Despite the alarming water crisis the world is facing, private interests are polluting, exploiting and selling water — a resource essential for all life. A 2009 publication, sponsored by the World Bank’s International Finance Corporation and several for-profit multinational companies, predicted that by 2030 global freshwater demand would exceed available supplies by 40 percent.\(^1\)

In addition to the increasing pollution and overuse of the available freshwater supply, climate change will exacerbate water shortages worldwide. In fact, a UN-Water report said, “...climate change is expected to account for about 20 percent of the global increase in water scarcity.”\(^2\)

Yet the oil and gas industry continues to contribute to climate change and the water crisis by drilling and fracking for fossil fuels and siphoning off the water in our aquifers and watersheds. Water resources need to be protected, and the public’s best interest should be put before the interests of multinational corporations.

**Fracking’s Climate Impact**

Fossil fuel emissions are the leading source of climate-altering greenhouse gases from human activity.\(^3\) Hydraulic fracturing, or “fracking,” is a process that the oil and gas industry uses to extract natural gas and oil from shale rock formations buried deep within the Earth.\(^4\) On a global scale, drilling and fracking result in significant greenhouse gas emissions,\(^5\) which threaten the climate on which we depend.\(^6\)

**Climate Change and Human Activity:** Many greenhouse gases exist naturally in our atmosphere and are crucial for keeping the planet habitable. At these natural levels, greenhouse gases trap and absorb some energy from solar radiation within the atmo-
sphere and emit the rest back to space. This process, called the greenhouse effect, keeps our planet warm; without it, the Earth would freeze.

However, since the time of the Industrial Revolution, human activity has increased the amount and type of greenhouse gases entering the atmosphere. The increased concentration is intensifying the greenhouse effect by making layers of greenhouse gases thicker, trapping more heat, and releasing less energy back to the atmosphere. As a result, the climate is getting hotter. In the long term, our planet cannot accommodate the current levels of greenhouse gas emissions released from human activity.

**Fracking and Climate Change:** Fracking requires large quantities of water mixed with sand and toxic chemicals, which are injected underground at high pressure to crack dense rock and release oil and gas. Because natural gas is a relatively clean-burning fossil fuel compared to oil and coal, it has been touted as a potential bridge fuel for addressing climate change and transitioning to a future powered by low-carbon renewable energy resources. However, recent studies have demonstrated that increased development of shale gas may actually accelerate climate change because large amounts of methane, a potent greenhouse gas that makes up more than 90 percent of shale gas, leak during fracking. Additionally, volatile organic compounds, including benzene and toluene, are released during fracking and can mix with nitrogen oxide emissions from diesel-fueled vehicles and equipment to form ground-level ozone. These emissions contribute to the enhanced greenhouse effect and climate change.

### Common Greenhouse Gases Accelerating Climate Change

<table>
<thead>
<tr>
<th>Greenhouse Gas</th>
<th>Source</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Vapor</td>
<td>Naturally occurring, but can be indirectly accelerated by human activity</td>
<td>Human activity can indirectly intensify water vapor quantities through global warming because a warmer atmosphere contains more water vapor. There is a positive feedback loop between global warming and water vapor: the warmer the temperature, the more water vapor in the atmosphere; the more water vapor in the atmosphere, the warmer the temperature. Human activity can also contribute to water vapor levels through other greenhouse gas emissions (for instance, methane chemically alters in the atmosphere and produces a bit of water vapor as a byproduct).</td>
</tr>
<tr>
<td>Carbon Dioxide (CO₂)</td>
<td>Naturally occurring and from human activity</td>
<td>CO₂ is generated from fossil fuel combustion, including vehicle emissions and some manufacturing processes. Deforestation also increases CO₂ levels.</td>
</tr>
<tr>
<td>Methane (CH₄)</td>
<td>Naturally occurring and from human activity</td>
<td>Sources of CH₄ include agriculture, natural gas distribution and landfills.</td>
</tr>
<tr>
<td>Nitrous Oxide (N₂O)</td>
<td>Naturally occurring and from human activity</td>
<td>N₂O can originate from fertilizer use, various industrial processes, fossil fuels and vehicle emissions.</td>
</tr>
<tr>
<td>Tropospheric (ground-level) Ozone (O₃)</td>
<td>Naturally occurring and from human activity</td>
<td>Carbon monoxide, hydrocarbons and nitrogen oxide can chemically react to produce “bad” (tropospheric) ozone. Carbon monoxide (CO) can be considered an indirect greenhouse gas since it can control the production of other greenhouse gases such as ozone and methane.</td>
</tr>
<tr>
<td>Volatile Organic Compounds (VOCs)</td>
<td>Naturally occurring and from human activity</td>
<td>VOCs can get into the atmosphere from vehicle emissions, fuel production and biomass burning.</td>
</tr>
<tr>
<td>Chlorofluorocarbons (CFCs)</td>
<td>Synthetic, from human activity</td>
<td>CFCs come from completely synthetic sources like aerosols and cleaning solvents and can stay in the atmosphere for more than 100 years. CFCs can deplete “good” (stratospheric) ozone</td>
</tr>
<tr>
<td>Carbon Tetrafluoride (CF₄)</td>
<td>Synthetic, from human activity</td>
<td>CF₄ has a long atmospheric lifespan and can come from a variety of industrial processes.</td>
</tr>
<tr>
<td>Sulfur Hexafluoride (SF₆)</td>
<td>Synthetic, from human activity</td>
<td>SF₆ has a long atmospheric lifespan and can come from a variety of industrial processes.</td>
</tr>
<tr>
<td>Hydrofluorocarbons (HFCs)</td>
<td>Synthetic, from human activity</td>
<td>HFCs are made from synthetic sources and can come from a variety of industrial processes, but have a shorter atmospheric lifespan.</td>
</tr>
</tbody>
</table>

Industry and Water: Their Profits and Our Problems

Water belongs to the public and should be protected and preserved for the public. However, the private water industry treats water as a market-based product, and some companies are selling public water resources to the oil and gas industry. The commodification of water — i.e., treating water as a commodity — combined with fracking could contribute to water scarcity and climate change.

Water-for-Profit Companies Make Money Off Fracking: Shale gas development creates a potential multibillion-dollar market for water supply and treatment services, the prospect of which could be encouraging some large investor-owned water utilities to support shale gas and downplay its water risks.

For example, during 2011, American Water — the largest publicly traded water and sewer utility in the country — sold 250 million gallons of water to a dozen gas-drilling companies, making $1.6 million in revenue. It sold water at 34 distribution points in Pennsylvania mostly through pipeline extensions from its water systems. The company gave gas drillers a major discount on the price of water compared to what households pay — a benefit shared by other large industrial water users. On average, drillers paid 45 percent less than residential customers per gallon of water. (See Table 1.)

This disparity appears to be a result from a bias in the company’s rate structure that favors large water users. Pennsylvania American Water said that it charged drillers its standard commercial rate and must serve any qualified applicant that requests service within its service area. Pennsylvania American Water’s natural gas drilling company customers included ALTA Operating Company, LLC; Cabot Oil & Gas Corporation; Carrizo Oil & Gas, Inc.; EOG Resources, Inc. and Rex Energy Corporation.

Water Commodification and Drought, A Bad Mix: In Pennsylvania, for example, the Susquehanna River Basin Commission (SRBC) grants permits to private companies so they can withdraw and purchase water from the Susquehanna River basin for fracking. Many permits have been granted to oil and gas companies, and in March 2012 the SRBC approved a private water company’s application to withdraw millions of gallons of water to supply to drillers for fracking. A month later in April, however, the commission placed a temporary moratorium on water withdrawals in certain areas due to severe drought conditions. This is particularly noteworthy since shale gas fracking uses significantly more water than conventional natural gas production, and unsustainable water withdrawals combined with increasing drought conditions can greatly reduce water supply.

How All of This Impacts Weather and Water

As a U.S. Geological Survey publication said, “The hydrologic cycle describes the continuous movement of water above, on, and below the surface of the Earth.” Rainfall can recharge surface and groundwater sources. Heat from the sun evaporates water back into the atmosphere as a vapor that condenses into clouds before falling again to the Earth. “Climate and freshwater systems are interconnected in complex ways,” the Intergovernmental Panel on Climate Change noted. “Any change in one of these systems induces a change in the other.”

Table 1. The Gas Driller Discount: Comparison of Pennsylvania American Water’s Metered Water Sales to Gas Drillers and Residential Customers During 2011

<table>
<thead>
<tr>
<th>Customer Class</th>
<th>Volume Sold (in gallons)</th>
<th>Revenue</th>
<th>Average Charge (Revenue/Volume) / ($ per 1,000 gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Drillersa</td>
<td>250,400,000</td>
<td>$1,600,000</td>
<td>$6.39</td>
</tr>
<tr>
<td>Residential Customersb</td>
<td>28,327,905,000</td>
<td>$329,801,618</td>
<td>$11.64</td>
</tr>
<tr>
<td>Difference</td>
<td></td>
<td></td>
<td>$5.25</td>
</tr>
<tr>
<td>Driller discount</td>
<td></td>
<td></td>
<td>45%</td>
</tr>
</tbody>
</table>

Unpredictable and Extreme Weather Events: Climate change is believed to affect the water cycle and cause more extreme weather events, including heat waves, floods and droughts. Also becoming more common are tropical cyclones and other severe storms. Rising ocean temperatures will lead to more rapid evaporation. The National Oceanic and Atmospheric Administration reported that “2011 was a record-breaking year for climate extremes, as much of the United States faced historic levels of heat, precipitations, flooding and severe weather.” For example, Tropical Storm Lee caused extreme flooding in states like Pennsylvania and New York. During the first quarter of 2012, wildfires ignited along the east coast from Florida to New England, and 48 states experienced abnormally dry or drought conditions.

Impacts on Water Quality and Quantity: According to a UN-Water report: “Scarcity is also a question of water quality. Freshwater bodies have a limited capacity to process the pollutant charges of the effluents from expanding urban, industrial and agricultural uses. Water quality degradation can be a major cause of water scarcity.”

Climate change has a bearing on water quality and quantity. It will intensify prolonged drought conditions, decrease freshwater availability and hinder groundwater recharge. The warmer temperatures combined with increasingly extreme storm events and droughts will also lead to more water pollution. As intense rainfall hits saturated or impervious surfaces, like roads, it cannot infiltrate the ground and instead flows overland as stormwater runoff, picking up pollutants along the way. In addition, increasing temperatures melt snowpack, ice caps and glaciers. Glacial melting causes sea levels to rise, which increases saltwater intrusion in many freshwater sources, reducing the amount of drinkable freshwater.

Fracking and the commodification of water are detrimental to people and the planet. In order to help mitigate global climate change and ensure a sustainable water supply for future generations, we must ban fracking and water commodification.

Integrate Water and Climate Change Policy

Water usage decisions should not be left to a market-based mechanism. To safeguard communities from water degradation and shortages, we should implement integrative water and climate change policies aimed to: (1) significantly reduce the amount of greenhouse gases released into the atmosphere, and (2) sustainably manage and protect all water resources. If water is treated as a commodity, it cannot adequately be protected for current or future generations.

- Governments should foster adaptive water resource management. As described by the Center for Island Climate Change Adaptation and Policy at the University of Hawai’i, adaptive water management is shaped by policies and rules that are: “(1) forward-looking—focused on crisis avoidance as well as crisis mitigation; (2) flexible—able to adjust to changing needs and conditions; (3) integrated—able to address climate-related impacts that cut across political and geographical boundaries; and (4) iterative—utilizing a continuous loop of monitoring, feedback, and reevaluation.” Being adaptive allows water management practices to be preemptive rather than reactive.
- Water management practices should not be solely reactive. Proactive water protection provisions should support precautionary principles.
- All water resources should be managed under statewide commons and the public trust framework.
- Fracking and the commodification of common water resources must be banned.

Endnotes

8 IPCC, 2007 at 98 to 102; Schlesinger, 2011 at 379 and 382.
9 Schlesinger, 2011 at 379 and 382.
12 Schlesinger, 2011 at 381 to 383.


16 Colborn, 2011 at 1042.


21 American Water, 2012 at 35.


33 IPCC, 2007 at 105 to 107 and 122; Pacific Institute and UN Global Compact, 2009 at 2.

34 Schlesinger, 2011 at 384.


36 Ibid.


38 UN-Water, 2007 at 10.

39 Kundzewicz, 2007 at 175, 176, 178 and 185; Pacific Institute and UN Global Compact, 2009 at 2.

40 Kundzewicz, 2007 at 175 and 176.


42 IPCC, 2007 at 105 to 111.

43 Schlesinger, 2011 at 385.

44 Kundzewicz, 2007 at 175 and 179.