THE Water Research FOUNDATION

Communications Related Projects

Water Research Foundation subscribers can download and/or order completed reports on our website at www.waterrf.org. More information on specific projects can be obtained by contacting John Albert, Chief Research Officer, at 303.734.3413.

Risk Communication

Four Steps to Effective Cyanotoxin Communications: A Risk Communications Toolkit [#4697]
Corona Environmental Consulting, LLC

This project provides materials, templates, and tools for utilities, regulatory agencies, and water professionals to better communicate about the risks associated with cyanotoxins in drinking water supplies. The research team leveraged interviews with utilities and a digital engagement platform with a broad range of stakeholders to create user-centered, compelling, and informative messages. The approach is designed to prepare messages and materials to build upon previous communications research and tools and resources developed by the Water Research Foundation (WRF), the American Water Works Association (AWWA), the Centers for Disease Control and Prevention (CDC), EPA, state regulatory agencies and others.
Published in 2018.

Terminology for Improved Communication Regarding CECs [#4551]
King's College London

This project's primary aim was to develop successful communication tools that ensure consumers can easily find and understand tailored water quality information relating to contaminants of emerging concern (CECs) and risk from a reputable information source, such as a water utility website. To this end, the researchers investigated consumer information use patterns, needs, and preferences, and their understanding of key terminology. Current information practices and materials utilized in the U.S. water industry, as represented by seven participating utilities, were also evaluated. Research partner: UKWIR.
Published in 2017.

Context and Core Messages for Chromium, Medicines and Personal Care Products, NDMA, and VOCs [#4457]
CH2M HILL

This project developed core messages for the water community to communicate with different audiences about the risks of key, priority CECs that, not only help explain the risks, but also account for consumer risk perceptions. It also provides guidance to water utilities regarding risk communication for different types of CECs in general. In addition to the research report, the project produced an animated film, Protecting Our Drinking Water, which provides context about the following four targeted substances in drinking water: chromium, medicines and personal care products, NDMA, and VOCs . The project also produced question-and-answer articles (referred to as core message sheets or "Thinking about" sheets) for each of the four substances. Lastly, the project developed background technical information sheets to provide succinct information related to occurrence, toxicity, and treatment efficacy for each of the substances. The animation is available to view on the project page. The animation can also be downloaded and displayed on your Website. The Core Message Sheets and Technical Information Sheets are available under Project Resources/Project Papers.
Published in 2015.

Identifying the Gaps in Understanding the Benefits and Costs of Boil Water Advisories [#4385]
Stratus Consulting Inc.

This project (1) gathered data on the terminology, application, occurrence, practices, costs, effectiveness, and impacts of boil water notices (including advisories and orders) in North America, (2) synthesized the current knowledge and defined the costs and benefits of boil water notices, and (3) suggested methods to increase the ability to document costs and benefits of these public communication and advisory practices.
Published in 2014.

Downstream: Context, Understanding, and Acceptance (The Effect of Prior Knowledge of 'Unplanned' Potable Reuse on Acceptance of 'Planned' Potable Reuse) [#1658]
JACOBS

Researchers have determined that the public must accept the idea of drinking water reuse before it can become a key strategy for sustainable water supply. Vocal public opposition to reuse projects, even those that do not involve drinking water reuse, has halted projects from being implemented. The project evaluates whether people are likelier to accept drinking water reuse when they understand the full context of the water cycle: that all water is used and reused. Specifically, that treated wastewater effluent is discharged into rivers that become sources of drinking water downstream. This project did not address reuse resulting from the discharge of treated wastewater effluent to groundwater.
Published in 2013.

Talking About Water: Vocabulary and Images that Support Informed Decisions about Water Recycling and Desalination [#1638]
New Water Resources

This project investigated how the images and words used to communicate with the public can affect their acceptance of water reclamation and desalination projects. This research defined the issues related to the acceptance of water reuse and desalination, reviewed published materials, and conducted qualitative and quantitative field investigations. The report includes a glossary that can be used in communicating about water projects, including reuse and desalination,

and recommendations for the water community to improve communication and public acceptance.
Published in 2011.

Water Utility Tool for Responding To Emerging Contaminant Issues [#4169]
CDM
This project developed an electronic tool that drinking water utilities can use to respond to emerging contaminant challenges (specifically, EDCs and PPCPs). Specifically, the tool provides information and references, and identifies considerations for water utilities when planning monitoring programs, analytical methods, treatment processes and treatment enhancement options, source protection efforts, risk assessment, and effective communication strategies that can be used with customers and other stakeholders on EDCs and PPCPs. Note: The tool can be downloaded from the project page by clicking on Web tools. After downloading the zip file containing the tool, be sure to extract the files. Then open the home.html file.
Published in 2011.

Contaminant Risk Management Communication Strategy and Tools [#4001]
Jane Mobley Associates
Develops an overall contaminant risk management strategy and individual contaminant tools to help utilities provide this information to customers during routine, emerging, and emergency situations in a more credible and expeditious manner. Research partner: UKWIR.
Published in 2010.

Toxicological Relevance of EDCs and Pharmaceuticals in Drinking Water [#3085]
Southern Nevada Water Authority
Conducted an extensive literature review on the known toxicity of EDCs and pharmaceuticals including naturally occurring EDCs and pharmaceutically active compounds. Analyzed various raw and finished drinking waters for a suite of EDCs and pharmaceuticals, and screens various bottled waters, beverages, and food products. Also uses an in vitro bioassay to assess the estrogenicity of various waters, beverages, and foods. Conducted risk assessments for chemicals of interest based on findings. Tailored Collaboration partner: Southern Nevada Water Authority.
Published in 2008.

Arsenic Rule: Consumer Confidence Report Guidance [#2894]
Stratus Consulting Inc.
Provides guidance to community water systems on how to address Consumer Confidence Report (CCR) and risk communication requirements related to the final arsenic rulemaking, issued by the U.S. Environmental Protection

Agency (EPA). Expands on work in project #2692, Understanding the Impact of CCRs and Emerging Issues Communications on Customers. Further evaluates and refines tools for effective communication specifically with respect to language on arsenic contamination required for inclusion in CCRs. Research partner: EPA.
Published in 2004.

Risk Communication for Emerging Contaminants [#2776]
The George Washington University
Develops, tests, and evaluates proactive strategies and tools for utilities to identify and track emerging drinking water contaminants (e.g., endocrine disruptors, pharmaceuticals, MTBE [methyl tertiary-butyl ether], radon, etc.). Also provides strategies and tools for utilities to proactively and effectively communicate information to the public about the emerging contaminants.
Published in 2004.

Protocol for *Cryptosporidium* Risk Communication [#444]
Carnegie-Mellon University
Presents written protocols for implementing voluntary and mandated *Cryptosporidium* risk communication programs, using standard consumer marketing strategies and established risk communication techniques. Provides methods for utilities to measure the effectiveness of the programs.
Published in 2002.

Inform and Educate

Customer Messaging on Plumbing System Issues [#4664]
Corona Environmental Consulting, LLC
This project developed and validated a series of messages for opportunistic premise plumbing pathogens (OPPPs), with a focus on *Legionella*, to educate various customer groups on the steps they need to take to better protect themselves from waterborne disease from their own premise plumbing.
Published in 2018.

Flushing Guidance for Consumer Premise Plumbing and Service Lines to Avoid or Address a Drinking Water Advisory [#4572]
Corona Environmental Consulting, LLC
This study identified situations when flushing is advisable and explored the best practices for flushing premise plumbing and service lines. The project also provided examples of effective messaging for audiences consisting of homeowners, building managers, and others with control over premise plumbing. This report provided a guidance for premise plumbing flushing based on expert

input, as well as a communications strategy for delivering the guidance based on analysis of past flushing guidance documents and water communication best practices. The guidance and communications strategies are first steps toward development of evidence-based flushing guidance materials and communications strategies. The report also explores the properties of contaminants and how those properties influence whether or how a particular contaminant can be flushed; the make-up and properties of premise plumbing and the impacts of premise plumbing configuration on flushing efficacy; and data gaps in our understanding of premise plumbing flushing and communication with water customers regarding flushing.
Published in 2018.

Rate Approval Process Communication Strategy and Toolkit [#4455]
ARCADIS U.S., Inc
The primary objective of this project is to identify and develop communication strategies and specific messages that utilities can use to gain support during their rate and budget approval process, and complement these communication strategies and messages with a set of scalable and ready-to-use products to support utilities and governing boards throughout this process. In the interim, the Water Research Foundation and Denver Water hosted a Rate Restructure Communication Workshop in July 2014. The objective of the workshop was to share lessons learned from utilities around the county concerning communication strategies that build support for rate changes. The workshop produced a short report and presentations, available under Project Resources on the project page.
Published in 2016.

Development of a Water Utility Primer on EDCs/PPCPs for Public Outreach [#4387]
Intertox Inc.
The goal of this project is to distill and synthesize current information on EDCs and PPCPs into a primer, with supporting citations and communication materials, which drinking water utilities can use to inform and communicate with non-technical audiences. The primer will be a centralized up-to-date data source that can provide a landmark for future summaries of EDCs and PPCPs in water, as well as a reference source for further information.
Published in 2015.

Model Public Communication Plan for Advancing Direct Potable Reuse Acceptance [#4540]
Data Instincts
This project established a framework communication plan and developed an implementable, strategic communication plan to achieve direct potable reuse acceptance. Research partner: Water Reuse Research Foundation.
Published in 2015.

Development of a Public Communication Toolbox for Desalination Projects [#4481]
Data Instincts
The project (1) developed a framework for an education and outreach plan focusing on desalination issues, (2) developed a centralized list of available information regarding key desalination benefits and challenges from reputable agencies, and (3) created information items, including a video titled Desalination: Water for a Thirsty World, PowerPoint presentation to educate colleagues on communicating about desalination (available under Project Resources/Presentations), triple bottom line assessment of desalination, and white paper within the research report.
Published in 2014.

Effective Climate Change Communication for Water Utilities [#4381]
Stratus Consulting Inc.
This project produced a guidance document to assist water utilities in communicating about climate change, with an emphasis on building support for water utility climate-related adaptation or mitigation investments or projects. A message mapping worksheet is included within the report to help water agencies develop messages that will build long-term support for their specific climate-related actions. The worksheet is also available under Project Resources/Project Papers as a Microsoft Word template for utilities to build their own message mapping strategy. Lastly, the project produced a video to provide water professionals with the information they need to understand the relationship among water, water utility needs, and climate change. Links to the video are available in the report and Executive Summary.
Published in 2014.

Water Footprint: A New Concept for Sustainable Water Utilities [#4378]
MWH Americas, Inc.
The project (1) synthesized and assessed the growing body of work on the concept of "virtual water" that represents the total water embedded in consumer goods and activities, commonly called "water footprints," (2) considered questions of whether and how the concept and metrics of water footprints may help in conveying the value of water to a public that is often unwilling to pay the full cost of the water on which they depend, (3) identified opportunities for drinking water utilities to integrate the water footprint into appropriate planning and communications to support a sustainable water utility and sustainable communities, and (4) proposed a water footprint road map for leadership,

research, or integration opportunities for utilities and the water sector. Research partners: UKWIR and CSIRO. *Published in 2014.*

Best Practices in Customer Payment Assistance Programs [#4004]

Stratus Consulting Inc.

Developed a guidance manual to (1) provide tools to help water utilities select from among many flexible customer payment plans, (2) build effective programs to help customers better manage their water usage (e.g., low flush toilets and shower heads, repair measures), and (3) identify how best to communicate the availability of these programs and others outside the utility that may enhance customers' regular payment of water bills. *Published in 2010.*

Surviving or Thriving in Economic Recession: Strategies of Water Utility Leaders [#4296]

Convened a CEO forum where utility leaders discussed the recession's impacts and shared with peers their experiences and successful strategies for coping with the current economy and its unprecedented impacts. Strategies span operations, capital programs, finance, revenues, risk management, and communications. Leaders identified cost impacts, specific tradeoffs, and sustainability of a wide range of strategies. They also identified opportunities and "silver linings" strategies that would have far-reaching long-term benefits. Additionally, potential ideas for research emerged that would strengthen drinking water utilities responses to future economic challenges. A forum report was developed to share the strategies and discussion highlights with WRF subscribers. *Published in 2009.*

Communicating the Value of Water: An Introductory Guide for Water Utilities [#3113]

Malcolm Pirnie, Inc.

Identifies the benefits of communicating effectively and consistently to constituents about the value of water. Identifies key messages that utilities can use to speak to the value of their product with a variety of stakeholders. Identifies marketing tools that can be used to successfully convey the value of tap water. Identifies water utilities that have successfully communicated the value of their tap water, tools used, and associated costs. Develops a guidebook to help drinking water utilities effectively communicate the value of their tap water. Includes a CD-ROM. *Published in 2008.*

State of Knowledge of Endocrine Disruptors and Pharmaceuticals In Drinking Water [#3033]

Southern Nevada Water Authority

Synthesizes existing knowledge on endocrine disrupting compounds (EDCs), pharmaceutically active compounds (PhACs), and personal care products (PCPs) in drinking water supplies. Also includes what is known about health effects, analysis, occurrence, and behavior in drinking water treatment processes for this broad range of compounds. *Published in 2008.*

Addressing Concerns About Tastes and Odors and Cyanotoxins in Tap Water [#2746]

City of Phoenix (Ariz.)

Develops a multi-barrier management plan to control taste-and-odor problems. Implements several algae control measures to reduce other algae-related problems such as potential health-related problems caused by algal biotoxins. Develops proactive controls to minimize the growth of taste-and-odor producing algae. Also develops responsive controls to treat taste-and-odor compounds if proactive measures are not effective. Tailored Collaboration partner: City of Phoenix. *Published in 2007.*

Early Warning and Management of Surface Water Taste-and-Odor Events [#2614]

Metropolitan Water District of Southern California (Los Angeles) and McNamee, Porter & Seeley, Inc.

Develops predictive tools or methods for taste-and-odor (T&O) events in lake, reservoir, and river sources. Reviews and adapts existing, successful water quality tests, sensory methods, and remote sensing technologies used in water supply and other industries for the prediction of T&O events. Also reports on a survey of existing successful customer communication strategies to proactively communicate T&O events to the public. Includes a CD-ROM. *Published in 2006.*

Message Management: Effective Communications [#2766]

Jane Mobley Associates

Improves utility knowledge of the importance of developing a proactive and effective public relations strategy with customers. Also assesses various methods that were developed outside of the drinking water industry and media not typically used by the industry for communicating with customers. *Published in 2005.*

The Value of Water: Concepts, Estimates, and Applications for Water Managers [#2855]
Stratus Consulting Inc.
Helps the drinking water industry to further identify and express the qualitative aspects and driving forces that are affecting how water economics are changing. In addition, helps water utilities respond effectively to the emerging policy debate regarding the role of drinking water supply and distribution in development and national prosperity.
Published in 2005.

A Guide for the Implementation and Use of Chloramines [#2847]
Black & Veatch
Studies chloramination operations in order to capture best practices. Also presents effective approaches to customer interactions in anticipation of converting the distribution system disinfectant from free chlorine to chloramines. Includes a CD-ROM. Tailored Collaboration partner: Tampa Bay (Fla.) Water.
Published in 2004.

Water Utility Self-Assessment for the Management of Aesthetic Issues [#2777]
McGuire Environmental Consultants, Inc.
This project provides guidance for utility self-assessment in three areas: identification of potential and real taste-and-odor (T&O) problems, management of T&O problems when they occur, and communication during T&O events within the utility and with the public. A webtool is posted on the project page, which contains the Taste and Odor Self-Assessment and the Taste and Odor Decision Tree. These tools are designed to help utilities understand how well-prepared they are for a T&O event, and plan their response in case an event occurs.
Published in 2004.

Synthesis Report on *Cryptosporidium* [#372]
Black & Veatch
Identifies the available information on past, current, and planned research activities concerning *Cryptosporidium* for use by water utility management. Answers questions pertinent to utility operations and management and identifies gaps in the informational base. Published as two reports: in 1997, Cryptosporidium *Answers to Questions Commonly Asked by Drinking Water Professionals*, and in 1998, *Critical Evaluation of* Cryptosporidium *Research and Research Needs*.
Published in 1997/1998.

Guidelines for Implementing an Effective Integrated Resource Planning Process [#920]
Wade Miller Associates, Inc., West Virginia University, and Tellus Institute
Describes successful methods of conducting and implementing integrated resources planning (IRP), a comprehensive water resource planning technique. Includes conceptual and working definitions of IRP and, through case studies, shows elements of successful methods used to achieve consensus and to acquire regulatory approvals and public acceptance.
Published in 1996.

Effective Customer Communication

Forging Powerful and Sustainable Relationships Between Clean Water Agencies and the Community [#4678]
KKS Advisors
This project investigated how clean water agencies (CWAs) can leverage emotional motivators in public engagement programs to create longstanding relationships with the community. Effective messaging and educational materials and/or programs that take advantage of research on emotional connectors is vital to tangibly demonstrate the value of water and the technology that creates clean water. The project objectives were to assess which emotional motivators and customer engagement practices are most effective at fostering sustainable community relationships for water utilities and in different local contexts and identify leading practices in customer engagement. The project produced a report and self-assessment tool to support water agencies in adopting these practices.
Published in 2019.

Consumer Perceptions and Attitudes Toward EDCs and PPCPs in Drinking Water [#4323]
King's College London
This project developed tools and guidance on understanding consumer perceptions and attitudes towards endocrine disrupting compounds, pharmaceuticals, and personal care products (EDCs/PPCPs) in drinking water to improve future communications and responses by the drinking water industry. In addition to the research report, the project developed 5 recommendation documents for different utility personnel, a document containing lists representing the most prominent terms used to refer to EDC and PPCP contaminants in water in the U.S. media, and a PowerPoint presentation that summarizes the results, which utilities can use for their own presentations. These additional deliverables are available on the project page under Project Resources.
Published in 2013.

Assessing Customer Preferences and Willingness to Pay: A Handbook for Water Utilities [#4085]
University of New Mexico
Develops more robust tools to better characterize customer input to utility investment priorities. Reviews survey approaches for eliciting accurate customer preferences, describes how such tools have been used in public decision-making, and tests the tools in water utility customer surveys. Also develops a handbook that provides guidance to utilities and their vendors on designing, implementing, and analyzing customized "willingness to invest" surveys for typical utility investments.
Published in 2011.

Water Conservation: Customer Behavior and Effective Communication [#4012]
ICF International
Investigates residential customer behavior relating to water use so that water utilities can develop appropriate water conservation communication tools and strategies to reduce residential customer water consumption. Investigates demographic (i.e., age, ethnicity, income), geopolitical, and other factors that affect water use behaviors of residential customers. Also investigates the effect of communication tools, strategies, and messages on water use and conservation behavior of residential customers, and the relationship between selected factors and selected communications. Research partner: EPA.
Published in 2010.

Customer Acceptance of Water Main Structural Reliability [#2870]
Stratus Consulting Inc.
Develops a methodology for utilities to assess customer perceptions, attitudes, and expectations for water system reliability, for their tolerance to service disruptions and construction impacts, and for their willingness to pay for expected levels of service. Develops a format for quantifying these factors in a way that can be incorporated into an infrastructure decision-making process, along with the technical and economic analyses traditionally used.
Published in 2005.

Developing Customer Service Targets by Assessing Customer Perspectives [#2690]
PA Consulting Group, Inc.
Develops customer-driven customer service performance targets and measures for drinking water utilities by assessing customer perspectives and soliciting customer input.
Published in 2004.

Public Perception of Tap Water Chlorinous Flavor [#2639]
Carollo Engineers
Evaluates public perception of chlorine taste and odor in drinking water and the resultant acceptance level. Also identifies options for utilities to improve tap water flavor and customer perceptions to chlorine residuals. Includes a CD-ROM.
Published in 2004.

Understanding and Enhancing the Impact of Customer Confidence Reports [#2692]
Stratus Consulting Inc.
Evaluates the impact and effectiveness of utility communications required by the Consumer Confidence Report (CCR) program. Includes researching customer perceptions about their drinking water utility, customer understanding of current and emerging water utility issues, and effectiveness of the utility communication program. Also considers communications about arsenic. Research partner: EPA.
Published in 2004.

Consumer Attitude Survey Update [#394]
Robert Hurd & Associates, Inc.
Updates the 1993 survey (project #802) with survey data from 1996–97 at the national level. Discusses trends in public confidence and expectations, perceptions, and satisfaction. Also identifies the driving factors behind these attitudes and trends, and assesses the impact of media on public confidence and customer satisfaction. Discusses the implications of these findings for measuring customer attitudes at the local utility level. A report of partial findings is available to WRF subscribers.
Published in 2003.

Consumer Perceptions of Tap Water, Bottled Water, and Filtration Devices [#2638]
Carollo Engineers
Provides information on drinking water utility customer attitudes and perceptions for use by water utility personnel in customer education and satisfaction programs and in public relations. Focuses on point-of-use applications and bottled water use.
Published in 2003.

Tools and Methods to Effectively Measure Customer Perceptions [#466]
Thames Water Utilities (U.K.)
Evaluates available assessment tools and methods that measure customer perceptions and changes in their opinions toward drinking water utilities and utility services.
Published in 2001.

Consumer Attitude Survey on Water Quality Issues [#802]
Apogee Research, Inc.
Describes a telephone survey of 1,603 adult consumers in the United States to determine their views on water quality issues and the water utility industry. Includes results of interviews with a small cross section of environmentalists, mayors, and water utility general managers nationwide. Also covers a follow-up survey to assess the impact of the cryptosporidiosis outbreak in Milwaukee on public attitudes and perceptions in Milwaukee as well as the rest of the nation. Research partner: AWWA.
Published in 1993.

Public Attitudes Toward Water Utilities [#115]
Audits and Surveys, Inc.
Reports results of a statistically valid random telephone survey of U.S. households on public water systems concerning attitudes toward drinking water quality, safety, and costs. Published in *Journal AWWA*, 78(6):34–40, June 1986.
Published in 1986.

Stakeholder Collaboration

Hospital Discharge Practices and Contaminants of Emerging Concern in Water [#4616]
This project will improve understanding on the current discharge and treatment practices of health care facilities and their efficacy to manage the risk of contaminants of emerging concern (CECs), both chemical and microbiological. It will also investigate what regulations exist regarding such practices and how they are communicated with water utilities.
To be completed in 2019.

Sources and Fate of Taste-and-Odor-Causing Compounds in the Missouri River [#4683]
Corona Environmental Consulting, LLC
This research project will focus on gathering knowledge on the taste-and-odor (T&O)-causing compounds found in four water systems on the Lower Missouri River (St. Louis Department of Public Utilities; Missouri American Water; City of Kansas City, MO Water Services; and Water District #1 of Johnson County, Kansas). The primary project deliverable will be an early warning monitoring system that will help utilities drawing source water from this region to predict the potential for an algal bloom, prepare for T&O challenges, and manage operations to mitigate these challenges. The project will also identify the necessary components of a regional communication network for watershed stakeholders to share information and data.
To be completed in 2019.

Integrating Land Use and Water Resources: Planning to Support Water Supply Diversification [#4623]
Brendle Group
This project explored current and future opportunities to diversify water supplies through better coordination between water utilities and the land use planning and development community. The project team conducted a literature review on water supply diversification practices that may be available through the integration of water resource and land use planning. Additional information, gathered through an online survey, stakeholder interviews, and focus groups, was used to develop case studies and inform the other work products. Project deliverables include a summary report, a coordinated planning guide, a literature review, and literature review sources and case study interview database.
Completed in 2018.

Joining-Up Urban Water Management with Urban Planning and Design [#4853]
University of Arizona
This project investigated the key inhibiting and enabling factors in coordinating efforts across the urban planning, design, and water management sectors. The research team conducted a literature review, administered a national survey, and interviewed experts in order to develop tools and strategies to help those sectors work together. Using their data, the team mapped out connections between the sectors; analyzed best practices for integration; and developed a self-assessment tool, the Bridges-to-Barriers Matrix, to improve collaboration. Case studies detail specific examples of both successful and unsuccessful collaboration efforts within each community.
Completed in 2018.

Blueprint for One Water [#4660]
Brown and Caldwell
This project sought to advance the adoption of a One Water approach through the development of a user-friendly blueprint for the practical application of One Water planning. This blueprint is beneficial for utilities across multiple water resource sectors, including water supply, wastewater, reuse, watershed management, stormwater, and energy and resource recovery. The research team summarized case studies and best practices through a stakeholder survey and one-on-one interviews with a group of participating utilities, organized and facilitated a workshop to effectively engage participants, and delivered a clear and comprehensive blueprint for the successful development of an integrated water management (IWM) plan.
Completed in 2017.

National Dialogue on Contaminants of Emerging Concern and Public Health [#4463]
Malcolm Pirnie, the Water Division of ARCADIS
The overall objective of this project was to enhance communication and dialogue between public health organizations, researchers, water utilities, and other organizations about the potential human health risks of CECs in drinking water. The project broadened the national dialogue about the risks of CECs in drinking water by conducting a workshop that included public health professionals and other stakeholders in the discussion, bringing in the public health perspective to inform utility communications on CECs. The final products include a workshop report and six overview papers that summarize topics presented at the workshop. The overview papers are available within the workshop report and individually under Project Resources/ Project Papers.
Published in 2014.

Emergency Communications With Your Local Government and Community [#3046]
University of Louisville
Develops and provide written and oral message statements that can be used by public agencies (water and wastewater utilities) and elected officials to communicate with the public following disasters, as well as during disaster warning alerts. Also includes an action plan for working with the public to increase public awareness of potential public health risks, and appropriate responses.
Published in 2008.

Advancing Collaborations for Water-Related Health Risk Communication [#2851]
The George Washington University
Provides drinking water utilities with a framework for developing an ongoing, collegial relationship with the local public health and medical communities resulting in cooperative, informed decisions, and effective use of communication strategies related to existing and emerging water quality issues. Research partner: EPA.
Published in 2006.

Stakeholder Perceptions of Utility Role in Environmental Leadership [#2854]
ETC Institute
Evaluates stakeholder perceptions (global level) of environmental leadership and the role of their drinking water utility in providing environmental leadership. Also develops guidance for use by utilities in assessing their stakeholders' perceptions and expectations (local level) of their role in environmental leadership and in increasing stakeholder awareness of environmental leadership.
Published in 2006.

Understanding Public Concerns and Developing Tools to Assist Local Officials in Planning Successful Potable Reuse Projects [#2919]
Resource Trends, Inc.
Develops a better understanding of public concerns and potential opposition to indirect potable reuse. Provides an array of approaches (i.e., a toolkit) for utilities to use in working with stakeholders in order to improve planning and implementation of reuse projects. Also provides guidance on using the toolkit and on defining and targeting the resources needed for success. A best practices document was published in 2004 and tools and a Website in 2006.
Published in 2004/2006.

Water Utility/Agricultural Alliances: Working Together for Cleaner Water [#2781]
Conservation Technology Information Center
Identifies strategies for drinking water utilities to build successful source water protection alliances with agricultural producers at the local, state, and national level.
Published in 2005.

Demonstration/Evaluation of the Potential of Public Involvement in Preventing Future Invasive Alien Plant Problems in the East Maui Watershed [#2540]
Maui County (Hawaii) Board of Water Supply
Develops a proactive approach to managing invasive alien plants through early detection, establishment of information support, formation of effective control protocols, and timely response, using public involvement in all phases. Tailored Collaboration partner: Maui County Board of Water Supply. A report of partial findings is available to WRF subscribers.
Published in 2002.

Guidance to Utilities on Building Alliances With Watershed Stakeholders [#468]
Stratus Consulting Inc., Tellus Institute, Technology Planning and Management Corporation, Robert Hurd & Associates, Inc., and Katz & Associates
Identifies typical watershed stakeholders and their objectives in basin planning. Also, develops procedures for building win-win alliances between water utilities and stakeholders for the purpose of overcoming constraints to planning, managing, and developing long-term sustainable drinking water supplies.
Published in 2001.

Public Involvement...Making It Work [#2526]
CH2M HILL
Provides an easy-to-follow process for developing project-specific public involvement programs, integrating them into a utility's decision-making process, and sustaining them for the project duration. Presents a streamlined

public involvement process for gaining stakeholder support and producing viable water resource solutions.
Published in 2001.

Public Involvement Strategies: A Manager's Handbook [#918]
CH2M HILL
Based on research conducted among small and large water utility systems, includes a 10-step process for water utility managers to use in identifying and planning public involvement strategies. Contains how to information throughout the text, helpful strategies for facing tough tasks and avoiding common mistakes, and a catalog of processes and techniques to help implement a public involvement plan.
Published in 1995.

Communication Technology

Defining Optimum Security and Communication Methodologies for Intelligent Water Networks [#4670]
EMA, Inc.
Today's water utilities utilize a wide range of information sources, including SCADA systems, AMI/AMR systems, water quality monitoring systems, security monitoring systems, etc. Each of these information sources, along with the technologies used to transmit the associated data, has evolved largely independently. As such, utilities must deal with numerous communication platforms along with multiple communication protocols and cybersecurity measures. The objective of this project was to first inventory the different types of information sources currently being used by water utilities along with the associated communication media and protocols. The project team then assessed the security risks associated with each information source and its communication approach and determine whether the current cybersecurity measures in use provide acceptable protection. In cases where the current measures appear inadequate, alternate approaches will be recommended.
Published in 2018.

Social Media for Water Utilities [#4638]
Water Words That Work
This research explores the business case for utility executives and board members to invest in, and engage their customers through, social media. The project offers clear, practical guidance on how utilities can integrate social media engagement into their day-to-day operations and provides resources and templates that staff can customize and used any time. The research will help utilities answer strategic questions, such as: When and how should utilities restructure staff, policies, and budgets to begin using social media? How do utilities best harness social media to alert customers during crisis events? Is it worth it for utilities to expose themselves to the hyperbolic debate found on social media, and is there any alternative? The project produced several deliverables, including an executive briefing, literature review, case studies, and web tool.
Published in 2017.

AMI/AMR Standardization for Water Utilities [#4467]
American Water
The primary goals of this project were to identify requirements and specification criteria for AMR/AMI systems and outline approaches to develop and implement standards that address water utility needs. Recommendations are grounded with input from utilities and vendors on the variety of systems in use, and identified requirements and specifications found in other parts of the water industry.
Published in 2016.

Planning and Implementing CIS and AMR/AMI Projects [#4583]
EMA, Inc.
This Tailored Collaboration project identifed typical water industry activities and best practices related to selecting, implementing, using, and upgrading key customer service technologies, from a meter-to-cash perspective. The primary focus was on Customer Information Systems (CIS) and Automated Meter Reading (AMR), or Advanced Metering Infrastructure (AMI) capabilities. Tailored Collaboration partners: Greater Cincinnati Water Works, El Paso Water Utilities, City of Winnipeg, City of Regina, and City of Baltimore.
Published in 2016.

High Performing Information Systems Aligned with Utility Business Strategy [#4316]
Red Oak Consulting
The project provides a comprehensive update of the Water Research Foundation 1993 guidance manual, Instrumentation and Computer Integration of Water Utility Operations (project #434). The update pays particular attention to the alignment of IT and utility business strategic planning.
Published in 2013.

Advanced Metering Infrastructure: Best Practices For Water Utilities [#4000]
American Water
This project provides a roadmap for decision-making, project success, and demonstrable business success for utilities considering advanced meter infrastructure (AMI)/automated meter reading (AMR) projects. Research partner: UKWIR.
Published in 2011.

Optimizing the Water Utility Customer Contact Center [#4100]

Amawalk Consulting Group

Identifies best practices, processes, and technologies for water utility customer contact center operations to optimize the contact center as a utility-wide resource for communications, resulting in more efficient and effective utility operations, and improved responsiveness to customer contacts. Also provides utilities with a vision of how contact centers will function in the future given changing business process concepts and technology innovations, and identifies the key components and characteristics of the customer contact center of the future. Includes a CD-ROM. Research partner: EPA.
Published in 2010.

Field Computing Applications and Wireless Technologies for Water Utilities [#3178]

Spacient Technologies, Inc.

Develops utility case studies and guidelines for prioritized implementation of field computing systems to ensure secure data communications and improve water utility asset maintenance and customer field service operations. Assesses the current state and use of field computing technologies throughout the water industry; describes key work practices performed by mobile utility workforces and field service professionals; reviews existing and emerging field computer and wireless technologies; and quantifies improvement opportunities and benefits. Includes a CD-ROM. Tailored Collaboration partner: San Francisco Public Utilities Commission.
Published in 2008.

Benchmarking Water Utility Customer Relations Best Practices [#2947]

Competitive Advantage Consulting, Ltd.

Identifies customer relations best practices used by other relevant organizations and metrics that can be used for internal measurement and comparison. Provides tools to help utilities identify, evaluate, compare, and change existing customer relations practices to improve efficiency and customer satisfaction. Includes a CD-ROM.
Published in 2006.

General Communication

Performance Benchmarking for Effectively Managed Water Utilities [#4313]

CH2M Hill, Inc.

This project identified best practices and metrics used by water utilities to support each of the ten attributes of effectively managed water utilities; developed and documented a framework and methodology for utilities to evaluate the attributes; and created an Excel-based tool that they can use to conduct a self-assessment for internal performance benchmarking. For each of the ten attributes, the tool helps a utility identify areas where it can undertake activity to improve its performance. Within each practice area, at least one performance measure is defined so that utilities can track their progress in achieving performance goals in areas they define as high priority. The tool allows utilities to track both the level of performance achieved and the degree of implementation within their organizations for each performance measure. Published in 2014. The Excel tool and User Guide are available under Project Resources/Web Tools. Guidance on conducting a self-assessment is available as a PDF for download as 4313a. The final report is available to download as 4313b. Updated in January 2017, *Effective Utility Management: A Primer for Water and Wastewater Utilities*, is posted under Project Papers. To learn more about this effort, visit http://www.watereum.org/.
Published in 2014/2017.

Water Footprinting in the Urban Water Sector [#4419]

Global Water Research Coalition

This project explained the water footprint concept, investigated the applicability of water footprinting tools to the urban water sector and how they combine with or complement other sustainability related tools, determined if there is a role for the sector in further development and application of the tools, and identified research priorities and actions from the current challenges, issues, and knowledge gaps. The greatest challenges to applying Water Footprint methods in the urban water sector were found to be terminology, gaps in the methodology, limited data availability, uncertainty regarding the value to the sector, and lack of information regarding which method to select for a particular purpose. Priority research areas are predominantly associated with advancing methodological aspects including water quality, water transfers between river basins, data assumptions, and timescales. Research partner: GWRC.
Published in 2012.

Strategic Communication Planning: A Guide for Water Utilities [#2955]

Jane Mobley Associates

Reports on the role of strategic communication planning in the overall performance and success of drinking water utilities. Establishes the link between high trust and credibility and the ability to communicate effectively. Identifies how strategic communications can become an integral component of drinking water utility planning and operations. Determines the level of resources and funding necessary to achieve an effective strategic communication plan. Provides a guidebook that integrates key findings from past research and this project, to help drinking water utilities develop strategic communication plans. Includes a CD-ROM.

Published in 2006.

Customer Attitudes, Behavior, and the Impact of Communications Efforts [#2613]

ETC Institute

Identifies factors that affect customer satisfaction, including communication of information about water quality issues. Reports on ways to inform customers about water quality issues, and provides guidance on communication strategies. Includes a CD-ROM.

Published in 2004.

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