

A TWENTY-FIRST CENTURY U.S. WATER POLICY



JULIET CHRISTIAN-SMITH and PETER H. GLEICK,
with **HEATHER COOLEY, LUCY ALLEN,**
AMY VANDERWARKER, and KATE A. BERRY
FOREWORD BY **WILLIAM K. REILLY**

Water is life. The People's Water Board advocates for access, protection, and conservation of water. We believe water is a human right and all people should have access to clean and affordable water. Water is a commons that should be held in the public trust free of privatization.

The People's Water Board promotes awareness of the interconnectedness of all people and resources.

—*Mission of the People's Water Board of Detroit, Michigan*

3

WATER AND ENVIRONMENTAL JUSTICE

Amy Vanderwarker

Introduction

The United States has remarkable water systems, developed over two centuries of technological, institutional, and economic advances. Yet the benefits of those systems have not been felt equally across regions, communities, or populations. And the adverse consequences of inadequate water quality or quantity, and the lack of responsiveness of some water institutions to community input and participation, have helped contribute to the growing environmental justice (EJ) effort to reform water policies based on respect and justice for all, free from discrimination, bias, or inequity. In communities from Detroit to New Orleans, the inner city to the tribal areas, efforts to understand and address EJ issues around water are beginning to take shape.

Environmental justice research documents disproportionate environmental burdens facing low-income communities and communities of color, ranging from high concentrations of hazardous facilities to contaminated groundwater from agricultural activities. Environmental justice contextualizes the environmental conditions that threaten the physical, social, economic, or environmental health and well-being of these communities within overall patterns of racism, classism, and other forms of discrimination in the US economy, government, and society in general. Water justice is one piece of a larger vision for EJ. Concepts of the “soft path for water” and of water justice demand that all communities be able to access and manage water for beneficial uses, including drinking, waste removal, cultural and spiritual practices, reliance on the wildlife it sustains, and enjoyment for recreational purposes (EJCW 2005).

Recent experience in Detroit offers an example of both the challenges and innovative solutions associated with inequities in water policy and management. Frustrated by a series of water shutoffs, threats of privatization, and a closed and unresponsive water board, residents from across Detroit formed a People's Water Board to shadow the governing Board of Water Commissioners of the municipal water supplier, the Detroit Water and Sewage Department. The demands of the People's Water Board include a citywide water affordability plan, public control of water services, and more transparent water decision making (People's Water Board 2009). These kinds of organizing efforts in Detroit, a predominantly African American city with high rates of poverty and unemployment, exemplify growing community responses to water injustices, especially the chronic lack of access to safe, clean, affordable water in some low-income communities and communities of color.

This chapter draws on concepts that EJ advocates and organizers from across the country have long used to demand healthy, clean places to live, work, and play as a framework to explore water-specific EJ issues in federal policy and to identify needed policy changes. We explore some of the most severe and well-documented examples of water injustices and their underlying causes, with recommendations to better incorporate EJ into federal water policy. Indigenous water issues are addressed separately (see chapter 4: Tribes and Water), however, any consideration of water injustices must highlight both the historical legacy of indigenous water struggles and the imperative need to address current indigenous water concerns.

The Environmental Justice Movement

Environmental Justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction.

Environmental Justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias.

—*First and Second Principles of Environmental Justice*

Many communities have struggled to protect their natural resources and quality of life for years, but the modern EJ movement emerged from several currents of social justice activism in the 1970s. It gained momentum from grassroots struggles around the country to protect community lands and people from pollutants. The movement expands the definition of the environment to include where people live, work, and play. In doing so, it challenges mainstream environmentalism to move beyond ecological protection and address the broad hazards that low-income communities and communities of color face (Cole and Foster 2001).

The EJ movement challenges the exclusive nature of environmental decision making. For example, decisions about where to build a dam have historically been made without any input from those who would be most affected by the proposal—such as the people

displaced by flooding or the people whose water would be dammed. To counter this pattern, the EJ movement has worked to ensure the voices of those most affected by environmental decisions are involved in a transparent decision-making process (Di Chiro 1996).

In 1991, the First National People of Color Environmental Leadership Summit authored the 17 *Principles of Environmental Justice*, which remain foundational today. The principles outline three major concepts of EJ: no community should bear a disproportionate burden of environmental hazards, all communities should have access to environmental benefits, and decision-making processes need to be transparent and include community voices.

Many early EJ struggles revolved around battles to prevent the siting of toxic facilities, ranging from refineries to hazardous waste facilities, in low-income communities and communities of color (Cole and Foster 2001). Water issues were and continue to be a piece of many fights, but rarely has a comprehensive EJ analysis applied directly to water problems and the range of agencies involved in water management.

Mounting pressure on both state and national governments resulted in the creation of a federal-level policy infrastructure to incorporate EJ into environmental decision making. In 1992, the federal Environmental Protection Agency (EPA) created an Office of Environmental Justice and in 1993 established a National Environmental Justice Advisory Committee (NEJAC) to provide independent advice and analysis from stakeholders on EJ issues (EPA 2010b). In 1994, President Clinton signed Executive Order 12898, directing agencies receiving federal funding to address the disproportionate environmental impacts of their policies and programs on low-income communities and communities of color. The executive order also established an Interagency Working Group on Environmental Justice, bringing together representatives from 12 federal agencies to integrate EJ into federal programs, including agencies with water jurisdiction.

Environmental Justice and Federal Water Policy

All federal agencies involved in national water policy, no matter their diversity or jurisdiction, are encompassed within the executive order on EJ. As was noted in chapter 2: Legal and Institutional Framework of Water Management, “federal water policy” includes the literally dozens of agencies, laws, Congressional committees, and regulations designed to manage water resources in the United States. It includes sweeping pieces of legislation such as the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA), as well as water provisions within legislation as diverse as that governing the Department of Agriculture and the Resource Conservation and Recovery Act, which manages hazardous waste disposal. The Bureau of Reclamation and the Army Corps of Engineers build and operate large-scale, publicly funded water projects, which develop water resources for irrigation, domestic supplies to urban areas, and hydropower. With the exception of the Army Corps, all have been represented within the Interagency Working Group on Environmental Justice.

Federal environmental policy, including water policy, has struggled to fully institutionalize EJ, despite the strong guidance of NEJAC. Independent studies by the National Academy of Public Administration, the US Commission on Civil Rights, and the Office of the Inspector General have all reached similar conclusions: EJ “has not yet been integrated fully into the agency’s core mission or its staff functions” (NAPA 2001) and “federal agencies have not established accountability and performance outcomes for programs and activities” (USCCR 2003, 8). As result, there has been little effective or comprehensive implementation of EJ policies (OIG 2006).

The history of federal water policy has created a particular set of EJ issues. Federal water policy has prioritized use of water for economic purposes, primarily through large-scale water developments, such as dams, irrigation, and flood control, and in doing so, has overlooked a range of impacts on specific communities and the environment (Steinberg 1993). A heavy reliance and emphasis on “engineering” solutions to water problems, such as dams, has emphasized technological skills rather than community voices or local consequences (Espeland 1998; Donahue and Johnston 1998). Correspondingly, water decisions, whether at a local or federal level, have been exclusive and opaque (EJCW 2005; Ingram, Whiteley, and Perry 2008). Consequently, as water scholars Helen Ingram, John Whitely, and Richard Perry note, “many water developments fail to satisfy the basic distributional equity and environmental justice tenet that no groups, particularly the disadvantaged, should be made worse off . . . because of water policies” (2008, 16).

Documenting Environmental Injustices

The poor and especially the nonwhite poor bear a disproportionate burden of exposure to suboptimal, unhealthy environmental conditions in the United States.

—Evans and Kantrowitz (2002)

In the past several decades, there have been hundreds of studies investigating the correlations between race, income, and environmental burdens.¹ Literature reviews reveal overwhelming evidence that backs up what many communities long suspected: Race and class matter in the distribution of environmental burdens. Toxic waste sites and facilities that release toxic emissions are more likely to be sited in low-income neighborhoods, with primarily nonwhite residents (Bullard et al. 2007; Fricker and Hengarten 2001; Rowan and Fridgen 2003). Health in the United States is inextricably linked to race and class. Lower-income communities and communities of color have higher rates of a vast array of diseases ranging from asthma to lead poisoning to higher rates of mortality (Evans and Kantrowitz 2002; Brulle and Pellow 2006; Gee and Payne-Sturges 2004; Quintero-Somainsi and Quirindongo 2004; Williams and Collins 1995). An analysis of California health data suggested that about 250,000 Californians sometimes go without water due to insufficient supply or are exposed to contaminated water, and that many

of these residents “reside in rural, economically disadvantaged communities” (Wilber 2003; Moore and Matalon 2011).

As a result, low-income communities and communities of color may experience the cumulative impacts of exposure to a wide variety of contaminants or disproportionate lack of access to resources. According to NEJAC, the idea of cumulative risks and impacts is the “matrix of physical, chemical, biological, social and cultural factors which result in certain communities and sub-populations being more susceptible to environmental toxins, being more exposed to toxins, or having compromised ability to cope with and/or recover from such exposure” (NEJAC 2004, i).

There are many barriers to achieving change for EJ in communities. More affluent communities have an array of privileges that help ensure healthier environments, including more political influence and resources to fight unwanted environmental hazards (Brulle and Pellow 2006). An Institute of Medicine report on EJ and public health found that “there are identifiable communities of concern that experience a certain type of double jeopardy in the sense that they (1) experience higher levels of exposure to environmental stressors in terms of both frequency and magnitude and (2) are less able to deal with these hazards as a result of limited knowledge of exposures and disenfranchisement in the political process” (Committee on Environmental Justice 1999, 6).

These problems extend to water resources. Water injustices within federal water policy include:

- Instances where low-income communities and communities of color are disproportionately burdened by water hazards, ranging from lack of clean drinking water to higher exposure to fish contamination;
- Legacies of discrimination in land-use planning and housing that perpetuate water inequities, such as exposure to lead contamination in drinking water;
- Inequalities in the enforcement of water-specific policies and regulations;
- Gaps in existing regulations around water policy and a lack of regulations around critical water justice issues;
- Cumulative risks and impacts to low-income communities and communities of color that are overlooked;
- Community voices and water needs that have been excluded from federal water policy.

Regional studies and stories from across the country document the water struggles of low-income communities and communities of color and demonstrate that there is much progress to be made before water justice is achieved in the United States. Accurate data on water quality and water use do not exist in many places and is not comprehensively collected nationwide (see chapter 1). There is also a lack of data comparing water issues in the context of race and income. For example, the US Census once collected information on individual sources of drinking water, but the question

is no longer asked, making it difficult to assess questions of inequitable access to water (GWTF 2007).

LACK OF ACCESS TO SAFE, CLEAN DRINKING WATER AND WASTEWATER SERVICES

There is a widespread assumption that safe, affordable water for drinking and household use is available to all residents in the United States—indeed UN estimates of urban populations with access to safe water or sanitation often assume 100 percent coverage in the United States. The reality is that some low-income communities and communities of color lack access to water for the most basic human needs. This lack of access to clean, safe drinking water can be caused by contamination in the water or because of a lack of adequate drinking water and wastewater infrastructure, such as old or nonexistent plumbing.

DRINKING WATER CONTAMINATION

Without water we can't live, but we have nitrates. There is no money put into communities for certain things. Either the community doesn't have enough money to fix the problem or agencies don't really care about it.

—Jessica Sanchez, *resident of East Oroshi, California*

Jessica Sanchez lives in East Oroshi, a small predominantly low-income, Latino town in California's agricultural heartland, the San Joaquin Valley. The groundwater that is the source of drinking water in East Oroshi has been contaminated with nitrates, a result of fertilizer application at large farms and confined animal facilities (Harter 2009). Nitrates can cause death in infants, reproductive problems, and have been linked to cancer (Moore and Matalon 2011).

The federal Safe Drinking Water Act requires all drinking water to meet health standards set by the EPA, but violations occur regularly. In one year alone, the water of nearly one-third of all people drinking water from a public system had a health violation (EPA 2009c). Over the last five years, more than 49 million people were served by water systems that reported instances of contaminants exceeding federal health limits (Duhigg 2009c). This leads to widespread, but poorly quantified and hard to measure, health impacts. By one estimate, there are 16.4 million gastrointestinal illnesses caused by contaminated drinking water each year (Messner et al. 2006).

Low-income communities and communities of color often face the most severe and persistent drinking water contamination (Evans and Kantrowitz 2002). Sixty-one percent of drinking water systems on Native American reservations had health violations or other significant reporting violations in 2006, compared with 27 percent of all public systems in the United States (EPA 2009c). One study found that levels of both nitrate and coliform on two reservations in Nebraska were significantly

higher than both regional and national averages (McGinnis and Davis 2001). Another report linked high levels of industrial contaminants in the drinking water of Latino residents in Tucson, Arizona, to abnormally high rates of adult cancer and neurological disorders in newborns (Pinderhughes 1996). In the Appalachia region of West Virginia, the drinking water supply of low-income communities has been contaminated with coal slurry injections containing a host of toxic chemicals (Sludge Safety Project 2009).

Lead is a metal found in natural deposits, but it is commonly used in a variety of household products, old paints and household plumbing materials, and water service lines. The greatest exposure to lead comes from swallowing or breathing in lead paint chips and dust, but lead in drinking water is also a health risk. A prohibition on lead in plumbing materials has been in effect since 1986, but an old infrastructure can contaminate drinking water with lead. Drinking water can contribute over 20 percent of lead poisoning in children (EPA 2004), and low-income, African American, and Latino children consistently have disproportionately high levels of lead in their blood (EPA 2000).

LACK OF ACCESS TO ADEQUATE INFRASTRUCTURE FOR THE POOR

We're like a hole in the doughnut with regard to sewer, garbage pickup and street lighting. . . . We want a voice in political affairs and we want the services that are afforded to everyone around us. We're trying to get communities that have been neglected for 100 years brought up to date, up to code, up to 21st-century standards.

—Maurice Holland, *Midway Community Association, North Carolina* (qtd. in UNCCR 2006)

In small towns like Midway, North Carolina, African American residents live with the vestiges of Jim Crow segregation and lack of basic services such as sewer systems (Parnell et al. 2004). Residents in the small, rural African American community struggle with sewage overflows while nearby, white, affluent communities are developed as major tourism destinations (UNCCR 2006). Researchers in North Carolina found that “discriminatory zoning ordinances and land-use regulations continue to be used to deny African Americans access to basic services and political voice in critical community and economic development decisions” (Johnson et al. 2004, 3).

While many people often take the pipes that bring water to their fingertips for granted, literally hundreds of thousands of houses across the country lack complete plumbing, many in impoverished rural areas (Gasteyer and Vaswami 2004). The 2007 American Housing Survey indicates that 1.1 percent of all housing units lack some aspect of indoor plumbing, rising to 2.3 percent for houses below the poverty level. Over 3 percent of households experienced a water stoppage at some point in the year (US Census 2008).

Numerous studies have shown that these problems are higher among low-income communities and communities of color. One study shows that African Americans are more than twice as likely and Hispanics are more than three times as likely as non-Hispanic

whites to live in homes with incomplete plumbing (Mather 2004). Nearly 12 percent of Native Americans on reservations and 30 percent of Alaska Natives lack plumbing (EPA 2001b). Rural African American households are three times as likely as other rural households to lack plumbing (George, Pinder, and Singleton 2004). In rural subdivisions, called *colonias*, along the 2,000-mile border between the United States and Mexico, just about one-quarter of all residents lack treated water and 44 percent of the houses do not have wastewater plumbing (FRBD nd). Residents are overwhelmingly Latino, of Mexican descent, and immigrants. About one-third of these residents live below the poverty level and average incomes are as low as \$5,000 per year in some areas (FRBD nd).

Discrimination in zoning and construction has denied low-income communities and communities of color basic infrastructure such as sewers and wastewater (Lichter et al. 2007; Troesken 2002; WERA 2002; Anderson 2008). *Colonias*, both along the border and in agricultural areas, rural African American communities, and Native American reservations illustrate a material form of racial discrimination (Snipp 1996). And these same isolated rural areas are most likely to lack basic water and wastewater services (Snipp 1996).

Access to, and the scale of, water financing is also often inequitable. Water distribution systems are generally financed and constructed at a local level, with some federal support, but such funding (primarily in the form of loans and grants for infrastructure construction) has a series of barriers for low-income water systems (discussed in the next section) and has traditionally failed to address the underlying persistence of water problems in low-income communities and communities of color.

WHO PAYS AND WHO IS LEFT OUT: EQUITY IN WATER FINANCING AND FUNDING

Despite the clear evidence that many people in the United States still lack basic water infrastructure, federal appropriations for water projects have been steadily declining since the mid-1960s (Cody and Carter 2009). Drinking water and wastewater systems throughout the country, not just those serving low-income communities and communities of color, are facing funding needs estimated between \$334.8 and \$504 billion over the next 20 years to maintain the current drinking water systems and replace outdated infrastructure (EPA 2009a). In the face of an already glaring gap in services for low-income communities and communities of color, this looming need threatens to exacerbate the existing inequities in both access and funding.

SMALL SYSTEMS IN NEED

Ninety-four percent of water systems in the country are small water systems, serving fewer than 3,300 connections (EPA 2009c). Small systems generally have higher rates of health violations and infrastructure costs per person served. In 2005, small systems had

93 percent of all health violations, with one violation per 80 persons served, versus one violation per 196,204 persons served in very large systems (Imperial 1999).

According to the Congressional Research Service, the “EPA and states have documented the difficulties many small systems face in meeting SDWA [Safe Drinking Water Act] rules, and more fundamentally, in ensuring the quality of their water supplies. Major problems include deteriorated infrastructure . . . diseconomies of scale; and limited technical and managerial capacities” (Teimann 2006, 15). Because of these barriers, small water systems also have three times the per-household infrastructure need of large systems (EPA 1999a).

These systems have largely failed to receive the benefits of federal environmental programs established to help drinking water systems comply with health standards, primarily through the Safe Drinking Water State Revolving Fund, and to a lesser extent, the Clean Water State Revolving Fund. Federal and state grant or low-interest loan programs are extremely hard to obtain because of extensive engineering and reporting requirements, and often small systems “are characterized by narrow or weak tax bases, limited or no access to capital markets, lower relative household incomes, and higher per capita needs” (Copeland 2010, 7). Even when grants and loans can be obtained, the cost of installing and operating a new treatment system may put a large cost burden on a low-income community because of the small number of people to share the costs (NDWAC 2003).

Compounding this lack of resources is the failure of states to use provisions within the Safe Drinking Water State Revolving Fund that would assist small communities. The federal government allows states to use up to 30 percent of capitalization grants to provide loan subsidies for low-income communities, but most states have used only a fraction of this. State are also empowered to forgive the principal of a safe drinking water loan, but according to the EPA, since 1996, only 16 states have done so, totaling less than 3 percent of all loan funds awarded (Copeland and Tiemann 2008). Also, the EPA has failed to set aside authorized funds for technical assistance to small systems (Tiemann 2009). Another study documented the inequitable distribution of the Clean Water State Revolving Fund for wastewater systems: low-income, minority communities were statistically less likely to receive construction grants (Imperial 1999). Federally recognized tribes, which face chronic drinking water and infrastructure issues, are prohibited from receiving more than 1.5 percent of all available funding under the CWA and SDWA, despite the well-documented need in these areas (EJESC 2009).

AGRICULTURE AND INEQUALITY

Agriculture is the largest water user in the nation, and one of the largest sources of water contamination (EPA 2005; chapter 8: Water and Agriculture). The western United States produces the vast majority of the country’s crops, but this production would be impossible without large-scale water developments that move water from rivers to farmlands,

often across great distances. The federal Bureau of Reclamation maintains and operates publicly funded infrastructure, such as aqueducts, dams, and pumping stations, and delivers subsidized irrigation water to farms that do not naturally have enough rainfall to sustain production. These subsidies have enabled, and are a critical support for, large-scale, corporate agriculture (Reisner 1993). In 2009, the Associated Press found that the Bureau of Reclamation gave out more than \$687 million in subsidies over two years to hundreds of farmers in California and Arizona (Burke 2009). “Although water subsidies originally may have possessed a legitimate social purpose, that purpose largely has been outlived. Instead of the intended small family farmers receiving the benefits, much of the subsidies now go to large growers and corporations” (Candee 1989, 657–658).

Federal water policy supports large-scale agriculture, but for the most part, agribusinesses are not held responsible for the impacts of their farming practices (Kimbrell 2002). This includes the impacts on local water resources, ranging from the flooding of rivers to create dams for irrigation to the contamination of streams and drinking water wells throughout rural areas (Woeffle-Erskine 2007; Duhigg 2009b). Even though the federal government spends billions on water, energy, and crop subsidies, it does not authorize enough money to help provide safe drinking water to small systems in the same agricultural areas. In some areas of California, farms receive federally subsidized irrigation water piped from hundreds of miles away, while low-income communities next door cannot drink their tap water due to agricultural contamination (Scott 2010).

In studies from California to the Great Plains to the southern states, the communities next to highly profitable farming enterprises often struggle with high rates of unemployment, poverty, and a lack of basic water and wastewater services (Carter 2010; MacCannell 1983; Preston and Bailey 2003). In a study of 13 midwestern agricultural states, with nearly 3 million people, researchers found that rural development funding, which goes to projects such as water and wastewater infrastructure, was about \$53 per capita, whereas the top 20 farm subsidy recipients received on average over \$1 million in federal payments (Bailey and Preston 2007). Though this is an imperfect comparison, it provides a sense of the scale and nature of inequitable federal subsidies.

It is not just federal subsidies that keep large-scale farming afloat; low-wage labor is also a fixture of industrialized agriculture (Kimbrell 2002). According to the Occupational Health and Safety Act of 1970, employers are required to provide proper sanitation, including drinking water, for farm workers in the fields. However, many studies show that farm workers face a lack of clean, safe water in both the fields where they work and the housing that is provided and maintained by farm operations (Vela-Acosta, Bigelow, and Buchan 2002). Testing of drinking water wells for migrant farm workers in Colorado found they contained high rates of nitrates (EPA 2009b). In Washington County, Oregon, which seasonally employs 8,000 migrant farm workers, 40 percent of all migrant farm worker housing lacked access to drinking water (McCauley et al. 2001). In another example, almost half the water supply of migrant farm workers in North Carolina contained bacterial contamination (Cieslski, Handzel, and Sobsey 1991). Federal

water subsidies are thus being provided to companies that cannot or will not provide basic water and wastewater services for their employees or in their employee housing, in violation of federal labor laws.

The connections between federal water and agricultural policy extend from the Bureau of Reclamation to the Department of Agriculture to the powerful lobbying interests that ensure regular reauthorization of federal subsidies (Reisner 1993). Even though agriculture is a critical piece of local economies and the nation's food security, the larger environmental and social costs of our current system of industrialized agriculture must be reconsidered if there is a true commitment to water justice.

AFFORDABILITY

If you don't pay your water bills, they cut off your water, and don't give you an opportunity to appeal. Then they transfer the bills above \$100 to property tax rolls for collection. If you can't pay, your house can be foreclosed. . . . People lose their homes, business and can even lose their children.

—Maureen Taylor, *Michigan Welfare Rights Organization* (qtd. in *NCLC 2006*)

After over 40,000 families had their water shut off in one year, the Michigan Welfare Rights Organization launched a campaign to create a citywide plan to ensure affordable water for Detroit's low-income residents. For low-income households, affordability is a question of both the economic burden a water bill places on a resident and whether that resident is being forced to displace other essential services to provide the basic need of water. The EPA defines water service *affordability* as 2.5 percent of Median Household Income (MHI). As long as water bills do not exceed 2.5 percent of MHI, water service is considered affordable. However, the MHI obscures many of the large discrepancies in the range of incomes in an area, or the geographic distribution of differing incomes. Although, on average, people can be paying less than 2.5 percent of their income on water bills, low-income households may be paying a much higher percentage. The percentage of MHI spent on a water bill also may not encompass all the water-related costs that a household may bear. For example, if household members must purchase bottled water because their water is contaminated, the actual amount they are paying is much higher.

The economic crisis that began in 2009 sharpened the types of affordability issues that Detroit faced. Reports of water shutoffs have become more common as utilities have been raising rates, becoming more aggressive in collecting overdue water bills, and shutting off accounts as their investments have fallen due to the recession (Smith 2008; DePalma 2007; Canfield 2010). Utilities in Chicago saw a 70 percent increase in the number of delinquent water bills in 2008 and implemented rate increases of 15 percent each year for the next three years (Cottrell 2008). The rising rate of foreclosures has impacted renters; for example, in Oakland, California, many low-income tenants faced

abrupt utility shutoffs as their landlords faced foreclosure in the wake of massive mortgage defaults (Grady 2008).

Despite the limitations of this measure, recent data has shown that the number of houses whose water and wastewater bills exceeded EPA's designated affordability criteria is growing. From 2002 to 2004, the number of bills for water and wastewater services in major cities that exceeded the EPA's affordability criteria rose from 3 to 7 percent (Brandt 2004). The Congressional Budget Office predicts that between 10 and 20 percent of households may be spending more than 4 percent of household income on water by 2019 (CBO 2002). For more information on a community campaign to ensure equitable access to affordable water, see the case study of Michigan Welfare Rights Organization in chapter 7: Municipal Water Use.

Another indicator of affordability is how much people spend on water as compared to other services or needs. In general, low-income residents spend a higher percent of their household income on water than wealthier residents do (Morello-Frosch et al. 2009). As many as one in five households face difficulties meeting "essential needs" over the course of a year, and the most common difficulty is paying utility bills (Bauman 2003).

There are no federal programs to assist low-income residents in covering their water bill, such as the ones that exist for telephone and energy usage. It is left to the discretion of the utility to create such a program. A survey of large utilities found that only 8 percent had a subsidy, or "lifeline" rate (Raucher 2004). Given this lack of a safety net, the rising cost of drinking water is also a rising threat to the water security of low-income communities.

URBANIZATION: LEGACIES OF DISCRIMINATION IN LAND-USE PLANNING PERPETUATE WATER INJUSTICES

When I was a little girl, because our wetlands were of good quality, we would get all excited to run out and play. Turkey Creek had a cultural significance—we couldn't use the beaches because they were segregated. We used the creek for fishing and swimming and baptizing. But then development started coming, and it ruined the quality of our wetlands, and there was flooding in our streets and homes and churches.

—Rose Johnson, *Turkey Creek resident and activist* (Johnson, pers. comm. 2010)

North Gulfport and the neighboring community of Turkey Creek, Mississippi, were founded by emancipated slaves. The entire area is a flood zone, and African American residents were relegated to the edges of the wetlands along Turkey Creek. Residents long used the creek for recreation, as nearby beaches were segregated. The creek slowly became contaminated as industries such as DuPont Chemical moved into the area and urban sprawl devoured the creek's wetlands and increased flooding in the homes of nearby residents (Ray 2004). The wetlands would absorb water and prevent flooding, but as they were

paved over, flooding worsened. Today, residents are fighting to create a greenway along Turkey Creek.

Urbanization—the process of urban growth—has led to a drastic increase in the amount of land covered by impervious surfaces, such as concrete. These surfaces generate much larger quantities of water running off streets than the nonurbanized landscapes they replace. This runoff picks up the many chemicals and heavy metals that exist in urban areas, including pesticides, oil and grease, bacteria, and trash, and is one of the largest sources of water contamination today (EPA 2010a). Exacerbating runoff are combined sewage overflows, or CSOs, which are sewer systems built to carry both sewage and stormwater in the same pipes. These systems overflow when there is lots of rain or snow and discharge directly into nearby water bodies, carrying many pollutants that affect health, including bacteria, viruses, and floating trash (EPA 2001a).

Widespread water issues with urbanization have been caused, in large part, by the overwhelming disconnect between land-use planning policies and water planning. As the Government Accountability Office notes, “most states and localities do not comprehensively assess the impacts of different land uses on water quality and develop strategies to mitigate any adverse effects” (GAO 2001, 6).

The disconnect between land-use planning and water management maps onto legacies of discriminatory planning. Land-use planning and zoning practices determine what land uses are allowed where, including residential housing and industrial facility sites. From *redlining* practices, which deliberately excluded people of color from living in certain neighborhoods, to federal housing policies that encouraged suburban development at the expense of urban city centers, land use and zoning decisions have facilitated the concentration of low-income communities and communities of color in impoverished areas and near toxic facilities (NAPA 2003). Ultimately, land-use planning and zoning have “segregated communities along the lines of race and class” and led to “the creation of an urban underclass that is denied access to mainstream opportunities” (Wilson, Hutson, and Mujahid 2008, 212).

Today, this “urban underclass” is often especially susceptible to the water-related problems of urbanization, ranging from overflowing CSOs to seasonal flooding (EJCW 2005). Case studies from communities such as Turkey Creek; West Philadelphia (Spirn 2005); Bayview Hunters Point in San Francisco (EJCW 2005); Columbia Sloughs in Portland, Oregon (Stroud 1999); Anacostia River in Washington (Williams 2001); Gary, Indiana (Hurley 1988); and Sun Valley in Los Angeles (TreePeople 2009) attest to the complex ways the low-income communities and communities of color come to live in areas with high rates of contamination, storm and wastewater overflows, or increased risks of flooding.

Most urban runoff prevention programs are run at the state level and are voluntary. EPA efforts to regulate national stormwater permitting programs have been slow and ineffective (GAO 2007). There are few incentives and resources for local governments to tackle the issue independently.

When cities do take action to address the impacts of urbanization, it can have EJ implications. In several cities, municipal plans to address CSOs have called for the construction of large wastewater treatment plants to be located in low-income communities and communities of color (Lane and Heath 2009). For more on one community's struggle to ensure an equitable CSO treatment plan, please see chapter 5: Water Quality.

The combination of discriminatory land-use patterns and the impacts of urbanization means that water issues in a low-income community or community of color may be easily overlooked. Whereas many of the water-related impacts of urbanization are related to local planning and permitting decisions, it is also local-level planning that has influenced the concentration of low-income communities and communities of color into marginal urban geographies. As the EPA takes an increased role in addressing the disconnect between water and land-use planning policy, it must also address the historical and living legacies of discrimination that affect communities today.

Bearing the Burden: Low-income Communities and Communities of Color Pay for Industrial Development

One of the most important contributions of the EJ movement has been demonstrating how the costs of pollution that impact low-income communities and communities of color are not factored into traditional environmental decision making. Federal water policies around industrial discharge show how the environmental costs of industrial development are displaced onto these communities.

CONTAMINATED FISH

Studies from around the country have shown that many communities of color have some of the highest rates of fish consumption, ranging from Native American and Alaskan Natives to African Americans to Latinos to Asian and Asian American populations (OEHHA 2001; Corburn 2002; EHC 2005; Shilling 2009; Silka nd; Williams et al. 2000; AMAP 2009). The EPA has found low-income communities consume significantly higher amounts of both cooked and uncooked fish (EPA 2002). Studies in Pennsylvania and South Carolina demonstrate that African American anglers consume up to four times the amount of fish as white anglers do (Weintraub and Birnbaum 2008). Another study in Indiana found significantly higher daily average fish consumption rates among anglers of color versus white anglers (Williams et al. 2000). In one survey from California's Sacramento–San Joaquin Delta, 86 percent of Hmong women, 75 percent of Cambodian women, 58 percent of Vietnamese, and 57 percent of Filipino women surveyed ate sport fish versus 30 percent of white women (Silver et al. 2007).

Many fish today are contaminated by pollutants that bioaccumulate in their flesh after being released into the water. Common contaminants include mercury from historic gold mining, ongoing mercury depositions from coal plants, and chemicals called persistent organic pollutants used in a variety of manufacturing processes.

The policy response to fish contamination has been one of *risk avoidance*, which allocates the responsibility for addressing risks to those who bear the risks (O’Neill 2007). The EPA issues fish advisories to provide guidance on safe levels of consumption for contaminated fish. In areas with high levels of contamination in specific fish species, they recommend replacing or reducing consumption. Under the CWA, all facilities are required to obtain permits that specify the quality of water they will discharge; this is the National Pollutant Discharge Elimination System. Under the CWA’s Total Maximum Daily Load program, the EPA can limit the total amount of contaminants in a particular water body. But instead of using these tools to create pollution limits in waterways with documented subsistence fishing, the EPA ultimately places the burden of protection on low-income communities, communities of color, and other fish consumers (O’Neill 2007).

Risk avoidance also simply fails at its policy objectives when it comes to low-income communities and communities of color. Many communities have found that fish advisories are difficult to understand or are not language-appropriate (Silka nd; EJCW 2005). The fish advisories are often based on recreational angler levels of consumption, rather than subsistence rates (Shilling 2009).

As the NEJAC explains, “For many communities of color, low-income communities, tribes, and other indigenous peoples, there are no real alternatives to eating and using fish, aquatic plants, and wildlife. For many members of these groups it is entirely impractical to ‘switch’ to ‘substitutes’ when the fish and other resources on which they rely have become contaminated. There are numerous and often insurmountable obstacles to seeking alternatives (e.g., fishing ‘elsewhere,’ throwing back ‘undesirable’ species of fish, adopting different preparation methods, or substituting beef, chicken or tofu).” The “cost” of widespread fish contamination, caused by private companies and government facilities, thus disproportionately is borne by low-income communities and communities of color (Gauna, O’Neill, and Rechtschaffen 2005).

LACK OF ACCESS TO WATER FOR RECREATIONAL OPPORTUNITIES

We all grew up in Chelsea and we didn’t realize we had a river. You can’t see it, you can’t touch it, there are no viewpoints—just huge industries up and down the waterfront. We started to question why are all these industries in Chelsea? It became clear to us that it was because we are a low-income community of color.

—Roseann Bongiovanni, *Chelsea Creek Action Group*

Chelsea Creek runs into the Boston Harbor through East Boston and Chelsea, both working-class neighborhoods with large immigrant communities. An EPA investigation

in partnership with community groups found that Chelsea and East Boston have significantly less access to green space than elsewhere in Boston. Working with local and national agencies, companies, and residents, community groups such as the Chelsea Creek Action Group cleaned up and redeveloped an old industrial site into the Condor Street Urban Wild Park, and they are now working to create an entire Chelsea Riverway for local residents to access the waterfront (NOAH 2006).

Disparities in distribution of open spaces have been well documented. Low-income communities often have less access to open spaces and recreational opportunities than do more affluent communities (Timperio et al. 2007; Harnick 2006; Kibel 2007). In a report mapping race, income, and park access in Los Angeles, the City Project found that the communities that had the worst access to parks were the largely nonwhite and poor communities of Central and South Los Angeles (Garcia and White 2006). Along many industrialized waterfronts, the adjacent low-income and predominately minority communities are effectively cut off from the waterfront; in the low-income, predominately Latino and African American industrial shipping area of South Bronx, New York City, the Hunts Point area has six miles of waterfront, and only 200 feet of waterfront recreation access (Sustainable South Bronx 2008). Research from around the country demonstrates that a lack of recreational opportunities translates into increased health problems, ranging from high rates of obesity, type II diabetes, and other diseases among low-income communities and communities of color (Wilson, Hutson, and Mujahid 2008).

Natural spaces can promote physical and psychological health (Giles-Corti et al. 2005; Garcia and White 2006), and increasingly, EJ activists are working to secure access to healthy creeks and water-based recreational opportunities as a means of creating positive changes in their communities (Miller 2009). Even though many of the patterns of industrial development along waterways trace back to local land-use planning decisions and ordinances, the federal government can play a proactive role in not only creating strict CWA permits for industrial facilities and thus limiting pollution, but also in identifying and supporting watershed restoration projects in low-income communities and communities of color.

ENERGY PRODUCTION AND WATER INJUSTICES

There was a sludge dam holding nine billion gallons of toxic substances right above where we lived. I also watched the March Fork stream get poisoned three miles above the intake valve for the town of Sylvester, West Virginia. If we're poisoning our drinking water, we have to ask what kind of people are we?

—Judy Bonds, *Coal River Mountain Watch, West Virginia* (qtd. in Smecker 2009)

Community organizations such as Coal River Mountain Watch and Ohio Valley Environmental Coalition have been working to stop the impacts of coal mining in Appalachia

for years. Efforts to secure tighter water restrictions on coal mining practices face two huge barriers: the power of corporate lobbying interests, and the country's reliance on coal for electricity (Duhigg 2009c). The work and challenges of the Ohio Valley Environmental Coalition exemplify the struggle many low-income communities and communities of color face in trying to address the impacts of energy production on water resources.

Energy production and water are highly interdependent (Feeley et al. 2005). Energy production is the second largest user of water in the United States, and virtually every type and phase of production requires water, from the mining of fossil fuels to the cooling water used in power plants to the transport of coal. This can lead to the depletion of local water sources. Not only is energy production water-intensive, it is water-polluting, especially fossil fuel plants, which dump large quantities of contaminated water used in the production process into local ecosystems (Clean Air Task Force and The Land and Water Fund of the Rockies 2003).

The EJ impacts of energy production are clear. In New Mexico, Navajo drinking water wells have been contaminated by uranium mines (EPA 2008). Throughout the West, indigenous communities have been displaced from ancestral rivers and their subsistence lifestyles destroyed for hydropower dam construction (Woeffle-Erskine 2007). On the Cheyenne reservation in Wyoming, coal bed methane extraction contaminates vast quantities of groundwater (Small 2005). A new rush to access natural gas using a water-intensive method called *hydraulic fracturing* (or "fracking") has resulted in such high levels of methane that drinking water is actually flammable in some communities throughout the Northeast (Duncan 2010).

Energy policy, dispersed through a variety of federal agencies, has not worked in tandem with water policy (Gleick 2009). As calls for more integrated water and energy policy become prevalent, addressing the long-standing impacts of energy production on low-income communities and communities of color is an important starting place.

CLIMATE CHANGE AND WATER INJUSTICES

New Orleans has been made the ground zero of climate change.

—Dr. Myra Lewis, *Deep South Center for Environmental Justice*

The experience of Hurricane Katrina revealed the connections between climate change, EJ, and management of our water resources. As Dr. Myra Lewis, assistant director at the Deep South Center for Environmental Justice, explains, "New Orleans always had intense environmental justice issues and contamination. Katrina reset our agenda. It was a monumental failure of every level of government that was supposed to be protecting our interests." Katrina revealed how a confluence of geographic, social, and political factors that created a situation in which low-income communities and communities of color in New Orleans were disproportionately affected by the disaster (Smith 2006).

Climate change will worsen some of the existing inequalities outlined in this chapter (Pastor et al. 2006). For a broader discussion of climate change impacts on water resources see chapter 10: Water and Climate. In the example of Hurricane Katrina, the numerous contaminated sites and facilities near low-income communities and communities of color in Louisiana created a public health threat as flooding waters were polluted by toxic materials (Bullard and Wright 2009). For subsistence communities relying on fish and other aquatic life for income, changing water temperatures and flows will drastically reduce these sources of livelihoods (FAO 2008). In agricultural areas, changing growing conditions may increase the use of fertilizer and pesticides, risking increased contamination in rural places where small, low-income communities already struggle with polluted ground and surface water (Fougères 2007). Alaskan Native communities already face accelerated erosion due to melting sea ice and heavy wave activity; 31 villages are facing relocation (GAO 2009).

There are two main policy responses to climate change—mitigation and adaptation. Mitigation reduces the emissions of greenhouse gases, which drive climate change. Adaptation refers to adjustments in the built environment, lifestyles, and management practices to new climate conditions. A community's ability to both mitigate and adapt to the wide-ranging impacts of climate change is influenced by their vulnerability, which depends on many factors, including income, race, class, gender, and ethnic dynamics, but also hinges on the “basic provision of health care, the livability of places, overall indicators of quality of life, and accessibility to lifelines (goods, services, emergency response personnel), capital, and political representation” (Cutter 2006, 121). Many low-income communities and communities of color will experience the impacts of climate change most acutely because they are the most vulnerable (Morello-Frosch et al. 2009).

Given this reality, from an EJ perspective, the federal government's first step should be strong measures to reduce greenhouse gas emissions, which are linked to water management in several critical ways. Water management itself is energy-intensive. Water and wastewater systems account for at least 4 percent of the nation's energy use (EPRI 2002), although some experts believe this number could be considerably higher. Energy costs are a major proportion of the total utility operating costs with some estimates indicating that electricity is 80 percent of the cost of water provision (WRRC 2010). For example, in both Arizona and California, the single largest users of electricity are massive water infrastructure projects that bring water supplies to cities such as Tucson and Los Angeles (WRRC 2010). Additionally, energy use in our homes, businesses, and institutions to pump, heat, and treat water may be four times greater than that for the provision of water and wastewater systems (CEC 2005).

Other proposals to curb greenhouse gas emissions perpetuate water injustices. Hydropower is often framed as a “clean” way of generating energy and reducing carbon emissions from use of fossil fuels, but large dams can contribute to water contamination, severely disrupt the local ecosystem, and displace communities or community resources

(Leslie 2008). Large-scale ethanol production, proposed as a “bio-fuel” to reduce fossil fuel dependence, has led to a host of water problems and threatened small farmers around the globe (Hauter 2008). Environmental justice advocates fear proposals such as creating markets for carbon trading will exacerbate the already existing pollution in low-income communities and communities of color (Shepard and Corbin-Mark 2009).

With a predicted increase in severe weather events, how the federal government prepares and assists communities after water-related disasters is a crucial EJ issue. “Many minorities and the poor have had greater difficulties recovering from disasters due to less insurance, lower incomes, fewer savings, more unemployment, less access to communication channels and information, and the intensification of existing poverty” (Pastor et al. 2006, 23). Vulnerability is compounded by disparities in government disaster preparedness, aid, relief, and recovery. These range from the basic failure to provide assistance, to disaster materials issued in inappropriate languages, cultural stereotypes and racism in service provision, and unequal distribution of disaster relief and recovery assistance from local, state, and national agencies (Heberger et al. 2009; Pastor et al. 2006).

Ultimately, for many EJ activists, moving forward means moving away from a dependence on fossil fuels. The Environmental Justice Leadership Forum on Climate Change, an alliance of EJ organizations working to impact the development of climate change policy in the United States, calls for “a national goal supported by legislatively dedicated resources to transition us from the fossil fuel economy to the green, clean renewable energy economy by 2020” (Shepard and Corbin-Mark 2009).

Underlying Causes of Water Injustices

Climate change has heightened the sense of urgency to address water injustices. However, any potential solutions for both water management issues and climate change will not be adequate if they fail to address some of the underlying inequalities in federal water policy that link the various water injustices outlined in this chapter.

INEQUALITIES IN ENVIRONMENTAL REGULATION AND ENFORCEMENT

A driving force behind much of the EJ movement has been the reality that environmental regulations are not equitably enforced. Biases in government regulation and enforcement have failed to ensure that low-income communities and communities of color receive the same environmental protections that more affluent, white areas do (Bullard 2001). In an exhaustive report examining penalties applied by the EPA, researchers found that penalties under the Resource Conservation and Recovery Act are up to 500 percent higher in white communities than in communities of color for comparable violations (Lavelle and Coyle 1992). For example, petroleum refineries along the Mississippi River, surrounded

by predominantly African American communities, tend to receive smaller fines than refineries in white, affluent communities do (Lynch, Stretesky, and Burns 2004).

The CWA is the EPA's main tool to keep water bodies free of pollution, yet illegal wastewater discharges have been routinely identified as a problem (Leavitt 2007) and enforcement of the act in low-income communities and communities of color is not evenhanded. A recent lawsuit by African American residents in Texas documented consistent pollution of their drinking water by local oil companies, despite clean-up efforts in neighboring, white areas (Hoffman 2007). In Dickinson, Tennessee, a county landfill is sited in the one African American community in the area, and the local well water has been poisoned by leaking hazardous materials. Even though city and county officials knew of the contamination, they continued permitting landfill operations. Additionally, they provided notification and treatment to nearby white families, but not to African American residents (Bullard et al. 2007).

Another example is the National Priority List created under the Superfund Program to identify and clean up sites with hazardous contamination. One study demonstrated that it took 20 percent longer for Superfund sites in low-income communities and communities of color to be listed and that penalties for pollution in white communities were 46 percent higher than in nonwhite communities (Lavelle and Coyle 1992). Another showed that the more people of color there are in an area, the less likely it is to receive Superfund protection (Anderton, Oakes, and Egan 1997; Hird 1993). Yet another shows that a 10 percent higher Native American population lowers the chance of being listed by a shocking 80 percent, and a 10 percent higher level of poverty decreases listing chances by 31 percent (O'Neil 2007).

An important mechanism at the federal level for low-income communities and communities of color is filing complaints with the Office of Civil Rights (OCR) under Title VI of the Civil Rights Act of 1964, which prohibits any agency that receives federal funding from discrimination in services (Ringquist and Clark 1999). A recent court case, however, highlights the failure of the federal government to respond to EJ complaints. In 2003, the community group Rosemere Neighborhood Association, based in Vancouver, Washington, filed a Title VI complaint with the OCR against the City of Vancouver, Washington. Rosemere alleged that Vancouver failed to use EPA funds to address long-standing problems in 17 low-income and minority neighborhoods, including inadequate sewer services and other standard amenities found in more affluent areas.

Over the course of six years, the organization faced retaliation by the City of Vancouver and was forced to file a second civil rights claim. Finally, in 2009, the Ninth Court Circuit of Appeals found that the OCR had failed to respond to Rosemere's complaints, which "bloomed into a consistent pattern of delay by the EPA." The court noted "that Rosemere's experience before the EPA appears, sadly and unfortunately, typical of those who appeal to OCR to remedy civil rights violations" (*Rosemere Neighborhood Association v. United States Environmental Protection Agency*, 581 F. 3d 1169, 9th Cir. 2009, 13510).

OVERLOOKING LARGE SOURCES OF CONTAMINATION

Efforts to regulate nonpoint source contamination have not effectively addressed the root causes of the contamination or they overlook large sources. For example, the wastes from large animal facilities are technically subject to water-quality permits by the CWA, but these only apply if the facilities discharge into surface waters. This regulatory loophole has effectively left hundreds of thousands of facilities entirely unregulated (GAO 2008). Even compliance and enforcement of regulations that do exist have been acknowledged by the EPA to be insufficient; as of 2008, less than one-third of eligible facilities even had permits (Copeland 2010). Nonpoint source contamination (originating from a variety of sources), such as agricultural runoff or animal feedlots, is largely exempt from CWA regulation (ELI 2000; see also chapter 5: Water Quality).

The pork industry came to eastern North Carolina because we are black, poor, rural and have no political clout. The farms permitted seepage of waste into groundwater from their cesspools. The wells here were constructed over 50 years earlier. They were open for all kinds of contamination.

—Gary Grant, *Executive Director of Concerned Citizens for Tillery*

The injustices within water management are not simply the result of unequal enforcement of existing regulations, but also are due to a lack of policies or regulations in place that address the chronic water issues faced by low-income communities and communities of color. Concerned Citizens for Tillery in North Carolina have been fighting the industrial hog industry for the past decade. Hogs now outnumber residents of the state, and hog farming has been linked to elevated rates of nitrates in nearby wells (Marks 2001). After partnering for a study with professors at the University of North Carolina, the citizens' group found that areas with lower incomes and more African American residents had the highest numbers of hog farms (Wing, Cole, and Grant 2000). Subsequent studies found similar conditions in the Mississippi hog industry (Wilson et al. 2002).

Agricultural and animal facility runoff can lead to high rates of nitrates in groundwater (Harter 2009). The EPA has a drinking water standard for nitrates, but its regulation of nutrients in both drinking water and surface water has been found to be “inadequate at both a statewide and national scale” by State-EPA Nutrient Innovations Task Group (SENITG 2009). This type of gap results in severe health and quality-of-life risks for residents in Tillery and many other communities throughout the United States (Duhigg 2009b).

GROUNDWATER PROTECTION: A GLARING GAP

Over half of US residents rely on groundwater for some part of their drinking water (GWTF 2007), but the quality of groundwater is increasingly found to be degraded. There are many sources of contamination, and the contaminants vary widely across geographic regions, but some of the main sources are a combination of industrial

discharges, hazardous facilities such as waste sites, farming operations, and runoff (EPA 1999b).

Rural, private well owners are acutely at risk of drinking water contamination. Over 43 million people, mostly in rural areas, rely exclusively on groundwater from private, domestic wells (DeSimone, Hamilton, and Gilliom 2009). Incomes in rural areas are anywhere from 15 to 30 percent lower, and poverty rates 30 to 40 percent higher, than in nonmetropolitan areas (Rubin 2001). A recent US Geological Survey study found that 20 percent of private wells sampled contained at least one contaminant at levels of concern to human health (DeSimone, Hamilton, and Gilliom 2009), but private wells are not regulated by the Safe Drinking Water Act.

Instead of an overarching federal vision for groundwater management, a fragmented array of federal laws touch on some aspect of groundwater protection or cleanup (GWPC 2006a; see also chapter 2: Legal and Institutional Framework of Water Management). This actually hinders comprehensive cleanup and assessment because most of these laws are built to address a separate environmental issue, rather than groundwater (Pye and Patrick 1983), and the regulations that do exist have large holes. For example, more than 50 percent of liquid hazardous waste produced in the United States is disposed of through underground wells. These wells are divided into five categories, known as *classes*, and regulated under the Safe Drinking Water Act, but there are serious deficiencies in the regulatory program. Class V wells are the most numerous, with over 1.5 million in the country, but only one-fifth have permits (GWPC 2006b). As the Groundwater Protection Council explains, “Groundwater has too often been taken for granted and has suffered from a lack of emphasis on the part of local, state, and national leadership and a lack of funding for protection and research” (GWPC 2006, 4).

Complicating groundwater management are the multiple legal frameworks governing its use. Many of these doctrines rely on strong private property doctrines, which protect, to varying degrees, the rights of landowners with property overlying aquifers to pump groundwater (Ashley and Smith 2001). This makes groundwater quality and quantity impacts hard to control and ongoing monitoring very difficult.

Even when efforts to remediate contamination are taken, as the EPA’s Groundwater Task Force noted, “Groundwater cleanup activities and decisions are often not prioritized in a manner that would result in addressing the most pressing needs or maximizing the public health benefit of monies spent” (GWTF 2007). The EPA’s overall failure to more proactively manage groundwater thus compounds the already existing inequalities in water regulation in low-income communities and communities of color.

CUMULATIVE RISKS AND IMPACTS OVERLOOKED WITHIN FEDERAL WATER POLICY

Environmental justice activists have long pushed for a cumulative impacts model of protecting public health in environmental regulation (Bullard 2001), but two major components of water-quality regulation related to public health have failed to incorporate the

basic elements of cumulative impacts: the formation of drinking water standards and the industrial permitting under the CWA (NAPA 2001). Neither process routinely includes the wide variety of contaminants that communities may be exposed to or the chemical interplay these contaminants may have (Gauna, O’Neill, and Rechtschaffen 2005). They also overlook the protection of vulnerable populations, such as children or pregnant women, even when contaminants are shown to be particularly harmful for these groups (EJCW 2005; NEJAC 2004).

Drinking water standards are set using cost-benefit analyses, which attempt to quantitatively assess the public health risks associated with a particular contaminant in comparison to the overall costs of fully cleaning up or regulating the contaminant (Foster 2002). As noted earlier, low-income communities and communities of color are more likely to live near polluting facilities, but these disparities are not addressed in traditional cost-benefit analyses. Environmental justice and law scholar Sheila Foster points out that this type of technical evaluation “violates most notions of equity and justice” because “many environmental issues, such as siting decisions, entail clearly different distributions of net benefits and costs (or risks), often along lines of geography, income, political power, and race” (Foster 2002, 468).

Theoretically, a cost-benefit analysis is an objective means of comparison. But the process for establishing drinking water standards has been beset by industry pressure. Lobbyists have been able to secure less stringent standards by using considerable private resources to argue that the costs of regulation are too expensive, as well as bankrolling studies to argue that the health threats of a particular contaminant are minimal (Duhigg 2009d; Corn 2009).

Water discharge permits required by the CWA are similarly drafted by staff who use technical methodologies and work with the polluter to create an amenable limit on discharges, rather than working with communities to identify needed protections (NAPA 2001). From an EJ perspective, these quantitative methods are a way of “managing, regulating, and distributing risks—instead of protecting public health and the environment in low income and people of color communities” (Bullard et al. 2007).

SUPPORTING THE SOCIAL, CULTURAL, AND ENVIRONMENTAL VALUE OF WATER

Water rights are everything we have in our communities. They are part of our history and culture, part of our livelihood.

—Janice Varela, *New Mexico Acequia Association*

Water has value that goes beyond economic production. It has cultural, spiritual, and social meanings (Donahue and Johnston 1998). But these values have few legal or political protections (Ingram, Whiteley, and Perry 2008; Espeland 1998), particularly in regards to water rights and increasingly, private values have crowded out these public ones. For

example, the water-sharing customs of acequias, which hold water rights communally rather than privately, are integral to identity, survival, and sense of community in small, rural, Latino, and Native American towns throughout New Mexico. For more on water rights, please see chapter 2: Legal and Institutional Framework of Water Management.

Many EJ activists oppose privatization of water services because it threatens to infringe on this heritage and local water values and uses. Privatization commodifies what many communities feel is a common resource that should be protected for overall public use (Barlow and Clarke 2001). Furthermore, private takeover of water services has caused a host of negative impacts in low-income communities and communities of color, ranging from drastic rate increases and service shutoffs (Snitow, Kaufman, and Fox 2007; EJCW 2005). Other types of privatization are emerging throughout the country; new “water markets” are forming that allow entities with water rights to sell water from one area to another (Klein 2007). New water markets and privatization threaten to exacerbate existing water injustices as low-income communities and communities of color will not be able to access these markets (Gibler 2005). Providing water services to a low-income, rural community will not be profitable.

The failure to integrate social and cultural values is not solely the result of private involvement. Public water agencies have also often failed to protect these aspects of the public interest. While growing privatization of water infrastructure worldwide prompts questions about *justice* by directing our attention to issues such as unfair allocation and pricing and limited public access to decision making, we also know that historically, policy failures regarding water equity have as often been the result of misguided government decisions to dam rivers, divert water, and buy and sell water rights in order to better benefit the interests of the rich and powerful (Ingram, Feldman, and Whiteley 2008). The United States’ dam-building boom reflects the ways that particular values can get lost in the calculus of federal water policy and the need to better incorporate and protect the social, environmental, and cultural values of water.

Recommendations for Federal Water Policy

Past water policy in the United States has often had adverse and inequitable consequences for low-income and communities of color. Although strategies to address these consequences are varied, one thing is clear: providing communities with a voice in water policy decisions—a key component in the soft path to water, and environmental issues broadly, is central to accepted principles of EJ (EJCW 2005). Whether it is breaking down barriers of discrimination that bar certain communities from basic water services, or incorporating information on the cumulative impacts of pollution in a community, or recognizing the cultural value of water, the issues faced by low-income communities and communities of color must be more carefully and explicitly integrated into federal water policy. The EJ movement has struggled to show agencies and decision makers the

importance of an open and transparent decision-making process (Cole and Foster 2001; Di Chiro 1996). In order to begin addressing EJ in federal water policy, we must start by including the voices of those directly affected by the existing system of water management.

The following policy recommendations offer ways to address the current water injustices and, in doing so, create a more equitable, sustainable vision for federal water policy.

FULLY INTEGRATE ENVIRONMENTAL JUSTICE PRINCIPLES INTO FEDERAL WATER-RELATED PROGRAMS AND POLICIES

Many federal agencies, including the Environmental Protection Agency and Department of the Interior, already have the statutory ability to address the concerns raised by EJ communities in permitting, project review and construction, and financing activities related to water. There are guidance documents through the work of NEJAC and other efforts of the Office of Environmental Justice.

A more serious effort must be made to fully integrate EJ into federal water policy, using the benchmarks of measurable progress in eliminating disproportionate impacts in low-income communities and communities of color, as well as implementing a clear system of evaluation and accountability based on demonstrable results in a specified time frame. Some of the key elements of such an effort to integrate EJ into federal water policy include staff positions charged with EJ assessments. For instance, federal agency staff should assess the disproportionate impacts of any proposed project, policy, or permit, ranging from CWA National Pollutant Discharge Elimination System permits to Bureau of Reclamation dam operations. In addition, methods should be developed to incorporate noneconomic water uses, such as social and cultural activities, into proposed projects, policies, or permits. Finally, the federal government should reform water quality permits and programs, such as the Underground Injection Control and the Total Maximum Daily Load programs, to be based on numeric standard that are protective of the most sensitive populations.

SET PRIORITIES FOR ADDRESSING WATER-RELATED ENVIRONMENTAL JUSTICE ISSUES

Addressing EJ in federal water policy requires not only revising programs to include EJ principles moving forward, but also recognizing and proactively addressing current water injustices. Federal agencies with water management authority should ensure that their programs identify communities facing disproportionate water impacts and create concrete action plans within defined goals and time frames to address issues. Clean-up and remediation priorities should be based on disproportionate impacts to low-income communities and communities of color within programs such as the Resource Conservation and Recovery Act or Superfund remediation. Finally, when working with community groups to develop solutions to longstanding EJ and water issues, the technical expertise

of federal agencies (National Fish and Wildlife Services, Army Corps, and others) should be used. These projects should use a collaborative, community-based framework to identify and implement needed actions.

COLLABORATE WITH STATE AND LOCAL GOVERNMENTS TO ADDRESS
WATER-RELATED ENVIRONMENTAL JUSTICE ISSUES

Given the local nature of both EJ issues and water management, and the delegation of authority to state agencies implementing federal water legislation, federal agencies must participate in related state processes to ensure EJ is adequately addressed. This can include, but is not limited to, providing leadership in working with state and local governments as well as other stakeholders to identify and prioritize issues of water and EJ concern in a specified region and coordinating with state and local governments to ensure implementation of an enhanced, standard public participation process.

USE CUMULATIVE IMPACT ASSESSMENTS IN WATER PROJECT
PLANNING AND PERMITTING CONSIDERATIONS

For any piece of federal water policy to effectively integrate EJ principles, it must use a cumulative risk and impact model in decision making. The EPA has created a *Framework for Cumulative Risk Assessment* and NEJAC has issued guidance on how to most effectively implement such a framework. Efforts should be undertaken within all federal agencies with water authority to implement the framework and NEJAC recommendations. This would include incorporating social, economic, cultural, and community health factors, particularly those involving vulnerability, into the EPA's and other water-related agencies' decision-making processes; assessing diverse types of discharges a facility emits and emissions from other adjacent polluters in permitting decisions; using diverse sources of information and expertise including that of communities that stand to be directly affected by the proposed project, program, or permit; and focusing on community-based approaches, particularly community-based participatory research and intervention.

MAKE WATER POLICY AND GOVERNANCE DECISIONS AND POLICIES MORE
ACCESSIBLE AND RESPONSIVE TO COMMUNITY NEEDS

NEJAC has produced many guiding documents on how to ensure adequate and meaningful public participation, including the Model Plan for Public Participation. The EPA, Department of Interior, Department of Agriculture, Army Corps, and other agencies that are involved in water policy should ensure the core values expressed within the model plan strategies are part of their water-related activities and take

proactive steps to ensure meaningful public participation, including providing documentation in languages other than English in areas where more than 10 percent of the impacted community speaks a language other than English; facilitating ongoing opportunities for direct interaction between agency heads and communities, allocating funding for staff positions trained and dedicated to community outreach, and facilitating collaborations; and choosing arrangements for community interactions to maximize effective participation, assessing factors such as meeting times, locations, and translation needs.

PROVIDE RESOURCES FOR COMMUNITY-BASED ORGANIZATIONS TO ADDRESS WATER ISSUES AND FACILITATE PUBLIC PARTICIPATION

Organizations in low-income communities and communities of color often lack the resources or capacity to effectively resolve ongoing water issues. Community-based organizations and technical assistance providers can play a central role in ensuring meaningful involvement of affected community residents in environmental decision making and resolving community-based issues/concerns. Federal agencies such as the EPA, Department of Agriculture, and Army Corps should build relationships and collaborate with community-based organizations to help bridge community needs and agency efforts to resolve water issues.

ESTABLISH AN INTERAGENCY GROUNDWATER PROTECTION AND OVERSIGHT PROGRAM

Groundwater management and clean-up is currently dispersed among a variety of federal laws and legislation, ranging from administration of the Underground Injection Control program within EPA's Office of Ground Water and Drinking Water to guidelines within the Resource Conservation and Recovery Act for disposal of hazardous waste near groundwater aquifers. This fragmented approach does not provide a comprehensive strategy for protection and management of groundwater. Steps to implement a comprehensive strategy for protection include improving data collection and assessment of threats and existing conditions within aquifers; providing support for interagency and state efforts to protect and manage groundwater; identifying critical EJ and groundwater issues; and allocating sufficient funding to ensure program maintenance.

IMPLEMENT NEW FEES AND STRICTER FINES ON DISCHARGERS UNDER THE CLEAN WATER ACT

The noneconomic costs of water discharges, ranging from the contamination of fish to the contamination of local water bodies, are often borne by low-income communities

and communities of color. The EPA should use its statutory authority to fine dischargers that violate National Pollutant Discharge Elimination permits and work with state-delegated authorities to ensure state agencies also use their statutory authority to strictly enforce permit violations. Such fines can provide funding for water needs and deter future pollution.

RECOGNIZE THE HUMAN RIGHT TO WATER

The US Congress should pass legislation recognizing the human right to water, as recognized by the UN Human Rights Council in September 2010. Such legislation can lay the groundwork for a new ethic underlying water management across federal agencies and create an imperative for all federal government agencies to prioritize the provision of basic water resources for all Americans.

ADDRESS CRITICAL ENVIRONMENTAL JUSTICE ISSUES WITH APPROPRIATE FEDERAL WATER FUNDING

Addressing long-standing water injustices will require federal financial support. Programs such as the Clean Water State Revolving Fund, the Safe Drinking Water Revolving Fund, and the Department of Agriculture's Rural Loan and Grant program, should be required to prioritize funding and expand current programs specifically for low-income communities and communities of color to fund critical water supply, water quality, and wastewater projects. This can be accomplished through expanding existing set-asides dedicated to small and low-income communities, creating EJ prerequisites within programs that currently lack such standards, and reducing local match requirements for grants for small-system or low-income water projects.

A second aspect to equitable federal funding is ensuring that both direct grant and loan programs and subsidy programs are not worsening water injustices. This requires an assessment of federal subsidy programs and identification of communities eligible for subsidies. Entities receiving federal funding should be required to demonstrate collaboration with affected communities and ongoing efforts to address disproportionate impacts in order to continue receiving funding. This would apply to programs to both grant and loan programs such as Department of Agriculture's Environmental Quality Incentives Program, State Revolving Funds, but also Bureau of Reclamation agricultural water delivery programs such as California's Central Valley Project.

DIRECT FEDERAL WATER-RELATED CLIMATE CHANGE ADAPTION AND
MITIGATION PLANNING PROCESSES TO IDENTIFY AND PROTECT VULNERABLE
COMMUNITIES

Federal water policy must include efforts to reduce the rapidly growing risks of climate change for water resources and developed water systems. This includes broad efforts at all federally owned or operated infrastructure, with special attention to inequitable or disproportionately large impacts on vulnerable populations. This includes assessing water- and climate-related risks in EJ communities, particularly those risks related to flooding, water scarcity, quality threats, and sea-level rise, and developing adaptation plans with those communities.

References

- Anderson, M. 2008. "Cities Inside Out: Race, Poverty and Exclusion at the Urban Fringe." *UCLA Law Review* 55: 1095–1160.
- Anderton, D. L., J. M. Oakes, and K. L. Egan. 1997. "Environmental Equity in Superfund." *Evaluation Review* 21 (1): 3–26.
- Arctic Monitoring and Assessment Programme. 2009. *AMAP Assessment 2009: Human Health in the Arctic*. Oslo: Arctic Monitoring and Assessment Programme.
- Ashley, J. S., and Z. A. Smith. 2001. "Western Groundwater Wars." *Forum for Applied Research and Public Policy* 16. (1): 33–39.
- Bailey, J. M., and K. Preston. 2007. *Swept Away: Chronic Hardship and Fresh Promise on the Rural Great Plains*. Lyons, NE: Center for Rural Affairs.
- Barlow, M., and T. Clarke. 2002. *Blue Gold: The Fight to Stop the Corporate Theft of the World's Water*. New York: The New Press.
- Bauman, K. J. 2003. *Extended Measures of Well-Being: Living Conditions in the United States: 1998*. Washington, DC: US Census Bureau.
- Brandt, P. 2004. "Overview of Affordability Programs." USEPA Environmental Financial Advisory Board, Affordability Workshop. San Francisco: August 18, 2004.
- Brulle, R. J., and D. N. Pellow. 2006. "Environmental Justice: Human Health and Environmental Inequalities." *Annual Review of Public Health* 3 (27): 1.
- Bullard, R. D. 2001. "Environmental Justice in the 21st Century: Race Still Matters." *Phylon* 49: 151–171.
- Bullard, R. D., P. Mohai, R. Saha, and B. Wright. 2007. *Toxic Waste and Race at Twenty: 1987–2007*. Cleveland, OH: The United Church of Christ.
- Bullard, R. D., and B. Wright. 2009. "Race, Place and the Environment in Post-Katrina New Orleans." In *Race, Place and Environmental Justice after Hurricane Katrina: Struggles to Reclaim, Rebuild and Revitalize New Orleans and the Gulf Coast*. Edited by R. D. Bullard and B. Wright, 19–48. Philadelphia: Westview Press.
- Burke, G. 2009. Large Subsidies to Corporate Farms in West Depleting Vital Water Supplies. *The Arizona Daily Star*, April 15.

- California Energy Commission (CEC). 2005. *2005 Integrated Energy Policy Report*. Report CEC-100-2005-007. Sacramento: California Energy Commission. <http://www.energy.ca.gov/2005publications/CEC-100-2005-007/CEC-100-2005-007-CME.PDF>.
- Candee, H. 1989. "The Broken Promise of Reclamation Reform." *Hastings Law Journal* 40: 657–685.
- Canfield, C. 2010. "Water Bills Go up in down Economy as Usage Drops." *Inside Bay Area*. April 4.
- Carter, L. G. 2010. "Reaping Riches in a Wretched Region: Subsidized Industrial Farming and Its Link to Perpetual Poverty." *Golden Gate University of Environmental Law Journal* 3 (1): 5–41.
- Cieselski, S., T. Handzel, and M. Sobsey. 1991. "The Microbiologic Quality of Drinking Water in North Carolina Migrant Labor Camps." *American Journal of Public Health* 81: 762.
- Clean Air Task Force and The Land and Water Fund of the Rockies. 2003. *The Last Straw: Water Use By Power Plants in the Arid West*. Hewlett Foundation Energy Series. San Francisco and Menlo Park: The Energy Foundation and The Hewlett Foundation.
- Cody, B. A., and N. T. Carter. 2009. *35 Years of Water Policy: The 1973 National Water Commission and Present Challenges*. Washington, DC: Congressional Research Service.
- Cole, L. W., and S. R. Foster. 2001. *From the Ground Up: Environmental Racism and the Rise of the Environmental Justice Movement*. New York: New York University Press.
- Committee on Environmental Justice, Institute of Medicine. 1999. *Toward Environmental Justice: Research, Education, and Health Policy Needs*. Washington, DC: National Academy Press.
- Congressional Budget Office (CBO). 2002. *Future Investment in Drinking Water and Wastewater Infrastructure*. Washington, DC: The Congress of the United States.
- Copeland, C. 2010. *Water Quality Issues in the 111th Congress: Oversight and Implementation*. CRS Report R40098. Washington, DC: Congressional Research Service.
- Copeland, C., and M. Tiemann. 2008. *Water Infrastructure Needs and Investment: Review and Analysis of Key Issues*. CRS Report RL31116. Washington, DC: Congressional Research Service.
- Corburn, J. 2002. "Combining Community-Based Research and Local Knowledge to Confront Asthma and Subsistence-Fishing Hazards in Greenpoint/Williamsburg, Brooklyn, New York." *Environmental Health Perspectives* 110 (Suppl 2): 241–248.
- Corn, D. 2009. Rocket (Fuel) Man. *Mother Jones*, February 13. <http://motherjones.com/politics/2009/02/rocket-fuel-man>.
- Cottrell, M. 2008. "City Sees Sharp Rise in Unpaid Water Bills." *Chi-Town Daily News*, September 8.
- Cutter, S. 2006. "The Geography of Social Vulnerability: Race, Class and Catastrophe." In: *Understanding Katrina: Perspectives from the Social Sciences*. Edited by D. A. Farber and J. Chen, 120–122. New York: Aspen Publishers.
- DePalma, A. 2007. "City Keeping Water Rate From Rising." *New York Times*, December 7.
- DeSimone, L. A., P. A. Hamilton, and R. J. Gilliom. 2009. *Quality of Water from Domestic Wells in Principal Aquifers of the United States, 1991–2004 – Overview of Major Findings*. USGS Circular 1332. Reston, VA: US Geological Survey.
- Di Chiro, G. 1996. "Nature as Community: The Convergence of Environment and Social Justice." In *Uncommon Ground: Rethinking the Human Place in Nature*. Edited by W. Cronon, 298–320. New York: W. W. Norton.

- Donahue, J. M., and B. R. Johnston. 1998. "Conclusion." In *Water, Culture, & Power: Local Struggles in a Global Context*. Edited by J. M. Donahue and B. R. Johnston, 339–346. Washington, DC: Island Press.
- Duhigg, C. 2009a. "Cleansing the Air at the Expense of Waterways." *New York Times*, October 12.
- . 2009b. "Health Ills Abound as Farm Runoff Fouls Wells." *New York Times*, September 17.
- . 2009c. "Millions in US Drink Dirty Water, Records Show." *New York Times*, December 7.
- . 2009de. "That Tap Water Is Legal But May Be Unhealthy." *New York Times*, December 17.
- Duncan, B. 2010. "Flammable Drinking Water? Why Gas Drilling in New York and Nearby States Could Become an Environmental Catastrophe." *AlterNet*, April 21. <http://www.alternet.org/story/146540/>.
- Electric Power Research Institute (EPRI). 2002. *Water & Sustainability (Volume 3): U.S. Water Consumption for Power Production—The Next Half Century*. Report 1006786. Palo Alto: Electric Power Research Institute.
- Environmental Health Coalition (EHC). 2005. *Survey of Fishers on Piers in San Diego Bay: Results and Conclusions*. National City, CA: Environmental Health Coalition. http://www.environmentalhealth.org/EHC_Misc_Archive/CBCPierFishersSurveyReport.htm.
- Environmental Justice Coalition for Water (EJCW). 2005. *Thirsty for Justice: A People's Blueprint for California Water*. Oakland: Environmental Justice Coalition for Water.
- Environmental Justice Executive Steering Committee (EJESC). 2009. "Environmental Justice at EPA—Transition Paper." Environmental Justice Executive Steering Committee, Washington, DC. <http://environmentaljusticeblog.blogspot.com/2009/02/environmental-justice-at-epa-transition.html>.
- Environmental Law Institute (ELI). 2000. *Putting the Pieces Together: State Nonpoint Source Enforceable Mechanisms in Context*. Washington, DC: Environmental Law Institute.
- Espeland, W. N. 1998. *The Struggle for Water: Politics, Rationality, and Identity in the American Southwest*. Chicago: University of Chicago Press.
- Evans, G. W., and E. Kantrowitz. 2002. "Socioeconomic Status and Health: The Potential Role of Environmental Risk Exposure." *Annual Review of Public Health* 23: 303–331.
- Federal Reserve Bank of Dallas (FRBD). nd. "Texas Colonias: A Thumbnail Sketch of the Conditions, Issues, Challenges and Opportunities." Federal Reserve Bank of Dallas. Accessed August 2, 2009. <http://www.dallasfed.org/ca/pubs/colonias.html>.
- Feeley, T., J. Duda, L. Green, R. Kleinmann, J. Murphy, T. Ackman, and J. Hoffman. 2005. *Addressing the Critical Links Between Fossil Energy and Water*. Washington, DC: Department of Energy/Office of Fossil Energy's Water-Related Research, Development, and Demonstration Programs.
- Food and Agriculture Organization of the United Nations (FAO). 2008. *Climate Change Adaptation and Mitigation in the Food and Agriculture Sector*. Technical Background Document from the Expert Consultation held on 5 to 7 March 2008. Rome: United Nations.
- Foster, S. 2002. "Environmental Justice in an Era of Devolved Collaboration." *Harvard Environmental Law Review* 26: 459–498.
- Fougères, D. 2007. "Climate Change, Environmental Justice, and Human Rights in California's Central Valley: A Case Study." Center for International Environmental Law, Washington, DC. http://www.ciel.org/Publications/Climate/CaseStudy_CentralValleyCA_Nov07.pdf.

- Fricker, R. D., and N. W. Hengartner. 2001. "Environmental Equity and the Distribution of Toxic Release Inventory and Other Environmentally Undesirable Sites in Metropolitan New York City." *Environmental and Ecological Statistics* 8: 33–52.
- García, R., and A. White. 2006. *Healthy Park, Schools, and Communities: Mapping Green Access and Equity for the Los Angeles Region*. Los Angeles: The City Project.
- Gasteyer, S., and R. T. Vaswani. 2004. *Still Living without the Basics in the 21st Century: Analyzing the Availability of Water and Sanitation Services in the United States*. Washington, DC: Rural Community Assistance Partnership.
- Gauna, E., C. A. O'Neill, and C. Rechtschaffen. 2005. *Environmental Justice: A Center for Progressive Regulation White Paper*. CPR White Paper 505. Washington, DC: Center for Progressive Reform. <http://www.progressivereform.org/whitePapers.cfm>.
- Gee, G. C., and D. C. Payne-Sturges. 2004. "Environmental Health Disparities: A Framework Integrating Psychosocial and Environmental Concepts." *Environmental Health Perspectives* 112 (17): 1645–1653.
- George, L., J. Pinder, and T. Singleton. 2004. *Race, Place, and Housing: Housing Conditions in Rural Minority Counties*. Washington, DC: Housing Assistance Council.
- Gibler, J. 2005. *Water for People and Place: Moving Beyond Markets in California Water Policy*. Oakland: Public Citizen.
- Giles-Corti, Billie, M. H. Broomhall, M. Knuiiman, C. Collins, K. Douglas, K. Ng, A. Lange, et al. 2005. "Increasing Walking: How Important Is Distance to, Attractiveness, and Size of Public Open Space?" *American Journal of Preventive Medicine* 28 (2S2): 169–176.
- Gleick, P. 2009. "Testimony of Dr. Peter H. Gleick before the United States Senate Committee on Energy and Natural Resources on the Energy and Water Integration Act of 2009." Pacific Institute. <http://pacinst.org/publications/testimony/>.
- Grady, B. 2008. "Foreclosed Property Renters Won't Lose Water." *Oakland Tribune*, February 27.
- Ground Water Protection Council. 2006a. *Ground Water Report to the Nation: A Call To Action*. Oklahoma City: Ground Water Protection Council.
- . 2006b. *Ground Water and Underground Injection Control*. Oklahoma City: Ground Water Protection Council.
- Ground Water Task Force (GWTF). 2007. *Recommendations from the EPA Ground Water Task Force*. EPA 500-R-07-001. Washington, DC: US Environmental Protection Agency.
- Harnik, P. 2006. *The Excellent City Park System: What Makes It Great and How to Get There*. San Francisco, CA: The Trust for Public Land.
- Harter, T. 2009. "Agricultural Impacts on Groundwater Nitrate." *Southwest Hydrology* 8 (4): 22–23, 35.
- Hauter, W. 2008. "Agriculture's Big Thirst: How To Change the Way We Grow Our Food." In *Water Consciousness: How We All Have To Change To Protect Our Most Critical Resource*. Edited by T. Lohan, chap. 6. San Francisco, CA: AlterNet Books.
- Heberger, M., H. Cooley, P. Herrera, P. Gleick, and E. Moore. 2009. *The Impacts of Sea-Level Rise on the California Coast*. Oakland: California Climate Change Center.
- Hird, J. A. 1993. "Environmental Policy and Equity: The Case of Superfund." *Journal of Policy Analysis and Management* 12 (2): 323–343.
- Hoffman, D. 2007. "Under Pressure from Citizens, EPA to Provide Water for Oil and Gas-polluted Rural Community." Sierra Club press release. <http://texas.sierraclub.org/press/newsreleases/20070615.asp?AID=/20070614/BREAKINGNEWS/70614062>.

- Hurley, A. 1988. "The Social Biases of Environmental Change in Gary, Indiana, 1945–1980." *Environmental Review* 12 (4): 1–19.
- Imperial, M. T. 1999. "Environmental Justice and Water Pollution Control: The Clean Water Act Construction Grants Program." *Public Works Management & Policy* 4 (2): 100–118.
- Ingram, H., J. M. Whiteley, and R. Perry. 2008. "The Importance of Equity and the Limits of Efficiency in Water Resources." In *Water, Place and Equity*. Edited by J. M. Whiteley, H. Ingram, and R. Perry, 1–33. Boston: MIT Press.
- Johnson, J. H., A. Parnell, A. M. Joyner, C. J. Christman, and B. Marsh. 2004. "Racial Apartheid in a Small North Carolina Town." *The Review of Black Political Economy* 31 (4): 89–107.
- Kibel, Paul S. 2007. *Access to Parklands: Environmental Justice at Eastbay Parks*. San Francisco, CA: Golden Gate University School of Law.
- Kimbrell, A. 2002. "Introduction." In *Fatal Harvest: The Tragedy of Industrial Agriculture*. Sausalito, CA: Foundation for Deep Ecology.
- Klein, C. A. 2007. "Water Transfers: The Case against Transbasin Diversions in the Eastern States." *UCLA Journal of Environmental Law and Policy* 25: 249–282.
- Lane, A., and T. Heath. 2009. *Environmental Racism in Syracuse, NY: A Case Study of Government's Failure to Protect an Endangered Waterway and a Neglected Community*. Syracuse, NY: Partnership for Onondaga Creek. <http://www.onondagacreek.org/resources/presentations>.
- Lavelle, M. and M. Coyle. 1992. "Unequal Protection: The Racial Divide in Environmental Law." *The National Law Journal* 15 (3): S1–S12.
- Leavitt, C. 2007. *Troubled Waters: An Analysis of 2005 Clean Water Act Compliance*. Washington, DC: US PIRG Education Fund.
- Leslie, J. 2008. "The Age of Consequence: A Short History of Dams." In *Water Consciousness: How We All Have To Change To Protect Our Most Critical Resource*. Edited by T. Lohan, chap. 7. San Francisco: AlterNet Books.
- Lichter, D. T., D. Parisi, S. M. Grice, and M. Taquino. 2007. "Municipal Underbunding: Annexation and Racial Exclusion in Small Southern Towns." *Rural Sociology* 72 (1): 47–68.
- Lynch, M. J., P. B. Stretesky, and R. G. Burns. 2004. "Slippery Business: Race, Class and Legal Determinants of Penalties against Petroleum Refineries." *Journal of Black Studies* 34 (3): 421–440.
- MacCannell, D. 1983. *Agribusiness and the Small Community. Background Paper to Technology, Public Policy and the Changing Structure of American Agriculture*. Washington, DC: US Office of Technology Assessment.
- Marks, R. 2001. *Cesspools of Shame: How Factory Farm Lagoons and Sprayfields Threaten Environmental and Public Health*. New York: Natural Resource Defense Council.
- Mather, M. 2004. *Housing and Commuting Patterns in Appalachia*. Washington, DC: Population Reference Bureau.
- McCauley, L. A., M. Beltran, J. Phillips, and M. Lasarev, and D. Sticker. 2001. "The Oregon Migrant Farmworker Community: An Evolving Model for Participatory Research." *Environmental Health Perspectives Supplements* 109 (Suppl 3): 449–455.
- McGinnis, S., and R. K. Davis. 2001. "Domestic Well Water Quality within Tribal Lands of Eastern Nebraska." *Environmental Geology* 41: 321–329.

- Messner, M., S. Shaw, S. Regli, K. Rotert, V. Blank, and J. Soller. 2006. "An Approach for Developing a National Estimate of Waterborne Disease due to Drinking Water and a National Estimate Model Application." *Journal of Water and Health* 4 (Suppl 2): 201–240.
- Miller, J. 2009. "Rebooting Urban Watersheds." *High Country News*, June 1. <http://www.hcn.org/issues/41.10/rebooting-the-urban-watershed-movement>.
- Moore, E., and E. Matalon. 2011. *The Human Costs of Nitrate-Contaminated Drinking Water in the San Joaquin Valley*. Oakland, CA: Pacific Institute.
- Morello-Frosch, R., M. Pastor, J. Sadd, and S. B. Shonkoff. 2009. *The Climate Gap: Inequalities in How Climate Change Hurts Americans & How to Close the Gap*. Los Angeles: USC Program for Environmental and Regional Equity.
- National Academy of Public Administration (NAPA). 2001. *Environmental Justice in EPA Permitting: Reducing Pollution in High-Risk Communities Is Integral to the Agency's Mission*. Washington, DC: National Academy of Public Administration.
- . 2003. *Addressing Community Concerns: How Environmental Justice Relates to Land Use Planning and Zoning*. Washington, DC: National Academy of Public Administration.
- National Consumer Law Center, Consumer Federation of America, US Public Interest Research Groups and Consumers Union (NCLC). 2006. "Consumer Groups Comments to EPA's Proposed Revisions to the Existing National-Level Affordability Methodology for Small Drinking Water Systems Variances." Docket ID No. OW-2005-0005.
- National Drinking Water Advisory Council (NDWAC). 2003. "Recommendations of the National Drinking Water Advisory Council to U.S. EPA on Its National Small Systems Affordability Criteria." Office of Water, US Environmental Protection Agency. http://www.epa.gov/ogwdw/ndwac/pdfs/report_ndwac_affordabilitywg_final_08-08-03.pdf.
- National Environmental Justice Advisory Committee Cumulative Risks and Impacts Group (NEJAC). 2004. *Ensuring Risk Reduction in Communities with Multiple Stressors: Environmental Justice and Cumulative Risks/Impacts*. Washington, DC: US Environmental Protection Agency.
- Neighborhood of Affordable Housing (NOAH). 2006. "Chelsea Creek Action Group." Neighborhood of Affordable Housing. <http://www.noahcdc.org/cbe/ccrp.html>.
- Office of Environmental Health Hazard Assessment (OEHHA). 2001. *Chemicals in Fish: Consumption of Fish and Shellfish in California and the United States*. Oakland, CA: California Environmental Protection Agency.
- Office of Inspector General (OIG). (2006). *EPA Needs to Conduct Environmental Justice Reviews of Its Programs, Policies, and Activities*. Report No. 2006-P-00034. Washington, DC: US Environmental Protection Agency.
- O'Neil, S. G. 2007. "Superfund: Evaluating the Impact of Executive Order 12898." *Environmental Health Perspectives* 115 (4): 1087–1093.
- O'Neill, C. 2007. "No Mud Pies: Risk Avoidance as Risk Regulation." *Vermont Law Review* 31: 273–354.
- Parnell, A. M., A. M. Joyner, C. J. Christman, and D. P. Marsh. 2004. *The Persistence of Political Segregation: Racial Underbounding in North Carolina*. Mebane, NC: Cedar Grove Institute for Sustainable Communities.
- Pastor, M., R. D. Bullard, J. K. Boyce, A. Fothergill, R. Morello-Frosch, and B. Wright. 2006. *In the Water of the Storm: Environment, Disaster, and Race after Katrina*. New York: Russell Sage Foundation.

- People's Water Board. 2009. "People's Water Board Mission." People's Water Board. <http://peopleswaterboard.blogspot.com/2009/06/peoples-water-board-mission.html>.
- Pinderhughes, R. 1996. "The Impact of Race on Environmental Quality: An Empirical and Theoretical Discussion." *Sociological Perspectives* 39 (2): 231–248.
- Preston, M., and A. Bailey. 2003. "The Potential for High-performance Design Adoption in Retail Property Portfolios." *Corporate Social Responsibility and Environmental Management* 10 (3): 165–174.
- Pye, V. I., and R. Patrick. 1983. "Ground Water Contamination in the United States." *Science* 221 (4612): 713–718.
- Quintero-Somaini, A., and M. Quirindongo. 2004. *Hidden Danger: Environmental Health Threats in the Latino Community*. New York: Natural Resource Defense Council.
- Raucher, R. 2004. "Affordability of Water Service: What Does It Mean? How Is It Measured? Why Does It Matter?" Paper presented at USEPA Environmental Financial Advisory Board, Affordability Workshop, San Francisco, August 18, 2004.
- Ray, J. 2004. "Delta Defender: Stopping Developers with an 'African Drumbeat.'" *Sierra Magazine*. http://www.sierraclub.org/sierra/200405/profile_printable.asp.
- Reisner, M. 1993. *Cadillac Desert: The American West and Its Disappearing Water*. New York: Penguin Books.
- Ringquist, E. J. 2005. "Assessing Evidence of Environmental Inequities: A Meta-Analysis." *Journal of Policy Analysis and Management* 24 (2): 223–247.
- Ringquist, E. J., and D. H. Clark. 1999. "Local Risks, States' Rights, and Federal Mandates: Remediating Environmental Inequities in the U.S. Federal System." *Publius* 29 (2): 73–93.
- Rowan, G. T., and C. Fridgen. 2003. "Brownfields and Environmental Justice: The Threats and Challenges of Contamination." *Environmental Practice* 5: 58–61.
- Rubin, S. J. 2001. *Economic Characteristics of Small Systems*. Rural Water Partnership Fund White Paper. Duncan, OK: National Rural Water Association.
- Scott, J. 2010. "Nitrate Contamination Spreading in California Communities." *California Watch*, May 13. <http://californiawatch.org/nitrate-contamination-spreading-california-communities>.
- Shepard, P. M., and C. Corbin-Mark. 2009. "Climate Justice." *Environmental Justice* 2 (4): 1–4.
- Shilling, F. M. 2009. "Fishing for Justice or Just Fishing?" *Ecology Law Currents* 36: 205–211.
- Silka, L. nd. "The Southeast Asian Environmental Justice Partnership: Citizens Revive a New England Mill Town River." *New Village Journal*. Accessed September 10, 2009. <http://www.newvillage.net/Journal/Issue3/3silka.html>.
- Silver, E., J. Kaslow, D. Lee, S. Lee, M. L. Tan, E. Weis, and A. Ujihara. 2007. "Fish Consumption and Advisory Awareness Among Low-Income Women in California's Sacramento–San Joaquin Delta." *Environmental Research* 104 (3): 410–419.
- Sludge Safety Project. 2009. "What Is Underground Coal Slurry Injection?" Sludge Safety Project. http://www.sludgesafety.org/coal_slurry_inj.html.
- Small, Gail. 2005. "The Coal Wars: Northern Cheyenne Reservation, Lame Deer, Montana." *Voices from the Earth* 6 (1). http://www.sric.org/voices/2005/v6n1/coal_wars.html.
- Smecker, F. J. 2009. "Coal Mine Laws Written in Blood: An Interview with Judy Bonds." May 27. Towards Freedom. <http://towardfreedom.com/home/content/view/1593/1/>.
- Smith, N. 2006. "There's No Such Thing as a Natural Disaster." Understanding Katrina: Perspectives from the Social Sciences. <http://understandingkatrina.ssrc.org/Smith/>.
- Smith, R. 2008. "More Utility Bills Go Unpaid: Consumers' Economic Struggles Spur More Power Shutoffs as Firms Step Up Collections." *Wall Street Journal*, November 3.

- Snipp, C. M. 1996. "Understanding Race and Ethnicity in Rural America." *Rural Sociology* 61 (1): 125–142.
- Snitow, A., D. Kaufman, and M. Fox. 2007. *Thirst: Fighting Corporate Theft of Our Water*. San Francisco: John Wiley and Sons, Inc.
- Spirn, A. W. 2005. "Restoring Mill Creek: Landscape Literacy, Environmental Justice and City Planning and Design." *Landscape Research* 30 (3): 395–413.
- State-EPA Nutrient Innovations Task Group (SENITG). 2009. *An Urgent Call to Action: Report of the State-EPA Nutrient Innovations Task Group*. Washington, DC: US Environmental Protection Agency.
- Steinberg, T. 1993. "That World's Fair Feeling: Control of Water in 20th-Century America." *Technology and Culture* 34: 401–109.
- Stroud, E. 1999. "Troubled Waters in Ecotopia: Environmental Racism in Portland, Oregon." *Radical History Review* 74: 65–95.
- Sustainable South Bronx. 2008. "In My Backyard: A Profile of Hunts Point with Recommendations for Realizing Community Members' Vision for their Neighborhood." Sustainable South Bronx. http://www.warnkecc.com/wp-content/uploads/wcc_ssb_report_2408.pdf.
- Szasz, A., and M. Meuser. 1997. "Environmental Inequalities: Literature Review and Proposals for New Directions in Research and Theory." *Current Sociology* 45 (3): 99–120.
- Tiemann, M. 2006. *Safe Drinking Water Act: Issues in the 109th Congress*. Washington, DC: Congressional Research Service.
- . 2008. *Drinking Water State Revolving Fund (DWSRF): Program Overview and Issues*. Washington, DC: Congressional Research Service.
- Timperio, A., K. Ball, J. Salmon, R. Roberts, and D. Crawford. 2007. "Is Availability of Public Open Space Equitable across Areas?" *Health & Place* 13 (2): 335–340.
- TreePeople. 2009. "Sun Valley Watershed." TreePeople. <http://www.treepeople.org/sun-valley-watershed>.
- Troesken, W. 2002. "The Limits of Jim Crow: Race and the Provision of Water and Sewerage Services in American Cities, 1880–1925." *Journal of Economic History* 62 (3): 734–772.
- University of North Carolina Center for Civil Rights (UNCCR). 2006. *Invisible Fences: Municipal Underbounding in Southern Moore County*. Chapel Hill: UNC Center for Civil Rights.
- US Census Bureau. 2008. *American Housing Survey for the United States: 2007*. Washington, DC: U.S. Government Printing Office.
- US Commission in Civil Rights (USCCR). 2003. *Not in My Backyard: Executive Order 12,898 and Title VI as Tools for Achieving Environmental Justice*. Washington, DC: US Commission on Civil Rights.
- . 1999a. *National Characteristics of Drinking Water Systems Serving Populations Under 10,000*. Washington, DC: US Environmental Protection Agency.
- . 1999b. *Safe Water Drinking Act, Section 1429, Groundwater Report to Congress*. Washington, DC: US Environmental Protection Agency.
- . 2000. *America's Children and the Environment: A First View of Available Measures*. Washington, DC: US Environmental Protection Agency.
- . 2001a. "EPA Report to Congress: Implementation and Enforcement of the Combined Sewer Overflow Control Policy." Office of Water, US Environmental Protection Agency. http://cfpub.epa.gov/npdes/cso/cpolicy_report.cfm.
- . 2001b. *1999 Drinking Water Infrastructure Needs Survey*. Washington, DC: US Environmental Protection Agency.

- . 2002. *Fish Consumption and Environmental Justice: A Report Developed from the National Environmental Justice Advisory Council*. Washington, DC: Washington: US Environmental Protection Agency.
- . 2004. *Lead and Copper Rule: A Quick Reference Guide for Schools and Child Care Facilities That are Regulated Under the Safe Drinking Water Act*. Washington, DC: US Environmental Protection Agency.
- . 2005. *Protecting Water from Agricultural Runoff*. EPA 941-F-05-001. Washington, DC: US Environmental Protection Agency. http://www.epa.gov/owow/nps/Ag_Runoff_Fact_Sheet.pdf.
- . 2008. *Health and Environmental Impacts of Uranium Contamination in the Navajo Nation: Five Year Plan*. Washington, DC: US Environmental Protection Agency. <http://www.epa.gov/region9/superfund/navajo-nation/pdf/NN-5-Year-Plan-June-12.pdf>.
- . 2009a. *Drinking Water Infrastructure Needs Survey and Assessment: Fourth Report to Congress*. Washington, DC: US Environmental Protection Agency.
- . 2009b. “Migrant Farm Worker Drinking Water: Safe at the Well?” US Environmental Protection Agency. <http://www.epa.gov/Region8/ej/mfw.html>.
- . 2009c. *2006: Public Water System Compliance Report*. Washington, DC: US Environmental Protection Agency. <http://cfpub.epa.gov/compliance/resources/reports/accomplishment/sdwa/>.
- . 2010a. “Basic Information: What Is Nonpoint Source Pollution?” US Environmental Protection Agency. <http://www.epa.gov/nps/whatis.html>.
- . 2010b. “Environmental Justice Factsheet.” US Environmental Protection Agency. <http://www.epa.gov/compliance/ej/nejac/index.html>.
- US Government Accountability Office (GAO). 2001. *GAO 02-12 Environmental Protection: Federal Incentives that Could Help Promote Land Use that Protects Air and Water Quality*. Washington, DC: US General Accountability Office.
- . 2007. *GAO-07-479 Clean Water: Further Implementation and Better Cost Data Needed To Determine Impact of EPA’s Storm Water Program On Communities*. Washington, DC: US General Accountability Office.
- . 2008. *GAO-08-1177T Concentrated Animal Feeding Operations: EPA Needs More Information and a Clearly Defined Strategy To Protect Air and Water Quality*. Washington, DC: US General Accountability Office.
- . 2009. *GAO-09-551 Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion*. Washington, DC: US Government Accountability Office.
- Vela-Acosta, M. S., P. Bigelow, and R. Buchan. 2002. “Assessment of Occupational Health and Safety Risks of Farmworkers in Colorado.” *American Journal of Industrial Medicine Supplement* 42 (S2): 19–27.
- Water Resources Research Center. 2010. *The Water-Energy Nexus. Arroyo*. Tucson: University of Arizona.
- Weintraub, M., and L. S. Birnbaum. 2008. “Catfish Consumption as a Contributor to Elevated PCB Levels in a Non-Hispanic Black Subpopulation.” *Environmental Research* 107 (3): 412–417.
- West End Revitalization Association. 2002. *Failing Septic Systems and Contaminated Well Waters: African-American Communities in Mebane, North Carolina*. Mebane, NC: West End Revitalization Association.

- Wilber, M. 2003. *Californians without Safe Water*. Sacramento: California Department of Water Resources, Statewide Planning Office.
- Williams, B. 2001. "A River Runs through Us." *American Anthropologist* 103 (2): 409–431.
- Williams, D. R., and C. Collins. 1995. "US Socioeconomic and Racial Difference in Health: Patterns and Explanations." *Annual Review of Sociology* 21: 349–386.
- Williams, R. L., J. T. O'Leary, A. L. Sheaffer, and D. Mason. 2000. *An Examination of Fish Consumption by Indiana Recreational Anglers: An On-Site Survey*. Technical Report 99-D-HDFW-2. West Lafayette, IN: Purdue University.
- Wilson, S. M., F. Howell, S. Wing, and M. Sobsey. 2002. "Environmental Injustice and the Mississippi Hog Industry." *Environmental Health Perspectives* 110 (Suppl 2): 195–201.
- Wilson, S., M. Hutson, and M. Mujahid. 2008. "How Planning and Zoning Contribute to Inequitable Development, Neighborhood Health, and Environmental Injustice." *Environmental Justice* 1 (4): 211–216.
- Wing, S., D. Cole, and G. Grant. 2000. "Environmental Injustice in North Carolina's Hog Industry." *Environmental Health Perspectives* 108: 225–231.
- Woelfle-Erskine, C. 2007. "Who Needs Dams?" In *Dam Nation: Dispatches from the Water Underground*. Edited by C. Woelfle-Erskine, J. O. Cole, and L. Allen, 1–416. New York: Soft Skull Press.