Contributors and Acknowledgements

The Investor Water Toolkit was developed in collaboration with more than 40 institutional investors from the Investor Water Hub and is the ultimate resource on water integration, written for investors, by investors.

INVESTOR CONTRIBUTORS

<table>
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<tr>
<th>Name</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Kees Ouboter</td>
<td>ACTIAM</td>
</tr>
<tr>
<td>Kristel Verhoef</td>
<td>ACTIAM</td>
</tr>
<tr>
<td>Wood Turner</td>
<td>Agriculture Capital</td>
</tr>
<tr>
<td>Emma Lupton</td>
<td>BMO Global Asset Management</td>
</tr>
<tr>
<td>Robert Fernandez</td>
<td>Breckinridge Capital Advisors</td>
</tr>
<tr>
<td>Kevin Lehman</td>
<td>Breckinridge Capital Advisors</td>
</tr>
<tr>
<td>Andrew Teras</td>
<td>Breckinridge Capital Advisors</td>
</tr>
<tr>
<td>Amy Hauter</td>
<td>Brown Advisory</td>
</tr>
<tr>
<td>J. Michael Reinoso</td>
<td>Castleton Partners</td>
</tr>
<tr>
<td>Stephen Kibsey</td>
<td>Caisse de dépôt et placement du Québec (CDPQ)</td>
</tr>
<tr>
<td>Marcela Pinilla</td>
<td>Christian Brothers Investment Services (CBIS)</td>
</tr>
<tr>
<td>Mounir Ennenbach</td>
<td>Citi</td>
</tr>
<tr>
<td>Courtney Lowrance</td>
<td>formerly Citi (currently Asian Infrastructure Investment Bank)</td>
</tr>
<tr>
<td>Patricia M. Healy</td>
<td>Cumberland Advisors</td>
</tr>
<tr>
<td>Lydia Miller</td>
<td>Dana Investment Advisors</td>
</tr>
<tr>
<td>Jason Scott</td>
<td>Encourage Capital</td>
</tr>
<tr>
<td>Heather Keough</td>
<td>formerly Goldman Sachs Asset Management (currently Leaders Arena)</td>
</tr>
<tr>
<td>Marissa LaFave</td>
<td>Green Century Capital Management</td>
</tr>
<tr>
<td>Ken Locklin</td>
<td>Impax Asset Management</td>
</tr>
<tr>
<td>Nadira Narine</td>
<td>Interfaith Center on Corporate Responsibility (ICCR)</td>
</tr>
<tr>
<td>Steven Lydenberg</td>
<td>The Investment Integration Project (TIIP) and Domini Impact Investments</td>
</tr>
<tr>
<td>William Boardman</td>
<td>KBI Global Investors</td>
</tr>
<tr>
<td>Matthew Sheldon</td>
<td>KBI Global Investors</td>
</tr>
<tr>
<td>Sue Yang</td>
<td>Macquarie Infrastructure and Real Assets</td>
</tr>
<tr>
<td>Mary Minette</td>
<td>Mercy Investment Services</td>
</tr>
<tr>
<td>D. Matthew Coleman</td>
<td>Nephila Advisors LLC</td>
</tr>
</tbody>
</table>
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**Dr. Peter Adriaens**, University of Michigan and CEO, Equarius Risk Analytics Ltd

**Libby Bernick** and **Narottama Bowden**, Trucost, S&P Dow Jones Indices

**Michelle Bonat**, Data Simply, Inc.

**Dr. Casey Brown**, University of Massachusetts Amherst

**Daniel Carreira**, formerly Natural Capital Finance Alliance (currently at PRI)

**Christina Copeland** and **Cate Lamb**, CDP Water

**Gregory Elders** and **Lenora Suki**, Bloomberg

**Gemma James** and **Justin Sloggett**, Principles for Responsible Investment (PRI)

**Tytti Kaasinen**, Global Engagement Services International (GES)

**Nadja Kunz**, Liu Institute for Global Issues and NBK Institute of Mining Engineering, The University of British Columbia

**Dr. Upmanu Lall**, Columbia Water Center, Columbia University

**Glen Low** and **Michelle Lapinski**, The Earth Genome Project
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**Authored by:**
Monika Freyman, CFA
Siobhan Collins
Lital Kroll

**Graphic Design**
Patricia Robinson Design
Kien Tseng
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Executive Summary

Water is a risk that investors must better understand and manage as populations grow and a changing climate makes rainfall and weather patterns more erratic. From prolonged droughts in California, Brazil and South Africa to destructive flooding in many more regions, extremes in water availability are becoming the new reality. Fragmented or weak governance of water systems adds further to the risk. Social license risks are also increasing, with companies halting expansion plans or being pushed out of operating regions due to regional community concerns over water.

By 2030, demand for water is expected to exceed supply by 40 percent; yet, every business in the world relies on water, and 663 million — every one in ten people — already live without access to safe water globally.¹ Some regions, like East Asia, the Middle East and Central Africa, could see as much as a 6 percent contraction in GDP by 2050 due to water-related impacts on agriculture, health, and incomes.² These water-related risks to business have multiple material impacts for investors, from underperformance of investments to increasing volatility and risks across entire asset classes.

Ceres’ Investor Water Toolkit is designed to help investors manage these risks. Developed in collaboration with more than 40 institutional investors from the Ceres Investor Water Hub, a working group of Ceres Investor Network, it is the ultimate investor resource on water risk integration in portfolio management. This “how-to” guide enables investors to evaluate water risks across all asset classes and design strategies for mitigating water risks in their investment portfolios. It is the first such comprehensive resource created for all investors, from foundations, to pension funds, to asset managers, both large and small.

The Toolkit is designed to:

● Help investors comprehensively understand water risk drivers;
● Create a one-stop platform that allows institutional investors to integrate water across the decision-making value chain, from asset class analysis to portfolio characterization, to buy/sell decision making;
● Provide stand-alone guides, resource lists and databases on specific topics or asset classes, including equities, municipal bonds and private equity;
● Provide case studies written by investors that showcase real life water risk integration practices;
● Evolve and capture new ideas through time at www.ceres.org/investorwatertoolkit.

ROADMAP

From basic practices to more comprehensive water research and analytics, the Toolkit gives investors a roadmap for integrating water into investment decisions. The main elements of the Toolkit are laid out in five chapters:

Chapter 1, Understand Water Risks, outlines the fundamental physical, regulatory and social risks related to water. Water risks can have an immediacy, or short-term nature, that results in total value destruction overnight. Wastewater accidents and the increasingly extreme nature of water-related weather events are often the main drives of the immediacy of water risks. Similarly, increasing tendency for local communities to react swiftly to existing or perceived corporate impacts on water supplies, can lead to social license to operate risks, with companies halting expansion plans or being pushed out of operating regions. Such risks potentially impact a company’s revenues and its ability to grow and expand.

Chapter 2, Establish Priorities, explains how to set priorities and create institutional goals and policies related to water integration. Policies should include proxy voting guidelines, engagement strategies and recommendations for improving portfolio and security research practices. Utilizing key performance indicators (KPIs) to track progress toward set goals will help inform leadership, as well as improve communication with clients. Clear priorities and goals are the foundations of successful water integration. Without them, the remaining recommendations may be harder to implement.

Chapter 3, Buy/Sell Analysis, looks at how to integrate water into buy/sell analysis for equities, municipal bonds and also private equity projects. It explains how the Water Risk Dashboard helps investors assess a company’s water risk exposure — in terms of water dependency, water resource
security and its resilience, or ability to mitigate its water risk exposure. It is also vital to understand where in a specific industry’s value chain water risks lie, from the supply chain to wastewater management or end of product lifecycle. Included in this chapter are a number of databases, tools and research resources to assist in integrating water into fundamental security analysis.

Chapter 4, Portfolio and Asset Class Analysis, explains how to analyze portfolios and asset classes for water risks. Individual securities may have relatively low water risk exposure, but, in aggregate, a portfolio may have large exposure to water vulnerable regions or issues. This chapter reviews water footprinting of portfolios, including an analysis of the water risks of the major investment indices. It also suggests how to prioritize holdings for further research on water risks, based on the size of the holding, investors’ ability to influence change, and the potential for regional water mitigation benefits.

Chapter 5, Engagement, focuses on the importance of corporate engagement for creating long-term investment value. Whether investors are pursuing active or passive strategies, they should consider engaging the companies in their portfolio. This chapter provides resources to guide shareholders in the engagement process, and also highlights the importance of benchmarking engagement activities and establishing internal investor KPIs to evaluate progress.

Investor Case Studies are also integrated throughout the Toolkit website. These include:

- Water Risk Analysis Across a Large Pension Fund, The State Board of Administration of Florida
- Water Footprinting Analysis of Major Global Indices, Ceres
- Coordinated, Collaborative Investor Engagement on Water Risks in the Hydraulic Fracturing Industry — Lessons Learned from Asia, Martin Currie (A Legg Mason Company) and PRI

Databases designed for the Toolkit are also embedded throughout the and include:

- Toolkit Compendium of Investment Belief and Policy Statements That Integrate Water
- Proxy Voting Guidelines That Integrate Water
- Toolkit Sector and Industry Water Risk Database
- Water and ESG Research Resources: Metrics, Maps, Tools and Research Platforms
- Water Risk Framework for Municipal Water and Wastewater Bonds
- Ceres SEC Sustainability Disclosure Search Tool

The hundreds of hours contributed by institutional investor members of the Ceres Investor Water Hub in developing this Toolkit is a testament to their commitment to improve global investor water awareness and integration practices. It further demonstrates that, as investors become more water aware, they recognize that both individual and collective efforts are necessary to mitigate water risks and their potentially large impacts.

The Investor Water Toolkit is also available as an interactive and evolving online resource for investors at www.ceres.org/investorwatertoolkit.
Chapter Summary

To effectively manage water risks, investors must consider the key risk drivers — and the materiality and timing of those risks. Water risks are more than an operating cost concern. Their impact on such factors as revenue and growth can be material, particularly in the short term. The increasingly extreme and episodic nature of water-related weather events, and the tendency for local communities to react swiftly to existing or perceived corporate impacts on water supplies, drive the immediacy of water risks.

This chapter introduces the Investor Water Risk Dashboard as a framework for assessing water risk and illustrates how sector-specific and geographic approaches to assessing risk can improve investment analysis. In addition, investors need to look beyond water risks at the individual security level and also study portfolio water risks, beginning with portfolio exposure to geographic water risk hotspots and industries. Given that water is required to sustain life, communities and regional economies, there are important investor responsibilities related to water and an increasing expectation that investors adhere to international norms such as the U.N.’s Human Right to Water and Sanitation and Sustainable Development Goal 6.

Relevant Supplemental Materials to Chapter 1:
- Case Study: Water Risk Analysis Across a Large Pension Fund, Florida SBA

WATER RISK DRIVERS

As a unique natural resource, water is impacted by environmental, social and governance (ESG) issues that may impact business practices. These pressing issues highlight the business vulnerabilities, or risks, related to declining water quality and supply in water bodies around the globe. This includes risks associated with tighter restrictions on waste-discharge practices and rising operating costs associated with lack of access to clean water (Figure 1). For example:

- **Competition for water** is growing, resulting in the long-term trend of overexploitation of groundwater resources in economically important regions around the globe, including in the United States, South Africa, Mexico and South Asia.
- **Lack of climate-ready infrastructure** affects a number of sectors. For example, without sufficient investment in wastewater storage infrastructure to handle greater variability in precipitation patterns in industries such as mining, there is a probability of more frequent catastrophic accidents.
- **Access to water for power generation** is increasingly becoming a bigger strategic risk.
- **Cumulative impacts from pollution** from agriculture and industrial compounds, and emerging contaminants such as pharmaceuticals, threaten the quality of water resources needed for communities, economic growth and business development.
- **Social license risks** related to water are on the rise. For example, approximately 70 percent of the 15 million retailers who stock carbonated drinks in India’s drought-hit southern state of Tamil Nadu boycotted Coca-Cola and PepsiCo products, alleging that the companies are depleting their groundwater reserves, resulting in tens of millions of dollars in losses for both companies.
- **Weak government oversight** of water resources in many regions exacerbates the risks listed above.

These issues contribute to a water resource emergency that was recently ranked one of the “top global risks” by the World Economic Forum. Increasingly, institutional investors recognize the importance of studying water risks and find water analysis a practical starting point for improving ESG practices overall and engaging sub-advisors on ESG integration methods (see SBA Florida Water Risk Analysis Case Study).
**TRANSLATING WATER ISSUES TO MATERIAL RISK**

Competition for water, weak regulation, growing population, aging infrastructure, water contamination and climate change are driving water risks. The most significant risks are physical, regulatory and social, referring primarily to the social license to operate. These risks are increasingly manifesting as financially material and impacting a wide range of asset classes.
Table 1: Sample Physical, Regulatory and Social Risks Related to Water

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Example</th>
</tr>
</thead>
</table>
| Physical  | • Drought and floods  
            • High water competition  
            • Declining water supply (surface water, groundwater, snowpack)  
            • Regional water quality degradation  
            • Aging or inadequate water infrastructure  
            • Cumulative impacts on water resources from other end users in region  
            • Risks to biodiversity due to water resource impacts  
            • Climate change impacts  
            • Water variability or temperature changes that impact hydropower production and lead to higher energy prices |
| Regulatory | • Unexpected regulatory change related to sourcing, wastewater management, or product design and development  
            • Abrupt increases in water tariffs  
            • Fines or enforcement actions  
            • Poor or unsustainable regional water management by authorities, including inability or lack of capacity to manage cumulative impacts on water resources  
            • Poor regional water stewardship that leads to increasing social-license risks in the entire area |
| Social    | • Community blocking of current or future planned operations  
            • Concerns of indigenous communities that rely upon a water resource or consider it of important cultural significance  
            • Human Right to Water and Sanitation violations and risks  
            • Customers or workforce impacted by regional waterborne diseases |

ASSESSING THE MATERIALITY OF WATER RISKS

The term “materiality” has been interpreted differently over the years according to context. The ideas in the Toolkit often use the U.S. Securities and Exchange Commission’s definition, which states that “a matter is material if there is a substantial likelihood that a reasonable person would consider it important.” At times the ideas in the Toolkit refer to financial materiality, which is focused on quantifying financial risks, but not intend to discount nonfinancial issues as unimportant or immaterial.

Three elements to weigh when considering financial materiality are (1) duration, (2) magnitude of the financial impact and (3) whether these impacts are related to revenue, operating costs or capital expenditures and assets. Water-related risks can be particularly material in the short term. This is due to the increasingly extreme and episodic nature of water-related weather events, as well as the sometimes rapid reaction of local communities to existing or perceived corporate impacts on water supplies. On the other hand, some financial impacts tied to water may be less acute, but over time negatively affect revenue, profit margins and earnings (e.g., steadily increasing water tariffs or higher costs of goods sold). As investors seek to understand the potential financial materiality of water risks, it can be helpful to map the timing and duration of potential impacts against their expected financial magnitude (Figure 2).
Understand Water Risks — Investor Water Toolkit

Figure 2: The magnitude and time dimensions of investor water risks. Some risks can be short-term with relatively low financial impact, while others might be long-term with very high financial impact.

Lower-magnitude risks often involve increasing costs, while higher-magnitude financial risks are related to revenue, loss of market share or risks to assets. Therefore, when an investor looks at a company’s many different possible water risks, it is helpful to measure which of these can have the highest-magnitude, short-term impact on the business (Figure 3).

Figure 3: Illustration of how water risks can financially impact companies. Highest materiality water risks often come from companies missing opportunities to grow or through loss of social license-to-operate risks. The cost of sourcing freshwater can be one of the smaller risk factors.
INVESTOR WATER RISK DASHBOARD: A FRAMEWORK FOR ASSESSING WATER RISK

Translating these high-level trends and risks to the security level requires capturing information on three key areas: water dependency, water resource security and management’s response. These three elements interact with each other and either amplify or reduce a company or entity’s overall risk exposure (Figure 4).

Water resource dependency is a measure of how and where a company relies on water resources in its value chain:

- To understand water resource dependency is to understand where water risks lie in a company’s value chain (e.g., sourcing of inputs, wastewater management in direct operations, product-use or end-of-life impacts) and what the financial risks are related to water (e.g., potential total loss of revenue, small increase in costs). Water needs vary by sector, with wastewater discharge often being an overlooked dependency. Oftentimes a company’s water risks will lie in the large volumes of wastewater it produces and the need for water resources to assimilate this waste into the environment.

Water resource security refers to the environmental, regulatory and social conditions on the ground.

- The water resource security analysis involves understanding the contextual and geographic issues that create water risks. Investors must be aware of which regions are important to a company and the potential water risks they face there. This includes assessing whether water-resource security is threatened by physical, regulatory, or social-license-to-operate risks.

Management’s response refers to how corporate management, water resource managers or others choose to mitigate water risks. It is also a measure of resilience.

- Response analysis includes assessing both a company’s resilience to risks and its associated risk-mitigation strategies. Mitigation strategies can range from short-term strategies, such as hedging against water risks, to longer-term strategies of working with stakeholders to improve watershed resilience in key supply chain regions.
Investor Response to Risks
Investors can also directly respond to and mitigate risks themselves. A common approach is through direct or collaborative investor engagement with portfolio companies identified as high risk (see Engagement Chapter). In addition, where investors have a strong regional exposure to water risk, they may consider engaging water authorities to support more sustainable water-management planning. They can also work with other large end users of water in a region to collectively try to understand impacts and ways to collaborate to protect key water resources.

Conducting the Water Risk Dashboard analysis for each company or entity requires an investment in time and resources. Investors are therefore advised to choose a subset of their portfolio for this analysis, using the steps outlined in the portfolio water prioritization strategy (see Portfolio and Asset Class Analysis Chapter).

More granular details of these risks and key recommendations related to the Dashboard are outlined in the Buy/Sell Analysis Chapter.

SECTOR-SPECIFIC AND GEOGRAPHIC ANALYSIS
To understand a company’s water resource dependencies and its level of water resource security, a deeper dive into researching sector-specific and geographic exposure is required.

Sector Analysis
A company’s water dependency and related risks vary greatly by sector and industry. For example, a mining company’s water needs and risks will differ substantially from those of a pharmaceutical company. An information technology and software services company may face water risks through energy disruptions for its cooling centers (power generation often requires large volumes of water), while a semiconductor manufacturer may find its water risks are related to the inability to source large volumes of high-quality water for circuit production. For some sectors and industries, water risks will be limited to one part of the value chain, while for other sectors water risks may be potentially material throughout the value chain (Figure 5).

<table>
<thead>
<tr>
<th>GICS Industry</th>
<th>Supply Chain</th>
<th>Operations</th>
<th>Product Use / End of Life</th>
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= High Risk  = Medium Risk  = Unclear or Low Risk  Indicates Ceres Addition

Figure 5: Material water risk by industry. Materiality of water impacts at different parts of the value chain by industry (medium to high-risk industries listed only). Based on the Sustainability Accounting Standards Board’s (SASB) Materiality Mapping, combined with Ceres’ and Investor Water Hub analysis and classification of risks (medium or high). SASB metrics were provisional only at the time of this analysis, please go to www.SASB.org for more details the Buy/Sell Analysis Chapter of the Toolkit.
Not surprisingly, extractive industries, such as metals, mining, oil and gas, all have high water risks in direct operations. Water risks in supply chains, as well as risks related to energy needs, are prevalent in a number of sectors and industries.

**Water Risks in the Agricultural Sector**

Food and beverage companies in particular face water risks in their agriculture commodity supply chains. Approximately 70 percent of freshwater is used to grow crops, feed livestock and process ingredients. By 2050, in order to meet the needs of a projected population of 9.7 billion, water demands are expected to increase by 55 percent and food demands by 60 percent. Supply chain risks include higher commodity price volatility and decreasing reliability of supplies. A recent MSCI analysis of food companies in its All Country World Index (ACWI) found that $459 billion in revenue may be at risk from lack of water available for irrigation or animal consumption, and $198 billion is at risk from changing precipitation patterns affecting current crop production areas.

Ceres recently evaluated 42 food companies’ response to water risk and found that, while most are making progress, the majority remain unprepared. To lean more see Ceres’ [Feeding Ourselves Thirsty Report](#).

**Water Risks in the Energy Sector**

For many sectors, water risks manifest through increases in energy prices. Large volumes of water are often required for energy production, either for hydroelectricity production or for cooling coal-fired, natural gas or nuclear power plants. Hydropower and thermoelectric power make up 98 percent of the world’s electricity generation. These two most common forms of power are also the most water intensive, which makes them extremely vulnerable to drought, competition over water resources and water shortages. In addition, when water temperature in a reservoir rises, it often cannot be used to cool a power plant. Doing so may violate the plant’s permit, which limits the heat impact of discharge water on fish and biotic communities. Climate change is exacerbating these risks with more frequent extreme temperatures and precipitation patterns.

It is therefore important for investors with large holdings in power generation assets to understand the water risks linked to particular types of energy production. For example, in a recent study, Duke Energy was found to have a substantially higher water-dependency risk than its peers, due to its reliance on nuclear and coal.

The energy and utility sectors can also face climate change and water risks when their infrastructure is not adapted for climate change. Increasingly, mega-billion-dollar projects are only functioning at limited capacity due to climate-induced drought and low reservoir levels. For example, the Kariba Dam that supplies electricity to four countries in Southern Africa is now barely functioning because of prolonged low reservoir levels and low power production. Lake Mead, the reservoir for the Hoover Dam, has not reached full capacity since 1983.

Similarly, it is increasingly critical for sectors that require wastewater infrastructure (e.g., for coal ash storage, tailings ponds from mining, or manure pits in dairy or meat production) to ensure that this infrastructure is climate adaptable and able to withstand greater extremes in rainfall. For example, hundreds of mining tailings ponds across the world hold large volumes of wastewater and sediment, and their failure rates may be increasing.

The Climate Bond Initiative’s recently released water standard for green bond issuances provides guidance and criteria for assessing climate adaptability risks for both large infrastructure and nature-based projects.

**Geographic Analysis**

Water-dependency analysis is most powerful and comprehensive when it is combined with geographic water security analysis, which assesses the environmental, regulatory and social conditions in key regions. Many tools have been created to provide investors with better geographic water risk analysis. One such tool, the Water Risk Filter, developed by WWF and DEG, assesses not only basin water risks, but also operational water risks, and uniquely, offers response suggestions aligned to stewardship frameworks, such as Aqua Gauge, that enable response evaluation.
Figure 6: A snapshot of the types of analyses and outputs available from The Water Risk Filter including: Summary of operational and basin related physical, regulatory and reputational water risks in bar chart, matrix and map form. These serve to highlight site locations against different types of water risks. For more information go to Toolkit Chapter on "Metrics and Data to Support Buy/Sell Analysis" and/or http://waterriskfilter.panda.org/.

Another is the World Resources Institute (WRI) Aqueduct, a global water risk atlas that shows regional exposure to a number of indicators. One of its more popular and comprehensive metrics is regional water stress, which highlights the amount of competition for freshwater flows. Additionally, through the Bloomberg Terminal, investors can chart company locations (operations to offices) against the regional water stress indicator, as shown for Dow Chemical in Figure 7.

Figure 7: Geographic analysis of Water Risk. Made overlaying Dow Chemical's facility locations (manufacturing, assembly, production and engineering) against water stress (an indicator of water competition), using the WRI Aqueduct via the Bloomberg terminal's BMAP function. Source: http://www.wri.org/our-work/project/aqueduct
While indicators such as baseline water stress can be helpful as red flags for high-water-risk areas, more comprehensive analysis is needed in many situations. By understanding industry and regional needs, an investor can assess whether issues such as groundwater declines, social conflicts or transboundary disputes may be more critical for a particular company (Figure 8). For support on more in-depth geographic analysis and information on metrics, maps and research resources, see Buy/Sell Analysis Chapter.

PORTFOLIO-LEVEL WATER RISKS

Although it is important to conduct water risk analysis at the corporate or security level, it is equally important to evaluate aggregate water risks at the portfolio level or across asset classes. Investors may find that many of their aggregate holdings are overweight in industries with particularly high water risks or to regions in which water resources are vulnerable. Ceres has found that both United States (U.S.) and global indices have a very high proportion of companies in medium or higher water risk industries. For this analysis, along with investor case studies on portfolio water risk footprinting, go to the Portfolio and Asset Class Analysis chapter.

Some risks that may be hard to diversify away and may impact large portions of a portfolio may include:

- Underinvestment in climate-ready wastewater storage infrastructure in mining and other industries raises the probability of more frequent catastrophic accidents.19, 20

- Cumulative contamination and degradation of freshwater systems in many regions from land cover loss (deforestation), agriculture and industrial compounds adds costs to businesses and increasing social-license-to-operate risks.21,22

- Degradation of freshwater systems and associated dead zones in coastal areas due to agricultural nutrient and fertilizer run-off may eventually drive significant changes in soil management and crop production practices.23, 24

- Lack of access to adequate, clean freshwater supplies and sanitation for 2.5 billion people worldwide results in lost productivity and economic activity in economically important

Figure 8: Depletion is the fraction of renewable freshwater available in a watershed that is consumptively used by human activities on an annual basis. Regions with 75-100% and above are chronically water short — they are using all their renewable water all the time. Source: Brauman, et al., ”Water depletion: An improved metric for incorporating seasonal and dry-year water scarcity into water risk assessments,” Elementa: Science of the Anthropocene 4(1): 000083, (2016).
manufacturing regions and is becoming a human rights crisis. Some industries may be reliant on the workforce in these regions for key components in their supply chains or be targeting these regions as customers.

- Regions like East Asia, the Middle East and Central Africa may see an estimated 6 percent contraction in GDP by 2050 due to water-related impacts on agriculture, health and incomes.

INTERNATIONAL NORMS AND RESPONSIBILITIES

As global investors begin prioritizing water as an issue to embed into investment beliefs and policies, in addition to associated investment practices, they should consider that water is not only a universal solvent and coolant, but is fundamental for sustaining life and stabilizing climate patterns (Figure 9). Corporate and investor water use is therefore tied to larger issues of social, community and economic well-being, and carries significant responsibility. Water’s unique properties make it much more than a commodity or minor component of cost of goods sold.

These responsibilities are embodied in the U.N.’s Sustainable Development Goal 6, the U.N. Human Right to Water and Sanitation and the U.N. Global Compact. For more details on how investors can recognize and manage this responsibility within their investment governance documents, see Establish Water Priorities Chapter. For recommendations related to the human right to water, see Engagement Chapter.

Figure 9: Water’s unique properties and impacts to business. Freshwater provides many business benefits, but also tied to business responsibilities. Modified from Ceres’ Investor Water Handbook.
Chapter 2. Establish Priorities

Chapter Summary

Investment beliefs and policies help align institutional goals with investment practices and are critical for establishing institutional priorities. While investment beliefs and policies are primarily used by asset owners to inform ESG priorities, a growing number of asset managers state that having their own clear set of beliefs and policies that integrate core ESG criteria can help build deeper relationships with clients and drive new product development. This governance language can inform the investment decision-making processes and drive corporate engagement priorities.27

This chapter outlines a five-step process for establishing water-related priorities and integrating them into decision-making structures, starting with (1) Establish Leadership Commitment on ESG and Water, (2) Research and Understand Material Water Issues, (3) Set Priorities, (4) Create a Belief Statement and Investment Policies, and (5) Track Progress Against Key Performance Indicators.

Working through these five steps can help institutions understand their water goals and priorities and lay the groundwork for integrating water into daily portfolio-management decisions. For each of the five steps, detailed examples, resources and case studies are provided.

Key Chapter Supplemental Resources:

- Table listing Investor Resources on Water, Climate and Sustainability
- Database: Toolkit Compendium of Investment Belief and Policy Statements That Integrate Water
- Database: Proxy Voting Guidelines That Integrate Water
- Spectrum of Investor Water Priorities
- Case Study: Aligning Investment Policy Statements and Water Values with Organizational Goals, Park Foundation
- Case Study: Aiming for Portfolio-Level Water Neutrality, ACTIAM

STEP 1: ESTABLISH LEADERSHIP COMMITMENT ON ESG AND WATER

It’s critical to establish leadership and guidance from the board of trustees, or the highest level of fiduciary authority, when creating or updating important guiding documents, such as investment beliefs and policies. The active involvement of trustees in ESG research and integration sends a strong message to investment and governance staff — and to their asset managers and consultants — that ESG investment risks and opportunities are a leadership priority that is being comprehensively examined. If investors, and particularly their institutions’ trustees, do not articulate their beliefs on critical ESG issues or develop policies to guide the organization, they effectively cede key decisions to others, who will manage them ad hoc according to their own investment practices and judgments.28

Commitment from leadership sends a further signal that the integration of ESG factors, and greater water risk awareness, can impact the firm’s financial performance and protect long-term value. Thus, it is important that the board or a dedicated leadership team drive both the process and the approval of the final investment language that will guide the fund.29

Boards often create “sustainable investment committees,” composed of both external experts and internal staff, that report back to the board and guide the various activities outlined in this five-step process.
STEP 2: RESEARCH AND UNDERSTAND MATERIAL WATER ISSUES

Fresh water is much more than an input in operations or a line item in financial statements. Investment firms should recognize that water’s role in supporting natural biological, community, and economic systems and activities creates both risks and responsibilities. It is therefore helpful to research the spectrum of water issues and risks before choosing investment priorities, or developing beliefs or policies as a firm. For example, investors should consider the often-competing needs for water in regions in which cities, agriculture, companies and important natural systems depend on the same rivers or adjacent wetlands. For more information, see Chapter 1, Understanding Water Risks.

To expedite and conduct background research on investor water issues, organizations can tap consultants, investor peers, NGOs, academics, issue experts and other stakeholders to help build internal expertise. Commonly referenced research resources and investor peer groups that can assist in understanding and mapping broader ESG and water-related research are listed in Table 2.

Increasingly, investors are investigating whether their investment priorities are aligned with broader ESG-related norms, objectives and policies, such as the United Nations’ Sustainable Development Goals (SDGs). SDG 6, “Ensure availability and sustainable management of water and sanitation for all,” focuses on water and identifies a set of global targets to be achieved by 2030 (Box 1).

**Box 1: Sustainable Development Goal (SDG) 6 Targets**

- By 2030, achieve universal and equitable access to safe and affordable drinking water for all
- By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls in those in vulnerable situations
- By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
- By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
- By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers, and lakes
- By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programs, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
- Support and strengthen the participation of local communities in improving water and sanitation management.

For more on SDG6: [https://sustainabledevelopment.un.org/sdg6](https://sustainabledevelopment.un.org/sdg6)
### Establish Priorities — Investor Water Toolkit

#### Table 2: Investor Resources on Water, Climate and Sustainability Issues

<table>
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<tr>
<th>Groups and Organizations that Provide Investor Support and Resources</th>
<th>Investor Water Groups</th>
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| **Investor Water Groups** | • Ceres’ Investor Water Hub  
  • Interfaith Center for Corporate Responsibility (ICCR) — water working group  
  • Principles for Responsible Investment (PRI) — water working group  
  • China Water Risk |
| **Climate and Sustainability Groups** | Ceres’ Investor Network — North America (working groups include focus on deforestation, disclosure, green bonds, etc.)  
  Asia Investor Group on Climate Change (AIGCC) — Australia and Asia  
  Investor Group on Climate Change (IGCC) — Australia and New Zealand  
  Institutional Investors Group on Climate Change (IIGCC) — Europe  
  International Corporate Governance Network (ICGN) — Global  
  Council of Institutional Investors (CII) — North America  
  RIA Canada and SHARE Canada  
  US SIF and European SIF  
  Global Investor Coalition — Global (Ceres, AIGCC, IGCC, IIGCC) |

| Guides on the Human Right to Water and Sanitation and the United Nations’ Sustainable Development Goals | • The United Nations’ Sustainable Development Goals (SDG 6)  
  • The UN Guiding Principles on Business and Human Rights and Universal Declaration of Human Rights: The Human Right to Water and Sanitation  
  • CEO Water Mandate and SHIFT’s Guidance for Companies on Respecting the Human Rights to Water and Sanitation  
  • ICCR’s Stakeholder Responsibilities in Managing Access to Water |

| Reports on the Economic Importance of Water | • World Economic Forum’s Global Risks Report 2017 — highlighting water’s high-level position in the context of global threats  
  • Charting Our Water Future, McKinsey & Company  
  • High and Dry: Climate Change, Water, and the Economy, The World Bank |

| Research Resources Analyzing the Materiality of Water Risk | • Ceres’ Investor Water Handbook  
  • Ceres’ SEC Filing Water Search Tool  
  • Ceres’ Water Earnings Impact Tracker, available via Investor Water Hub membership  
  • Ceres’ The Ripple Effect, Water Risk in the Municipal Bond Market  
  • Ceres’ Feeding Ourselves Thirsty: Tracking Food Company Progress Toward a Water-Smart Future  
  • Bloomberg’s Transcript Analysis Function (TA), where investors can search earnings calls for topics such as “drought, flood, water scarcity” to see how often they are linked to lower revenue and earnings.  
  • CDP Annual Global Water Reports and associated company-specific questionnaires  
  • Sustainability Accounting Standards Board (SASB) industry briefs, including analysis of material water risks for specific industries (see SASB website and Buy/Sell Chapter)  
  • Investor Water Risks in the Mining Sector, NBIM and Columbia University Study |

| Guides on Developing Investment Beliefs and Policies | • Ceres’ The 21st Century Investor Blueprint for Sustainable Investing  
  • Action on Climate: A Practical Guide for Fiduciaries, SEI, Responsible Endowments Coalition  
  • How Asset Owners Can Drive Responsible Investment: Beliefs, Strategies and Mandates, PRI  
  • Writing a Responsible Investment Policy: Guidance for Asset Owners, PRI |
STEP 3: SET PRIORITIES

A firm’s water priorities and goals will uniquely reflect the organization’s own values, objectives for shareholder value creation and style of investing. As an example, on one end of the Spectrum of Investor Water Priorities (Figure 10), a mainstream asset management firm may initially choose to focus on helping to improve the disclosure of water risk among its portfolio companies, thereby improving broader market understanding of water risks. This will result in the output of more water-related disclosure (e.g., through sustainability reports and 10-K filings), benefitting market participants on a global scale. Alternatively, a faith-based investment firm may set internal mandates to focus on ensuring that investment holdings align with international norms, such as the Human Right to Water and Sanitation. At the far end of the spectrum, an impact investor or regional foundation may be driven to align its investments toward improving community water resources — a positive-impact objective. This might include advocating for portfolio companies to work collectively to improve common regional water resources, or making targeted investments in water-conservation projects.

Figure 10: An illustrative spectrum of investor water priorities and goals, showing an increasing level of “intentionality” that can be aligned with a firm’s beliefs and policies. Investors should recognize that the evolution of their water priorities will likely begin at the far left of the spectrum and, as the firm becomes more progressive, move toward more proactive approaches over time.

STEP 4: CREATE A BELIEF STATEMENT AND INVESTMENT POLICIES

Once priorities are established, the next step is to formalize them through the creation of a belief statement and/or set of investment policies. There is no one template or formula for writing investment belief statements. These statements can be short or long, detailed or general, comprehensive or selective. Regardless of structure, they should provide clear guidance and set expectations to internal teams, external managers and portfolio companies on the firm’s key ESG — and water — priorities and goals. They should clearly address those issues that are the most important drivers of a firm’s investment process and the beliefs at the core of a firm’s investment practices that distinguish it from others. Beliefs should represent and be appropriate to the institution.

To explore examples of peer investment belief and policy statements that integrate water and ESG issues across a spectrum of priorities, see the Toolkit Database of Investment Belief and Policy Statements.

For example, through its investments for clients and other responsible investment activities, PGGM — the second-largest pension fund in the Netherlands — aims to reduce the negative aspects of its investment footprint and make a positive contribution to a suite of seven ESG targets, including “water scarcity,” as defined in its investment belief language.
Spectrum of investor water priorities and examples of associated investor activities. Investors can take on different water priorities as a fund (see examples above). Under each water priority are listed sample ways that investors can follow through via their own actions. These values or priorities can be embedded into responsible investment policies that guide the organization toward better investment decisions.

**Spectrum of Investor Water Priorities and Examples of Associated Investor Activities**

*Improve Water-Risk Disclosure*
- Encourage increased disclosure of corporate water risks and impacts in voluntary disclosure platforms and frameworks, such as CDP Water, GRI, and SASB.
- Support disclosure of material water risks in financial filings by supporting standardized, mandatory ESG reporting (e.g., engaging securities regulators, stock exchanges).
- Study sector-specific water issues and regional high-water-risk hot spots in investment portfolios (see Portfolio Analysis Chapter).
- Contribute to improving methods of analysis of materiality and impacts of water risks by working with investor groups such as Ceres’ Investor Water Hub and others or engaging ESG data providers.

*Manage Water Risks*
- Include specific water criteria in the firm’s proxy voting and engagement guidelines; as needed, engage the board and management of portfolio companies facing high water risks (see Engagement Chapter).
- Build out expertise and oversight of material ESG issues (including water) with the firm’s Board of Trustees or highest level of fiduciary authority.
- For portfolio companies, support directors that demonstrate expertise on ESG and water issues, in addition to upper-management compensation structures that promote water awareness and management.

*Mitigate Water Risks and Prevent Water Resource Degradation*
- Promote practices by portfolio companies, municipalities and private equity projects that encourage both water and supply resiliency, in addition to limiting wastewater discharge and contamination impacts on local communities and natural systems.
- Encourage portfolio companies to understand the cumulative impacts to local water resources in key operating regions and to invest in projects and stakeholder engagement activities that limit and/or improve these cumulative impacts.
- Encourage companies and municipalities to consider climate change mitigation and adaptation planning in expansion plans, infrastructure development and capital expenditure programs. When issuing a green bond related to water, consider certification through the [Climate Water Bond Standard](#) to implement climate-friendly infrastructure programs and strategies.

*Align with Internationally Recognized Water Standards and Norms*
- Support and contribute to water policies, initiatives and recognized local and global targets that protect fresh water (including awareness of and alignment with the UN’s SDG 6 water objectives).
- Make a commitment to the Human Right to Water and Sanitation and avoid violations through the firm’s investments and portfolio companies.
- Respect water’s cultural value to indigenous communities, making sure internationally recognized protocols are being followed and that portfolio companies respect these rights.

*Promote Positive Water Impact*
- Support activities and make investments in companies and infrastructure that improve the health and sustainability of water resources in key watersheds and local communities.
- Promote collective action by companies to protect and restore both groundwater and surface-water resources.
- Support and promote sustainable watershed management by engaging with local water authorities, or by supporting state or national policies and regulations that improve water management.
Once investors establish belief statements, they should update or create investment policies that describe the specifics of how the institution hopes to achieve its priorities, that help determine manager selection and monitoring, and that inform the investment decision-making process. Language in aspirational belief statements becomes actionable through policies that guide day-to-day investment and engagement activities, such as risk tolerance, time horizon and investment methodologies.

Additionally, investment policy statements can:

- Set ESG and water expectations for investee companies
- Provide guidance and procedures for investment practices across asset classes
- Drive fund manager selection and guidance
- Influence engagement and active ownership approaches/procedures
- Set compensation structures linked to ESG and water performance
- Set clear guidelines related to proxy voting and engagement strategies

As investment values and goals can, and often do, evolve over time, it is appropriate for investment firms to review and update their investment beliefs and policies on a regular basis.

Whether pursuing active or passive strategies for their portfolios, investors should consider actively engaging with their portfolio companies and developing clear proxy voting guidelines concerning material ESG issues. Proxy voting guidelines help define how a fund will vote (proxy voting and AGM participation), allocate responsibilities (ESG integration in-house or by external managers, etc.) and conduct and participate in company engagements (on what issues and via which strategy, e.g., dialogues, filing shareholder resolutions, board interactions). Below are two examples of proxy voting guidelines taken from Ceres’ Proxy Voting Guidelines That Integrate Water Database (see Box 2 and database).

Some funds create uniquely designed water goals that can serve to make a strong statement on the importance of water and simultaneously influence the evolution of investor water commitments. For example, in 2017 ACTIAM released a portfolio-wide goal to be water neutral by 2030, contributing to the SDG 6 goal of ensuring availability and sustainable management of water and sanitation for all (which is aligned with its investment policies on water). See the case study: Setting Portfolio-Level Water-Neutral Goals, ACTIAM.

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**Box 2:**

“Proposals may be filed that ask a company to prepare a report evaluating the business risks linked to water use and impacts on the company’s supply chain, including subsidiaries and water user partners. Such proposals may also ask companies to disclose current policies and procedures for mitigating the impact of operations on local communities or ecosystems in areas of water scarcity. The Fund advisor will support proposals seeking the preparation of a report on a company’s risks linked to water use or impacts to water. The Fund advisor will support proposals seeking the adoption of programs and policies that enhance access and affordability to safe drinking water and sanitation.” — Calvert Investments, Inc.

“Water Supply and Conservation: Companies should disclose crucial water supply issues, as well as contingency planning to ensure adequate supply for anticipated company demand levels. SBA often supports proposals seeking disclosure of water supply dependency or preparation of a report pertaining to sustainable water supply for company operations.” — Florida State Board of Administration

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[Proxy Voting Guidelines That Integrate Water](#) or See Establish Priorities Chapter of the Online Toolkit
Investment policies can help influence an investor’s corporate engagement strategy. For example, Norges Bank Investment Management (NBIM) annually publishes water expectations, laying out the water-management practices it expects its portfolio companies to follow. This approach can be an effective and efficient way to engage the hundreds or potentially thousands of companies that a large universal owner may have in its portfolio.

Universal owners also increasingly recognize that sustainability and water issues can best be managed by taking a systems approach. This approach helps establish a coordinated set of investment policies and practices that address financial performance goals, along with sustainability and water goals. The Investment Integration Project (TIIP) provides investors with 10 tools of intentionality for how to turn their belief statements and goals into concrete actions (see case study below). See the Portfolio and Asset Class Analysis Chapter for more details on systems ideas.

Additionally, some investors establish policies to align bonus and compensation structures with performance on integrating and supporting ESG priorities or supporting long-term over short-term performance. The Ceres Investor Blueprint for Sustainable Investing and Investor Water Handbook provide further recommendations on modifying compensation and research structures to align with ESG goals.

### Implementation of Water Risk and Reward Investment Policies and Practices at a Systems Level, The Investment Integration Project

**STEP 5: TRACK PROGRESS AGAINST KEY PERFORMANCE INDICATORS**

Investment beliefs and policies are most effective if associated internal accountability and performance measurement systems are put in place. The mapping and reporting of key performance indicators (KPIs) informs leadership on the effectiveness of its policies and activities in meeting its ESG and water priorities. For example, if it is a priority to improve water risk disclosure in portfolio companies, an associated KPI would be to track the number of companies that disclose detailed water risk information in their regular reporting platforms (such as 10-K’s, CDP surveys, GRI, SASB, sustainability reports, etc.). Likewise, if supporting the SDGs and the Human Right to Water and Sanitation are a priority, then specific KPIs on performance and trends related to the percentage of portfolio companies that have a formal human rights policy could be tracked over time (Figure 10).

Below and in Figure 11 are some illustrative KPIs that could be used to track performance against priority areas listed in the Spectrum of Investor Water Priorities (Figure 10).

**Manage Water Risk**
Change over time in the number or percentage of portfolio companies in high-water-risk sectors with board-level expertise on environmental and water issues.

**Mitigate Water Risks and Prevent Water Resource Degradation**
Change over time in the number of municipal bonds issuing certified green bonds related to protection of water resources.

**Align with Internationally Recognized Water Standards and Norms**
Change over time in the number or percentage of portfolio companies with a Human Right to Water and Sanitation policy or that are aligned with the goals of SDG 6.

**Promote Positive Water Impacts**
Change over time in the number or percentage of portfolio companies that have projects that restore high-risk watersheds.

Under each priority section, a number of other detailed KPIs can be developed. Sustainability and water KPIs can help investors understand not only if they are fulfilling their goals and priorities, but also if they should modify their
goals or investment policies and practices. KPIs set into motion a cycle of continued improvement and thus, can be useful in showcasing an investor’s commitment to sustainability or water issues and highlight successes. Firms can decide to report on their investment activities against their ESG policies, either to beneficiaries, or publicly. KPIs can be useful in expressing ESG goals and related performance priorities to new or existing clients. In some cases, they can also be co-created with clients and become a productive way to continually develop practices that support client goals.

Financial performance KPIs can also be established that track whether water priorities have somehow changed the risk profile, financial performance or composition of investment portfolios. For example, have sustainability or water priorities tilted the portfolio toward larger companies that are better at disclosing sustainability data?

While it is important to set KPIs and track the progress of a firm’s investments through corporate behavior as suggested in Figure 10, investors should align their own actions with their water priorities.

Additionally, for investors who work with external consultants and managers, consultants can report performance indicators on water and ESG integration. Additional information a manager could provide on a regular basis to asset owners includes:

- A description of the manager’s experience, expertise and tools for evaluating water risks and opportunities (by sector, asset class, etc.), and how water issues pertain to the assets in the current portfolio
- Whether the manager offers a water-themed investment strategy, and if so, how the strategy informs understanding of water risks and opportunities in other investment products offered
- What reports or performance indicators the manager provides to clients to showcase the water characteristics of their portfolios, or specific investment decisions that were affected by their water criteria (for example, water footprinting of portfolios)
- Whether the manager can track indicators specific to the owner’s ESG or water policies and beliefs

By integrating water into investment belief and policy development, the institution can better grasp and manage the complexities of a material issue such as water. By establishing matching investor performance metrics, these policies can be tracked, refined and improved over time, thereby allowing the institution to most efficiently and effectively reach its investment goals.

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**Figure 11:** Investors can develop a set of KPIs that help track whether water priorities embedded in investment policies are making a difference at the corporate or security level. The visual above outlines sample water priorities against the “spectrum of investor water priorities,” with sample corporate expectations that might be embedded in active ownership policies with matching key performance indicators.
Chapter 3: Buy/Sell Analysis

Chapter Summary
This chapter presents ideas for embedding the dimensions of water risk (as outlined in Chapter 1, Understanding Water Risk) into daily decision-making processes and portfolio management methods. The first step is to conduct a portfolio prioritization analysis to see which companies should be prioritized for in-depth, security-level water risk analysis. Figure 12 below shows how portfolio analysis not only leads to a better understanding of aggregate water risk exposure but can also assist in prioritizing which entities to research more thoroughly. The second step is to gather data and information on securities deemed to have high water risk, as outlined in the three areas of the Corporate Water Risk Dashboard: Water Resource Dependency, Security and Response (Figure 13). The ideas presented in this chapter are relevant to public equities, corporate bonds, private equities and municipal bonds.

Key Chapter Supplemental Resources:
- Water Metrics, Tools, Maps and Research Resources and Database
- Database of Sector Specific Water Risks
- Case Study: Lessons for Investors from a Drought Stress-Testing Tool, Citi
- Database: Munibond Water Cheatsheet

Figure 12: Portfolio and Security Analysis Steps and Linkages. Portfolio analysis includes water risk heat mapping, mitigation analysis and stock prioritization. Security analysis includes research of water risk drivers and materiality, and formulating engagement and investment action based on all of the above.
EQUITIES: A FRAMEWORK FOR ASSESSING WATER RISK

The level of material water risk exposure is a function of the extent and nature of the water resource dependency of a company or entity, the water resource security of that company or entity, and management’s response to mitigate risks. These three elements, outlined in the Corporate Water Risk Dashboard (Figure 13) interact with each other and either amplify or dampen overall risk exposure.

- **Water resource dependency** is the possible financial risk exposure from how and where in its value chain the company relies on water resources. This includes understanding where water risks lie in a company’s value chain (e.g., sourcing of inputs, wastewater management in direct operations, product water impacts) and what financial risks are related to water (e.g., potential total loss of revenue, small increase in costs). These dependencies tend to be sector specific.

- **Water resource security** involves understanding a company’s geographic dependencies and the environmental, regulatory and social conditions on the ground in those regions. This analysis is also referred to as context-based analysis, in that it frames corporate water needs and water-management policies and goals against a region’s reality.

- **Management’s response** refers to assessing the company’s resilience vis-à-vis water risks and how these risks are being mitigated by corporate management, water resource managers or others. Mitigation strategies can range from short-term strategies, such as hedging against water risks, to longer-term strategies of working with stakeholders to improve watershed resilience in key supply chain regions.

Conducting this analysis for each company or entity requires an investment in time and resources by the investor. Therefore, it is advisable that investors apply this approach to a subset of their portfolio through the steps outlined in the Portfolio & Asset Class Analysis Chapter and extrapolating the results to similar holdings in the portfolio.

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**Figure 13:** Key elements of the Corporate Water Risk Dashboard. Modified from Ceres’ Investor Water Handbook, with model originally developed by Piet Klop of PGM.
Applying the Corporate Water Risk Dashboard

Combining all three elements of water analysis — dependency, security, and response — provides the most comprehensive assessment of investor water risk exposure. Figure 14 illustrates the information categories and data inputs that form the essential building blocks.

To better illustrate how the Dashboard can be applied in equities and corporate bond analysis, consider two examples:

- **Company A: Semiconductor Manufacturer.** Company A, operating in Taiwan, has high water dependency, requiring very large volumes of high-quality freshwater for chip manufacturing (an estimated 2,000 gallons per eight-inch wafer). The company also faces high water security risks, due to growing population and industrial pressures on shared water supplies, as well as increasingly intense droughts in the region. Therefore, the company’s overall water risk profile is potentially high. However, management has been very proactive, investing in water-recycling technologies, purchasing wastewater from communities in the region and working with local stakeholders to protect key reservoirs and rivers and promote sustainable watershed management policies and practices. As a result of this aggressive response, the company’s net water risk should be assessed as medium.

- **Company B: Textile Producer.** Company B, in Singapore, has relatively low water needs in its manufacturing operations, but a dependence on large volumes of chemicals in its dyeing process, requiring it to manage wastewater streams carefully. The company also faces water risks through its large purchases of cotton, a highly irrigated crop. The regions from which it sources cotton are experiencing more frequent droughts and face depletion of groundwater supplies. Due to these wastewater and supply chain issues, the company has medium water dependency. It faces a medium level of water security risk, given that regulatory permitting and water resource oversight in Singapore is relatively strong. However, the company amplifies its risk profile by

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**Figure 14:** Corporate water risk dashboard in action. Left hand side represents detailed examples of elements that drive Corporate Water Risk and the right-hand side represents detailed examples of corporate response that can mitigate that risk. If a corporation has high water risk exposure then high response to risk can lower the overall materiality of that risk and, conversely, if a corporation medium water risk exposure and there is not corporate response to lower these risks, then overall materiality may be higher.
an apparent lack of management awareness and focus on these issues. The company has begun to experience more wastewater exceedances, and local communities are becoming concerned about expansion plans. As a result of this weak management response, the company’s net water risk should be assessed as high.

SECTOR ANALYSIS

A company’s water dependency and related risks vary greatly by sector and industry. For example, a mining company’s water needs and risks will differ substantially from those of a pharmaceutical company. An information technology and software services company may face water risks through energy disruptions for its cooling centers (power generation often requires large volumes of water), while a semiconductor manufacturer may find its water risks are related to the inability to source large volumes of high-quality water for circuit production. For some sectors, water risks will be limited to one part of the value chain while for other sectors water risks may be potentially material throughout the value chain (Figure 15 and The Toolkit Sector and Industry Water Risk Database).

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<tr>
<td>Hotels, Restaurants &amp; Leisure</td>
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<td>Real Estate Management &amp; Development</td>
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<td>Internet Software &amp; Services</td>
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<tr>
<td>Semiconductors &amp; Semiconductor Equipment</td>
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</table>

Figure 15: Material water risk by industry. Materiality of water impacts at different parts of the value chain by industry (medium to high-risk industries listed only). Based on the Sustainability Accounting Standards Board’s (SASB) Materiality Mapping, combined with Ceres’ and Investor Water Hub analysis and classification of risks (medium or high). SASB metrics were provisional only at the time of this analysis, please go to www.SASB.org for more details the Buy/Sell Analysis Chapter of the Toolkit.

**Toolkit Sector and Industry Water Risk Database** or See Buy/Sell Analysis Chapter of Online Toolkit

METRICS AND DATA TO SUPPORT BUY/SELL ANALYSIS

Public equities benefit from comprehensive information on current and future water issues. Effective leveraging of material information can potentially improve the portfolio’s risk and return profile over the long-term.
Types of Indicators

To obtain the most comprehensive assessment of water risk exposure, investors should seek out three types of indicators:

1. Point-in-time metrics that provide snapshots or “red flags” of potential water risk
2. Information on possible future risk exposure
3. Geographic contextual information related to water resource security

This triangulation approach is consistent with traditional financial risk analysis, which also relies on point-in-time metrics, future forecasts and contextual indicators such as macroeconomic growth and political stability (Figure 16).

For example, in fundamental analysis, point-in-time indicators would include financial ratios such as price/earnings, debt/equity and earnings per share. While these indicators capture important information for peer comparison, they do not give a comprehensive assessment of a company’s risk and return profile. Traditionally, analysts also meet with management and collect contextual information, such as macroeconomic trends, future financial projections and market risks, to determine whether corporate growth plans are realistic.

Similarly, integrating water risks requires analysis through multiple lenses. A single indicator on water intensity — the volume of water used to produce a dollar of revenue, or the wastewater produced per unit of product — is helpful to flag a company’s potential water dependency, but does not paint a complete picture. To successfully integrate water issues into their analysis, investors must understand the drivers of, and risks to, company future forecasts, and local and regional water needs and constraints. Future projections of water requirements versus regional needs can be particularly important in assessing company growth and expansion plans. Investors should triangulate the sources of information that they rely on, gathering information not only from companies but also from independent third parties. For example, investors should track company news flow and/or databases of fines and litigation to be alerted to any poor practices and increasing risks related to a company’s water exposure.

![Figure 16: Categories of water risk indicators and their parallels in financial analysis. Three types of indicators — (1) point in time, (2) future forecast and (3) context — should be used for both financial and water buy/sell analysis.](image-url)
**Water Indicators and Data Sources**

Information from companies on their water risk exposure and regional water security issues, and their responses to these risks, are increasingly available through company filings (e.g., 10-Ks, annual reports), websites or corporate sustainability reports. Several other platforms, such as Bloomberg, Reuters and FactSet, aggregate information for investors on ESG and water issues. CDP’s Water Database is a particularly valuable resource for corporate water information, and its annual report provides a useful snapshot of key trends and water risks, obtained via discussions with corporate management for each sector surveyed. The Global Reporting Initiative (GRI) and SASB, meanwhile, are involved in setting standards on corporate reporting of ESG risks, including water. Both are currently evolving their water indicators.

Investors should also consider conducting independent analyses of corporate water risk exposure, including an analysis of where companies may be restrained in their growth, or where potentially large material risks may be lurking in the future. A list of metrics, proxy indicators, tools and research resources is provided below.

**Water Resource Dependency Indicators**

Point-in-time indicators (red flags) include:

- Information on where water dependency and risks are highest in the business value chain, as well as regionally, and the potential materiality of those risks
- Percentage of operations, revenues or earnings that have high water resource dependency
- Volumes of water required and wastewater produced per unit of production in aggregate for the entire company
- Volumes of water required and wastewater produced per unit of production for each major facility

Future and forecasting indicators include (or entail):

- Current and expected future percentage of operations and revenues from regions high in water risk or stress (e.g., high competition)
- Current and expected future percentage of operations in regions with little regional water governance oversight
- Value at risk of a company under high-water-risk scenarios

**Water Resource Dependency Data Sources**

- Ceres’ SEC search tool for water and climate risks in financial filings
- Ceres’ “Feeding Ourselves Thirsty: Scoring Food and Beverage Companies on Water Risk”
- WWF Water Risk Filter — Agriculture Supply Chain Analysis
- Natural Capital Project InvEST database of ecosystem services
- TRASE — resource for commodity and supply chain risks
- Ceres’ “Hydraulic Fracturing and Water Stress: Water Demand by the Numbers”
- SASB sector guides
- “Water in the Mining Industry,” NBIM and Columbia Water Center working paper and website on water-related risks of mining

**Water Resource Security Indicators**

Point-in-time red flags include:

- Physical water risk information, such as water stress (competition), water scarcity or drought
- Physical water quality information regarding major water resources on which entity relies
- Condition of regional water infrastructure
- Physical water information related to biodiversity and ecological health
- Percentage of operations, revenues or business value created in regions of water scarcity, stress or drought, or in regions that rely upon water resources that are unsustainably managed
- Information on the current physical, regulatory or social-license risks in key regions
- Regulatory information, such as number of corporate fines, spills and accidents, along with litigation data
- Social license risk information related to water, including concerns expressed by indigenous populations related to water resource use

Future and forecasting indicators include:

- Information on the potential future physical, regulatory or social license risks in key regions
- Information related to variability of precipitation flows, including exposure to flood risks and climate change vulnerabilities
Information on water quality for major water resources on which the company relies, the likelihood that water quality will be further degraded in the future, and the implications for the company

Regulatory information related to possible poor and weak water stewardship by local authorities that will lead to degraded water supplies or social conflicts over water

Social license risk information, such as past and current conflicts in the region over water and other environmental issues

Number of portfolio companies that currently have, or are considering implementing, an independently assessed U.N. Human Right to Water and Sanitation policy

Regulatory information indicating possible rapid tightening of how water is allocated or wastewater managed, with possible material implications for corporations in the region

**Water Resource Security Data Sources**

All: Physical, Regulatory and Social

- GRI, CDP and SASB are three NGOs focused on gathering corporate disclosure information, which includes discussion of physical, regulatory and social or reputational risks
- ESG data platforms, such as Bloomberg, FactSet and Reuters, collect some corporate water data and provide analytics (see examples below)
- ESG data research providers, such as Sustainalytics, MSCI, ISS-oekom, Vigeo-Eiris, and Trucost provide individual corporate assessments of water risks, along with occasional sector- or industry-themed water reports
- Data aggregators and optimizers like Data Simply and OWLshares are now making it easier to see all of the risk scores and analysis from fee-based providers in one place
- Conflict tracking and news-service tracking are helpful for proactive monitoring of ESG and water risks in real time, and can be helpful predictors of future risk. This is especially important given that many ESG research firms only do deep profiles of ESG or water risks on an annual basis. Many ESG data and research providers do include a news-tracking element. It's important to include local-language news sources with this tracking, because conflicts often brew over a long period of time before they receive international media attention. Other news subscription services include Lexus-Nexus, RepRisk, the ECOFACT Policy Outlook platform and Trubshaw Cumberlege social-conflict monitoring.

**Physical Assessment Focused**

Global

- WRI Aqueduct baseline water stress (competition) and current and future climate indicators, along with flood-risk maps
- WWF-DEG Water Risk Filter
- Ecolab Water Risk Monetizer
- UNEP Bank Drought Stress Test Tool
- Equarius waterBeta
- Bloomberg mining water risk tool (using Aqueduct data)
- CHIRPS: gridded, satellite-based daily rainfall data available globally. CHIRPS is easier to access through a commercial data provider because downloading the data can be tedious.

U.S.

- NOAA National Centers for Environmental Information (Global Historical Climatology Network): source of station-based data across the U.S. (on the order of thousands of stations). Weather variables include daily/hourly temperature, rainfall, snowfall, wind, and other variables; 50+ years of history typically available.
- SNOTEL (via Department of Agriculture’s NRCS): good source of daily rainfall and snow data in the western U.S., including water source regions in the Rocky and Sierra Nevada mountains; 30+ years of history typically available.
- USGS: source of daily river-flow data. Gauges are located along most major rivers and tributaries across the U.S.; 50–100+ years of history typically available.
- Palmer Drought Index: good summary indicator of wetness or dryness in the U.S., across multistate regions, states and intrastate climate divisions.
- Commercial data providers, such as Speedwell Weather, MDA Weather Services, The Weather Company, ISCIENCES and RMS: offer quality-controlled data that can sometimes make place-based analysis easier than going to government or weather databases.
Regulatory and Social-Risk Assessments

- WRI Aqueduct water-stress level: good indicator for competition over water in a region, and therefore a proxy indicator of potential social conflicts
- ECOFACT Policy Outlook platform: social policy and regulatory developments
- Trubshaw Cumberlege: social-conflict monitoring
- Government databases that provide information on violations or water issues of concern, such as the EPA’s Toxic Release Inventory and chemical watch list
- Government databases that monitor social community concerns, such as Defensoria in Peru, which tracks conflicts there and reports data and news on a monthly basis
- Local NGOs: can be extremely useful partners in providing insights into regional issues and risks

Response Analysis
Water Risk Response Indicators

- Does corporate board and executive leadership have responsibility and expertise in environmental and water issues?
- How does corporate management disclose, manage and track water risks?
- What are past and current data and trends on water-related incidents, fines, legal actions and accidents, and what is the company doing to avoid these in the future?
- Does corporate management have a proactive stakeholder program on water?
- Does the company work collectively with other stakeholders in a region to improve watershed health, and how?
- What water policies and targets does the company have, and how are these relevant to the water risk exposure of the company and of the regions of operation and dependence?

Table 3: Characteristics of Water Tools, Datasets & Resources

<table>
<thead>
<tr>
<th>Tool/Dataset/Resource</th>
<th>Best Suited For</th>
<th>Primarily a…</th>
<th>Evaluates Water Risk Exposure</th>
<th>Evaluates Corporate Response to Risk</th>
<th>Corporate Locations Embedded in Tool</th>
<th>Financial Data in Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bloomberg Water Risk Valuation Tool (WRVT)</td>
<td>Equities</td>
<td>Financial Model</td>
<td>☀</td>
<td>☐</td>
<td>☀</td>
<td>☀</td>
</tr>
<tr>
<td>CDP Corporate Water Database</td>
<td>Equities</td>
<td>Questionnaire &amp; Dataset</td>
<td>☐</td>
<td>☀</td>
<td>☐</td>
<td>☗</td>
</tr>
<tr>
<td>Ceres Aqua Gauge™</td>
<td>Equities</td>
<td>Questionnaire</td>
<td>○</td>
<td>☐</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Ceres SEC Water Risk Search Tool</td>
<td>Equities</td>
<td>Data Mining</td>
<td>☐</td>
<td>○</td>
<td>○</td>
<td>☗</td>
</tr>
<tr>
<td>Earth Genome</td>
<td>Private Equity</td>
<td>Maps &amp; Datasets, Services</td>
<td>☐</td>
<td>☗</td>
<td>☐</td>
<td>☩</td>
</tr>
<tr>
<td>EcoLab/Trucost Risk Monetizer</td>
<td>Equities</td>
<td>Model &amp; Datasets</td>
<td>☐</td>
<td>☗</td>
<td>☐</td>
<td>☢</td>
</tr>
<tr>
<td>Equarius waterBeta</td>
<td>Equities</td>
<td>Financial Model, Services</td>
<td>☐</td>
<td>☗</td>
<td>☐</td>
<td>☢</td>
</tr>
<tr>
<td>InVEST-Integrated Valuation of Ecosystem Services &amp; Trade-Offs</td>
<td>Private Equity</td>
<td>Models, Datasets, Services</td>
<td>☐</td>
<td>☗</td>
<td>☐</td>
<td>☢</td>
</tr>
<tr>
<td>NCFA Bank Drought Stress Test Tool</td>
<td>Bank Credit Portfolios</td>
<td>Scenario Models, Datasets</td>
<td>☐</td>
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</tr>
<tr>
<td>NCFA Corporate Bonds Water Credit Risk Tool</td>
<td>Corporate Bonds</td>
<td>Model &amp; Datasets</td>
<td>☐</td>
<td>☐</td>
<td>☢</td>
<td>☢</td>
</tr>
<tr>
<td>Sustainable Water Management Profiling</td>
<td>Municipal Bonds</td>
<td>Assessment Standard</td>
<td>☐</td>
<td>☗</td>
<td>N/A*</td>
<td>N/A</td>
</tr>
<tr>
<td>WRI Aqueduct™</td>
<td>Equities</td>
<td>Maps &amp; Datasets</td>
<td>○</td>
<td>☐</td>
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</tr>
<tr>
<td>WWF-DEG Water Risk Filter</td>
<td>Equities</td>
<td>Maps, Datasets, Models</td>
<td>☐</td>
<td>☢</td>
<td>☢</td>
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</tr>
</tbody>
</table>

- Has Information  ☀ Some Information  ○ No information

* Profiles Water Agencies
** If used in Bloomberg corporate location overlay possible

Source: Ceres analysis via survey and independent research with Peter Adriaens of University of Michigan. www.ceres.org/investorwatertoolkit
● Does the company support sustainable water-management practices and policies in key regions?

● Is the company tracking how it is potentially working against or for SDG 6?

● What technologies may be applied now and, in the future, to mitigate current risks?

● What investor-specific strategies can be applied if the company is unresponsive to water risks?

Water Risk Response Data Sources

● Ceres Aqua Gauge

● CDP, GRI and SASB water data, which include questions on water governance and response

● ESG research providers

● The Earth Genome (available currently in one location)

● Sustainable Water Management Profile (assessment of water authorities)

For more information on the resources above and others see Appendix 1, Database of Water and ESG Research Resources: Metrics, Maps, Tools and Research Platforms and How They Can be Applied by Investors.

Benchmarking Industry Peers on Water

Investors may find it helpful to translate the Investor Water Risk Dashboard, or a similar approach, into a scoring platform. Scoring can help pinpoint those sectors or companies within a portfolio that exhibit both relatively high risk exposure and low responsiveness (Figure 17).

Although this sort of risk–response scoring analysis provides a picture of relative water risk exposure, it fails to capture the materiality of risk or the magnitude of the company value at risk from a catastrophic incident or loss. Therefore, scores are best used to flag trouble or low performance and should not be the end point in water risk analysis.

**Figure 17:** Scoring companies on water risk exposure and response. Source: GES analysis of companies in the industrial conglomerate, food and beverage, garment and mining sectors on water risk exposure by geography and policy and preparedness. For more information on methods, see GES, Water Stewardship Engagement Benchmarking Report, March 2017.
A deeper analysis of water risks requires understanding current and future water risk drivers. This analysis should optimally include modeling the future financial exposure an investor faces from water risks, along with assessing the adequacy of the response. Scenario analysis, which involves studying thresholds and applying value-at-risk and stress-testing analysis, should also be considered.

Additionally, measurement of both positive and negative impacts on water resources should also be part of more comprehensive analysis; however, it is often missing in current scoring and water risk analysis methods. A discussion of these techniques follows.

**STRESS-TESTING, SCENARIO ANALYSIS AND IMPACT ASSESSMENT**

As investors study an entity's water dependency, regional security and response, the application of stress-testing, scenario analysis and impact assessment can provide critical information on potential losses.

**Stress-Testing**

This more comprehensive approach to understanding regional water security risks identifies the tipping points in water resource allocation situations that could have a material financial impact on business operations. Once the tipping points are identified, mitigation strategies can then be developed (Table 4).

Due to the shared nature of water resources, many mitigation strategies require collective action by investors, companies, regional water managers and other stakeholders in local regions. In some situations, collective action by entire industries might be needed to modify or mitigate a particular water-related risk. As a result, industry practices may need to be modified overall to mitigate a particular risk or issue, with various stakeholders playing a key role in that change.

<table>
<thead>
<tr>
<th><strong>EXAMPLE THRESHOLD</strong></th>
<th><strong>STRESS TEST</strong></th>
<th><strong>EXAMPLE MITIGATION STRATEGY</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Land cover degradation leads to inability of region-wide streams, lakes and groundwater to maintain adequate water quality</td>
<td>Stress test for additional capital expenditures and operating costs related to sourcing lower-quality water</td>
<td>Promote watershed land use protection (wetlands, forest cover, sustainable land use practices) with investor-owned companies</td>
</tr>
<tr>
<td>2. Degradation of freshwater supplies due to end of pipe, nutrient loading or poor waste and wastewater management practices</td>
<td>Stress test for high waste-discharging industries and possible risk of loss of social license to operate due to local community concerns</td>
<td>Promote proactive stakeholder engagement on these issues and work collectively to lessen impacts</td>
</tr>
<tr>
<td>3. Climate change and subsequent greater volatility in water supply and weather patterns</td>
<td>Stress test for uncertain water supply, including diversifying sourcing, or investing in water efficiency and reputational risks; stress test wastewater management systems and infrastructure for catastrophic flood risks</td>
<td>Adapt and mitigate for climate and greater water volatility disruptions in strategic planning</td>
</tr>
<tr>
<td>4. Emerging contaminates</td>
<td>Stress test for product redesign if current product lifecycle is linked to contaminants, especially relevant for pharmaceuticals, consumer products, plastics, chemicals</td>
<td>Promote product water-risk lifecycle analysis and gain information on contaminants of greatest concern and research reformulating products if possible</td>
</tr>
<tr>
<td>5. Large-scale overreliance on nonrenewable groundwater supplies</td>
<td>Stress test for slowing economic growth in highly groundwater-reliant regions with poor stewardship of those resources</td>
<td>Engage with policymakers in these key regions of importance to manage groundwater supplies and stabilize or, if possible, reverse trend in declines</td>
</tr>
<tr>
<td>6. Regional human-health impacts due to lack of access to safe drinking water and sanitation services</td>
<td>Stress test for improvements in worker and customer productivity and well-being under conditions of safer drinking water</td>
<td>Promote worker access to freshwater and sanitation including putting in place Human Right to Water and Sanitation policies and commitments</td>
</tr>
</tbody>
</table>
**Scenario Analysis**

Scenario analysis is an established method for developing strategic plans and assessing possible future financial risks and impacts. It can drive more focused engagement on water risks, including by providing much-needed information on whether management’s responses to risk are adequate.

The benefits of scenario analysis are that it is forward-looking and that it avoids the trap of data-availability bias, or the tendency to make decisions based on information that is already known or disclosed.38,39 Both companies and investors can independently benefit from conducting scenario analysis from their own perspectives and engaging on potential differences in results. Scenario analysis is also gaining ground in climate and carbon modeling, and is a method recommended by the Task Force on Climate-Related Financial Disclosure.40

Scenario analysis can inform financial models such as discounted cash flow models, which can then be modified to reflect value at risk due to water (Box 3). To assess financial impact or loss of value, an analyst can integrate potential water risk factors and the associated duration of those risks and probabilities. This could involve assessing which risks can be mitigated and which are harder to manage. Conducting stress-testing and quantifying financial exposure to individual risks may be particularly helpful in assessing which risks require immediate response and should be prioritized for engagement.

A number of recent studies on water risks and their probability and potential materiality will likely help mainstream this type of analysis. For instance, NBIM and the Columbia Water Center are in the last phase of a three-year study of water risks in mining. Preliminary results on regulatory, wastewater management and other risks indicate that it is possible to assign probabilities and measure the materiality of water risks more systematically (Figure 18).41

Scenario water risk analysis methods are also evolving for bank portfolios, including using data and models from the catastrophe insurance industry. This trend can help accelerate the evolution of methods for fund management research (see Citi case study). Investors need to dig more deeply to find information on the probabilities of a particular water risk and the potential upper bounds on financial impacts. If an analyst is willing to conduct deep research, probabilities

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**Figure 18: Water risk probabilities and financial impact assessment for the mining sector.** A mining company faces water risks from cumulative impacts to water resources in the region, and this can lead to two risk pathways. The first involves the company needing to improve its wastewater infrastructure operations (top pathway), which may impact margins and profits due to higher operating costs. The second involves the increasing chance of social conflict and loss of social license to operate, which could limit operations and revenue generation in the region. *Source: Modified graphic by Dr. Upmanu Lall, Columbia Water Center.*
and impacts from certain risks can potentially be quantified. For example, a water risk for many mining companies is tailings pond failure. Given that there are thousands of these structures globally and that their failures have been tracked by news media and researchers, an analyst could apply probable failure rates. Likewise, if climate change and weather variability have been increasing price volatility for key commodities, this could be quantified, as well as potential impacts on certain food and beverage companies. More work is required to collect systematically empirical evidence of different types of investor water risk.

**Evolution of Water Risk Reporting and Analysis**

Water risk analysis is moving from the narrow study of physical volumetric data on corporate water use to recognizing the multidimensional nature of water risk exposure, including social and regulatory elements. More robust data, analytical tools, and methods for assessing financial materiality of exposure due to water risks are emerging. This will make water risk analysis and scenario- and stress-testing easier to conduct. (Figure 19). Integrating climate and water resource data sets into place-based regional security analysis, for example, may be one fruitful way forward.

A systematic method for assessing water resource impacts of large multinational companies operating in many regions with several product lines has yet to be developed. Ideally, such an approach would leverage impact investing methods for public equity analysis. GRI, the long-established standard-setting organization for ESG reporting, is currently developing its corporate water metrics to provide more information on impacts.42

Overall investor water risk analysis at the security level is maturing, thanks to years of effort among many pension funds, fund managers, data and research providers, NGOs and other stakeholders. The optimal outcome is for investors to have a better understanding of water risks in their holdings.

As methods and approaches evolve over time, one can imagine that investor corporate water analysis could resemble a dashboard of financial, resource and community impact data.
PRIVATE EQUITY WATER DUE DILIGENCE

In contrast to public equity investing, in which a portfolio manager may decide to buy a stock one week and sell it the next, private equity investing often takes months or years to execute and an equally long time to sell. These typically large and long-term deals often take teams of internal staff to study and craft them. Private equity managers therefore value very comprehensive due diligence—and water risk analysis is no exception. For guidance in this process, the Toolkit offers the water due diligence decision tree below, developed in collaboration with a spectrum of different private equity investors.

Applying the Private Equity Water Due Diligence Decision Tree

This decision tree provides water due diligence recommendations for new private equity projects (Figure 20). The decision tree is aspirational and nonprescriptive, simply aiming to guide investors on the best water due diligence questions to be asking at different steps in the decision-making process. In many instances, data sourcing and analytics will be missing and proxies or assumptions may be required. Similarly, it may be necessary to modify the questions for local conditions under which a project is being considered.
Figure 20: Private equity water due diligence decision tree. Sequential steps to assess physical, regulatory and social water risks. Red stop sign symbols represent possible red flag “deal-breaker” risks that can jeopardize a project.

The blue boxes to follow represent major water due-diligence questions in Figure 20.
Evaluate Current and Future Water Needs

There is no need for investors to conduct water due diligence if a planned project or entity does not have exposure to high water needs and risks. Sectors with traditionally high water needs and risks include energy, mining, some manufacturing, data centers, hotels and resorts, and utilities. Many basic-materials, food, beverage, textile and consumer-product companies also have high water needs, both in direct operations and via their supply chains.43

Water risks can be physical, governance/regulatory or social in nature. Increasingly, entities and projects are exposed to social license-to-operate risks due to community water-related concerns.

Water needs and risks can be assessed by:

1. Mapping the company’s water needs and risks: supply chain, direct operations, wastewater discharge or product lifecycle.
2. Measuring what proportion of sales, earnings or assets have high water needs or risks and conducting stress-testing and scenario analysis, and estimating whether a substantial contraction in current or future operations, revenues or earnings would take place under high-water-risk scenarios. An example of stress-testing is assessing the net asset value of assets that are exposed to extreme water events.
3. Understanding the duration of water risks. Although water risks may not be present at the beginning stages of the project, they may grow over time due to climate change impacts or changes in water availability. This can be particularly relevant to commodity and agricultural production.

If answer to the above question is:

- **NO**, then carry on with non-water-related due diligence.
- **YES**, then assess the two regional, context-based issues below simultaneously.

Regional Physical Risk Assessment

1. Can the water needs of the project and all regional end users (communities, agricultural, industrial and needs of aquatic ecosystems) be met currently and into the future? Be sure to conduct scenario analysis, taking into account different water realities and their consequences for future operations and profitability.
2. Are there diverse sources of water for the region, and are they being managed sustainably?
3. What are the current and projected impacts of climate change and weather variability on these resources?
4. Understand the water consumption and discharge footprints of end users in the region. Are there bad actors? How can you quantify and monitor these?
5. Are water bodies able to assimilate wastewater discharges from end users in the region, now and into the future, without jeopardizing the sustainability of those resources? Determine if there are current or emerging contaminants of concern (e.g., nitrogen or phosphorus loading, microplastics, low water oxygen, pharmaceuticals). Is there a risk of future liability due to dangerous pollutants in the area?
6. If purchasing land, is waste disposal occurring on the site?
7. Are there environmentally or culturally sensitive regions of concern?
8. If water is required for cooling, are water bodies able to provide water at an adequate temperature, now and into the future, taking climate change into account?

9. Is the region located in a flood plain or exposed to sea-level rise?

10. What is the age and state of water infrastructure (supply, wastewater and stormwater assets)? What maintenance and capital expenditure planning is being conducted to ensure that infrastructure can meet future regional water supply and wastewater needs?

**Regional Water Governance/Regulatory Risk Assessment**

Assess regional water authority’s capacity and capabilities:

1. Do entities and authorities managing water resources have the capacity, political will and programs to ensure their current and future sustainability? Advanced water-management practices include long-term planning (over 30 to 50 years), climate modeling, population-growth planning, tiered water pricing strategies, preserving minimum flows to sustain aquatic ecosystems and use of best-in-class technology.

2. What are the reporting lines of different entities within the water authority? Are there agency conflicts or problems with reporting structure? Is there strong coordination between water and energy management planning, and between ground- and surface-water resource planning?

3. If the water-management function is handled by a private concession, what kind of regulatory oversight is in place?

4. If the water authority provides a “Will Serve” letter, is the authority able to provide water and sewer services in the long term, beyond current political time cycles? These letters should not be a substitute for good due diligence on water.

5. Does the water authority have sustainable management strategies in place, including population growth and climate change modeling? Will the region experience growing water demand from rapid increases in population? Conversely, if the population is shrinking, can infrastructure and operations be incrementally scaled back and supported by a lower tax base without putting human health at risk (to avoid a Flint, Michigan, situation)?

6. If there are contaminants of concern, is the authority able to manage and mitigate them through best-in-class technology to protect health and water resources, or through targeting the source of contamination? Is there likely to be rapid regulatory change to manage these contaminants?

**What is the financial stability of water authorities?**

1. What kind of budgetary resources does the entity possess? How much of the local budget is dedicated to water-management issues? How diligent has the entity been in maintenance and capital spending? Is water an important issue locally, and how does it rank in the broader agenda of local issues? Who sets the water budget, and how has it changed recently?

2. Are municipal water connection charges major elements of local budgets, and if they are, do the charges promote unsustainable water use and urban sprawl?  

3. What is the authority’s ability to raise funds? Is credit rating in jeopardy due to revenue risks from poor water and climate planning practices?

**How is water owned, allocated and priced?**

1. Is water pricing structured to promote water efficiency (e.g., tiered pricing) with biggest water users in the basin being charged more, while those at the bottom of the pyramid are guaranteed affordable access to water? Does water pricing reflect the true cost of delivery, given appropriate maintenance and capital expenditure plans?

2. Is the percentage of household income spent on water no more than two and a half percent of median income for low-income households?

3. Are systems in place that respect the human right to water and provide for minimum ecological flows?

4. If water is privately owned or managed, are the regulations and conflict-resolution mechanisms conducive to resolving water competition issues?

5. Are sound water-allocation rules in place? Although a project may have a right to water, if it comes at the expense of many other end users in the region, the project is likely exposed to reputational or social license risks.

**Resources for conducting regional physical, governance/regulatory risk assessment:**

State-level water engineer, local Public Utility
Commission (PUC) or municipal water manager, local hydrologists and ecologists, environmental consulting and engineering firms.

If answer to the above question (in blue box) is:

- **NO**, then can physical risks be addressed through investment or co-investment with water authorities to improve water supply and quality? If governance/regulatory risks are high, are these addressable? If not, then these issues are possible red flags or deal-breakers (see next section).

- **YES**, then ensure that community and stakeholder risks are low also (see community and stakeholder risk section) and move on to assess whether the project itself is water resilient.

If the physical and regulatory/governance risks are assessed to be high (section II), use the following criteria to determine whether the risks are manageable:

1. If an investment is needed to secure more water supplies, assess what is the most efficient and sustainable way to secure regional supplies. Ideally, the entity that can deliver the investment at the lowest cost should be the one to deliver the project, with the other party sharing in the up-front capital expenditure and ongoing maintenance.

2. Are local authorities willing to share responsibility in securing new supplies?

To assess whether water governance/regulatory risks are addressable, it's important to ask: What has been the historical trend in the region and the watershed generally? Does the watershed extend across geographic boundaries (county, state, national) that may make regulatory change difficult?

If answer to the above question is:

- **NO**, then are local authorities able or willing to help address supply issues, or is this possibly a deal-breaker? If the investor has the capacity and ability to work with local authorities to improve governance risks, then the opportunity is still viable.

- **YES**, then move on to assess whether the project itself is water resilient.

**Are community and stakeholder risks low?**

To determine this, meet first with key community leaders and, later on, broaden engagement to possibly include community forums. Potential stakeholders are any end users of water in the region — communities, farmers, other industrial users and special interest groups — and they should be researched and understood early on. Given that social license risks can be large and catastrophic, it's important to understand major concerns related to water in the region.

Community and stakeholder risk assessment:

1. How do stakeholders prioritize water issues such as quality, availability, affordability, and environmental sustainability?

2. Is the project exposed to reputational risk by using or discharging water in the region?

3. What is the economic importance of access to water in the region?

4. Is there a high probability of current or future stakeholder conflict over water? If high, what are the financial implications of this ongoing conflict, including the worst-case scenario of loss of regional social license to operate and grow?

5. If part of the business model is arbitraging water prices (sourcing at lower rate and eventually selling at higher price), are water competition, reputational and stakeholder concerns addressable?

6. Is there conflict with other industrial users of water in the region, and if so, what is the potential impact? If the water footprint (both supply and effluent) is large, are there ways to influence the entity to be more efficient or to improve its water-discharge practices?

7. Are you competing with residents’ access to water by producing a nonessential good? Recognize that perception is key, no matter what the right to the water and responsible use.

If answer to the above question is:

- **NO**, then are stakeholder concerns addressable? And if not, is this a potential deal-breaker?

- **YES**, (and physical and governance/regulatory risks were manageable also) then move on to assess whether the project itself is water resilient.
PROJECT ANALYSIS

Does project have physical, governance/reputational and stakeholder resilience?

Project physical, governance/reputational and stakeholder resilience assessment:

Once it is determined that regional, physical, regulatory/governance and stakeholder concerns are manageable, the investor can move on to conducting deeper diligence on the water resilience of the project or entity itself. For acquisitions, a number of additional questions related to management's history of violations and community relations are required.48

Project physical water resilience assessment:

1. Assess the project’s water use and effluent footprints for the short and long term. Understand pollutants and the vulnerability of the water bodies the project is discharging into. Understand that the greatest water footprints may be created during the construction phase.

2. Assess diversity of supply and wastewater discharge options.

3. Understand methods and limitations behind regional environmental impact assessments when reviewing findings, and understand agency risks in these assessments.

4. Determine whether the project or facility has access to high-pressurized large volumes of water for fire suppression. This can be an issue in rural or emerging-market regions and can impact insurance coverage.

5. Consider investing in projects or being involved in activities that improve the resilience of the local watershed.

6. Determine the ability to financially hedge or insure against water-supply risks.

Project water governance resilience assessment:

1. Ensure that water is viewed as a strategic issue by the board, upper-level management and across all organizational levels.

2. Ensure that proper measurement, management, stakeholder policies and practices are in place to govern water use. For more details on recommendations, see Ceres' Aqua Gauge.

Project stakeholder resilience assessment:

1. Assess the water use patterns of suppliers and operations, as well as customers, and ensure the project is not significantly competing with any of them.

2. Determine whether water risks manifest themselves via social and health issues directly, or via the company's supply chain, own employees or customers, especially in regions impacted by lack of access to clean water and sanitation and waterborne illnesses.

3. Assess whether the U.N. Human Right to Water and Sanitation is being respected by operations, suppliers and others in region.

Project water opportunity assessment:

1. Are there opportunities for the project or supply chain to become more water efficient or self-sufficient, such as reusing its own wastewater or moving to low-water-use or -discharge technologies?

2. Are there opportunities to create an ancillary business from wastewater recycling or water-efficiency improvements (e.g., bioreactor)?

3. Is there an opportunity to promote the stewardship of water and enhance employee health, community living standards and project reputation?

4. Is there value creation through improvements in stakeholder engagement?

Once the investor has completed the project, it is important to establish a system of monitoring and managing water risks and issues into the future through ongoing engagement with local stakeholders, other large regional water users and water governance authorities.
FIXED INCOME: WATER-RISK FRAMEWORK FOR MUNICIPAL WATER AND WASTEWATER

The Municipal Bond Cheat Sheet section of the Toolkit provides a guide for U.S. municipal bond analysis in the water and wastewater (referred to here as “water”) sector. To many, this asset class represents the most promising opportunity to drive sustainable public water outcomes and address climate impacts in cities. Municipal and utility securities for water projects are increasingly being issued as green bonds, with financial yields tied to environmental performance targets. Thus, the municipal bond market is susceptible to systemic risks such as climate hazards, population change and infrastructure vulnerabilities, many of which carry direct financial impacts (see Ceres Water Infrastructure Reports and Resources online).

The water risks outlined in this framework could have a material impact on the financials of a water system in the following ways: reduced operating efficiencies and increased costs, accretion of unexpected capital outlays for renewal and replacement needs, and unplanned rate hikes that threaten the viability of future projects and create affordability pressures on customers. Deeper consideration of these risks in public water investment decisions could highlight new, more strategic investment and engagement opportunities that may be overlooked using existing mainstream market assessment tools and security valuation methods.

This framework can also guide investors in engaging more productively with municipal authorities on climate issues related to water resources management.
Chapter 4: Portfolio and Asset Class Analysis

Chapter Summary

Conducting water risk analysis of an entire portfolio is essential for two reasons. First, it allows portfolio managers and analysts to uncover which securities should be prioritized for deeper water risk research — namely, those that have high portfolio weightings and potentially very high water risks. Second, water risk exposure may be clearest at the portfolio level. For example, a portfolio may hold only very high-performing companies, but those companies may all still rely upon one geographic high-water-risk region for critical supply chain commodities or water supplies. Conducting security water risk analysis alone will not uncover high portfolio exposure to geographic or industry water risk hot spots — but conducting portfolio risk analysis will.

Water risk analysis should also be conducted across different asset classes to determine whether there is overlap between different types of investments in one region, and whether improving water risk management in one investment may lower the risks in others as well.

Key Supplemental Chapter Resources:
- Case Study: Water Footprinting Analysis of Major Global Indices
- Case Study: Setting Portfolio-Level Water-Neutral Goals to Align with Investment Priorities, ACTIAM
- Case Study: Portfolio Water Risk Footprinting of a Passive Portfolio, SBA Florida

PORTFOLIO WATER RISK HEAT MAPPING AND PRIORITIZATION

Given limited time and research resources, it is prudent to establish where high water risk exposure may lie in portfolios and to identify high-priority holdings and securities for further analysis. This leads to the need for a portfolio prioritization strategy. Once portfolio analysis is conducted, the investor can move on to the buy/sell analysis section to analyze individual security water risks.

Portfolio managers also need to understand water risks at the aggregate portfolio level, as well as the individual security level. All of a portfolio’s individual securities may have only low or moderate water risk, but in aggregate a fund manager may find that the portfolio has high exposure to high-water-risk geographic regions or industries versus the underlying benchmark.

To assist with portfolio water analysis and prioritization, a four-step, coarse-to-fine scale analysis approach is recommended (Figure 21).

Figure 21: Four-step investor water risk prioritization strategy. Suggested steps, moving from large-scale portfolio water risk heat mapping and sector/security prioritization, down to individual-security fine-scale analysis of risks and risk drivers.
STEP 1: CONDUCT PORTFOLIO WATER RISK FOOTPRINTING

The first step involves portfolio attribution analysis on water, or water risk heat mapping. To illustrate the value of portfolio water risk footprinting, Ceres conducted a water footprint analysis of four major global indices.

Water Risk Footprint of Major Global Investment Indices

Given the high proportion of funds that are now passively managed (tracking an investment index), it is particularly important to understand the potential exposure of indices to water risks. Ceres analysed the MSCI World, MSCI Emerging Markets, Russell 3000 and S&P 500 and found that the majority of stocks across all of these indices were in industries of medium to high water risk. This underlines the importance of studying water risks in all investment portfolios.

The analysis used SASB’s materiality maps to identify sectors and industries for which water and wastewater management are assessed as likely or not likely to be material. Ceres then used this materiality assessment, along with SASB’s industry-specific materiality indicators of “interest” and “financial impact,” to assign a rating of low, medium or high water risk exposure (Figure 22). The “Oil, Gas and Consumable Fuels,” “Semiconductors” and “Chemicals” industries consistently rank high regarding water materiality, as well as weight, across indices. The above approach is a very effective way to assess the degree of water risk exposure and the areas needing deeper risk research.

![Water Footprinting Analysis of Major Global Indices](image-url)

Source: Ceres and KKS Advisors’ interpretation of SASB materiality indicators.

Figure 22: Water footprinting of major indices by industry; water risk classification using SASB materiality indicators and Ceres classification methods. All indices studied had approximately one-quarter of their holdings in high-water-risk industries (with global indices higher than U.S.), and all had the majority of their holdings in medium- or higher-water-risk industries.
The footprinting approach employed by Ceres is an effective way to flag the degree of water risk exposure and the areas needing deeper risk research. There are many different ways to conduct water footprinting. Some institutional investors, such as ACTIAM and Florida SBA, are actively pursuing portfolio-level water risk analysis, finding that this approach affords a deeper understanding of risks or a way to track investment goals related to the Sustainable Development Goals. See Case Study: Setting Portfolio-Level Water Neutral Goals to Align with Investment Priorities, ACTIAM.

Florida SBA, meanwhile, works with ESG research partners and uses water risk scores. Below is a water heat map of Florida SBA’s passively held equity portfolio (Figure 23), accompanied by a case study. The heat map allows the portfolio manager to rapidly assess which sectors have the highest water risk, e.g., materials, consumer staples, utilities and energy. In this illustration, the investor worked with FactSet and MSCI to produce the heat map. MSCI used a proprietary water risk methodology, including WRI Aqueduct geographic analysis, to score and rank companies on water risk.

![Portfolio Water Risk Footprinting of a Large Passive Portfolio, Florida SBA](image)

**Figure 23:** Portfolio water risk heat mapping conducted by Florida SBA using MSCI data and FactSet. Red indicates high risk, black indicates medium risk and green indicates low risk. The squares represent the size of individual holdings.

CDP also has analytics capabilities that allow an investor to look at a group of companies and geographic regions of water concerns. For example, an analyst can assess which river basins portfolio companies mention most frequently as being at high water risk in their disclosures (Figure 24).

![Company Count by River Basin](image)

**Figure 24:** Number of times companies in an illustrative portfolio mention a river basin in discussing substantive water risks. Data is from corporate responses to CDP over 2015 and 2016. The analysis could be adjusted to focus on a set of companies in a sector or particular market. This type of analysis can help investors understand which river basins should be studied more closely. *Source: CDP’s Investor Analytics Platform, graph provided via personal communication with CDP.*
Industry Water Risks May Be Difficult to Diversify Away

Water footprinting may uncover which industries have high water risk exposure that is hard to diversify away — for example, those that cannot easily pick up and move and that require large amounts of water. As an example, copper ore production is geographically concentrated in water-scarce and increasingly climate-variable regions such as the U.S. Southwest, coastal Chile and Peru. Since mines cannot move locations, investors with heavy weightings in copper production should ensure their portfolio companies have strong strategic water management plans and stakeholder engagement strategies in place, while additionally embedding climate adaptation into their capital expenditure programs (Figure 25).

Results and Benefits: Heat mapping serves the primary purpose of showing where to focus deeper research, and also helps to identify opportunities for asset risk diversification. It is an efficient way to assess whether a fund has taken big “bets” related to water risk. For example, this analysis would reveal whether the investor has taken on more water risks than an underlying index, and where those risks lie. Perhaps most importantly, heat mapping is an efficient way to prioritize which areas of a portfolio may face higher water risks and require deeper research.

STEP 2: INVESTOR INFLUENCE ASSESSMENT

Methods and Data: Investors may wish to layer onto the portfolio water risk heat mapping exercise an analysis of the investor’s ability to influence, change or mitigate holdings risks, as measured by data such as percentage ownership and ownership structure. This could include assessing whether an investor owns a large percentage of industry companies and if there is efficiency in collectively engaging an industry. There are cases in which key investors have effectively engaged with industry groups on evolving best water-management practices. Some pension funds also have a strong geographic focus (e.g., home country, province, state) and can have considerable influence in engaging regionally based companies on water risks of concern.

Results and Benefits: Layering ownership data onto the heat-mapping exercise allows investors to further prioritize those companies with whom they can most efficiently and effectively engage to drive change that mitigates water risks.
STEP 3: REGIONAL RISK-MITIGATION OPPORTUNITIES ASSESSMENT

Methods and Data: This analysis involves mapping the geographic water risk exposure of an entire portfolio and assessing whether there are risk-mitigation synergies available to the investor — specifically, those situations in which mitigating water-system risks at one entity may mitigate water risks at another entity. For instance, investors can engage with portfolio companies, policymakers, water authorities and other stakeholders in high-water-risk regions, or an investor may choose to invest in water-oriented opportunities in the region.

This is illustrated below (Figure 26), where a portfolio manager might discover that a portfolio forestry company is causing run-off and pollution to freshwater bodies, resulting in increasing costs to two other portfolio companies in the same watershed — a water treatment facility and an energy production facility, which requires large volumes of water for cooling. By changing the practices of the forestry company, the investor may improve the operating performance and costs of the other portfolio facilities, not to mention the conditions of local communities and natural systems.

Often, water interconnections arise through agricultural commodities, with one company supplying water-intensive commodities to another company in the supply chain. Obtaining region-specific data from companies and investor-owned assets is key for this analysis; increasingly, data providers such as Bloomberg and FactSet are developing place-based data on corporate operations (Box 4).

Box 4: More Corporate Location-Specific Data Required

Although many corporations do not disclose the location of operating facilities or important supply chain regions, investors can still potentially obtain this information. Some sectors, such as mining or oil and gas production, often disclose key current operating areas or regions of planned future development. In addition, ESG research and data providers are increasingly improving regional data. For example, through Bloomberg’s BMAP function, investors can now see the locations of all publicly listed corporate offices and operations overlaid onto a global map of water stress (using the WRI Aqueduct). However, this analysis would improve further if companies more consistently disclosed regional operating and supply chain information. Once there is more corporate information on regional operations, investors or ESG research providers can conduct better environmental risk analysis, seeing where companies rely on shared watersheds or natural resources and collectively engaging them on risks in those regions.

Figure 26: Systemic water risks and impacts. An investor might own several portfolio companies in one region and find that one of its companies (e.g., an upstream forestry company) negatively impacts the operations or risk profile of other companies downstream. It might also come to light that the entire portfolio faces systemic water risks in the region. Source: Modified from Gary Foley et al. of EPA, Systems-Based Approach to Support Sustainable and Resilient Communities, Feb. 2015, by J. Michael Reinoso of Castleton Partners.
Results and Benefits: By understanding how mitigating water risks in one industry or company can lessen the severity of risks in another, an investor can efficiently and effectively focus further water research and engagement efforts. By this point in the analysis, an investor should have a shortlist of high-priority companies for further engagement and/or analysis.

STEP 4: PRIORITIZING SECURITY-LEVEL WATER RISK ANALYSIS

At this stage, an investor has now identified a smaller subset of portfolio holdings that potentially have high water risk and materiality, along with risk-mitigation co-benefits with other securities. In addition, the investor understands the degree to which they can leverage their various levels of ownership to influence change (Figure 27). Deeper analysis for each individual security can now be conducted using the Corporate Water Risk Dashboard, value at risk or impact analysis, as outlined in the Buy/Sell Analysis Chapter.

Once deeper analysis at the individual sector level has been completed, a better understanding of water risk drivers can be used to improve portfolio water heat mapping so that the entire cycle can begin again as needed.

ASSET CLASS ANALYSIS

When water resource systems fail or become unstable, economies, businesses, communities and investors can face financial risks across all asset classes. Regional drought, flooding or water quality degradation can impact the economic growth of entire regions and countries, hitting a large swath of sectors and investments. The World Bank, for example, estimated that water scarcity risks could cost some regions up to 6 percent of their GDP. Many investors are therefore looking beyond individual security analysis and traditional political and macroeconomic indicators to research the connections and common-pool resources that these economies and securities (and therefore also investment funds) rely upon to create long-term wealth. Thus, water risk analysis should take place not just at the security buy/sell decision-making level but also at the strategic asset allocation and portfolio levels.

Questions that can potentially be answered by a systems approach include:

Understanding Risks

- Is there high aggregate exposure to regions in which current or future economic and political stability or growth is at risk due to water? For example, India, South Africa, Brazil and the United States have all faced potentially economically and socially destabilizing water issues. The World Bank indicates that, in certain regions, GDP growth can also be significantly affected by water.

- Are there red flags or indicators that regional water resources may be facing tipping points and becoming less resilient and reliable, posing significant economic or investor risks, or that competition for water could be raising social license risks?

- Is there high aggregate exposure to high-risk and high-impact industries, or water risk issues in absolute terms as well as against relevant benchmarks?

Figure 27: Portfolio water risk prioritization. Portfolio assessment and prioritization help to narrow the universe of companies to research more deeply for water risk exposure.
Mitigating Risks

- Which water risks can be mitigated through financial asset diversification, and which cannot?
- How can portfolio managers across different asset classes and portfolios work collectively to mitigate these risks or create opportunities and positive impacts? For example, if a certain industry employs particularly high-risk water practices, how can investors collectively work with the industry trade group to improve practices?

In trying to answer these questions, investors may be surprised by some of the regional systemic water risks they face. For example, a global equity fund that is overweight mining assets may have significant exposure to the high-water-stress regions of Australia, South Africa, Chile and Peru. Another may find that its shale energy exchange-traded fund faces potentially very large exposure to highly material social license-to-operate risks related to wastewater disposal. Another investor may find that holdings in the food and beverage sector may be overly reliant on commodities in their supply chains that are produced only in drought-prone or water-stressed regions.

In addition to looking at broad risks and impacts, investors may also find it helpful to refer to some of the key concepts of systems science to guide their research and analysis (see Box 5). In particular, systems analysis can assist investors in uncovering the fundamental drivers of ESG risks and assessing the appropriateness of risk-mitigation responses. Portfolio heat mapping can be modified and adjusted to study water risks across asset classes. An illustrative example (Figure 28) shows holdings across four different asset classes, with assumed high-water-risk sectors or securities in blue. The investor has also mapped exposure to areas with high water competition (often called water stress) in blue. For example, by mitigating climate risks in a Mexico City water utility owned in a private equity portfolio, an investor may also be mitigating risks for a Mexican low-income housing developer in its public equity portfolio, as well as risks in the debt it owns in a local bottling company.

Box 5: Investor Benefits from Using a Systems-Level Approach to ESG and Water Risk Research

- Provides a comprehensive view of the fundamental drivers of risk and the potential outcomes of mitigation activities.
- Discriminates between which actions may address risks only in the short term, versus those that provide long-term solutions.
- Long-term-oriented investors would benefit most from a systems-level perspective because it provides insights into the connections between economic actors and the systems they rely upon, as well as the tipping points that can lead to shocks and economic instability.
- Systems analysis can provide insights into which risk mitigation approaches require collective effort versus individual action. For example, some issues can only be solved by the stakeholders, such as companies, investors and water authorities, in a water basin working together.
Figure 28: Illustrative example of water risk analysis across asset classes, where columns represent holdings by asset class. The blue-shaded areas are securities with high water risk exposure. The dark blue represents investment holdings with exposure to water risks in the Colorado River Basin.
Chapter 5: Engagement

Chapter Summary

Investors who take an active ownership approach on ESG and water issues can change corporate practices and policies, improve investment returns and create long-term investment value. It’s considered good practice to establish engagement strategies and proxy voting guidelines that align with sustainable investment goals and water priorities (as outlined in Chapter 2, Establish Water Priorities). Whether investors are pursuing active or passive strategies for their portfolios, all investors should consider engaging their portfolio companies and developing clear guidelines and engagement policies concerning ESG issues. This chapter provides a suite of resources to guide shareholders in this process, including the resources listed below:

Key Supplemental Chapter Resources

- Resources for Corporate, Fixed Income and Private Equity Water Engagement Questions
- Shareholder Resolutions and Trends Linked to Water
- Database: Proxy Voting Guidelines that Integrate Water
- Visual: Hierarchy of Engagement and Water Benchmarking Process
- Case Study: Coordinated, Collaborative Investor Engagement on Water Risks in the Hydraulic Fracturing Industry — Lessons Learned from Asia

THE IMPORTANCE OF INVESTOR ENGAGEMENT

Many investors have an active corporate engagement strategy, aimed at gathering information on potential risks and improving portfolio company practices and policies. Ultimately this engagement can mitigate ESG and water risks and, in some cases, generate positive impacts.

As shareholders and bondholders interact and engage with companies and other entities on water and ESG issues, their actions can help:

- **Promote long-term financial stability**: Engaging in ESG and water-related management actions — such as goal setting and disclosure, governance oversight and ensuring robust supply chains — enhances a company’s ability to generate long term financial returns.

- **Provide business benefits**: Shareholder engagement interactions can potentially help corporate boards and management make better-informed decisions, especially by broadening stakeholder engagement on hot-topic issues, such as environmental or social license-to-operate factors. The incorporation of sustainability considerations into strategic planning, risk management and daily operating practices is a good business practice for many companies. It should be considered part of standard business DNA and the “business norm.” Furthermore, dialogues between shareholders and issuers can provide better communication and understanding between parties on freshwater concerns and opportunities.

- **Uphold fiduciary duty**: Active engagement also shows responsibility as an investor. For beneficiaries who have long-term financial needs, active shareholders help ensure that corporate leadership and management is focused on critical ESG issues and that portfolio companies are exploring new approaches to deal with material risks. This helps protect the long-term value of assets, while providing additional benefits to shareholders and their beneficiaries.

- **Provide insights**: Engagement gives investors helpful information about the quality of management, strategy, and the capacity and ability of companies to respond to current and future water risks. Additionally, it can help investors develop better insights into investment and growth opportunities.
BUILDING A SUCCESSFUL WATER ENGAGEMENT STRATEGY

Building a successful water engagement strategy begins with aligning a firm’s water engagements with its investment beliefs and policy statements. Key suggested steps are as follows:

1. Determine material water risk factors for portfolio companies or high-risk industries and decide engagement priorities, scope and tactics as a fund. These can include, but are not limited to: Dialogues, letters, investor statements, shareholder resolutions and collaborative engagement models.


3. Publish corporate water management expectations.

4. Embed water in proxy voting guidelines (as described in Chapter 2).

Engagement Questions on Water Risk Drivers: Using the Water Risk Dashboard

It’s helpful to use the Water Risk Dashboard as a framework for engaging with portfolio or target companies on water risk management. Below are engagement questions and types of data to request, to help investors assess a company or entity’s corporate water dependency, security and response.

Water Dependency

- Where in the company’s value chain do water risks occur (e.g., in the company’s supply chain, its own operations, wastewater discharge practices, product use or disposal impacts)? Can those water needs be quantified and compared to those of industry peers?

- What percentage of operations or revenue is exposed to significant water risks, and what is the nature of those risks?

- At what stage in the product or service lifecycle are water needs highest?

- What are the volumes of water required, and wastewater generated, per unit of production versus industry peers?

- Has the company assessed its water/energy footprint? Do considerations for new energy generation sources take water into account?

- Are water risks related to the company’s electricity demand? Is power production sensitive to reservoir or river levels?

Regional Water Security

- Provide details on regions or watersheds of importance to the company.

- What is the nature of your water risk exposure? Are your water risks in key regions physical, regulatory, social or a combination of these?

- What is the nature of your physical water risks? Are they related to surface or groundwater resources, and the need for large quantities of water? Or are they linked to the need for water systems to assimilate waste streams and any product impacts on the quality of water?

- Do regulatory risks stem from lack of oversight by local water regulators and authorities? Is the risk of water resource degradation in the region due to company operations or other cumulative impacts in the region?

- Is the company experiencing or exposed to regulatory risks deriving from rapid changes in regulatory demands that will lead to higher future costs and capital expenditures?

- Provide information on trends in the company’s regulatory fines related to water. How do these compare to industry averages? If they are above industry averages or acceptable levels, why is this occurring?

- Do you have any potential social license-to-operate risks related to water, now or in the future?

- Which communities or environmental systems may experience a potentially large impact from corporate operations?

- Quantify to the degree possible the financial risk exposure from the dependency and security water risks listed above.

Water Response Engagement Questions

Water Governance

- How are your board and executive leadership involved in the management of water-related issues? Who has oversight of water-related issues within the company? Is compensation linked to ESG water oversight?

- Is the company integrating water into business strategy, product design and/or capital and financial planning?
Data, Disclosure and Performance Tracking

● Does the company have plans to increase transparency into its water risks on its website or through clear, standardized reporting frameworks (10-K’s, GRI, CDP or SASB, etc.)?

● Does the company have context-based water goals in its direct operations? In its supply chain?

Management of Physical Risks

● What is the company’s strategy in water-stressed regions to minimize potential supply disruptions or cost increases? How are you implementing this strategy?

● How does the company think about vulnerable watersheds within its supply chain? Are these considered in the supplier code of conduct, sourcing policies or contract renewals?

Management of Regulatory Risks

● How is the company supporting sustainable water management? How is the company helping to improve local water systems or infrastructure in any high-risk water geographies in which it is operating?

Management of Stakeholder, Social Risks

● How is the company working collectively with other companies and users in the watershed? How is the company avoiding conflicts over water with these other users?

● Does the company participate in voluntary initiatives (e.g., CEO Water Mandate) to share knowledge and build understanding of best practices?

● Is the company considering making a public commitment to the Human Right to Water and Sanitation, which should act as an ethical lens through which decisions are made (and is this policy being implemented across the business and supply chains)? Is implementation third-party audited?

● Quantify to the maximum degree possible the financial risk mitigated by the management strategies above.

A more conversational engagement approach to the dependency, security response dashboard that investors can follow is identified in Box 6.

Box 6

What do you do? Where do water risks lie in the value chain? From supply chain to end of product lifecycle?

Where do you do it? What are the regions of concern and what water risks are most relevant or material?

What are you doing about it? What is the company’s response to these risks? And how much might the company lose due to water risks?

Equity, Fixed Income and Private Equity Water-Engagement Questions

Regardless of the industry and asset class, water is a growing material risk that investors are elevating in their corporate and other engagement strategies. The resources below provide engagement question recommendations:

● Sector-Specific Engagement Recommendations in the online Toolkit Sector and Industry Water Risk Database

● Water Regulatory and Stakeholder Engagement Recommendations for Private Equities (Chapter 3)

● Fixed-Income and Municipal Bond Engagement Recommendations and Risk Framework

CONSIDERING COLLABORATIVE ENGAGEMENT

Portfolio managers and analysts engage portfolio companies and market players both independently and in collaboration with other shareholders. Collaborative engagement and action is particularly relevant given the shared, common nature of water resources. Coordinating shareholder requests also can be effective in leveraging resources and motivating companies to respond to various water-related business risks.

Coordinated, Collaborative Investor Engagement on Water Risks in the Hydraulic Fracturing Industry — Lessons Learned from Asia, Martin Currie (A Legg Mason Company).
Coordination also helps investors to determine top issues of concern and prevents companies from excluding duplicative shareholder resolutions from their proxy statements. Many investor networks have water working groups, focused on deepening their understanding of material water issues and on collaboratively engaging companies when needed (Table 5).

**Collaborative Engagement Spotlight: Engaging the Food and Beverage Sector on Water Risk**

Water risks to sustainable agriculture (water quality and quantity factors) have become a key focus for many investor groups, including Ceres’ Investor Network, Interfaith Center on Corporate Responsibility (ICCR), Principles for Responsible Investment (PRI), and Global Engagement Services (GES). In 2015, using the benchmarking scores and investor analysis from Ceres’ Feeding Ourselves Thirsty, 60 global investors with $2.6T in AUM (investor members of Ceres, PRI and ICCR) signed a letter requesting increased water risk management and disclosure from the 15 lowest-scoring companies. As a result of the letter and accompanying investor resolutions and dialogues, 13 companies disclosed their water risk response via CDP’s 2016 Water Questionnaire. This initial response signified progress in advancing food companies’ ability to understand and address their water impacts and risks, which is a critical first step for underperforming companies.

**Aligning Engagement Priorities with the Sustainable Development Goals and SDG 6**

A growing number of institutional investors are aligning their responsible investment goals and engagements with the U.N.’s 17 Sustainable Development Goals. Shareholders in particular are using them as guidance in steering and framing their ESG priorities. For some investors, it makes sense to concentrate on specific SDGs of concern from a materiality perspective — and those that fit within the firm’s larger ESG areas of focus. However, it’s important to note that the SDGs are not an investment framework.

A handful of case studies spotlight how global investors are measuring the impact of their investments toward the Sustainable Development Goals, especially SDG 6: “Ensure availability and sustainable management of water for all.” See the Case Study: Aiming for Portfolio-Level Water Neutrality, ACTIAM.

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**Table 5: Investor Resources and Membership Groups on Water, ESG/Climate Issues and Associated Engagement Guides**

<table>
<thead>
<tr>
<th>Investor Groups and Organizations that Provide Education, Networking and Resources on Water/ESG</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ceres’ Investor Water Hub</td>
<td></td>
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<tr>
<td>• Interfaith Center for Corporate Responsibility (ICCR) — water working group</td>
<td></td>
</tr>
<tr>
<td>• Principles for Responsible Investment (PRI) — water risk engagement working group</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>ESG/Climate</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ceres’ Investor Network — North America</td>
<td></td>
</tr>
<tr>
<td>• Asia Investor Group on Climate Change (AIGCC) — Australia and Asia</td>
<td></td>
</tr>
<tr>
<td>• Investor Group on Climate Change (IGCC) — Australia and New Zealand</td>
<td></td>
</tr>
<tr>
<td>• Institutional Investors Group on Climate Change (IIGCC) — Europe</td>
<td></td>
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<tr>
<td>• International Corporate Governance Network (ICGN) — Global</td>
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<tr>
<td>• Council of Institutional Investors (CII) — North America</td>
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<tr>
<td>• US SIF and European SIF</td>
<td></td>
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<tr>
<td>• Global Investor Coalition — Global (Ceres, AIGCC, IGCC, IIGCC)</td>
<td></td>
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<tr>
<td>• Principles for Responsible Investment (PRI)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Shareholder Engagement Guides and Resources on Water/ESG</th>
<th>21st Century Engagement: Investor Strategies for Incorporating ESG Considerations into Corporate Interactions (Ceres and BlackRock)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Guide to Filing Proxy Resolutions (ICCR)</td>
<td></td>
</tr>
<tr>
<td>• Introductory Guide to Collaborative Engagement (PRI)</td>
<td></td>
</tr>
</tbody>
</table>

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SHAREHOLDER RESOLUTIONS AND PROXY VOTING

Filing Shareholder Proposals on Water Issues
Shareholder resolutions are an engagement tool used by investors in certain geographies to try to influence corporate behavior and mitigate financial risk. Resolutions provide investors an opportunity to highlight substantive risk and management issues and to ask for increased disclosure, policies or action on a particular issue. Ultimately, resolutions can spur productive dialogue between investors and company management that eventually leads toward improved corporate management of the ESG issue at hand. A growing number of U.S. and international investors have been filing and co-filing resolutions with U.S. listed companies, in addition to exploring resolutions with internationally listed companies. There are several resources and organizations available to help guide investors on filing shareholder resolutions.  

Over the past 14 years, hundreds of resolutions on water have been filed by investors. Many of these resolutions have led to successful negotiations with the companies involved and cover issues ranging from water risk disclosure, to supply chain resiliency, the human right to water and water quality concerns, among many others. Explore a wide sample of water-related resolutions filed since 2011 through Ceres’ Climate and Sustainability Shareholder Resolution Database. 

For a comprehensive overview of shareholder engagement trends related to water and sector findings, read Ceres’ new analysis, see dataset below.

Integrate Water in Proxy Voting Guidelines
Investment teams and governance staff use guidelines to oversee proxy voting and to provide clear direction on how voting fiduciaries should cast proxy votes on key ESG issues, including water. Ceres has pulled proxy voting guidelines from nearly 50 institutions with water-related language (See Database of Proxy Voting Guidelines That Integrate Water). Global investors use these guidelines to directly prompt responsible and consistent voting on water-related shareholder proposals.

It is important to revise proxy-voting guidance on an annual or semiannual basis to drive better engagement protocols. This process can help investment teams account for the latest market risks and help steer portfolio companies toward better water stewardship. Additionally, investors can use their guidelines to engage third-party proxy voting services such as ISS and Glass Lewis on best in class voting recommendations.

Future Trends: A Spotlight on Growing Topics of Interest in Water-Related Engagements
- Supporting the Sustainable Development Goals (specifically, SDG 6)
- Improving water quality and watershed systems
- Driving systems change by engaging standard-setting bodies or advocating for local, federal or global water policy issues
- Encouraging the uptake of context- or science-based water goals
- Joining international, collaborative engagements on water

SEC Sustainability Search Tool: Water
The Ceres SEC Sustainability Disclosure Search Tool helps investors understand how companies are tackling the material risks and opportunities they face from sustainability issues like climate change and water availability (and quality). The tool allows users to access disclosures in the annual filings of over 4,500 U.S. companies with the U.S. Securities and Exchange Commission relating to water availability, scarcity, quality/pollution, regulation and innovation.

Ceres SEC Sustainability Disclosure Search Tool
TRACKING ENGAGEMENT PROGRESS OVER TIME

Investors have wide-ranging approaches to prioritizing their water-related engagements, from benchmarking company progress through key milestones, to selling off their shares should ESG progress not be attained. The duration of engagement with companies on ESG issues also varies greatly. Some fund managers might allocate one year to engaging with low-performing companies on ESG criteria and performance improvement before a divestment decision is made, while others might have a three-year time horizon. It takes time to establish a platform of mutual trust, awareness and understanding of the issues and to ensure that the right participants are in the room (beyond IR staff). A number of fund managers and owners believe strongly in the value of continuous, long-term engagement. Shareholders who are committed to corporate engagement often have in place benchmarks or milestones for tracking progress against goals. The Interfaith Center on Corporate Responsibility (ICCR), a coalition of faith- and mission-based investors, has been actively engaging with companies across a broad range of ESG and water issues. Dialogues with some companies have evolved into deeply collaborative relationships, some of which span a decade of work and cover a wide set of issue areas. In engagements such as these, it is important for investors to track and benchmark progress to ensure efforts are productive (Figure 29).

DRIVING SYSTEMS CHANGE

In addition to company-specific engagements, many managers commit time and resources to work with standard-setting organizations and external stakeholders on improving the integration of extra-financial (and water) risk data and issues in the greater market. The following institutions are important to investors in systems change:

- National fund management regulations and standard-setting bodies (e.g., the Securities and Exchange Commission in the U.S.)
- Finance industry associations (e.g., CFA Institute)
- World Federation of Exchanges and regional stock exchanges
- Industry organizations (e.g., food and beverage, mining, apparel, oil and gas)
- Disclosure bodies (e.g., International Integrated Reporting Council, CDP, Global Reporting Initiative, SASB)
- Global investor networks (e.g., Ceres Investor Network, PRI, ICCR)
- Local universities (collaborating on joint projects by sponsoring academic and intellectual analysis can create centers of excellence in investment and corporate sustainability, train the next generation and leverage innovative thinking)

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**Figure 29:** Visual of the ICCR Hierarchy of Impact. The hierarchy was developed to guide the progress of corporate water stewardship best practices through key steps 1–8.

Description: The ICCR Water Engagement tool was developed as a tiered internal benchmarking system, so that it can be applied to all companies, from those just taking initial steps in water management, to those with a more advanced approach. Investors can use such tools to track their engagement process and set strong goals and expectations with their portfolio companies. Note the water-specific benchmarking tool is an example drawn from ICCR’s larger engagement toolset.

Source: As originally shown in Ceres’ Investor Water Handbook. To explore more, access the report and additional details on pg. 38.
Endnotes

17. Kiernan, op. cit.
20. Blanchet et al., op. cit.
21. Many of the products in the consumer, materials and pharmaceutical sectors have the potential to impact water systems. An example is the alarming level of micro-plastics, pharmaceuticals and other persistent toxic chemicals now found in freshwater systems. See Schwarzenbach et al., “The Challenge of Micropolutants in Aquatic Systems,” *Science* 313, 2006.
24. Brian Moss, "Water Pollution by Agriculture," *Philosophical Transactions of the Royal Society B*.
30. See Ellsworth and Spalding, op. cit., for an in-depth analysis of why beliefs matter and how to establish them.
33 Investment policies can take various forms, including high-level statements on an organization's website, communication on a responsible investment policy document, and a range of policy documents covering different areas, codes or defined Investment Policy Statements.

34 Modified from Initiative for Responsible Investment, op. cit.


41 Blanchet et al.


46 For information on sustainable water infrastructure models, including revenue preservation, see: https://www.ceres.org/issues/water/water-infrastructure-and-financing.


48 For acquisitions, additional questions should include: What is the company’s history of regulatory violations and bad practices and compliance? Does it misrepresent its environmental track record? How accepted is it in the community? What is its history of wastewater treatment practices? Are there opportunities to change the billing system, reduce leakage or change to an alternative energy supplier? Are there opportunities related to water use and wastewater that can create efficiencies or new revenue streams?

49 For more information on green bonds, see Climate Bonds Initiative, “Explaining green bonds,” https://www.climatebonds.net/market/explaining-green-bonds.

50 This assessment is Ceres’ interpretation of SASB's indicators. If any of these indicators were classified as high, then the overall industry rating was labeled high. If the highest materiality classification was medium, then the industry was classified as medium. If the SASB materiality map determined that water risks were not likely, then the industry was classified as low. It should be noted that a low classification does not mean that an industry does not face water risks or impacts to resources and communities. For more information see www.SASB.org.

51 A good example of this is the Caisse de dépôt et placement du Québec's engagement with the Mining Association of Canada on better water-management practices.


