for damages that dovetailed with the January 2021 indictment of former Michigan governor Rick Snyder. “Although this is a significant victory for Flint,” the plaintiffs’ lawyer Corey Stern told journalists, “we have a ways to go in stopping Americans from being systematically poisoned in their own homes, schools, and places of work.”¹

1 Tyler Clifford and Kanishka Sing, “Federal Judge Approves \$626 Million Flint, Michigan Water Settlement,” Reuters, November 11, 2021, <https://www.reuters.com/legal/litigation/federal-judge-approves-626-million-flint-michigan-water-settlement-2021-11-10>.

In Michigan, what Kwame Holmes theorizes as *necrocapitalism* (to underscore the value-generating potential of anti-Black violence and death) precipitated the commoditization and distribution of water along the contours of reinforcing systems of value anchored in Black disposability and death.² While necrocapitalist logics result from recent financialization, the exposure it caused is not unprec-

2 See, e.g., Kwame Holmes, “Necrocapitalism, Or, The Value of Black Death,” *Bully Bloggers*, July 24, 2017, <https://bullybloggers.wordpress.com/2017/07/24/necrocapitalism-or-the-value-of-black-death-by-kwame-holmes>; Laura Pulido, “Flint, Environmental Racism, and Racial Capitalism,” *Capitalism, Nature, Socialism* 27, no 3 (2016) 1-16, DOI: 10.1080/10455752.2016.1213013.

edented. Indeed, the Flint crisis was presaged in the 1920s and 1930s by the emergence of municipal water infrastructures under Jim Crow segregation, which here includes not only the formal apartheid regime of the South, but also the *de facto* segregation of the Jim Crow North. Combining neglect and intentional exclusion, Jim Crow water systems, especially those in the South, exposed Black communities to water contaminated by pathogens.

Ernest B. Wilson's 1931 *The Water Supply of the Negro* provides an important snapshot of drinking water infrastructures under Jim Crow. Wilson studied wells across eight communities spanning Georgia's coastal plain and Piedmont regions, including Dudley in Laurens County as well as Augusta and Athens. According to the study, more than one hundred thousand Black Georgians drank from shallow wells exposed to contaminants linked to waterborne diseases. This had devastating effects.

For example, in 1926, in the course of four months after moving to a rented farm in rural Madison County, seven members of one farming family became sick with typhoid fever. Although five recovered, two succumbed to the disease. Endemic to much of the South through the early twentieth century, typhoid remained dangerous, with the violent vomiting, diarrhea, and fever of the condition inducing severe dehydration. The devitalizing and unequal water supply under Jim Crow drove Black exposure, susceptibility, and death.³ Dangerous wells

were not only prevalent in communities like Madison; they also remained an essential source of water in growing urban centers like Augusta and Athens. Although 80 percent of Augusta's Black residents connected to the municipal supply, the remaining 20 percent, confined to the west end, lacked access to purified water. The deliberate exclusion of 20 percent of Augusta's Black community from municipal water supplies was compounded for Black renters confined to inadequate housing governed by the confining spatial economy of Jim Crow. According to Wilson, despite adjoining land, on "one street three houses have been built on a double lot only a hundred feet in width" with "all three of these houses" using "a common well" that had "been condemned by the Board of Health" and a "common privy" of the "dug pit type" that leached into the water.⁴

Exposure to deadly water under Jim Crow resulted from the profitable spatial arrangement confining Black communities to small, overdeveloped parcels while ignoring contemporary understandings of healthful drinking water. The poisoning of Flint—along with the ongoing crises in Newark, New Jersey; Jackson, Mississippi; and many other predominantly Black communities around the US—reveals the enduring legacy of Jim Crow logics in contemporary necrocapitalist infrastructures.

3 Thank you to Maira Liriano at the Schomburg Center for the Study of Black Culture for connecting me with this source. Ernest B. Wilson, "The Water Supply of the Negro," *Bulletin*

of the University of Georgia 31, no. 3a (1931).

4 "The Water Supply of the Negro," 35.

FROM MANAGEMENT TO JUSTICE

Elena Sobrino, Ph.D.



Is it fixed yet? Can you trust the water now? That's the question everyone has for Flint, almost eight years into a water crisis that has left behind continuing uncertainty and apprehension about the toxicity of the city's water supply. Flint is a postindustrial city in the American Midwest with a remarkable history of union and civil rights movements that is now notorious for struggles centered on environmental justice. In 2014, while Flint's municipal operational budgets were submerged in debts, surrounding counties saw an opportunity to generate revenue through the construction of a new water pipeline. Although the construction costs would translate to millions of dollars of debt held in municipal bonds, Flint's unelected emergency managers overrode all objections and colluded in a speculative logic of future financial benefit, with catastrophic consequences for Flint. In order to transition to the new pipeline, the emergency managers approved a switch from Lake Huron to

the Flint River, a decision that resulted in lead contamination and other health hazards Flint residents continue to reckon with today.

Behind the notoriety of the crisis, which captivated national media outlets during the 2016 election season, lies a ponderous and painful pursuit of repair. Lawsuits have proliferated, but the inherently conservative structures of legal claim-making and negotiation come with their discontents. Recently, a consolidation of several class-action lawsuits resulted in a settlement proposal of \$600 million, which Flint residents have found problematic for a number of reasons.¹ Less well known is a 2020 lawsuit against three banks that

1 Bob Brown, Leon El-Alamin, Latisha Jones, Claire McClinton, Mona Munroe-Younis, Juani Olivares, Benjamin J. Pauli, Dan Scheid, Nayyirah Shariff, Laura Sullivan, and Monica M. Villarreal, "A Long Way from Justice: Reflections from Flint on the \$600 Million Settlement Proposal," *Environmental Justice* 13, no. 6 (2020): 222–224.

claimed the underwriters of the bonds for the disastrous pipeline project hold some responsibility for exposing Flint’s residents to harm.² The plaintiffs’ argument has had little legal traction so far—as one attorney put it, no one in the courts is prepared to take this unusual category of defendant seriously and “invent a new type of liability” anytime soon.³ This legal indecision has naturalized relief over justice, dispersing and individualizing the risks of infrastructural failures such that Flint residents themselves have had to become the *ad hoc* architects of a safe and reliable system of water provision.

Today many Flint residents continue to drink bottled water, much of it donated by corporation Nestlé to “points of distribution” that have spread across the city, known locally as “PODs.” Humanitarian paradigms of relief like this, which rely on volunteered labors of care, exploit social bonds of community while leaving the deep antisociality of infrastructure bond markets intact. As early as four o’clock in the morning, in the hot humidity of summer or harsh chill of winter, cars start lining up to wait at the edges of the church parking lots that temporarily turn into PODs once a

2 Kayla Ruble, “Flint Residents Su Investment Banks, Accuse Them of Helping Create Water Crisis,” *Detroit News*, October 7, 2020, <https://www.detroitnews.com/story/news/michigan/flint-water-crisis/2020/10/07/flint-residents-blame-water-crisis-investment-banks-lawsuit/5912871002>.

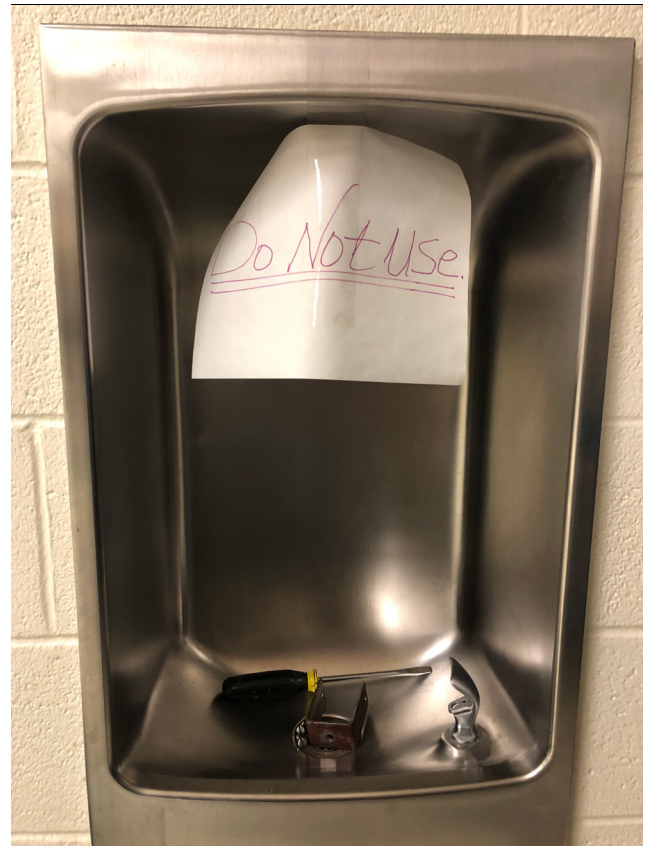
3 Steve Carmody, “Judge Hears Banks’ Request to Dismiss Flint Water Crisis-Related Lawsuit,” Michigan Radio, August 3, 2021, <https://www.michiganradio.org/law/2021-08-03/judge-hears-banks-request-to-dismiss-flint-water-crisis-related-lawsuit>.

week. Residents will be able to pick up anywhere between twelve to forty-eight liters of bottled water at a time. This water has been extracted from aquifers in rural Michigan; a truck driver drives over one hundred miles to the PODs from the Nestlé warehouse to drop off the pallets of water bottle cases, tightly wrapped in plastic. At PODs, the social costs of water commodification are easy to see and feel. Lifting cases of water day in and day out, sometimes even without a car to move water from POD to home, is physically as well as emotionally heavy work. But the commodification of water in Flint has intersected with the less visible but no less significant process of the transformation of water and its infrastructures into *assets*.⁴

The infrastructure bond market depends on the asset form as a technology of trust—one, however, that concentrates power and choices over environmental and social questions into narrow and coercive channels of reciprocity. The right of bond writers to be protected from liability and trust one another as financial agents is currently less disputable than the right of an entire city’s population to access water and trust it is safe to drink. Destin Jenkins calls this prevailing arrangement the “paradox of debt,” where the maintenance of essential infrastructure becomes tethered to financial technologies and conventions that depend on racism to ideologically prop up an

4 Emerging work on the “asset economy” argues that asset ownership is displacing commodity-driven forms of inequality. See Lisa Adkins, Melinda Cooper, and Martijn Konings, *The Asset Economy: Property Ownership and the New Logic of Inequality* (Cambridge, UK: Polity Press, 2020).

exclusive system of trust and control.⁵ The current water crisis in Benton Harbor, Michigan, grimly recapitulates that, as in Flint, the assetization of water disproportionately exposes Black communities to risk and invalidates elected Black leadership.⁶ When the value of infrastructure is fixed firmly in the asset form, there is less room to spell out fully the collective *values* around which cities might wish to organize infrastructure—values like racial justice, public health, and ecological sustainability.⁷ The trust that enables infrastructure bonds calls for a counter-strategy of *distrust* that questions the hidden premises of environmental *management* and re-orient questions of trust more explicitly around environmental *justice*. Flint’s unique history has positioned the city’s communities to integrate tactics from labor and anti-racist organizing to comprehensively challenge the financial “common sense” that underwrites the development of environmental crises and infrastructural capacities.



Images by Elena Sobrino, Flint, Michigan, 2019.

5 Destin Jenkins, *The Bonds of Inequality: Debt and the Making of the American City* (Chicago: University of Chicago Press, 2021).

6 On Benton Harbor, see Louise Seamster, “When Democracy Disappears: Emergency Management in Benton Harbor,” *DuBois Review: Social Science Research on Race* 15, no. 2 (December 2018): 295–322, <https://doi.org/10.31235/osf.io/3ahtb>.

7 For an account of how urban policy has shifted to privilege private over public financial techniques to meet operational needs, see Robert Lake, “The Financialization of Urban Policy in the Age of Obama,” *Journal of Urban Affairs* 37, no. 1 (2015): 75–78, <https://doi.org/10.1111/juaf.12167>.

RIVERS AND AQUIFERS

DE-ESCALATING WATER CRISIS

Bruno Seraphin and April Anson, Ph.D.

Since the time of its first white settlers, the US West has been paradoxically imagined as a place of infinite natural abundance and looming resource scarcity. In the era of accelerating drought brought on by fossil fuel-induced climate change and water mismanagement,¹ long-standing resource anxiety increasingly manifests as discourse about imminent “water wars.” Yet while many dread such conflict, others may welcome it: white supremacist and armed militia groups are increasingly embracing claims of environmental scarcity—stoking fear, building membership, and threatening violence in media-grabbing spectacles.² A recent example from southern Ore-

gon demonstrates that such extragovernmental context is vital to water-policy considerations.

In the spring of 2021, extreme drought across southern Oregon led the Bureau of Reclamation to declare, for the first time, that no water would be diverted from Upper Klamath Lake to supply regional farms. In anger and dismay, some locals blamed regional Indigenous peoples such as the Klamath Tribes, who maintain water rights to protect culturally important species such as salmon and lampreys. With the recently-won uneasy peace around water-rights threatened, many began to fear the resurgence of the “farms versus fish” binary that speciously claims conflict is inevitable.³

1 Bradley W. Parks, “What We’re Talking About When We Talk About Drought,” OPB: Oregon Public Broadcasting, May 13, 2021, <https://www.opb.org/article/2021/05/13/drought-oregon-climate-change>; Emma Marris, “The West Can End the Water Wars Now,” *Atlantic*, June 5, 2021, <https://www.theatlantic.com/science/archive/2021/06/oregon-water-drought-conflict/619109>; Andrew Morris, “California’s Water Mismanagement Leads to Farming Crossroads,” San Diego News Desk, September 18, 2021, <https://www.sandiegonewsdesk.com/2021/09/californias-water-mismanagement-leads-to-farming-crossroads>.

2 Oliver Milman, “Climate Denial Is Wan-

ing on the Right. What’s Replacing It Might Be Just as Scary,” *Guardian*, November 21, 2021, <https://www.theguardian.com/environment/2021/nov/21/climate-denial-far-right-immigration>.

3 Jessica Fu, “Tensions Rise in Klamath Basin as Feds Further Reduce Water Allotments to Farmers,” *Counter*, May 21, 2021, <https://thecounter.org/klamath-basin-feds-water-allotments-drought-releases-usbr-farmers-fisheries>; Gary Pitzer, “When Water Worries Often Pit Farms vs. Fish, a Sacramento Valley Farm Is Trying to Address the Needs of Both,” Water Education Foundation, August 24, 2018,

Enter People’s Rights—a network of “militia members, anti-maskers, conspiracists, preppers, anti-vaxxers, and others” cultivated by far-right activist Ammon Bundy and his sympathizers.⁴ Threatening to break open the canal gates, they set up a “water crisis info center” that locals wryly called “the circus tent.” Print and television media were quick to report this spectacle with little historical context or critical commentary. The *New York Times* heralded a “new water war” brewing in the West.⁵ Neon sign-like headlines warned: “Ammon Bundy Coming Soon,” even though no more than a handful of supporters ever arrived and Bundy remained nowhere in sight.⁶

Redubbing the “water crisis info center” a “circus tent,” locals deflated the crisis discourse that has

long propped up far-right spectacles, from the occupation of Malheur National Wildlife Refuge (2016), the standoff at Bundy Ranch (2014), and the semi-staged melodrama of the State of Jefferson separatist movement in the 1940s to nineteenth-century journalistic support for settler militias’ extreme violence against Indigenous peoples.⁷ Locals recognized the circus tent as another spectacle in this longer history of anti-Indigenous violence, an old pattern reshaping itself in an era of climate chaos.

Researchers have documented that the genocidal and environmental warfare of “settler colonialism” has made the region what it is today.⁸ Settler colonialism is an ongoing structure of invasion and extraction animated by a logic of elimination and an unending drive to acquire more resources.⁹ Settler miners, loggers, ranchers, and homesteaders have attacked Indigenous peoples by targeting their natural and cultural resources, burning agricultural fields, exterminating bison herds, and

<https://www.watereducation.org/western-water/when-water-worries-often-pit-farms-vs-fish-sacramento-valley-farm-trying-address-needs>.

4 Institute for Research and Education on Human Rights, *Ammon’s Army: Inside the Far-Right ‘People’s Rights’ Network, A Special Report by the Institute for Research & Education on Human Rights and the Montana Human Rights Network* (Kansas City, MO: Institute for Research and Education on Human Rights, 2021), <https://www.irehr.org/reports/peoples-rights-report>.

5 Mike Baker, “Amid Historic Drought, a New Water War in the West,” *New York Times*, June 1, 2021, <https://www.nytimes.com/2021/06/01/us/klamath-oregon-water-drought-bundy.html> (subscription required).

6 Ryan Sabalow, “Ammon Bundy Coming Soon: Federal Water Cutoffs Igniting Rebellion in Northern California,” *Sacramento Bee*, May 27, 2021, <https://www.sacbee.com/news/california/water-and-drought/article251710398.html> (subscription required).

7 Stephen Beckham, *Requiem for a People: The Rogue Indians and the Frontiersmen* (Corvallis, OR: Oregon State University Press, 1996); Brendan C. Lindsay, *Murder State: California’s Native American Genocide, 1846-1873* (Lincoln, NE: University of Nebraska Press, 2012).

8 Cutcha Risling Baldy, “Why We Gather: Traditional Gathering in Native Northwest California and the Future of Bio-Cultural Sovereignty,” *Ecological Processes* 2, no. 17 (June 2013), <https://doi.org/10.1186/2192-1709-2-17>.

9 Dina Gilio-Whitaker, *As Long as Grass Grows: The Indigenous Fight for Environmental Justice, From Colonization to Standing Rock* (Boston: Beacon Press, 2019).

polluting fish habitats.¹⁰

Informed by this historical context, Klamath Tribes members identified the People's Rights' bravado as a credible threat of cultural genocide. Opening the canal gates would result in another massive fish die-off, and Klamath Tribal member Joey Gentry made the stakes clear: "If the fish die, our people die."¹¹ As climate collapse accelerates, so, too, does the threat of environmental discourse like "water wars"—which perpetuates and justifies violence and ecofascism.¹² The "circus tent" critique warns that ecofascism is dangerous despite—nay, because of—its sensational but superficial rhetoric.

The tent came down unceremoniously at the end of the summer of 2021, after the Klamath Water Users Association, the Klamath Tribes, and local community organizations denounced People's Rights as ill-informed outside agitators with no real solutions, intent on putting the community at risk to promote a reactionary political agenda. This de-escalation reminds journalists, academics, and policy-makers not to take for granted

the inevitability of "water wars": in doing so, we may inadvertently legitimize militia agitation by granting the agitators their premise. Instead, we must amplify events like the intertribal Run4Salmon¹³ and consult the leadership of Klamath river communities such as the Yurok, Klamath-Modoc-Yahooskin, and Karuk Tribes, who conduct multidisciplinary research on the interconnections of aquatic ecosystems, prescribed fire, and community mental health.¹⁴ The "circus tent" case teaches us to be prudent with the language we use, to prepare ourselves to defuse white supremacist scare tactics, and to follow the lead of communities that are pursuing waterways based in relations of care and responsibility.¹⁵

10 Kyle Whyte, "Settler Colonialism, Ecology, and Environmental Injustice," *Environment and Society* 9, no. 1 (2018): 25–44.

11 Jeremy Raff, "If the Fish Die, the People Die: Water Wars in America's West," *Al Jazeera*, 10 November 10, 2021, <https://www.aljazeera.com/features/2021/11/10/if-the-fish-die-the-people-die-water-wars-in-americas-west>.

12 April Anson, "No One is a Virus: On American Ecofascism," *Environmental History Now*, October 21, 2020, <https://envhistnow.com/2020/10/21/no-one-is-the-virus-on-american-ecofascism>. See also Peter Staudenmaier, *Ecology Contested: Environmental Politics Between Left and Right* (Porsgrunn, Norway: New Compass Press, 2021).

13 Run4Salmon (website), Winnemem Wintu Tribe, <http://run4salmon.org>.

14 Karuk Tribe, *Karuk Climate Adaptation Plan*, 2019, <https://karuktribeclimatechange-projects.com/climate-adaptation-plan>.

15 See *Water: NFS* by Natalie Ball and Annelia Hillman pue-leek-la' <https://www.oregon-contemporary.org/water-nfs>.



Image by Dean Chahim, Yosemite National Park, 2017.

AN ENVIRONMENTAL JUSTICE APPROACH TO HYDROELECTRIC DAMMING

Sage Gerson, Ph.D.

As of 2000, forty-seven thousand large dams were choking, rerouting, and fracturing more than 60 percent of the earth's rivers.¹ These dams, while providing fossil-free sources of power through the generation of hydroelectricity, can have catastrophic impacts on fisheries, aquatic and terrestrial life, and nearby human communities. Dams have displaced approximately eighty million people worldwide; if the people whose lives have been impacted beyond immediate displacement were also counted, such as those whose traditional and/or land-based agricultural or fisheries foodways have been disrupted, then the number would be much higher.

The Muskrat Falls hydroelectric project in subarctic Canada is a recent example of the social disruption and displacement that megadams impose on Indigenous and land-based peoples. Not only does the development of the Muskrat dam require the displacement of the Innu people,² but it will also, according to an environmental-impact report, increase methylmercury in surrounding waters.³ Canada's massive James Bay hydroelectric projects of the twentieth century exemplify the disastrous impacts of increased levels of methylmercury: the construction of the dams poisoned the food chains that the surrounding James Bay Cree relied on. The catastrophic social and environmental damage caused by megadams led the World Bank, once an enthusiastic supporter of large dams, to conclude in 2000 that "in too many cases an unacceptable and often unnecessary price has

1 Victor Villalobos, "Megadam: 'Obsolete Technology' Wreaks Havoc across the Americas," *resilience.org*, October 25, 2019, <https://www.resilience.org/stories/2019-10-25/megadam-obsolete-technology-wreaks-havoc-across-the-americas>.

2 Colin Samson, "How a Controversial Dam Threatens Rights of Canada's Indigenous Innu People," *Conversation*, July 5, 2016, <https://theconversation.com/how-a-controversial-dam-threatens-rights-of-canadas-indigenous-innu-people-62054>.

3 Matt Hongoltz-Hetling, "US Demand for Clean Energy Destroying Canada's Environment, Indigenous Peoples Say," *Guardian*, June 22, 2020, <https://www.theguardian.com/environment/2020/jun/22/us-clean-energy-demand-destroying-canadian-environment-indigenous-peoples-say>.

been paid” to secure the developmental benefits of large dams.⁴

Other social impacts of dam building besides displacement and the destruction of traditional foodways include: the creation of man camps, which are directly linked to increases in violence against Indigenous women and girls;⁵ increased racial discrimination; and, the destruction of ancestral burial sites and important cultural objects. Indigenous resistance to dams in North and South America is often met with threats of violence. For example, the award-winning Honduran Indigenous and environmental rights leader Berta Cáceres was murdered barely a week after she was publicly threatened for opposing a hydroelectric project.⁶

As climate change intensifies and the need for renewable sources of power increases, many countries are turning to hydroelectricity’s low carbon generation as part of their energy solutions. However, conceiving of climate change as solely an emissions issue fails to address the unjust cultural, political, colonial, and economic power relations that both contribute to climate change⁷ and shape megadam development. Currently, more than 3,500 hydroelectric dams are being planned or built globally.⁸ This is particularly important in the North and South American context, as the US, Brazil, and Canada are three of the top four largest producers of hydroelectricity in the world—making the impacts of large dams a very salient issue for this report’s focus on justice, self-determination, and Indigenous sovereignty in relation to water and technology in North and South America. Brazil leads the way globally with 256 large dams built or planned.⁹ In addition, 412

4 Christopher Shulz and Bill Adams, “The World Commission on Dams: Then and Now,” Future-DAMS, November 20, 2020, <http://www.futuredams.org/the-world-commission-on-dams-then-and-now>.

5 Kyle Edwards, “How we treat women’: Worker Camps Make It Possible to Build Infrastructure in Remote Locations in Canada. Is It Worth the Human Cost?,” *Maclean’s*, May 13, 2019, <https://www.macleans.ca/how-we-treat-women>.

6 Jonathan Watts, “Berta Cáceres, Honduran Human Rights and Environment Activist, Murdered,” *Guardian*, March 4, 2016, <https://www.theguardian.com/world/2016/mar/03/honduras-ber-ta-caceres-murder-environment-activist-human-right>.

7 As Potawatomi scholar of Indigenous environmental justice Kyle Whyte writes, “climate change is an intensification of environmental change imposed on Indigenous peoples by colonialism.” For more on the interconnected systems contributing to climate change, read the Center for Interdisciplinary Environmental Justice’s (CIEJ) essay “No Comemos Baterías: Solidarity Science Against False Climate Change Solutions.” Kyle Whyte, “Indigenous Climate Change Studies: Indigenizing Futures, Decolonizing the Anthropocene,” *English Language Notes*, 55.1-2 (2017).

8 Reality Check Team, “Hydropower Dams: What’s behind the Global Boom?,” BBC, August 6, 2018, <https://www.bbc.com/news/world-45019893>.

9 John Vidal, “Why Is Latin America So Obsessed with Mega Dams?,” *Guardian*, May 23, 2017, <https://www.theguardian.com/global-development-professionals-network/2017/may/23/why-lat-in-america-obsessed-mega-dams>.

large dams are proposed, are under construction, or have been built in the Amazon Basin.¹⁰

Too often, hydroelectricity is still considered a “renewable” resource – for example, the U.S. Energy Information Administration¹¹ and the U.S. Department of Energy’s Office of Energy Efficiency & Renewable Energy¹² continue to consider hydropower a renewable source of energy – despite the fact that the lands and waters that dams flood are not renewable, nor are the human and more-than-human lives they disrupt and displace. Approaching hydroelectricity from an environmental justice perspective means understanding and working against the intertwined relationship between colonialism, violence against Indigenous people, and dam building. Consider, for example, the Pick-Sloan Plan, which supported the construction of five dams along the Missouri River in the 1940s. The dams flooded seven Lakota and Dakota reservations, forcing thousands of people to relocate, and enabling the U.S. Army Corps of Engineers to seize 550 square miles of Native land through eminent domain.¹³

Defending the self-determination and rights of people who are threatened by development-based displacement must be prioritized as part of climate change solutions – especially given that support for dams tends to come from economically and politically powerful global actors.¹⁴ Decolonization, landback, and Indigenous sovereignty are crucial parts of environmental justice. It is critical that policymakers in colonial nation-states like the US, Mexico, and Canada listen to the Indigenous and land-based peoples who would be impacted by proposed hydroelectricity development before projects are approved; uphold treaties with Indigenous nations; and honor and respect Indigenous sovereignty. Relationships with the land, water, and more-than-human life should first and foremost be initiated from a place of consent, reciprocity, and relationality. To this end, megadam projects should be opposed and undamming projects – like the one advocated for on the Klamath River that would liberate the river, create better conditions for spawning salmon, and re-make Indigenous traditional ecological practices possi-

10 David Hill, “More than 400 Dams Planned for the Amazon and Headwaters,” *Guardian*, May 6, 2014, <https://www.theguardian.com/environment/andes-to-the-amazon/2014/may/06/more-400-dams-amazon-headwaters>.

11 U.S. Energy Information Administration, “Electricity explained: Electricity in the United States. 18 March, 2021. <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php>

12 Rocío Uría-Martínez, Megan M. Johnson, and Rui Shan, *U.S. Hydropower Market Report* (Oak Ridge, TN: U.S. Department of Energy, January 2021), <https://www.energy.gov/sites/prod/files/2021/01/f82/us-hydropower-market-report-full-2021.pdf>.

13 “Water Is Life: Nick Estes on Indigenous Technologies,” *Logic 9* (December 7, 2019), <https://logicmag.io/nature/water-is-life-nick-estes-on-indigenous-technologies>.

14 Christopher Shulz and William M. Adams, “In Search of the Good Dam: Contemporary Views on Dam Planning in Latin America,” *Sustainability Science* 16 (January 2021): 255–269, <https://doi.org/10.1007/s11625-020-00870-2>.

ble – should be supported.¹⁵ Further, I urge policymakers to understand that Euro-American/Western developmental and extractive frameworks are only one type of approach to managing human relationships with the environment,¹⁶ an approach shaped by specific cultural values – and an approach that climate change shows is not working. There is a need to honor and respect cultures and relationships to land, water, and energy that are not extractive. In many Indigenous and non-Euro-American cosmologies, water is life, not merely a resource to be extracted – for example, the Lakḥótiyapi declaration “Mní Wičóni” means *water is alive*.

15 Ivy Huwald, “Undamming the Klamath,” *Humboldt Geographic*, 1, no. 17 (2020), <https://digitalcommons.humboldt.edu/humboldtgeographic>.

16 Nicholas Cannariato, “Our History Is the Future’ Puts Standing Rock in Broader Native American Story,” NPR, March 6, 2019.



Image by Dean Chahim, Mexico City, 2018.

NO MORE GROUNDWATER, MORE AQUIFERS!

Andrea Ballestero, Ph.D.

The twenty-first century has pulled aquifers up from the relative obscurity they enjoyed in the twentieth century; increasingly, people across the world realize that 99 percent of available freshwater¹ sits underground (Food and Agriculture Organization (FAO), 2015). This awareness is linked to increased water extraction. Since the 1950s, the world's use of subterranean water has increased fourfold. Aquifers currently face unprecedented pressures leading to depletion, salinization, and pollution (Konikow, 2011). In 2016, a group of international organizations called for an overhaul of groundwater governance (Food and Agriculture Organization (FAO), 2015). Specifically, they invited audiences to avoid irreversibly damaging aquifer systems and called attention to the fact that doing so requires public guardianship and collective responsibility based on science (Food and Agriculture Organization (FAO), 2015:3).

What if achieving the goal of securing the future of aquifers required something else, something like a fundamental shift in our imagination?² What if

the most powerful thing we could do is stop talking about groundwater and instead speak of aquifers? Some might say this is merely a semantic shift. I suggest the opposite. Aquifers are radically different formations than groundwater.

Groundwater, as a substance, can be quantified and turned into a decontextualized unit of a liquid: a number of liters or gallons. Think about how groundwater is allocated. Different actors negotiate a certain quantity of water during a particular period of time, abstracting the liquid without attending to much more than whether they have reached the quantity they have committed to use or escaped having to make the commitment in the first place. This is the case in the Central Valley in CA, for example, where decades of unregulated groundwater extraction have left whole towns without water.³ Thinking in terms of groundwater quantity enables this kind of dissociation from territory, history, economic systems, and social organization. Water's historical and spatial connections are severed to make it an input in a production or consumption process.

1 Fresh water is naturally occurring water that has low enough concentrations of salt to make it usable and drinkable by humans and other animals not adapted to live in the Ocean or consume salty water.

2 Anthropologists have studied the multiple forms, values, and institutional arrangements through which water participates in social

worlds. For a review see Ballestero 2019c.

3 La Ganga, María L., Gabrielle La MarLeMee, and Ian James. 2021. "A Frenzy of Well Drilling by California Farmers Leaves Residents without Running Water." *Los Angeles Times*, December 16, 2021. <https://www.latimes.com/projects/california-farms-water-wells-drought/>.

Aquifers, on the other hand, are spatial formations characterized by dynamic movement and deep relations. Aquifers are dynamic and spongy architectures sucking and seeping, swelling and shrinking, absorbing and oozing (Ballestero, 2018). They require people to stop and think about their form, realizing that they need to think water and stone together, inseparably. Aquifers privilege movement, the difficult and never frictionless encounter between water and stone. They remind us of the dynamic interconnection between life in the surface and subsurface worlds. They exist as a kind of choreography where technical, scientific, gender, emotional, legal, political, and economic aspects are always activated, always part of the world (Ballestero, 2019b). When we think about aquifers, we face emplaced formations with legacies that persist. Aquifers are place specific and hold historical ties.

They are intertwined with lively dynamics—human, geophysical, more than human. Reducing groundwater to quantified units masks those legacies; aquifers, on the other hand, resist that erasure through their persistent connection to place. Imagine the Río Blanco Aquifer in Costa Rica’s Caribbean coast. It sits at the doors of the country’s most important port, a site where most of the exports start the international travel they undertake as part of the commodity chain they are part of; it undergirds a community aqueduct association led by a fearless woman who has made history by becoming the first to be elected president of the aqueduct association; it erupts into people’s backyards as its extremely high water table constantly reminds residents of its vulnerability to pollution; it inspires children who draw their relation to water in order to create the logo of the commission that is dedicated to its protection; it inspires negotiations between community water providers and logistics companies lodged in the area who put have to confront measures of financial profit with the risk of depleting the aquifer. Aquifers are all of these relations, con-

flicts, and possibilities. Always more than a number of liters per second or foos per acre.

Dropping groundwater and embracing aquifers has another effect. It moves discussions away from scarcity (diminishing units of groundwater available) and moves it towards emplaced justice; justice for humans but also for the non-human beings with whom we share our world. A focus on scarcity locks us into the quantity discussion. A focus on justice opens our horizon to consider multidimensional relations as they happen in time and space; in Río Blanco, Costa Rica; in the Imperial Valley in California, USA, in Andhra Pradesh, India. Yes, a complex and challenging route, and yet, the only serious one we can take considering our current condition. The only serious one if we want to reroute the future history of water today (Ballestero, 2019a).

- Ballestero, A. (2018). Spongiform. *Theorizing the Contemporary*. Retrieved from <https://culanth.org/fieldsights/1447-spongiform>
- Ballestero, A. (2019a). *A Future History of Water*. Durham, NC: Duke University Press.
- Ballestero, A. (2019b). Underground as Infrastructure? Figure/Ground Reversals and Dissolution in Sardinal. In K. Hetherington (Ed.), *Environment, Infrastructure and Life in the Anthropocene* (pp. 17-44). Durham, North Carolina: Duke University Press.
- Ballestero, A. (2019c). The Anthropology of Water. *Annual Review of Anthropology* 48:405-421.
- Food and Agriculture Organization (FAO). (2015). *Shared Global Vision for Groundwater Governance 2030 and A call-for-action*. Retrieved from Rome:
- Konikow, L. F. (2011). Contribution of global groundwater depletion since 1900 to sea-level rise. *Geophysical Research Letters*, 38(17).

DISASTER TECH

M E X I C O C I T Y



Image by Dean Chahim, Mexico City, 2017.

SOCIALIZE FLOODING: CREATING COLLECTIVE SACRIFICE ZONES IN MEXICO CITY

Dean Chahim, Ph.D.

Mexico City is digging in to prepare for a wetter—and rapidly sinking—future. Like Jakarta and New Orleans, much of the metropolis of twenty-two million is literally falling under the weight of its own growth. A century of unrelenting groundwater pumping has led to runaway land subsidence, with no clear short- to medium-term solution.¹ This undermines the city’s combined sewers and drainage canals (which carry stormwater and sewage together) even as the climate crisis brings more frequent and intense rainstorms. In response, the government has undertaken ambitious tunneling projects to drain the city. While initially transferring the city’s flooding problems elsewhere, they are themselves unlikely to be sufficient to weather the storms to come. This means that the city’s streets will continue to flood. The key political question, however, is *whose* streets will bear the brunt of this flooding.

While flooding patterns owe much to local rainfall distribution,

¹ Estelle Chaussard et al., “Over a Century of Sinking in Mexico City: No Hope for Significant Elevation and Storage Capacity Recovery,” *Journal of Geophysical Research: Solid Earth* 126, no. 4 (April 2021), <https://doi.org/10.1029/2020JB020648>.

topography,² and the design of infrastructures, policymakers and the public in cities around the world frequently overlook the ways the *operation* of drainage infrastructures exacerbates the effects of already inequitable flood protection for marginalized residents. Mexico City’s long struggle against flooding shows not only how the operation of drainage systems exacerbates inequity but also points to ways more equitable operating protocols might be implemented to effectively socialize not just the costs of flooding (as is often done through insurance schemes), but the spatial distribution of floodwaters themselves.

The Mexico City metropolitan region is built largely on a series of artificially drained lakes in a closed basin with no natural rivers flowing in or out. Decades of excessive groundwater extraction have caused the city to sink, rendering major drainage canals nearly useless. The region therefore depends instead primarily on one of the world’s largest and most complex deep drainage tunnel systems to artificially drain water from the basin every time it

² In areas of the city with rapid land subsidence, “topography” is not a constant, but a constantly varying product of local geology and the history of groundwater extraction.



Image by Dean Chahim, Mexico City, 2018.

rains. These tunnels—ranging between four and seven meters in diameter—snake deep underneath the city and capture water from both the city’s rivers and local sewers, which themselves carry a toxic mix of sewage, industrial waste, and—during storms—rainwater. The system, known as the Deep Drainage System (*Sistema de Drenaje Profundo*), is like a subway network for stormwater and sewage, which nearly every inhabitant depends on, but no one sees.

The system’s primary tunnels were inaugurated in 1975 and immediately reduced flooding in downtown Mexico City, which had previously faced regular and catastrophic floods. Nevertheless, the city’s subsequent growth rapidly outpaced the government’s expansion to the system. This growth meant that even typical storms (occurring multiple times a year) would generate far more stormwater than the system could handle. The core problem was that the government had expanded the urban area served by the tunnel system without expanding the capacity of the system’s backbone: its outlet conduits, which gathered the entire system’s water and ejected it from the watershed entirely.

As a result, these outlets increasingly became bottlenecks during heavy storms, which caused backups

throughout the drainage system. By 1999, the system was in a generalized crisis, as evidenced by a disastrous overflow of water from an oversaturated drop shaft of the tunnel, which flooded Ejército de Oriente, a working-class neighborhood on the city’s eastern periphery. In the wake of a series of similar disasters, government engineers began to carefully ration access to the drainage system to avoid letting it become oversaturated. This improvised operational practice had previously been largely unheard of; the engineers who built the system did not imagine—or design—the system to operate in this way.

Engineers rationed access to the system primarily through the closure of floodgates that control the flows of sewers into the drainage tunnels. Much like metering the onramp to a freeway, the closure of floodgates caused backups of sewage and rainwater into local neighborhood sewers, routinely resulting in floods. This process of rationing was, however, highly political. Under pressure from politicians, engineers would routinely leave floodgates open in the richest and most central parts of the city—allowing them priority access to drain their waters—while closing floodgates in the poorest peripheral neighborhoods. This operational practice often meant

“sacrificing” these neighborhoods—a phrase engineers themselves often used—to floods of up to a meter (and sometimes even more) of sewage and rainwater. These neighborhoods served as de facto detention basins to temporarily hold stormwater that protected the rest of the city from more intense flooding.

The human and material toll of these floods was severe, as they would regularly triple commute times, cause infections, and ruin homes for residents with little or no savings. Some residents were forced to invest in extraordinary adaptations like meter-tall floodgates for their doorways, while others simply abandoned their first floors during the rainy season.³ Due to these recurrent floods, these neighborhoods became *sacrifice zones*: areas the government disproportionately exposed to toxic health effects and property damage—not to mention psychological trauma—in order to protect the health and wealth of more privileged areas of the city.⁴

3 For more on this history and these operations, see Dean Chahim, “Governing Beyond Capacity: Engineering, Banality, and the Calibration of Disaster in Mexico City” *American Ethnologist* (forthcoming).

4 The term “sacrifice zone” is typically used somewhat more narrowly to describe communities (disproportionately poor and, in the US context, inhabited by people of color) living alongside toxic industries, military installations, and their waste, whose well-being is sacrificed in the name of broader political and economic objectives. See Steve Lerner, *Sacrifice Zones: The Front Lines of Toxic Chemical Exposure in the United States* (Cambridge, MA: MIT Press,

In 2019, the government inaugurated a new outlet tunnel that promised to reduce the drainage system bottleneck and therefore the necessity of such rationing and the associated floods in the metropolitan region. Known as the Eastern Outfall Tunnel (*Túnel Emisor Oriente*), this tunnel has largely succeeded in reducing back-ups (and therefore the need to ration access) in the metropolitan drainage system even if smaller floods still occur due to local drainage network incapacity. Nevertheless, this project has simply displaced the problem of flooding elsewhere, farther from the city: the tunnel is now centrally implicated

in a flood in September 2021 that killed fourteen and gravely affected thirty thousand residents in the Mezquital Valley, where it discharges Mexico City’s waters.⁵ Both to avoid such downstream floods and deal with increasingly intense storms due to climate change, the government

will soon need to ration access to the drainage system once again. If left uncontrolled, the city’s continued expansion into undeveloped areas will also generate more stormwater, similarly accelerating a return to rationing.

2010). The kind of sacrifice I am describing here is more intermittent—floodwaters come and go—but residents face much of the same ongoing health effects and trauma and are similarly stuck in place.

5 Dean Chahim, “La Tragedia de la Inundación en Tula fue una Decisión Política,” *Washington Post*, September 20, 2021, <https://www.washingtonpost.com/es/post-opinion/2021/09/20/tula-inundaciones-rio-causas-hidalgo-mexico>.

**POLICYMAKERS FREQUENTLY
OVERLOOK THE WAYS THE
OPERATION OF DRAINAGE
INFRASTRUCTURE
EXACERBATES INEQUITABLE
FLOOD PROTECTION.**

Nevertheless, there is no reason that such rationing must necessarily disproportionately sacrifice the poor, as has been the historic government practice. A more equitable approach to managing rationing during these critical storm events would be to close the floodgates of the city's tunnel system in a relatively even pattern designed to induce widespread flooding across the city's vast low-lying region (which includes much of the wealthier city center), rather than simply in its poorest peripheral neighborhoods. Spread over wider areas, floods might be kept within manageable depths of ten to twenty centimeters, which could be easily contained with minor adaptations of doorways and driveways. The result of such an equitable rationing of access to the city's drainage system would mean that more of the city would flood on a given night with a heavy downpour, but the actual level of floodwaters would be much lower for everyone.

The result of such a redistribution of floodwaters would be the creation of what we might call *collective sacrifice zones*. The term recognizes that environmental harms produced by collective forms of life (e.g., cities) should be borne collectively, by spreading environmental harms across the population as broadly and equitably as possible.⁶ "Equitable" here does not mean *equal*, however. Indeed, equity would demand closing the floodgates (and therefore risk flooding) in those areas with the *greatest* wealth first and disproportionately, precisely because they are the zones where residents and businesses have the most means to adapt to and recover from flooding—and these are

6 Referring to toxic contamination, Lerner (2010, 300) puts it this way: "If sacrifices must be made for the greater economic good in a democratic republic, then surely they should be evenly shared."

also the areas that have long benefited disproportionately from the system's discriminatory operations. Rather than forcing the poor to adapt first and most radically to a changing environment, equity demands that those with the most means to adapt be first in line to receive the brunt of increasingly severe disasters.

The physical design of the city's drainage infrastructure does not prevent city engineers from rationing access more equitably. The fact that they do not do so (despite, ironically, often being from the very same neighborhoods that are regularly flooded) has everything to do with the political pressures they face to protect the wealthiest parts of the city from flooding, whose residents can threaten the state with costly lawsuits out of reach of poorer residents. The only way to reverse this tendency is to collectively organize and build the popular power to pressure the state to operate the system more equitably, despite almost certain opposition from the residents and business owners of the city's wealthier urban core.

To be clear, the operational strategy described here should be a recourse of last resort. It does not diminish the urgent need for new and expanded infrastructures to separate, retain, and reuse stormwater, as well as a deliberate slowing of the city's growth via a national decentralization strategy that channels investments away from Mexico City.⁷ Nevertheless, it will take years for such decen-

7 For examples of the kinds of structural changes needed to improve water management in the basin, see Centro para la Sustentabilidad Incalli Ixcahuicopa, *Repensar la Cuenca: La Gestión de Ciclos del Agua en el Valle de México* (Mexico City: Universidad Autónoma Metropolitana, 2009). <https://agua.org.mx/wp-content/uploads/2009/05/Repensar-la-cuenca-La-gestion-de-ciclos-del-agua-en-el-Valle-de-Mexico.pdf>.

tralization to bear fruit, and building infrastructures of the scale needed to completely eliminate flooding is impractically costly. This means that severe storms will continue to overload the drainage system. Yet while flooding may be inevitable in such circumstances, the inequitable distribution of floods across the space of the city is far from preordained. A change in operations could produce a far more equitable distribution of flooding in the city during such rain events.

Designers and policymakers in cities elsewhere have much to learn from Mexico City's inadvertent experiment with managing a drainage system pushed far beyond its normal operating capacity. Mexico City's drainage system is, of course, unique: it has controls built into it—and a network-wide interconnectivity—that allow for the relatively straightforward and precise redirection of water throughout the system, even when it is overwhelmed. Not every city has (or could develop) a similar level of control over their floodwaters, but for those that do, it is essential to examine how these systems might operate differently. These operations may well be the key to socializing flooding, such that it is no longer the poor who bear the disproportionate burden of adapting to a rapidly changing environment.



AUSTIN, TEXAS

STORM URI, 2021

INFRASTRUCTURAL COLLAPSE AND DISASTER PREPAREDNESS IN AUSTIN, TEXAS

Hililei Julia Hobart, Ph.D.

On the second night of Storm Uri's landfall in central Texas in February 2021, I could see downtown Austin's lights ablaze from the highest point of my neighborhood on the other side of I-35, the highway that runs north and south along the eastern edge of the city center.¹ On the side of the divide that I stood on in the historically redlined neighborhoods of East Austin, the power had gone out.² As infrastructure collapsed for most of Austin, people had to figure out how to slow the inevitable

1 Texas Tribune Staff, "Texas Power Outages: Nearly Half the State Experiencing Water Disruptions as Power Grid Operator Says It's Making Progress," *Texas Tribune*, February 18, 2021, <https://www.texastribune.org/2021/02/18/texas-winter-storm-power-outage-ercot>.

2 *Redlining* refers to a New Deal-era policy that classified neighborhoods by estimated mortgage-loan risk and industrial-use zoning. In Austin, city services for Black residents were consolidated in the East Side in 1928, along with waste-treatment facilities. See Eliot M. Tretter and Moulay Anwar Sounny-Slitine, *Austin Restricted: Progressivism, Zoning, Private Racial Covenants, and the Making of a Segregated City* (Austin, TX: [Institute for Urban Policy Research and Analysis, 2012); and Cecilia Ballí, "What Nobody Says About Austin," *Texas Monthly*, February 2013, <https://www.texas-monthly.com/news-politics/what-nobody-says-about-austin>.

damage to their homes: it got so cold for so long that the pipes froze. Who would bother to insulate in a city that spends most of the year trying to shed heat?

The threat of COVID-19's spread prevented households from joining together to share heat and food and resources. Rather than risk walking to warming stations or shelters, mothers suffocated in their cars with their babies as they ran the engines for heat; others managed to secure hotel rooms at inflated costs; still more huddled in designated "warm rooms" within their homes and hoped for the best. Members of Austin's unhoused community, which had visibly ballooned since March 2020, were ushered into warming centers, if they were willing to go, though many chose to stay with their belongings for as long as they could. The conditions of the pandemic, under which hesitancy around proximity to others became exacerbated across socioeconomic lines, shaped disaster relief mobility: people reorganized in space around multiple safety concerns, including aqueous, thermal, and viral threats.

The acute conditions of extreme cold posed a very different set of challenges, however, from those that were to come as temperatures rose again and the city thawed. Frozen water pipes that had burst now emptied out, streaming down walls, onto bathroom floors, and into basements. Water heaters, placed on the exterior of buildings, exploded. The

city's water table plummeted as everything drained out, and those who had evacuated their homes weren't around to manually shut off the city valves. Austin Water, the city's public utility provider, was overwhelmed by the "tens of thousands of private infrastructure failures" that strained the public system as it ran at two and a half times normal usage, eventually forcing a water outage.³ First, the city released a boil-tap-water notice for some South Austin neighborhoods serviced by the Ulrich Water Treatment Plant, which had lost power; a day later, the notice went citywide. For those who had been living without power, or those whose pipes had burst, this posed additional challenges for access to basic needs in the days that followed: a final, weary challenge after multiple failures of governance and infrastructure to prepare for Uri's arrival.⁴ In fact, Austin city audit reports detailing emergency management showed that only 12 percent of recommendations for disaster preparedness and community resilience following the 2018 Colorado River flooding event had been implemented, including adequate notification to residents about widespread power and water outages.⁵

In the aftermath of the storm, as people took stock of what they had lost, or were lucky not to have lost, the disproportionate impact on communities of color across Texas, in Austin, and in historically Black and Latinx neighborhoods within the capital city became clear on several fronts. Those living in older homes with less insulation; those reliant on public transportation; those in multigenerational households; those with a higher likelihood of having chronic health issues; those living in historically redlined neighborhoods with fewer medical emergency facilities—all experienced vastly different capacities for resilience set out by the social and political geographies of the city. In this instance, water marked those capacities for resilience as it froze, flooded, disappeared from, and grew toxic in Texas homes during one of the most disastrous storms ever to have hit the state.⁶ Extreme weather amid a climate crisis must no longer be treated as unusual or unexpected, but rather a condition of our time that water policy must urgently address.

3 Jonathan Lee, "Austin Water Responds to 'Demoralizing' Water Outages," *Austin Monitor*, March 4, 2021, <https://www.austinmonitor.com/stories/2021/03/austin-water-responds-to-demoralizing-water-outages>.

4 Joshua W. Busby et al., "Cascading Risks: Understanding the 2021 Winter Blackout in Texas," *Energy Research & Social Science* 77, no. 1 (July 2021): 1–10, <https://doi.org/10.1016/j.erss.2021.102106>.

5 City of Austin, Office of the City Auditor *Disaster Preparedness: The City Was Unprepared to Respond to Winter Storm Uri* (Austin, TX:

City of Austin, 2020): 10–15, https://www.austintexas.gov/sites/default/files/files/Auditor/Audit_Reports/Disaster_Preparedness_November_2021.pdf.

6 Amal Ahmed, "Why Texas Wasn't Prepared for Winter Storm Uri," *Texas Observer*, February 22, 2021, <https://www.texasobserver.org/why-texas-wasnt-prepared-for-winter-storm-uri>.

RETHINKING RELIEF FOR JUST WATER TRANSITION

Matthew Henry, Ph.D.



Image by Dean Chahim, Mexico City, 2018.

We are facing an accelerating water transition. Justice is not assured. In North America, ecosystemic disruption, infrastructural failure, and social inequity remain deeply entangled.¹ The “color of water”²—the racialized

1 DigDeep and the US Water Alliance, “Closing the Water Access Gap in the United States: A National Action Plan,” 2019, <https://www.digdeep.org/close-the-water-gap>.

2 Christopher F. Petrella and Ameer Loggins, “Standing Rock, Flint, and the Color of Water,” *Black Perspectives*, November 2, 2016, <https://www.aaihs.org/standing-rock-flint-and-the-col->

dimensions of water policy—has been evident in Flint, Michigan, and other majority-Black cities with lead-tainted water, like Newark and Baltimore; in the Colorado River Basin, where severe drought disproportionately impacts Latinx farmworkers and Indigenous communities like Navajo Nation, where 30 percent of families lack running water; and in groundwater contamination from fossil fuel extraction in rural, low-income communities across Appalachia and the Intermountain West.

[or-of-water](#).

The concept of *just transition* often refers to social safety net programs, such as worker retraining and economic diversification initiatives, necessary to support fossil fuel workers and communities facing economic precarity amid the emergence of renewable energy. But just transition can also describe adaptive measures necessary for communities to respond to and thrive amid shifting hydrological conditions—floods, droughts, and aging water infrastructures. Just transition has deep roots in the US labor and environmental justice movements, referring to an alternative economic system that prioritizes environmental sustainability, social equity, and dignified work. The climate justice movement refers to just transition as “the shift from an extractive economy to a regenerative economy” that prioritizes “redressing past harms and creating new relationships of power for the future through reparations.”³ This vision is capacious, emphasizing issues like food sovereignty, regenerative ecological economics, a commitment to anti-racist and anti-colonial futures, and the democratization of environmental decision-making.

For the water transition to be truly just, we must rethink the notion of *relief*, which implies reactive, short-term solutions to a deeper set of crises. This does not merely mean a renewed focus on proactivity—the anticipation and management of risk—but rather a shift away from the ephemerality of top-down disaster aid. The COVID-19 pandemic has exacerbated water equity

crises in almost every measurable way.

Yet pandemic relief policies in the US have largely offered short-term, technocratic solutions that fail to address root causes of systemic inequity. The EPA’s loosening of enforcement and compliance with water-quality law, in response to the pandemic, did not address water equity issues. FEMA’s relief for flood insurance renewal premiums expired three months into the pandemic. The HEROES Act, passed by the House of Representatives in May 2020, offered funding for potable drinking water in Indigenous communities and grants for drinking water and wastewater assistance programs in low-income communities, but only through the end of the fiscal year. The CARES Act, passed into law in March 2020, included insufficient climate and pandemic relief policy related to water.

Rethinking relief means re-considering the way we frame water crises. If we reframe Flint as the result of a racialized politics of abandonment through the privatization of public services in communities of color, it becomes clear that monetary settlements and infrastructure upgrades are but short-term, targeted responses to deeper patterns of institutional violence.⁴ If we properly understand Indigenous peoples’ experience of drought in the Colorado River Basin as a legacy of settler colonialism, then justice means the restoration of Indigenous cultural, political, and territorial sovereignty and increased tribal participation in drought

3 Climate Justice Alliance, “Just Transition: A Framework for Change,” n.d., accessed December 8, 2021, <https://climatejusticealliance.org/just-transition>.

4 Laura Pulido, “Flint, Environmental Racism, and Racial Capitalism,” *Capitalism, Nature, Socialism* 27, no. 3 (2016): 12, <https://doi.org/10.1080/10455752.2016.1213013>.

response planning.⁵

In fossil fuel-rich states like Wyoming, rather than protectionist water policy supporting new dams and reservoirs, justice would mean responding to the state's outside role in the climate crisis and allocating resources to support an equitable transition to a low-carbon energy economy.⁶

In sculpture, relief describes the lowering of a field to make the artwork's features more obvious and notable. In geography, relief describes heterogeneous topographies, landscape features less apparent on traditional political maps. To put something into "sharp relief" is to render it visible and urgent. A new grammar of relief in water policy would materialize histories of violence, dispossession, and exploitation. It would respond to diverse experiences of climate change and the demands of frontline and fenceline communities. It would be oriented toward building just, sustainable futures by responding to uniquely local needs and histories of trauma and exploitation. Water policy that is place-based and community-driven, and that deliberately avoids the reproduction of uneven power relations, can play a transformational role in institutional responses to the climate crisis.

5 See Nick Estes, *Our History Is the Future* (New York: Verso Books, 2019); and Dina Gilio-Whitaker, *As Long as Grass Grows* (Boston: Beacon Press, 2019).

6 Angus M. Theurmer Jr., "Wyo Looks to Store, Divert More Water as Lake Powell Dries Up," WyoFile, July 27, 2021, <https://wyofile.com/wyo-looks-to-store-divert-more-water-as-lake-powell-dries-up>.

**A CHALLENGE TO GREEN NEW DEAL
ACTIVISTS:
WE NEED TO REJECT “SUSTAINABLE”
TECHNOLOGIES THAT REPRODUCE
COLONIAL GOLD RUSH DEVASTATION
ON INDIGENOUS PEOPLES**

THE CENTER FOR INTERDISCIPLINARY ENVIRONMENTAL JUSTICE (CIEJ)

[HTTP://WWW.THE-CIEJ.ORG](http://www.the-ciej.org)

These Are CIEJ's Guiding Principles for Green New Deal Supporters Who Believe in Expanding GND Cosmivision Beyond US/Global North-Centric Techno-Optimism

Don't reduce the problem to temperature and CO2.

Climate change refers to a long-term change in weather patterns, including temperature, precipitation patterns, and extreme weather events such as droughts and hurricanes. The earth has moved through various climate changes over time; yet today, this issue is associated with human-made pollution that puts current lifeways and ecosystems at risk of collapse from the overall warming of the planet due to the burning of fossil fuels for industrial development. Carbon and temperature are powerful data currencies, so the data exchanges of policy, science, and economic industries reaffirm these points as a distraction from the deeper causes of climate change: colonialism and extraction. Climate action plans, reports, and statements typically start by citing the 1.5°C warming threshold given by the [United Nations Intergovernmental Panel on Climate Change \(IPCC\)](#) as motivation for their proposals to reduce carbon emissions. Statistical projections, led by software companies like Microsoft that profit on extractive industries, focus narrowly on carbon and temperature. These statistical projections are used to control climate policy through future generations, until at least fifty years from now. But simplistic CO2 reduction “solutions” and statistical modeling fail to deconstruct and heal the abusive relationship—characterized by colonial and capitalist-driven extraction—we have with the earth. An exclusive focus on CO2 and temperature as the core problems to mitigate, which comes from a decontextualized reliance on the IPCC report, sidelines the historical, dynamic, and cultural roots of climate change. It fails to address the oppressive systems that perpetuate not only climate change but also related destructive problems like contamination, extinction crises, water wars, and so on.

We need to move from decarbonizing to decolonizing.

Don't confuse “radical” with “large-scale.”

The state of California recently mandated that by 2035, only electric passenger vehicles will be sold in the state. This large-scale plan to limit access to non-greenwashed technology is not a climate solution nor an environmental solution. Plans claiming to implement “radical” climate action generally mean that their actions—widespread electrification, renewable energy production, and other green technologies—are more directly related to reducing carbon emissions than to blatant capitalist schemes that avoid carbon reduction like carbon trading. But describing a “radical” relationship between carbon emissions and technology limits the potential scope toward an analysis of technology and capitalism. In the case of the electric vehicle, because the manufacturing of the vehicle and lithium-ion batteries is so environmentally destructive, and because both the manufacturing process and the electrical grids the cars depend on will continue to produce massive amounts of carbon emissions, the cars will not have a significant enough impact on carbon emissions to prevent global warming. Changing the energy source or production technology still does not change the fundamental causes of climate change: ever-increasing energy and material consumption examples fueled by ongoing colonialism and capitalism. Because they leave

the roots in place, these superficial solutions—even and especially when implemented at a large scale—allow consumption and extractive practices to morph, with unknown rebound environmental effects. **We agree that we need radical change—but by radical change we mean tearing out the colonial capitalist foundations of climate change via land back and abolition.**

Don't use extraction as a solution to extraction.

Anti-imperial environmental justice is not just about divesting from fossil fuels; it's also about divesting from extracting other damaging materials in other regions. Climate solutions must be wary of using selective analyses that only critique one resource extraction in order to make claims to provide "good," "new," or "green" consumer options. Extracting more and different natural resources to create new consumer options to offset the extraction of another resource just increases extraction. For example, mining lithium for electric car batteries only destroys the water sources in the driest and most ecologically vulnerable regions of the world; it does not solve climate change. Electric cars are false solutions that continue extractivism and overconsumption. They do not actually reduce carbon emissions when you take the entire manufacturing process and electrical grid impacts into consideration. Extraction is a problem because it creates pollution and destroys the environment. There is no such thing as a clean mine, a clean factory, or a clean plantation; mines, factories, and plantations—and the accumulation and consumption that drive them—are the problems. Helium and hydrogen, for example, are being promoted as "clean energy" sources—yet hydrogen is a greenhouse gas that contributes to the same global warming problems as fossil fuels, and helium is often obtained as a byproduct from oil mining. **The solution is reducing accumulation and consumption, not accumulating and consuming something else.**

Don't displace impacts onto others.

We can't center only US-frontline communities at the expense of other communities around the world in line with the genocidal logics of environmental racism and toxic colonialism that drive displacement and migration. Our consumption of "green" technologies, like our consumption of fossil fuels, negatively impacts communities of concern down the supply chain domestically and abroad. The large-scale development of solar panels as a new energy grid component is an example of this problem. Solar panel production requires intensive mining of rare minerals, which is devastating the African environment and oppressing African peoples through coercive child labor, enslavement, and exploitative mining labor practices. The wide-scale implementation of home and business solar panels and solar energy fields in the desert comes at the cost of Black and brown lives abroad. Imperialism disconnects marginalized communities across geographies that bear the burden of environmental destruction and labor exploitation in order to produce and consume these goods and resources. Instead, we need to center transterritorial Indigenous, Black, colonized, and impoverished communities in our movement for climate justice. Protecting the earth requires global accountability and resistance to the greenwashing of imperialism. **Selective protection means collective oppression.**

Don't let today's demands make tomorrow's justice impossible.

Abolition requires us to imagine a world that is not yet here, a radical futurism

beyond bondage, incarceration, and disposability. Similarly, addressing the full extent of climate change requires us to imagine beyond colonialism, capitalism, racism, and extraction. Policy and advocacy goals accommodate capitalism, colonialism, and extraction and limit us to a reactionary defensive stance where we are always compromising and losing ground—even as we “win” policy campaigns. This undermines our ability to move proactively toward liberatory and healing futures. The colonial state is not our solution. Consumerism and work are not our solutions. Don’t structure your resistance around capitulating to the powers from above; instead make power from below—beyond consumerism, beyond work, beyond the state. **Make sure that what you ask for today is not contradictory to the decolonial abolitionist future.**

Do decolonize and rematriate everywhere.

Capitalist and colonial relations exploit peoples and land. A Western philosophy enforces a binary separating people from land, but for many Indigenous cultures and communities, people and land are one and the same. Multiple forms of colonial, capitalist, and heterosexist exploitation of people/land has commodified and made resources out of peoples/lands. To decolonize is to rematriate lands/waters and to break down the foundations of the nation-state: the military, which both pollutes and violently maintains imperial, colonial, and extractive relations over people and resources, borders, prisons, police, education, and so forth. To restore life and to value the dignified relationship among peoples/lands is to take back the lands/waters that have been distanced from our communities in service of capital. To rematriate is to nurture a sacred relationship among original caretakers of the lands through nonpatriarchal roles and leadership. To defend autonomy is to honor those who still live and thrive on their ancestral territories and who continue to defend their autonomy in the face of encroaching theft.

Land back.

Do abolish the conditions that create energy demand.

We are not addicted to fossil fuels; we are addicted to energy, whether it’s converted from tar sands or solar cells, whether it’s stored in hydrocarbons or lithium-ion batteries. Moving from fossil fuels to supposedly green/renewable energy will not transform the extractive nature of a capitalist economy, nor will it reduce ever-increasing energy demand, whose root cause is the need for ever-increasing production, consumption, and profit, including the capitalist construction of wage-labor jobs. In fact, mining industries that still cause emissions are now benefiting from transitions to different types of energy. As abolitionism calls us to abolish the conditions—social, economic—in which harm occurs, we must identify the conditions that structure energy use itself. **Only by challenging those conditions can we build new social discourses shifting from energy demands toward equitable energy relations.**

Do transform what labor means.

Labor demands are often in conflict with the environment because jobs are conflated with extraction. Work under capitalism extracts from and dehumanizes the worker through systems of ableism, racism, and sexism. Jobs should be abolished. Workers should be liberated from jobs so that our activities are not centered around making profit, but rather around making life possible and meaningful for ourselves, our families, and our communities. Decolonization requires us

to abolish jobs and reimagine dignified labor as individual and collective efforts and activities beyond extraction, beyond profit and benefits, beyond inclusion and assimilation into colonial, capitalist, and white supremacist projects, and beyond work. **Instead of jobs, we want a relationship with our tools and environment that is convivial—that cultivates our creativity and our interdependent autonomy.**

Do be accountable to our local, regional, and global connectedness.

The GND focuses on US policies, yet associated transitions in US labor, technological, and economic sectors impact communities around the world. Climate change resistance strategies must go beyond nation-state policies and limited US-centric electoral solutions because the sprawling reach of energy and resource extraction persists beyond borders and beyond fossil fuels. While many intend to be inclusive of transnational and transterritorial communities in their organizing, greenwashing often obscures how US imperialism continues to wage violence in pursuit of mineral resources. Organizing for environmental justice only within a settler-colonial fraction of the globe will devastate the rest of the world on its behalf. **We must transform the boundaries of what “environment” means and extend a localized consciousness to a global interconnectedness.**

Do cultivate local systems of interdependence.

As Nishnaabeg activist scholar Leeanne Betasamosake Simpson states, the alternative to extraction is “deep reciprocity. It’s respect, it’s relationships, it’s responsibility, and it’s local. If you’re forced to stay in your 50-mile radius, then you very much are going to experience the impacts of extractivist behavior.”¹ We must turn toward local systems and resources to break the cycle of globalized extraction-based consumerism and to truly build interdependent, sustainable relationships with the environment and people around us. In essence, this hyper-localizing means we need to stop consuming products from outside our communities so we can then create local work to meet those needs while sustaining our communities. From a decolonial stance, this also means recognizing whether we are settlers and working to return land to the original peoples. If we are where we are because of bondage and fugitivity, then we also must support land back and develop anticolonial relationships with original peoples. We believe decolonization is also abolitionist, antiracist, antiheteropatriarchal, and anti-ableist; we believe decolonization centers sacred and nonhuman beings, and can be created locally in ways that connect to others globally in transformative ways. **Cultivating interdependent, sustainable relationships with the local environment and people around us breaks the destructive cycle of globalized extraction-based consumerism. We can and must form both local and global relationships that break colonial and extractivist cycles.**

¹ Naomi Klein, “Dancing the World into Being: A Conversation with Idle No More’s Leanne Simpson,” *Yes! Magazine*, March 6, 2013, <https://www.yesmagazine.org/social-justice/2013/03/06/dancing-the-world-into-being-a-conversation-with-idle-no-more-leanne-simpson>.



Image: Greenwashing Extractive Technologies

By CIEJ (The Center for Interdisciplinary Environmental Justice) and Sophie Wang <https://www.wangshuf.com/>

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She grew up in St. Paul, Minnesota and holds a deep respect and love for freshwater lakes, rivers and systems. Dr. Hoover is committed to public scholarship, scholar-activism and finding ways of decentralizing power both in and outside of the classroom. She holds a masters and doctorate in agricultural and biological engineering with a concentration in ecological sciences from Purdue University.

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CENTER FOR INTERDISCIPLINARY ENVIRONMENTAL JUSTICE (CIEJ)

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The Center for Interdisciplinary Environmental Justice (CIEJ) is a collective working towards decolonizing environmental justice efforts. Their members are academics, activists, artists, and scientists currently located in California, Washington, Texas, Mexico, and the Arctic. In their decolonization work, they look to building climate solutions focused on relationships between people and the planet rather than the exploitation of Indigenous lands. Examples of their work include standing with the Kumeyaay Nation to protect the San Diego River from sand mining and sacred burial grounds from border wall construction; organizing with the Hualapai, Paiute, and Shoshone peoples of the Southwest against lithium extraction; and building transnational solidarity with the Lickan Antay and Kolla community to protect groundwater from lithium mining.

BRUNO SERAPHIN

Bruno Seraphin is a PhD candidate in anthropology and American Indian and Indigenous studies at Cornell University. A settler living in Karuk territory, he works with the Karuk Department of Natural Resources as a researcher and filmmaker, focusing on the shifting fire paradigm in the U.S. west. His research areas include environmental and visual anthropology, settler colonialism, militarism, and critical climate studies. Originally from occupied Wampanoag land in eastern Massachusetts, Bruno is an award-winning filmmaker with a BFA in film and television from New York University and an MA in folklore from the University of Oregon. He works for anti-colonial environmental futures.

SAGE GERSON

Sage Gerson (she/her) is a PhD candidate in the English Department at the University of California, Santa Barbara (UCSB). At UCSB, Sage has been a Mellon Sawyer Seminar on Energy Justice in Global Perspective Fellow, the graduate assistant for the Hemispheric South/s and Literature and the Environment Research Initiatives, and completed the Interdepartmental PhD Emphasis in Environment and Society. She received a 2021-2022 ACLS-Mellon Dissertation Completion Fellowship for her dissertation, "The Leaky Grid: Black and Native Electrified Imaginaries."

THEODORA DRYER

Dr. Theodora Dryer is the Research Lead of Climate and Water at the AI Now Institute and teaches at New York University's Tandon School of Engineering. Her policy research is historically informed and investigates how water injustice and environmental racism are mediated through algorithmic decision systems as well as the significant role of technological development and deployment in perpetuating the climate change crisis. Her research areas include water resource management, deleterious climate interventions spanning from weather modification programs to artificial intelligence and machine learning systems, and agricultural governance. She is trained in environmental and economic history, science and technology studies, and the history of technology and computing. Dr. Dryer holds awards from the Charles Babbage Institute in Information Technology and the IEEE in History of Electrical and Computing Technology. Her work has appeared in *IEEE Annals of the History of Computing*, *Historical Studies in the Natural Sciences*, *Logic Magazine*, and elsewhere. <https://www.theodoradryer.com>

ELENA SOBRINO

Dr. Elena Sobrino is an anthropologist of science who studies water, toxicity, and racial capitalism; she is currently exploring ecological and economic change in the Great Lakes region of North America, especially in Flint, Michigan, and the ongoing water crisis there. Her research tracks the distinct approaches environmental justice organizers, union members, and green chemists offer to ameliorate past, present, and future toxic harm. She is currently a Martin Family Fellow for Sustainability and PhD candidate at MIT in the Doctoral Program for History, Anthropology, Science, Technology, and Society. Her work has been supported by the Wenner-Gren Foundation and the J-WAFS Fellowship for Water Solutions.

Sobrino worked in local crisis management in Flint, Michigan from 2015 – 2016 as an assistant director of information and planning with the American Red Cross. She served as a field worker with the Centers for Disease Control, implementing a Community Assessment for Public Health Emergency Response. elenasobrino.site

MATTHEW HENRY

Dr. Matt Henry is an Assistant Instructional Professor in the Honors College and Affiliate with the School of Energy Resources at the University of Wyoming. His work has appeared in *Energy Research and Social Science*, *Environmental Humanities*, *ISLE: Interdisciplinary Studies in Literature and the Environment*, and elsewhere. His research focuses on environmental justice, just transition policies and processes at the energy-water nexus, and rural social resilience, and he is committed to anti-racist and decolonial research and praxis. He is currently leading and contributing to several collaborative initiatives focused on place-based, socially-equitable approaches to decarbonization and climate adaptation in the Intermountain West. Forthcoming in 2022, Matt's book *Hydronarratives: Water, Environmental Justice, and Imagining a Just Transition* (University of Nebraska Press) considers how narrative and storytelling support environmental justice advocacy in water insecure communities across North America.

HI'ILEI JULIA HOBART

Dr. Hi'ilei Hobart (Kānaka Maoli) is an Assistant Professor at the Department of Anthropology at the University of Texas Austin. Her research is interested in Indigenous foodways, Pacific Island studies, settler colonialism, urban infrastructure, and the performance of taste. She is the author of *Cooling the Tropics: Ice, Indigeneity, and Hawaiian Refreshment* is forthcoming from Duke University Press.

She holds a PhD in Food Studies from New York University, an MA in Studies in the Decorative Arts, Design, and Culture from the Bard Graduate Center, and an MLS in Archives Management and Rare Books from the Pratt Institute.

DEAN CHAHIM

Dr. Dean Chahim studies the relationship between engineering and environmental justice, with a particular focus on urban flooding. He is currently working on *Draining the Metropolis: Engineering and the Banality of Disaster in Mexico City*, a book manuscript that argues that engineering does not mitigate, but rather transforms disasters like flooding into increasingly routine forms of suffering for the poor. This research has been supported by the Wenner-Gren Foundation, Social Science Research Council, and Mellon Foundation. He is also working on the trans-media documentary *Las Huellas Del Agua / Watermarks*, which maps the human toll of flooding in Mexico City across its vast drainage system. He has been asked to speak about Mexico City's water crisis on the BBC, NPR, and RFI. His research has also been covered in publications in Mexico, including *Pie de Página*, *El Economista*, *Diario 24 Horas*, *Radio Centro*, and *La Octava*.

Dr. Chahim holds a PhD in Anthropology from Stanford University and previously trained and worked as an environmental engineer. He is currently a Princeton-Mellon Fellow in Architecture, Urbanism, and the Humanities at Princeton University, where he is also affiliated with the Metropolis Project in the School of Engineering and Applied Sciences and the Department of Civil & Environmental Engineering. He will start as an Assistant Professor in the Department of Sociology and Anthropology at the University of Texas at El Paso in Fall 2022.

NICOLE WEBER

Nicole E. Weber is a researcher, instructor, and librarian. Her research examines the social and cultural implications of digital media and technologies, specifically at the intersection of media, promotional culture, and health and wellness. Currently, she is a Ph.D. candidate in Media Studies at the Rutgers School of Communication and Information.

MOLLY DE BLANC

Molly de Blanc is a scholar and digital rights activist. She studies bioethics at New York University with interests around justice and technology. She worked with Dr. Theodora Dryer as a Climate and Water Research Assistant at the AI Now Institute.

THE AI NOW INSTITUTE

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