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Clear Waters

**Development of the
Environmental Professional –
Career Paths & Advice for Women**

Also Inside:

Watershed Conference Highlights





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President's Message	4
Mark Koester	
Executive Director's Message	5
Patricia Cerro-Reehil	
Highlights of Fall Watershed Conference	6-8
Water Views	11
James Tierney	
Focus on Safety	11
Eileen Reynolds	
Emerging Environmental Issues: Role of Academia in Preparing Environmental Professionals	12
Cornelius B. Murphy, Jr.	
Why Resilience is Key to Workplace Competency	15
Claire R. Baldwin	
Flexibility in the Workplace: How to Retain Women in Environmental Consulting	20
Lauren M. Livermore	
Attracting and Retaining Engineering Talent	22
Usha Wright and Darcy Sachs	
Career Paths at NYS Department of Environmental Conservation	26
Sandra Lizlovs	
Credentials for Credibility in Environmental Engineering	28
Jean Malafronte	
From a Female Operator's Perspective	31
Tanya May Jennings	
The Planner's Role in Wastewater Treatment	35
Janice Jijina and Natalie Cloud	
Importance of Business Development in Environmental Careers	40
Wendi Richards	
Know Your Reputation and Advance Your Career	45
Shari Harley	
Women in the Field Then and Now: 2004-2013	46
Donna Hager	
One Woman's Rise to WWTP Management in NYC Department of Environmental Protection	50
Tanya May Jennings	
Operator Quiz - Mathematics	52
NYSERDA Partners with Professional Research Foundations to Promote Innovation and Sustainability in New York State	53
Kathleen O'Connor	
After Superstorm Sandy: Army Corps and Public Back on Beach	56
JoAnne Castagna	
People	58
Interview with Former WEF President, Jeanette Brown	59
David Pecorini, Reprinted from Manhattan College newsletter	

Cover Image: Women across New York State serve critical roles in environmental engineering, systems operations, management and consulting for our water/wastewater treatment facilities.

Photo credit: istockphoto.com/

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Moving Forward

I do hope everyone made their summer as memorable as mine and are making your time this fall as unforgettable. We know that New York, with the beauty and unpredictability of its seasons, adds to the character of where we live.

In this issue of *Clear Waters*, we get to read articles exclusively from or about women in our industry. When I entered the industry over 30 years ago, there were very few women. While still male dominated, the numbers of women at all levels influencing and impacting water quality and the environment are growing. These articles demonstrate the depth of talent and innovation created by this movement. These messages are timeless and apply both in our industry and beyond.

Asset Management Task Force

The New York Water Environment Association's Asset Management Task Force led by Tim Taber and co-chaired by Yoon Choi is progressing full steam ahead. It defines asset management as: maintaining a desired level of service for the intent of providing the lowest life cycle cost. Lowest life cycle refers to managing, rehabilitating, repairing and replacing of assets. To implement this strategy requires an asset management program with a written asset management plan. The task force will produce an Asset Management White Paper to provide step-by-step education for organizations to implement an asset management program. Asset management programs should be a consideration of every municipality.

An asset management plan aids organizations in understanding the following:

- What assets are owned, what state or condition they are in and what value they provide
- What levels of sustainable service the assets need to provide and how the assets compare to the required performance
- Assets which are critical to sustained performance and how to manage consequences of asset failure, including emergency response plans
- Operation and maintenance cost for achieving the lowest, responsible operation and maintenance budget.
- What a municipality can set as its best long-term funding strategy

This is but a brief snapshot, and we look forward to the work we see from this Task Force.

Stormwater Task Force:

Stormwater issues are far reaching and affect all municipalities. Greg Liberman is founding chair of the Stormwater Task Force, the purpose of which is to clearly identify stormwater issues and their impact on our communities. It will then develop specific actions to help communities understand stormwater regulations and their ramifications; educate them on how to navigate these changes; and, how to implement necessary stormwater programs. The bottom line with stormwater is that not every solution or approach will fit with all the regulations and no universal funding is in place for stormwater problems. Emergency preparedness and planning is also a critical factor to be evaluated. Several major items will be addressed initially,

to include flooding, storms, integrated framework, influx of green infrastructure and variability of design.

My sincere appreciation goes out to Tim Taber and Greg Liberman for stepping up to chair these two critical task forces. I would also like to thank all of the volunteer members serving. For these individuals, the time allocation and efforts spent are considerable. For the rest of us, we eagerly await the positive outcomes of each group's action.

Scholarship Matching Fund Initiative

The third phase of the NYWEA Scholarship Program is in full swing. We have accomplished the first two goals – the creation of the scholarship fund and raising \$1 million for the endowment. To date, over \$200,000 has been awarded to over 100 students.

Phase three of the program has several initiatives. One is to secure an ongoing maintenance revenue stream to the NYWEA Scholarship Program so it can continue to award annual scholarships and maintain the \$1 million scholarship fund principal. Another is to provide an affordable way in which all of our members can contribute to make a real difference. In the past, the association has not offered a mechanism that truly facilitates individuals to contribute. The new matching fund initiative offers individual members an exciting way to double the value of a five-year pledge. An individual can make payments of \$20 a year for five years – a \$100 total pledge – and each \$20 is doubled by the matching fund mechanism. So, with each \$100 gift, \$200 actually goes into the scholarship fund. This enables all members to feel the appreciation and pride when they see young men and women receive NYWEA scholarships, knowing that they have made a direct impact.

The other key aspect of this matching fund is the receipt of five-year corporate pledges of either \$500 per year for \$2,500, or \$1,000 per year for a \$5,000 pledge. These corporate pledges provide the revenue to support the matching fund.

Our Scholarship Program is truly funding and supporting our future, so we ask all of you to support this exciting initiative!

Water Heroes

I was struck by something significant recently (yet hardly unknown to those in our profession) when I received a call on a Friday night from a friend and an industry professional. After a "monsoon," the plant experienced flooding and then a total failure of the influent pumps, causing a complete plant shutdown. While the rest of the community slept quietly in their warm beds and dry homes, this gentleman and the others at the plant were fighting and clawing in the rain and sewage to find whatever resources they could to get the plant back up and running.

These types of situations can be terrifying for those involved; yet, quite possibly, most in that community had no understanding of this then, nor do they now. Much of what we do is unsung, but what we do is vital to our environment, as well as to life itself. I wanted to take this moment to say thank you to all of the professionals in our industry who care deeply, work tirelessly, and do so because of their pride in being caretakers of our environment.

Mark Koester



Aim High

I like to see positive trends – I think we all do. Whether it concerns finances, NYWEA's membership or the height of your young child, we want to see growth. In keeping with the theme of this issue – the development of the environmental professional, focusing on women – I'm pleased to report that NYWEA has experienced growth in the number of female members. In 2004, women comprised 11 percent of members; and today, they

make up 13.5 percent of the total. The growth is a little slow, but the trend is in the right direction in what has traditionally been a male dominated field. As you will see from some of the articles, it hasn't always been easy for women to establish themselves in a work environment made up primarily of men. However, there are more environmental job opportunities for women now than there has ever been before.

It wasn't that long ago when I was the only woman in a board room otherwise filled with men. I remember sharing this fact with my father, who encouraged me by conveying his experience from a male perspective about his tenure on the board of trustees for Albany College of Pharmacy. On that board, he was one of the men who dominated the room where only *one* woman sat on the board with them. He helped me to understand that everyone in the room had made a decision to volunteer time to advance the mission of the organization, and regardless of gender, everyone in the room respected that commitment. Whether you serve on a board or work daily in a situation where one gender is dominant, keeping the overall big picture goals and the mission of the organization or project in focus, and respecting the viewpoints and opinions of others is one key to success.

I am no expert, but would like to share my thoughts on success (of course, not just for women): Good communication is key in everything you do. Be committed to your work, be honest, accountable, possess integrity, respect the opinions of others, and maintain a positive attitude. Get involved by serving on a committee

or a local board. Make time to attend technical meetings and network – there's no better way to feel energized about what you do. Marshal your energy to make a difference in your work. People who work in the environmental field share a passion for what they do, pass along this enthusiasm so we can encourage the next generation of environmental professionals.

Many thanks to Doug Daley and NYWEA's Publications Committee members and the women's networking group that helped to coordinate and develop the articles for this issue.


Patricia Cerro-Reehil
pcr@nywea.org

Scholarships Available for Students Pursuing Environmental Degrees

In 2014, the New York Water Environment Association will offer a major \$10,000 environmental scholarship as well as six \$1,500 scholarships. The application deadline is February 10, 2014. Outstanding high school seniors and college students who meet NYWEA eligibility guidelines and are pursuing careers in environmental engineering or science may find information and application forms on NYWEA's website.

We are very grateful and proud of the corporations, membership and friends who have contributed to our scholarship program and make it possible for us to offer these scholarships.

There are many financial opportunities for students interested in environmental careers. **NYWEA also has scholarships for children of members who have students pursuing environmental degrees.** Memorial scholarships are also available for those pursuing advanced degrees. Additionally, several of the NYWEA Chapters offer scholarships. Visit www.nywea.org/scholarship/ for more information on these opportunities.

Upcoming NYWEA Meetings & Chapter Training Sessions

DMR–Electronic Reporting and Proper Completion

October 17, 2013, Rochester, NY

Portable Pumps–

Uses, Sizing and Planning

October 23, 2013, Babylon, NY

DMR–Electronic Reporting and Proper Completion

October 29, 2013, Monticello, NY

Clarifier Optimization and Flow Measurement

November 6, 2013, Rochester, NY

November 7, 2013, Ithaca, NY

DMR–Electronic Reporting and Proper Completion

November 8, 2013, Rexford, NY

November 20, 2013, Babylon, NY

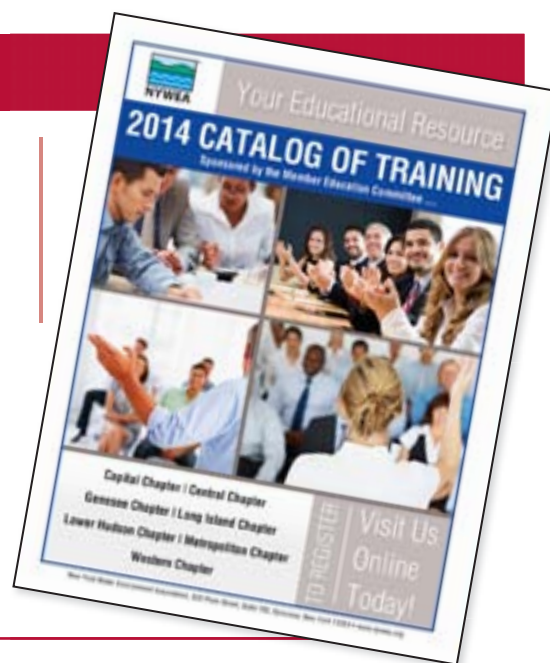
86th Annual Meeting

New York City Marriott Marquis

February 4–6, 2014

(Please note: Tuesday–Thursday dates)

Look for the online 2014 catalog posted on the NYWEA website soon!



The Thayer Hotel, West Point

NYC Watershed/Tifft Science & Technical Symposium

September 18–19, 2013



William C. Harding, Executive Director Watershed Protection & Partnership Council, addresses meeting attendees.



NYWEA President Mark Koester presents Lauren McPhillips with the NG Kaul Memorial Scholarship.



Right: Daniel Seaver, NYSAWWA Chair



(L-r): NYWEA Executive Director, Patricia Cerro-Reehil, Steve Fangmann, Bill Grandner and Tony DellaValle



Left: (L-r), Lt. Col. Jeffrey Starke, Paul Rush, NYCDEP, and Major Adam Brady



NYWEA's Maggie Hoose, left, and Maureen Kozol share a moment with Marty Aman.



(L-r): Jim Roberts, Amanda Bauner, Mindy Seaver, Dan Seaver, Dennis Kelleher and Arnold Palleschi



Julie Herzner, Hazen & Sawyer



Jim Porter, NYCDEP



Three Executive Directors, Jenny Ingrao, NYSAWWA, Patricia Cerro-Reehil, NYWEA, and William C. Harding, WPPC



Tim Burns, NYSEFC, talks to the members about monies available for Hurricane Relief efforts.



Bill Chestnut



Gina D'Agrosa, left, Westchester County DEF and Lisa Melville from the Department of State



Standing room only in Paul Granger's presentation on hydraulic fracturing.



Chris Wheland, City of Troy, listens to speaker.

Exhibit Hall Activity



Marty Aman and Judy Hansen at the NYWARN booth



Above: Tom Switalsky, KTM Associates



Trina Carman, Administration and Training Coordinator, NYSAWWA

Below: High traffic in the Exhibitor Hall.



Dr. Alan Molof, Polytechnic Institute of NYU



Jamie Howard, DN Tanks



NYC Watershed/Tifft Science & Technical Symposium, continued



Meredith Taylor, NYCDEP, speaks on treating plant infestation at a reservoir.



William Nylic, III, speaks about NYCDEP's ultraviolet disinfection facility.



Phil Eskeli, NYCDEP

Right: Tina Johnstone and Jim Mueller, both from NYCDEP



Jamie Howard, DN Tanks (left), and Tim Burns, NYSEFC



Below: Rich Fiedler, G.P. Jager



Elizabeth Reichheld, Section Chief, Stream Management Program, NYCDEP



Paul Granger, H2M Water, Julie Herzner, Hazen & Sawyer



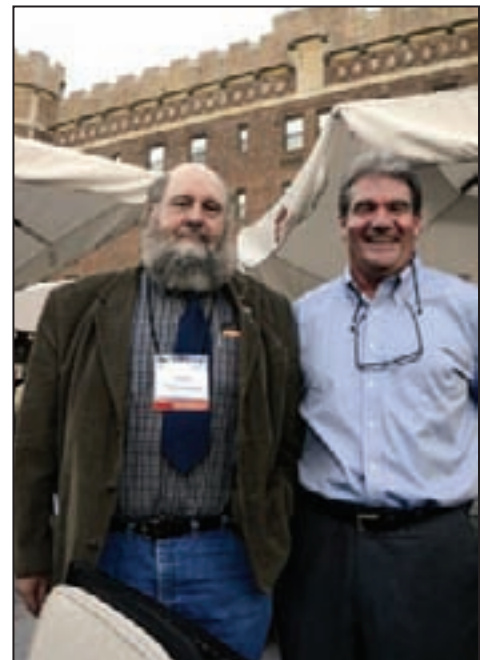
Jim Roberts, NYCDEP



Above: Kathy Russell from AFTEK, and Will Stradling, Siewert Equipment



Left: Mark Koester, of Koester Associates, and Kevin Castro, GHD, Inc.



John Sansalone, left, and William C. Harding enjoy the networking opportunity at the Zulu rooftop reception.



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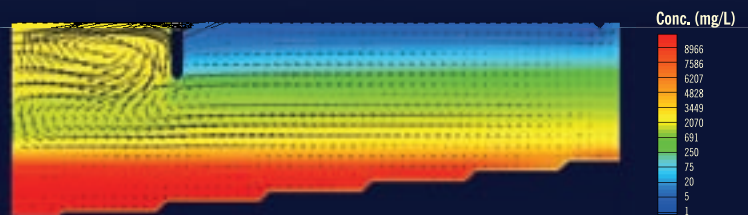
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Retrofitted Clarifier (enlarged center well)



For one client, enlarging the center well and minor adjustment to the baffle improved a clarifier's performance enough to avoid having to construct an additional clarifier — a net savings of approximately \$8 million.



Environmental Careers Rising to Top for Women

Today's college catalogs boast hundreds of career paths. With all these choices, how do we continue to recruit women to enter the environmental field? One way is to connect them with the environment when they are young. The NYS Department of Environmental Conservation staffers polled for this column all cited some connection to the environment as they were growing up. A person's early life experiences often

shape career aspirations, and there are many ways that we can expose girls and young women to the rewards of working to protect the environment. Maybe you enjoy camping, hiking or fishing. Sharing your knowledge and fondness for the outdoors with young people gives them an opportunity to develop their own connections. Possibly you are an individual with strong convictions about environmental protection and would enjoy working with youth on projects such as cleaning up a neighborhood stream, organizing a volunteer monitoring effort or participating in building a community rain garden.

Working as an environmental professional is a terrific career. You work with dedicated people and have a positive impact not only on people today but also on future generations. The work is exciting – always changing as new challenges emerge and fresh solutions are

developed. According to the US Department of Labor's Bureau of Labor Statistics, the environmental field is projected to grow 17 to 24 percent by 2020. As we face the many environmental challenges ahead of us, we need the brightest and best working towards solutions, and we want to encourage young people to be a part of this important effort.

Female NYSDEC staff members canvassed also noted the importance of helping guidance and career counselors to understand the multi-faceted nature of the environmental field. Young women can choose from among a multitude of environmentally-related careers. If a student likes science and math, environmental engineering or environmental science can offer rewarding career opportunities. In addition to the sciences, a young woman can contribute to the conservation of the environment through environmental law, environmental education or environmental journalism. There are many career paths in our field that involve a wide range of skills and talents. As counselors match a young woman's abilities with certain careers, options available in the environmental field should be among those brought to the forefront.

The NYSDEC is fortunate that many talented women chose to work here, and we are stronger for their hard work and diligent efforts. We look forward to more women choosing environmental careers and continuing to join our ranks.

*– James Tierney, Assistant Commissioner for Water Resources
NYS Department of Environmental Conservation*



Mentoring Needed in EHS Careers

As I may have previously mentioned, I did not start out in an environmental science career. I started out to be an apple farmer! Reality plays tricks, so here I am 30 years later in the field of environmental health and safety (EHS) and many of those I went to college with and who wanted to be environmentalists are doing something else.

The diversion certainly did not hurt me in the long run. When I first learned the safety ropes in a public utility, the corporation and

the industry in general were still learning about women in non-traditional careers. For a while, I was the youngest person of either gender and/or the only woman at any meeting. The safety guys were guys; but eventually, I became the "safety lady."

There was a chasm between safety and environmental jobs. Safety was inside the buildings, and environmental was outside – stay on your side and I'll stay on mine. Now, it's all a mix – all genders and ages with "safeties" doing some environmental, and "enviros" doing some safety. Super!

My EHS career has given me a wide range of experiences and taken me to some pretty odd places. I can say that, as I get older, I am glad I chose a career in which I don't have to prune trees in the middle of winter or spray pesticides in the summer heat. When

interesting problems pop up, I am surprised how I have either encountered the same or similar problems, or that I know someone who has and who can be contacted.

It was because I pursued the asking, that I learned much of the environmental end of my business. I didn't know the difference between a SWPPP and a SPCC until I found a mentor and went to some conferences. We should recognize that the need for mentors is very keen. Each one of us who has had EHS experience should be open to serving as a mentor, whether casually or as part of a professional association. The benefits are great and the personal satisfaction is fulfilling. At one of my recent contract jobs, a colleague and I had a mutual mentoring relationship. He was very experienced in electrical generation but a bit shaky on the technical safety and environmental end. I was good for the technical EHS, but was lacking in the generation part. We forged a bond and teamwork spirit that lasted for several years, until he retired a couple of years ago at age 70. While I was young enough to be his daughter, I served as his mentor and he as mine.

Age or gender makes no difference in the process of our career and educational growth.

*– Eileen M. Reynolds, Certified Safety Professional
Owner, Coracle Safety Management*

Emerging Environmental Issues: Role of Academia in Preparing Environmental Professionals

by *Cornelius B. Murphy, Jr.*

At the SUNY College of Environmental Science and Forestry (SUNY ESF), we are working on some of the emerging environmental challenges that tomorrow's environmental professionals will face. While SUNY ESF is one of the nation's oldest environmental colleges, it is the responsibility of the entire academic community to prepare students through coursework, investigative research and service to address the global needs of human society. Environmental challenges cannot be met solely through a single discipline lens; the next generation of environmental professionals needs to work in interdisciplinary environments, communicating with experts in the natural and social sciences, technology, policy, law and medicine.

Pharmaceutical Waste

Endocrine disruptors have been identified in almost 25 percent of our streams, rivers and lakes. The US Environmental Protection Agency (USEPA) scientists have identified more than 100 complex molecules used in medicines and personal care products that have been found to be present in environmental water samples and even in drinking water produced from surface water sources. It is clear that a significant number of these pharmaceutical residues are not being treated effectively by conventional wastewater treatment facilities.

A great deal more work needs to be conducted on the biodegradable characteristics of emerging drug therapies. We clearly know that even some of the most common medicines, such as ibuprofen and estradiol, are not being effectively treated. Recently, faculty and students at SUNY ESF demonstrated that well designed and operated constructed wetlands can be effective in biological

degradation of these pharmaceutical compounds. More research and demonstration is required.

Environmental Factors and Health

The next challenge that we face lies at the interface of environmental vectors and human health. Environmental vectors have been identified as at least part of the cause for the dramatic global increase in childhood diseases over the last 50 years. Childhood asthma rates have nearly tripled over the last three decades. Developmental disorders affect at least 10 percent of the babies born in the United States each year and Type 2 diabetes is almost becoming epidemic among children. We have also seen childhood leukemia and brain cancer increase significantly since 1970.

At the same time and since World War II, more than 80,000 new synthetic chemicals have been developed and introduced into commerce with a significant number used in consumer products. In 2008 alone, our country spent \$76.6 billion to treat children's diseases of environmental origin.

Our institution is part of a research consortium with Upstate Medical University, Syracuse University and the Syracuse Veterans Administration Hospital providing seed grants to interdisciplinary teams to focus on environmental medicine. The thematic areas involve nervous disorders, cancer and diabetes. It is anticipated that preliminary findings developed from the seed grants will serve as the basis for more significant funding from the National Institutes of Health and the USEPA.

The State University of New York (SUNY), in conjunction with New York Governor Andrew Cuomo, recently announced funding for a proposal to create the SUNY Institute of Environmental Health and Environmental Medicine in Syracuse. Partners in this initiative include SUNY ESF, Upstate Medical University, SUNY Oswego and Onondaga Community College. This \$15 million award, under the NYSUNY 2020 Challenge Grant program, complements the recent establishment of a BS program in the area of environmental health at SUNY ESF.

Ramifications of Climate Change

The issue of climate change may be the single most significant environmental threat. The 2013 Draft National Climate Assessment Report presents a worrisome picture. We have seen extreme changes in weather in the Northeast over the last few years and have had to deal with Super Storm Sandy, Tropical Storm Lee and Tropical Storm Irene. In 2012 nationwide, we had 12 very strong storms that each caused more than a billion dollars in damage. Super Storm Sandy alone resulted in greater than \$60 billion in damage. This all coincides with the recent announcement that atmospheric carbon dioxide concentrations have just exceeded the 400 ppm threshold.

But the picture isn't totally bleak. The US has been emitting less carbon dioxide per unit of GDP (gross domestic product), but the amount is still too high at 16.9 metric tons per capita per year. Nationwide, the grassroots response is growing: 650 business signatories support the Carbon Disclosure Project and 1,055 municipalities from all 50 states support the US Mayors



Photo courtesy of Doug Daley/SUNY ESF

The next generation of environmental professionals needs to have the ability to engage with problem-solving strategies that cross disciplinary boundaries. Training in field, laboratory and analytical modeling, as well as development of professional communication skills, prepares students for the challenges of implementing new approaches to historic problems, ranging from wetland treatment of emerging pollutants to biomass development for chemicals and energy. Two SUNY ESF students here are monitoring and modeling soil water fluxes for a wetland.



Photo courtesy of SUNY ESF

Graduate student research and development of sustainable materials support initiatives that seek to reduce energy required for production, minimize toxic air and water emissions, and develop new building, environmental and health-related products. Graduate students check out some state-of-the-art lab equipment in the Institute for Sustainable Materials.



Photo courtesy of SUNY ESF

SUNY ESF's newest building, the Gateway Center, demonstrates advanced green building design to reduce environmental impacts of energy consumption, air and water emissions. The building's intensive green roof, utilizing native plant communities, demonstrates the college's commitment, student engagement and leadership in research, development and the deployment of ecologically sustainable practices in the water environment. An undergraduate monitors the soil water chemistry of the green roof.

Climate Protection Agreement.

But we need aggressive and positive political leadership because the situation projected by the end of this century is potentially catastrophic. Think of the potential of 250 million environmental refugees, tens of trillions of dollars of infrastructure damage and its replacement. We have the opportunity to create and enhance a new renewable carbon and renewable energy business sector, creating new economic value while protecting our planet. The question is, do we have the will?

For our part, this campus has been recognized by Second Nature with a national award for reducing its carbon footprint by approximately 25 percent. A dozen faculty and many graduate students are working on mitigation and adaptation research. Our students and faculty continue to innovate and advocate for low

carbon impacting solutions through the ESF Green Campus Initiative and sponsored research, including developing and practicing green infrastructure techniques; growing willow biomass energy crops on derelict lands; integrating alternative energy sources in urban environments; and, employing green building practices.

Keeping Relevant

Higher education, with SUNY ESF in particular, needs to continue to keep academic programs relevant to these and other emerging environmental issues. Universities must not only deliver fundamental science, engineering, policy and technology courses, but must engage students in basic and applied research to expand society's ability to deal with these issues. Our future includes new and focused courses, the inclusion of experiential learning to clearly demonstrate the relationship that lecture and laboratory experiences have to the challenges of today, and integrative capstone experiences that require students to apply their learning and teamwork in tackling some of these problems. Academia must engage students in service projects to enhance their ties to the communities in which they study, live and work, and to understand how our solutions affect individuals in our communities.

In higher education, we need to work harder to cross the traditional disciplinary "silos," so the next generation of environmental professionals can communicate with each other and with the public they serve. We all know that the solutions for many of these difficult issues don't reside in a single discipline, but rather at the interface of multiple disciplines. Our capstone and experiential opportunities must provide not only those connections but must also transcend the discipline focus to meet the needs of a modern global society.

Our practicing professionals also have a responsibility to train their next generation of scientists and engineers. Environmental professionals and academia need to work

together to provide internships and the knowledge transfer of professional practice to our passionate and committed students.

As a society, we have made significant progress since 1970 on many environmental issues. However, significant challenges remain and our academic programs are best suited for the investigation and inquiry needed to meet these challenges. As professionals in this most important area, we must continue to innovate and advocate for responsible policy and solutions.

Cornelius B. Murphy, Jr., PhD, is President of the State University of New York College of Environmental Science and Forestry located in Syracuse, NY. Dr. Murphy may be contacted at cbmurphy@esf.edu.

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Why Resilience is Key to Workplace Competency

by Claire R. Baldwin



Photo courtesy of NYWEA

Claire Baldwin shares her expertise on the topic of succession planning to participants at the 2013 NYWEA annual meeting in New York City.

“Resilience is not a commodity you are born with, waiting silently on tap. It is self-manufactured painstakingly over time by working through your problems and never giving up, even in the face of difficulty or failure.” (Lorri Myers, *No Excuses, The Fit Mind-Fit Body Strategy Book*)

This quote no doubt echoes all too well with the leaders and employees of the New York utilities having faced a wide variety of crises over the last decade and painstakingly worked through the problems toward a brighter future. From climate change, to employee turnover and new regulations, the importance of having an adaptive, creative and ready staff is increasingly a metric that organizations must meet in order to be able to handle all these external changes, often in tandem to each other!

As an industry, our conversations have altered over the years, from dialogues centering on environmental stewardship in the 1970s, to sustainability since the 1990s, to resilience within our systems today. Thinking about utilities’ need to create or, in some cases, rebuild resilient infrastructure (after such natural disasters as Superstorm Sandy) has evolved so as to reflect and adapt to the pace of change in the world; yet, seldom do we think about the needs of our most important assets – the employees who are the caretakers of this infrastructure, and their need also to be resilient and adaptive to rapidly changing conditions.

Consider this scenario:

As Julie walked back to the office from the construction trailer, she felt exhausted and crestfallen from the meeting with the construction team. The general contractor had clearly missed key items in the master schedule which would no doubt lead to delays and the subcontractors had unwittingly followed suit, thus multiplying the effect to the schedule. Even her resident inspector had missed this mistake in his initial review of the program, and this was only the second week of Julie’s tenure as the construction manager on the job.

Slumping at her desk, she rested her head in her hands and wondered, not for the first time, if she was in over her head on this one. What was she thinking – the burn rate on this project was roughly half a million a week for the next two years. She privately wondered – did she really have what it takes?

Sighing, she decided to take a walk back to the site to try one more time to see if there was somehow a creative work-around that might magically emerge. As she walked the half mile to the site, she started to think about her recent success in Oneida County where the pace of construction was much more rapid and through the use of formal partnering the team had beaten the deadlines. Her steps picked up as she dialed up her deputy CM to start brainstorming about the applicability of those tools to this project which, perhaps when combined with contractor incentives, might be able to provide the push for creativity that was needed here. As she reached the site and hung up her cell, her mood had visibly shifted and ideas for change began again to flow. Yes, she was the right woman for this job and had the right team to make this vision a reality!

As highlighted by Julie in this situation, personal resilience reflects an individual’s or team’s tendency to cope with stress and often unexpected adversity. Yet it goes beyond the ability to “bounce back,” as current research is showing. It is believed that the process of facing adversity can actually have positive growth effects that allow employees to learn from, and better cope with, future challenges based on past experiences (Masten, 2006), much in the manner that a vaccine gives you future protection from a yet uncaught illness. Thus, it is important to be aware that this ability is at its core a process and not a personal trait as once thought, leading to the exciting possibility that personal resilience can be improved and enhanced!

History of Resilience

Resilience is not a new term in the workforce. In fact, historically resilient people have been said to be hardy, resourceful or even mentally tough – yet we have more often than not attributed those qualities to their personal characteristics rather than the processes that enabled them to demonstrate these strategies on a routine basis. In the workplace, change and daily stressors can have the cumulative effect of draining employees’ motivation, resourcefulness and even their job enjoyment. By enhancing the processes that build employee resilience, a leader can enrich employee work experiences while simultaneously gaining bottom-line benefits of better, more creative outcomes.

Optimism and hope are said to be key to resilience in nature (Rioli, Savicki and Cepani, 2002), but they must be bounded by reality in order to be effective (Coutu, 2003).

For those interested in developing or enhancing this key workplace competency, the art of navigation might make a good example. Building resilience is a process learned over time and to improve skills in ship navigation one must also spend time training and

**SHE STOOD IN THE STORM
& WHEN THE WIND DID
NOT BLOW HER WAY, SHE
ADJUSTED HER SAILS.**

continued on page 17



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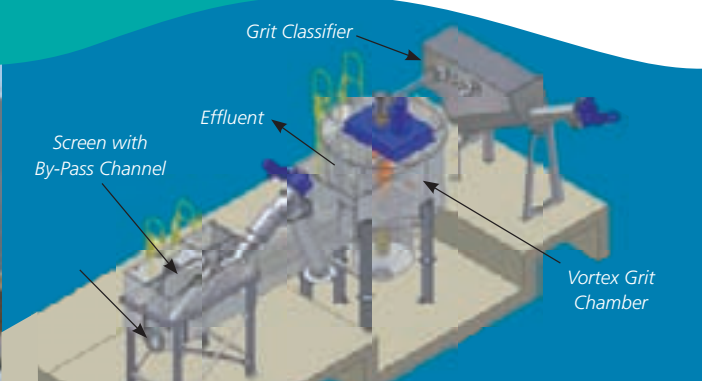


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continued from page 15

gaining experience and utilizing technological forecasting tools skills to “bounce back” and learn from mistakes as well as successes. Imagine sailing by the night sky - with a little effort, even difficulties can be an exhilarating experience.

Workplace Skill Development

Few things are more exciting than a team creatively working to solve a complex problem. However, the brainstorming and creative process can be a demanding and often exhausting one, calling on participants to tap into their “bounce back” skills in order to remain present and committed to problem solving.

Researchers have identified several strategies that individuals or teams can combine holistically to support and build on individual levels of resilience. They are:

- **Being Connected:** Using the power of contagion (*Ross, 2006*) – just like laughter and yawning, resilient thoughts and feelings jump from one person to another. Having a resilient core group on a project can have the added benefit of building a resilient and resourceful program – so chose teammates wisely and build a high energy team that can renew itself.
- **Creating a Habit:** Much like physical fitness, the best way to build a habit is to do it daily. Anyone who has undertaken an athletic event or overcome a personal handicap, knows this lesson: realistic, daily practice typically results in a better outcome (*Coutu, 2003*). Please note that these types of habits - those that require a change of mind - can be hard to accomplish and, on average, take over 60 days to achieve (*Lally et al, 2009*).

A good example of changing a mindset is the scenario that often occurs when managers are faced with a complex business situation, like resourcing a job with limited staff. If a manager who complains to his/her peers about a lack of staff tried instead to look at a matrix approach that uses untapped talent – such as interns, part-time workers from another field, or even other internal disciplines – he or she would be changing from a habitual negative outlook to a positive paradigm which would allow for the creation of greater options.

- **Line Up to a Goal:** All too often we lose the forest for the trees as the daily pressure of work crisis management distracts us and draws our attention away from our vision of the future. Resilient teams are those that are able to clearly articulate goals and continually re-orient themselves to this vision as part of their daily habit. Thus, when crises arise – as they always do – a steady focus and push toward a goal and vision of the future remain the center of the team’s actions. This is very different from the all too common practice of “putting out fires.”

Having a sense of being able to control, if not the situation, but the response or the environment around the incident, is also prevalent in those considered more resilient. (Riulli, Savick and Cepani, 2002)

Application of the values and vision that drive your team allows it to make swift and correct decisions, even when disruptive events occur, and help the team to follow principles for an incident management approach.

One easy way to increase skills in this area is to “take five” each day. In other words, at the end of the day take five minutes and assess your work for the day to see if, in fact, you have advanced toward your goals. If not, then review the things that distracted you today and evaluate their worth in the wider setting – could you have handled them differently?

If you did make progress toward a future vision – write it down to both note and celebrate it – but also so that, in the morning, you will start your day with a strong reminder of your resilience and success!

“You can’t stay in your corner of the forest waiting for others to come to you. You have to go to them sometimes.” (A. A. Milne, [1882-1956], author of Winnie the Pooh books)

- **Team Up with a Support System:** Professional groups, such as the New York Water Environment Association, exist throughout the industry – and for good reason. The value of having peers and connections to others is well known. As a team leader at any level, encouraging staff to build its own informal professional support networks inside and outside the organization increases the likelihood of resilient attributes as they effectively increase their resources.

Further, through having a broader network, leaders will have a greater sense of control as these networks most often create trusted sounding boards for their opinions and experiences (*Jordan, 1992*) especially in times of crisis. Thus, supporting and advocating for staff to build their own support networks, be they industry-based or simply socially-based, and to actively participate in them, should be encouraged as part of normal business. It is known now that such relationships facilitate workplace productivity and can be a key element in success during pressurized times.

Cost Benefits

Often at work, we notice and comment on those employees who seem to be having the hardest time with stress and managing their daily lives. Yet, it is these very barriers that can be crossed in building resilience skills. Disproportionate stress in the workplace can lead to high costs, such as poor decision-making, increased use of short or long-term sick leave and, typically, higher attrition rates. With an average cost for employee turnover ranging from 1 to 1.5 times the position’s annual pay, that is a very high cost indeed!

More resilient staff members are superior at making things work during emergency events and times of complexity. It is through these successes that they rebound and, in the process, enhance their loyalty and dedication to the organization (*Siebert, 2005*). As many in New York State recall, while the impact of Superstorm Sandy was in many ways immeasurable, so were the friendships and loyalties formed by those teams and companies who responded to support their neighbors, community and industry!

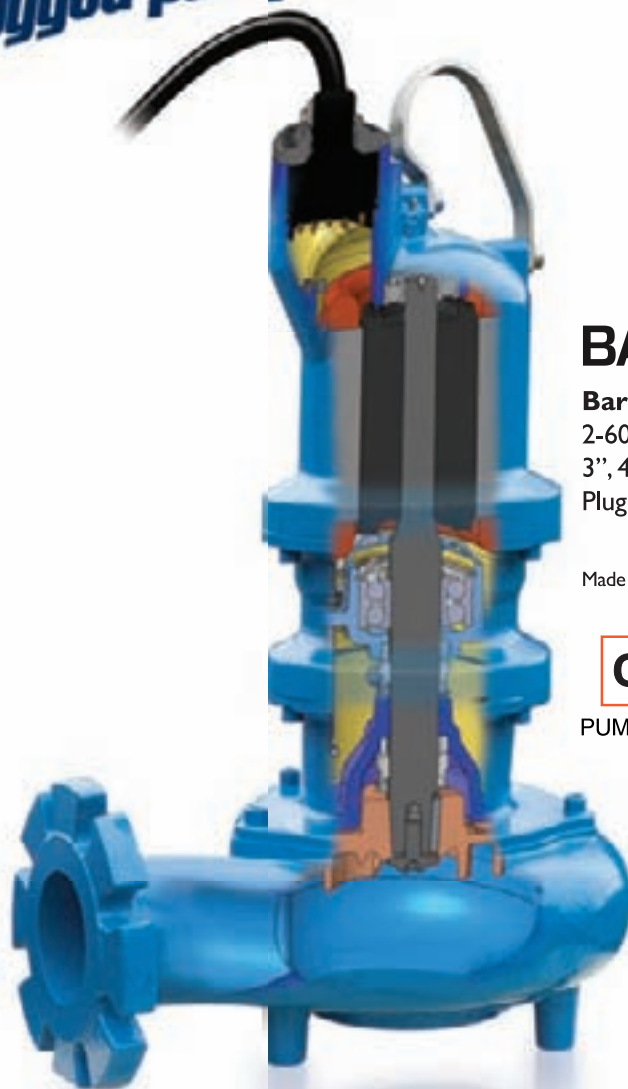
Finally, adaptive staffers who can be nimble under stress are also rare commodities in this rapidly changing world. They are often among those employees who are highest in creativity and flexibility and more likely to make sound decisions at critical moments. Further, as they are hardy (in every sense of the word), they typically cost less money per person in the long term. This is because, as a result of these traits they’ve adopted and strengthened, they are less likely to be ill or cause additional recruitment costs by leaving the company during or following critical periods (*Jackson, Firtko and Edenborough, 2007*). Thus, they are a winning asset in today’s tight business climate.

Perhaps the most impressive tenet about resilience is its high return for a low cost, as building these workplace skills is about time, leadership and personal effort more than finances. Small actions that incur little or no financial cost – such as choosing to visibly identify positives in a situation, networking, and verbalizing the

continued on page 19

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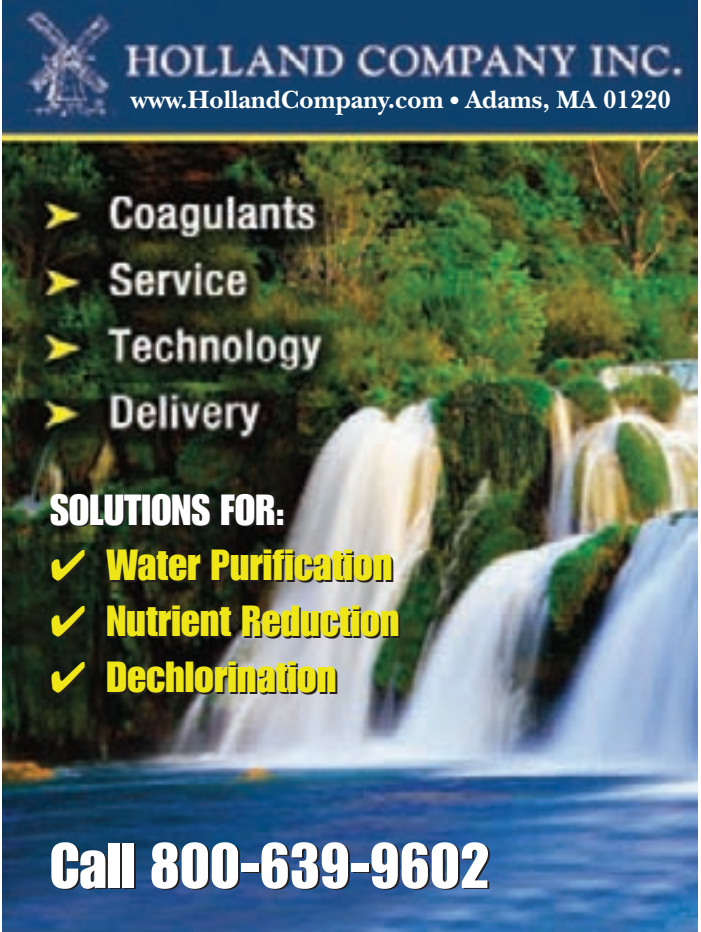
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team's vision when conducted on a regular basis – can make a huge difference to the resilience levels of staff, helping both you and your team build this vital skill for a brighter future.

Claire R. Baldwin is Senior Management Consultant with CDM Smith, a consulting, engineering, construction and operations firm that has over 5,000 employees worldwide. Ms. Baldwin works out of New York City and may be reached at Baldwinr@cdmsmith.com.

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Flexibility in the Workplace: How to Retain Women in Environmental Consulting

by *Lauren M. Livermore*

Why, in 2013, are so many well educated, accomplished women leaving their environmental careers to be home with their children or leaving to pursue other lines of work entirely?

The lack of flexibility in the workplace is a major driving force in this mass exodus. As environmental professionals, we are expected to have flexibility in our home lives to address expedited project schedules, last minute client requests, operational emergencies, evening meetings, or travel for out-of-town projects. In turn, environmental companies should be willing to provide equal flexibility in the workday for women (or men) who are trying to balance their personal and professional lives. Companies may ask why they should want to keep female employees as they begin to start their families engaged in the profession. The reasons why are numerous.

- Studies show that a diverse workforce with both males and females form better, more creative and efficient teams which are more adept at problem solving and, in turn, produce a better work product.
- Companies will lose the time and money spent training the employee, whether it is in quantitative ways, such as obtaining a professional engineering license, LEED® accreditation and other certifications; or in more qualitative ways, such as gaining on-the-job knowledge or learning company protocols.
- People in the mid-range of their careers are often in short supply in the environmental professions. It may be difficult for companies to replace these women who drop out of the workforce. Companies may have to pay more for overqualified replacements or resort to heavily managing one or two entry-level employees to help fill the void.
- The perception of a company's lack of flexibility is not only observed by the woman who is trying to achieve work flexibility, but also by other women in the office who feel they may need some flexibility in the future. Through networking, the perception also spreads to other women who might consider working at that company one day.

Types of Flexible Arrangements

How can companies in the environmental profession offer flexibility to their female employees? Some of the flexible arrangements that are becoming mainstream in the professional workplace include:

- Extended maternity leave (offering time beyond the 12-week Family and Medical Leave Act)
- Reduced or flexible work hours (shortened days or a day off)
- Condensed work weeks (four 10-hour days)
- Telecommuting (working from a computer for certain amounts of time per week)

If a woman started the discussion and her company then approves a flexible work schedule, how do they proceed to make the arrangement work smoothly? This is especially important, because whether true or not, there is the perception that those not seen in the day-to-day trenches are easily forgotten by co-workers or



Photo courtesy of Tina Poplawski, CDM Smith

The author, Lauren Livermore, reviews drawings for a project at her office.

management or viewed by them as slacking off. The following are key tips in assuring the success of a flexible schedule.

- Maintain consistency and communications surrounding the arrangement – set up a schedule and make sure all co-workers are aware of it.
- The employee should be accessible (by phone, text and/or email) for questions that may arise while out of the office.
- The company should provide tools to the employee to facilitate the flexible work schedule, whether it is a laptop to perform work from home, or a smart phone to take calls and emails on the go.
- The employee should check in monthly/quarterly with the manager to make sure the arrangement is working well for both parties. This will assist in finding out if either or both of you could be doing or managing something in a better way.

There is no single answer as to why women leave the environmental professions. However, the lack of flexibility at work is a key reason women put their careers on hold or pursue professions outside the environmental field. Recognition of this issue by both companies and professionals can help start the discussion for policy changes to correct this. While there is no “one size fits all” solution for every employee and company, by negotiating cooperative arrangements, the environmental professions may be able to retain more women.

In my own case, I am working reduced hours so I can spend one day at home with my daughter. My work schedule consists of four, eight-hour days per week. I requested the arrangement when I was out on an extended maternity leave for 16 weeks. My managers and colleagues were supportive of the truncated work week, and rightfully so, as the arrangement is going smoothly for both me and the company.

Lauren M. Livermore, PE, is Project Manager/Environmental Engineer for CDM Smith in Syracuse, New York, and may be reached at livermorelm@cdmsmith.com.

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Attracting and Retaining Engineering Talent

by Usha Wright and Darcy Sachs

Attracting and retaining talented employees is one of the top key criteria for a successful organization. This is especially true in the service industry where companies like O'Brien & Gere have, as their core asset, people. This engineering solutions firm headquartered in Syracuse, NY, believes that client satisfaction is a strategic goal that is best achieved with the right talent. In a highly competitive market, a company's central differentiator is the quality of talent available to provide innovative solutions to clients. As highly talented people are also highly sought after by competing companies, attracting and retaining talented people must always remain an organization's top priority.

Achieving Employee Satisfaction for Retention

A company needs to implement measures to achieve employee satisfaction and maintain a loyal workforce. An employee-owned company, such as O'Brien & Gere, operates with an understanding that talented people are interested in enriching assignments that broaden their knowledge and lead to career growth and, therefore, designs a workforce structure to enable employees to achieve this.

A key factor in employee satisfaction is transparent career tracks with clearly delineated requirements for advancement and opportunities for employees to acquire the knowledge and new skills they need to advance. In addition, O'Brien & Gere's job posting and slating practices help all employees seek opportunities for personal growth and be considered for any position, anywhere in the organization.

"We are committed to clear goal setting and meritocracy-driven performance assessments, mentoring, training and teamwork which we believe creates a vibrant work culture," said Michael Hudson, Human Resources Manager at O'Brien & Gere. "These are some of the reasons we have a highly engaged employee population." For the last several years, the company has received an 80 percent participation rate in its annual employee satisfaction survey, which is a recognized indicator of an engaged workforce.



Courtesy of O'Brien & Gere

Claire Leary, PE, Environmental Group Division Manager with O'Brien & Gere, consults on a site remediation plan with Doug Crawford, PE, Vice President in the Division.

Work Culture Key to Recruiting Female STEM Grads

To have a successful organization, it also is important to maintain a diverse culture. This can be achieved by developing a sustainable organization that is reflective of clients, encompasses diverse cultural, geographic and educational backgrounds, and embraces a variety of work and life experiences. Promotion of an inclusive culture also fosters communication, engagement, and diversity of thought, generates a stimulating work environment and drives betterment of ideas that create innovative, value-based solutions for clients.

To attract diverse talent, innovative approaches are necessary. In addition to traditional venues, O'Brien & Gere has increasingly relied on employees as ambassadors for recruitment, particularly in outreach initiatives working with organizations that cater to engineers and scientists with diverse backgrounds. Some of those initiatives include: participating in career building workshops and networking events; providing job shadow and internship opportunities for organizations such as Say Yes to Education and Society of Women Engineers; and, Syracuse University's Donofrio Scholars Program and National Society of Black Engineers and Women in Science and Engineering chapters.

In some ways, each employee is considered a recruiting ambassador as he or she communicates the advantages of the organization's culture to others who may be pursuing, or be in, the same profession. This creates a "pull" of talent into this firm.

With an increasing number of women graduating with degrees in science, technology, engineering and math (STEM) disciplines, organizations need to accommodate this change and attract and retain more women. The best resource for recruiting women is often an organization's existing female employees, since they are a credible source for job candidates, able to describe firsthand what it is like to work in that particular organization.

In planning for anticipated future talent needs, O'Brien & Gere created forums, called Talent Recruiting Advisory Committees, comprised of employees to leverage specific common interests and to assist in outreach initiatives. The first such forum focused on female graduates with STEM degrees. The committee created



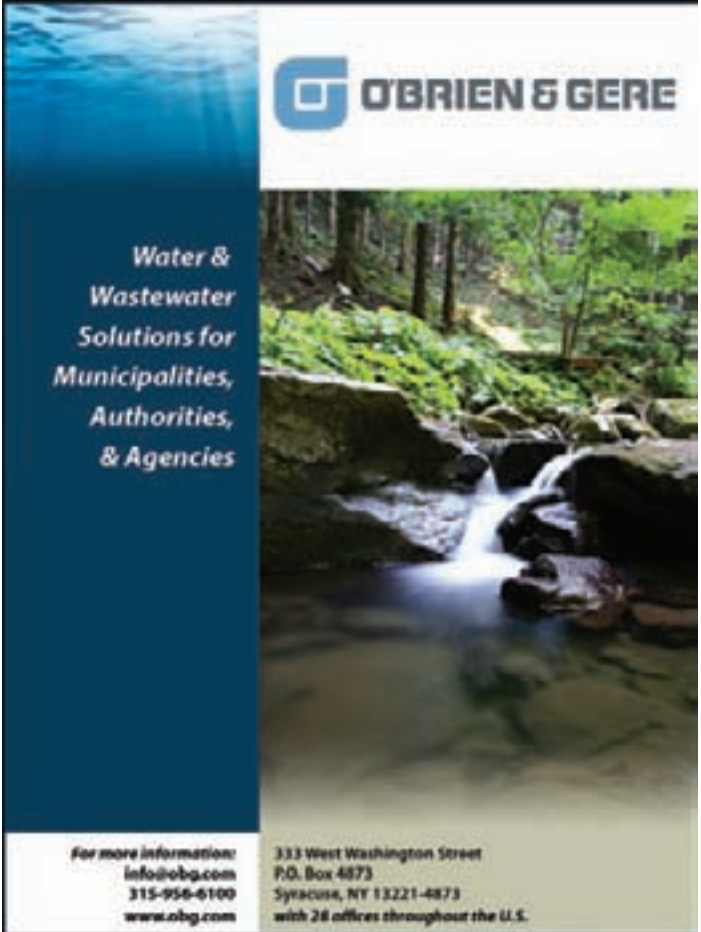
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and presented programs that communicated with female graduates statewide and provided encouragement in their careers, while highlighting this firm's unique work culture.

For example, O'Brien & Gere participated in a CV/Resumé Review workshop organized by Women in Science and Engineering at Syracuse University, a program designed to enhance and support the professional development of women students in the sciences and engineering fields. The workshop, led by faculty and professionals in the industry, assisted students with creating documents that best highlight the skills and competencies they have gained. "It was a great experience supporting the career development of this group of smart, talented graduate students," said Nonnie Lim, PE, Senior Project Engineer at O'Brien & Gere. "The mentoring offered through this program is very beneficial to the students who are striving to achieve professional success in a STEM field."

Attention to an organization's work culture is a critical element for retaining women in STEM careers. An organization's culture may, in fact, play a greater role in retention than any other factor. Like all employees, women desire to work within a culture that truly relies on performance to advance people and refuses to subscribe to bias-based barriers. Benefits that support retention – flexible work schedules, the ability to buy and sell vacation time, mentoring and providing a culture of respect and zero tolerance for harassment – are essential in fulfilling recruitment needs.

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Career Paths at NYS Department of Environmental Conservation

by Sandra Lizlovs

When I first started thinking about this article, I was going to find out why people who work at the NYS Department of Environmental Conservation (NYSDEC) chose the fields they did. This quickly evolved into asking: what are the different environmental careers here and what are the job functions of people at NYSDEC?

The NYSDEC mission statement reads:

“To conserve, improve and protect New York’s natural resources and environment, and to prevent, abate and control water, land and air pollution in order to enhance the health, safety and welfare of the people of the state and their overall economic and social well-being.”

That statement certainly is quite broad and includes many different professional career paths. These include aquatic and habitat biologists, program analysts, attorneys, conservation officers, engineers, foresters, geologists, land surveyors and program specialists. While a project may not involve every aspect of what NYSDEC has to offer, each professional at NYSDEC impacts New York’s environment every day.

Careers and Perspectives

When I go to work out at the gym in the mornings, others there have asked where I work. My reply is usually along the lines of: “I work at the DEC.” Often their response is: “Oh, you must be one of the game wardens!” I have to correct them and say that I’m an engineer. After a blank look, I explain further that I work with a number of the wastewater treatment plants in the area, frequently citing the local community sewage treatment plant as an example. They seem amazed. They had no idea that NYSDEC does more than write tickets to hunters and fishermen.

Below is a brief overview of the various professional careers at the agency. For more information, please see NYSDEC’s career webpage at <http://www.dec.ny.gov/about/571.html>.

Analysts: The NYSDEC issues permits for various activities. Readers of this magazine are most familiar with the State Pollutant Discharge Elimination System (SPDES) permits that are issued to wastewater treatment plants. However, NYSDEC is tasked with issuing permits to facilities for air emissions, mining activities, work in wetlands and work in protected streams. So the analysts here are jacks-of-all-trades, needing to work with various internal departments as well as industries, municipalities and other consultants to make sure that permits that are issued will protect the environment.

*Each professional at NYSDEC impacts
New York’s environment every day.*

Attorneys: A regulatory agency, NYSDEC has its own legal staff. Its attorneys work on Orders on Consent, help refer cases to the NYS Attorney General’s office, and provide legal guidance to NYSDEC staff.

Biologists: Biologists at NYSDEC may work on fishery, wildlife and wetlands issues. An aquatic biologist may do fish population surveys, aquatic habitat investigations, assist with acquiring public fishing access areas, and review proposed projects and how they impact

habitat. Other biologists may work on wildlife issues or wetlands. Biologists provide vital information. For example, a biologist may conduct a macroinvertebrate study on a stream to determine water quality levels and impacts a discharge from a wastewater treatment plant may have on the stream. This information is invaluable when it comes to determining if a stream is impacted by pollution.

Conservation Officers: Probably the most recognizable individuals are the department’s uniformed officers. Usually, the public looks at these officers as the people who check hunting and fishing licenses. However, the officers may also investigate criminal activities, such as falsification of DMR (discharge monitoring reports) data, illegal dumping and other violations of the environmental conservation law.

Engineers: Tasked with a large number of programs, NYSDEC includes air quality, solid waste management, remediation and water quality. Engineers may write permits, respond to petroleum spills, inspect sites, review and approve engineering plans, specifications and reports, as well as conduct enforcement activities.

Foresters: Foresters perform professional forestry work in such areas as the management, development and protection of forest stands, reforestation, and the public use of forest lands. They might coordinate pesticide use on state land and provide technical advice to private owners concerning forest management and the Forest Tax Law. They review proposed projects such as industrial plants, housing developments and power plants to determine impact on forest lands.

Geologists: Geologists perform and evaluate hydrogeologic, groundwater, water supply, solid waste and hazardous waste disposal site investigations. Their knowledge of how groundwater moves in a site is invaluable when a site needs to be remediated.

Many of these careers require, at a minimum, several college courses in the field. Some – for example, engineers – require a professional license.

I spoke to a number of people at NYSDEC, and while answers were different for each person, an overall theme emerged when asked why they chose their field: a love for nature.

A veteran NYSDEC engineering professional describes her own career path:

“When my kids were young, my husband and I moved from our native California to upstate NY so that he could pursue a career teaching economics at a liberal arts college. From the second floor of our home I could see Cayuga Lake. The kids played soccer at the park along its shore and swam in the village’s swimming program, so I had frequent opportunities to observe the lake. Watching its seasonal changes is what inspired me to become an environmental engineer. However, even when I entered engineering school, I really didn’t have a firm idea of what an environmental engineer actually did, and still less about the roles and responsibilities of an engineer who works in a regulatory function. But, I went to college and obtained a second bachelor’s degree with the goal to work for either the USEPA or the state DEC. Ending each work day knowing that I had made the environment somewhat better would be more satisfying than putting myself on a partner track. I knew money was not important to me, idealism was. Unfortunately, once I graduated, New York State was in the throes of a hiring freeze and no state positions were available. I accepted a position as an Engineer

II at a local consulting firm. Working in a consulting firm was a continuation of my education as an engineer in many ways. I learned that even though I had landed the job, I still needed to keep scouting for projects in order to meet 'billable hours' goals. Once placed on a project, I did take advantage of learning as much as I could about the technical aspects, as well as the fundamentals of project management and client relations. These were valuable lessons that I have been able to use in my work now in the government sector.


Honestly, the negative aspects of working for the state are few. I will say that, on the down side, there are always budget shortages, so opportunities for training, travel and educational advancement are limited. No doubt, my counterparts in the private sector have higher salaries than I do working in the public sector. The tradeoff is that I am given more vacation and holiday time. I live within my means, so although my personal family budget is tight, my financial burdens are far less than many others. As a regulator, the most difficult aspect is trying to impress upon the permittees how very important it is to plan for repairs and upgrades to their wastewater treatment plants and collection systems. It can be a real struggle to help permittees understand why they have been issued a Consent Order. What I enjoy most about being a NYSDEC engineer is that I am rarely bored. With the myriad of programs under the Division of Water alone, there is always much to learn, as policies and guidelines change frequently. I enjoy the ability to really research and investigate a given engineering (or design) problem. I enjoy using my skills to assist plant operators with the processing challenges that they are experiencing. Reviewing design plans allows me to pair my education and skills with those of the consulting engineer, assessing the design against accepted and established design practices. As an individual with a professional degree and professional license, I

appreciate that the supervisors and managers that I have worked under recognize and seek out my professional opinion. It is nice to have my skills and knowledge be valued and I feel I am treated with integrity and respect. Most of all, I am gratified that, through my role as an environmental steward for New York State, I am serving the people and the ecology by preserving and protecting the health of New York's waters."



A program specialist in NYSDEC's stormwater program said that her interest in the environment first peaked when she attended NYSDEC camps. Still other individuals in the agency remarked that they enjoy hiking, cycling, snowshoeing, fishing and other outdoor hobbies. Everyone here seems to nurture a love or passion for the environment and a wish to find ways to enhance water quality. Attaining professional practice here I believe to be a "natural" and satisfying endeavor.

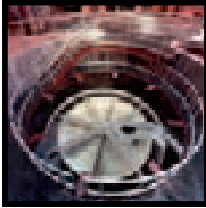

Sandra Lizlous is an Environmental Engineer 2 for the NYS Department of Environmental Conservation's Region 7, based in Syracuse, NY. She may be reached at smlizlov@gw.dec.state.ny.us. Ms. Lizlous is a long-term, active member of the NYWEA Central New York Chapter, and serves on its Publications Committee.





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Lining up credentials for success

Photo courtesy of Grealey and Hansen

Credentials for Credibility in Environmental Engineering

by Jean Malafronte

When I was in college, my mother advised, “Get as many letters after your name as possible. If you do that, you will go far.” I didn’t fully understand until entering the workforce just how important credentials can be, not only for your personal career, but also for your employer and the general public.

There are many personal benefits that can result from obtaining credentials. As a certified professional, the credentials can immediately identify you as a proficient professional in your field of expertise. This enhances your technical credibility and increases your personal marketability. By obtaining certain credentials, you may be satisfying requirements of state and local programs to be eligible for certain work. In addition, accreditation may encourage a greater commitment by you to your expertise and for the continued expansion of your knowledge base.

Employers receive many benefits from hiring employees with expanded qualifications or encouraging current employees to obtain them. Credentials can distinguish individual competencies from among potential new employees. Accredited professionals

on staff are more marketable and assure clients the people they are working with are committed to the industry and comply with the standards of each certification. In addition, employees with credentials are motivated to enhance their skills in order to maintain their accreditation.

Accreditation performs a public service in that it promotes environmental stewardship of the water and wastewater industry. The organizations that administer the accreditation exams and requirements establish peer reviewed standards to confirm the competence of the certified individuals and thus ensure the public’s confidence in the work being performed.

The list below is a good starting point when considering credentials that may assist in career growth and development (it is not a complete list). Consider speaking with mentors and supervisors for a list of desirable credentials to pursue that would boost your career and marketability. Check the websites provided for specific details on education and experience requirements, application instructions, fees and schedules for the exams.

Certification for Engineers and Scientists

NYS Professional Engineer (PE)

Administered by the NYS Office of the Professions
www.op.nysed.gov/prof/pels/

License required to practice engineering in New York State. Two Exams: Part A – Fundamentals Exam, and Part B – Principles and Practice Exam. Both have experience and education requirements for eligibility. Continuing Education Requirements maintain licensure.

Board Certified Environmental Engineer (BCEE) by the American Academy of Environmental Engineers and Scientists (AAEES) www.aees.org

PE required. Eligible for written and oral exam with eight years of experience, written exam waiver with 16 years of experience. Specialty certifications offered in various environmental fields.

Board Certified Environmental Scientist (BCES) www.aees.org
 Requirements are the same as BCEE description. Check website.

Diplomate, Water Resources Engineer (D.WRE) by the American Academy of Water Resource Engineers (AAWRE) www.aawre.org
 PE required. Ten years minimum work experience in water resources, and oral examination required.

Certified Professional in Erosion and Sediment Control (CPESC) www.cpesc.org

Three years of experience with BS degree, seven years with high school diploma. Exam required. Continuing education required to maintain certification.

Certified Erosion, Sediment and Storm Water Inspector (CESSWI) www.cesswi.org

Three years of experience with high school diploma and exam required. Continuing education required to maintain certification.

Certified Professional in Storm Water Quality (CPSWQ) www.cpsqw.org

Four years of experience with BS degree, seven years with high school diploma. Exam required. Continuing education required to maintain certification.

Professional Hydrologist www.aihydrology.org

Five years of experience with BS degree and exam required.

Hydrologic Technician www.aihydrology.org High school diploma

Certification for Operators

NYS Operator Certification www.dec.ny.gov/chemical/8707.html is approved by NYS Department of Environmental Conservation and administered by New York Water Environment Association www.nywea.org/OpCert/.

Required completion of training course and high school diploma for Grades 1, 1A, 2 and 2A. Additional education and experience required for Grades 3, 3A, 4 and 4A. Contact Tanya Jennings, NYWEA Operator Administrator, at 315-422-7811(ext.4) or tmj@nywea.org. NYS License has reciprocity in all 50 states.

OSHA Confined Space Entry www.osha.gov

Certification for entering confined spaces, including manholes and tanks. Training can be completed online with a two-hour course.

OSHA Certified Environmental Specialist www.osha.gov

Certification for environmental compliance and safety in the workplace. Training can be completed online with a 24-hour course.

Certification for Sustainable Design

Leadership in Energy and Environmental Design Accredited Profession (LEED® AP) through the US Green Building Council www.usgbc.org/LEED

Essential in green building design. Requires minimum experience working on LEED® projects and computer-based exam. Continuing education requirement to maintain certification.

Envision Sustainability Professional (ENV SP) through the Institute for Sustainable Infrastructure (ISI)

www.sustainableinfrastructure.org

Essential in Green Infrastructure certification. Requires computer-based exam. Recently developed, no continuing education credits required yet.

Certification for Construction

Certified Construction Manager (CCM) through the Construction Management Association of America (CMAA)

<http://cmaanet.org>

Education and four years of experience and certification exam required. Continuing education required to maintain certification.

Certification for Environmental Planning

Certified Environmental Planner (CEP) by the American Institute of Certified Planners www.planning.org

Education, experience and exam required. Continuing education required to maintain certification.

AICP Certified Environmental Planner (AICP CEP) by the American Institute of Certified Planners www.planning.org

AICP CEP is an advanced specialty certification with minimum eight years of experience. Exam required. Continuing education required to maintain certification.

Certification for Project Management

Project Management Professional (PMP) through the Project Management Institute www.pmi.org

One year of experience or PM training and exam required for CAPM Certification

Program Management Professional (PgMP) through the Project Management Institute. www.pmi.org

Three years of experience and PM training and exam required for PMP Certification. Continuing education required to maintain certification.

Certified Associate in Project Management (CAPM) through the Project Management Institute. www.pmi.org

Four years of project management and four years of program management experience, and exam required for PgMP. Continuing education required to maintain certification.

Many of the programs are certified through the Council of Engineering and Scientific Specialty Boards (www.cesb.org) and a comprehensive list of certification programs can be found on that website. In addition, the website, www.certificationguide.com, has an index of certification programs and is another resource for checking pathways to credentials that help advance careers.

Jean Malafronte, PE, LEED® AP, ENV SP, is Associate at the firm Greeley & Hansen based out of Philadelphia PA, and may be reached at www.greeley-hansen.com. Ms. Malafronte holds an MS degree in environmental engineering from the University of Massachusetts at Amherst and a BS degree in engineering science from Loyola University, in addition to green building design credentials. A member of NYWEA's Metropolitan Chapter since 2005, she has served on the State Board of Directors as a Committee Representative, chaired the Humanitarian Assistance Committee, and organizes the Women's Dinner Initiative program.

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From a Female Operator's Perspective

by Tanya May Jennings

Women have become increasingly more involved in the wastewater industry since the Clean Water Act was signed in 1972. Employment of women has changed over the years from primarily traditional female-oriented jobs to more non-traditional roles, such as those in the wastewater industry. However, with this change, women find unique challenges.



Photo courtesy of Monroe Co. Environmental Services

Mary Jo Healy, formerly a Pump and Process Operator, is Safety and Training Analyst at the Frank E. VanLare Wastewater Treatment Plant in Monroe County.

In New York State, approximately three percent, or 90 out of 2,990 wastewater treatment plant operators are women. Working in small town plants to large metropolitan facilities, these women vary in their daily duties, responsibilities and environments, so that each person's situation and experience is different.

To obtain a better perspective of the challenges and features of being a female wastewater operator today, three percent of New York plant operators were surveyed by the New York Water Environment Association. About one-third of these women professionals reported back on the following questions:

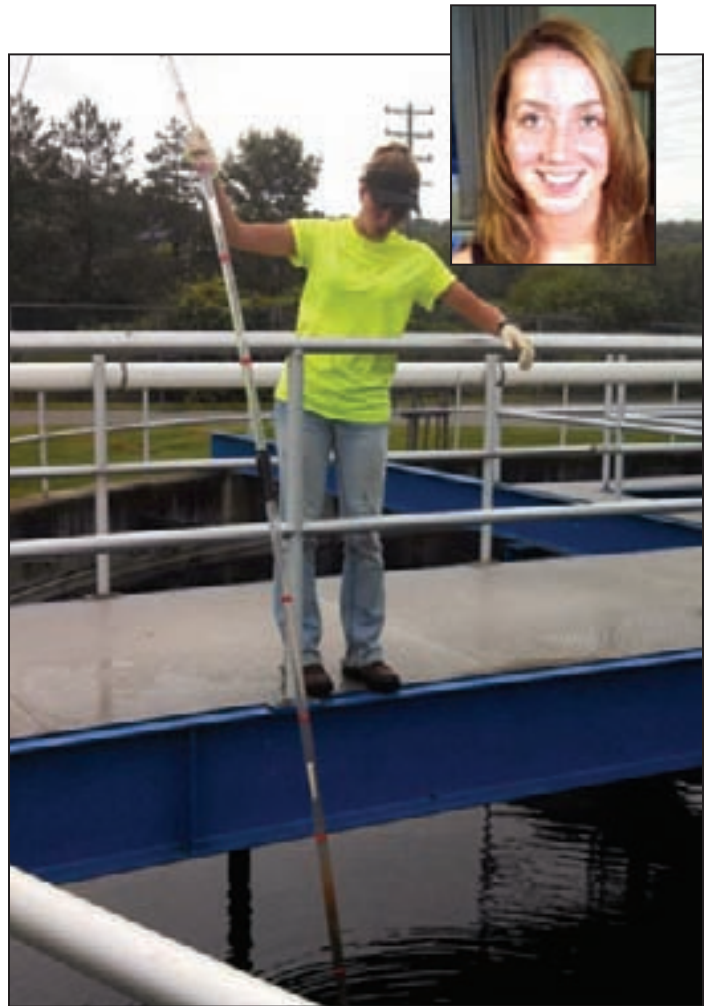
• **Why did you choose to become a wastewater operator?**

The majority of women answered that they chose to enter the



Photo by Lohr McKinstry, Press-Republican

Tina Gardner, chief operator (2A license) of the Town of Essex wastewater treatment plant on Lake Champlain, at the controls of the PLC-HMI touch screen.



Photos by co-worker, Mark Kellam

Rebecca Butler, a licensed wastewater treatment plant operator for the Village of Liberty, NY, is shown using a "sludge judge" to determine the blanket in the clarifier.

wastewater industry because they wanted to be in the environmental field to do something good for the natural environment. Others enjoyed the benefits, full-time employment and not being in a traditional office setting.

• **What are the highlights of being a wastewater operator?**

The biggest highlight is the end product – clean water! Others enjoyed the physical activity and having every day be a new and challenging experience while being outside. One female operator wrote: "I love my job. It's mechanical, it's physical, it's science and it's math. It's such an interesting job. We have to take care of our environment."

• **What is the downside of being a wastewater operator?**

Women have to constantly try to prove themselves to their male counterparts and show they are strong enough for lifting, tightening of valves and that they can work with different equipment. Another low point can be working outside during the New York winters which can be grueling at times, especially for those who live in harsher snowfall areas. A small number stated that the facilities within their wastewater plants do not accommodate women operators well, i.e., locker rooms, restrooms; however, they indicated they are also seeing improvements on this front.

• **Do you face any challenges being a female wastewater operator?**

continued on page 33



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Photo courtesy of Josephine Guarino

Josephine Guarino, dispatcher, monitors the weather in the control room of the Monroe County Van Lare plant.



Photo courtesy of Donna Bee

Donna Bee, 2A Wastewater Operator for the Village of Northport on Long Island

needed in the perception of the career field. Donna Bee, who works in Long Island, wrote: "Change the perception of what our job truly entails as opposed to the stereotypes that have been perpetuated since the days of Ed Norton. We are not uneducated individuals who roam under the cities in giant pipes filled with untreated waste. We are intelligent, articulate people who have studied hard to become

licensed professionals. We are tasked with maintaining and protecting public health and the quality and beauty of our waterways. What can possibly be more important than that?" Other incentives suggested would be: scholarships geared to women, co-op opportunities for women, more public education at various activities, and particularly more exposure at high school career days.

This question brought about the biggest response. Though society has elevated its perception of women in such a male-dominated career field, there are still challenges that persist. Women tend to have to work hard to be accepted as peers among their male counterparts and to prove that, "a female can do this job." Women must try to have their voices heard, breaking through to older operators who are set in their ways or because wastewater operations is considered, "a man's job". Women in male-dominated career fields need to have "thicker skins" and be able to interact with their male co-workers and not be easily offended. Then there are challenges that in general are faced by all women within any work environment: lack of social interaction with the male co-workers because of a perception; sexual harassment; pregnancy considerations; and, the constant juggle of family life with a career.

• **Is promotion potential the same within the field regardless of gender?**

The majority answered yes, that there was no difference in promotions between men and women. They believe that as long as you prove to be a good operator, there is room to advance regardless of gender. In the smaller plants, because there are fewer employees, everyone is promoted and treated more equally than in the larger plants where the ratio between men and women is quite significant. The perception of having a female supervisor is sometimes viewed negatively and can cause resistance by male co-workers so this, in itself, can provide another challenge for female operators.

• **Do you believe you are treated differently than the male operators within your facility?**

Again, this depended on the location and facility in which the female operator was working. The highest difference women expressed was that, sometimes, because they were female, their male counterparts felt they had "to protect" them, wanting to step in to do something for their female co-worker instead of allowing her to try first. This point also refers to challenges within the workplace – trying to prove themselves to male counterparts.

• **What would you say to other women interested in entering this career field?**

To this, everyone responded with, "Do it!" They all felt this was a rewarding career and that the personal satisfaction of the job makes this a very enticing career field.

• **How do we incentivize more women to get into the field?**

Not only for female operators but for all operators, a change is



Courtesy of Monroe County Environmental Services

Alison Perez, a Pump and Process Operator trainee, checks an automatic sampler at the VanLare WWTP in Rochester, NY.

~ • ~

Women are now becoming more of a presence in the workforce, diversifying the population of employees and holding positions in what normally were male dominated careers. Yes, women might have to work harder to prove themselves and some may still have to deal with biases held toward them in a male-dominated role – but that hasn't slowed them down. Based on this survey, it seems that the majority of women in the wastewater industry love what they do, enjoy the work atmosphere, and wouldn't change their positions for the world. Though there are challenges, these women are ready and willing to work hard and rise above anything thrown in their way. These women are strong, confident, educated, self-assured and competent in their roles as Wastewater Systems Operator Specialists.

Tanya May Jennings is the Wastewater Treatment Operator Certification Administrator with the New York Water Environment Association in Syracuse, NY, and may be reached at tmj@nywea.org.

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The Planner's Role in Wastewater Treatment

by Janice Jijina and Natalie Cloud

In planning new developments, improving existing areas and thinking about the future and sustainability of our communities as a whole, planners play a key role in wastewater treatment and management. Acting as the “big picture” people, planners consider whether there is adequate wastewater capacity to support development projects, determine where sewerage would be feasible, and address the community's overall vision – environmentally, economically and socially.

New Development

When people consider new development, they may think about how it will look, how it will affect their community, and whether it will affect traffic conditions. However, on Long Island, and elsewhere, an equally important consideration is whether there is available capacity to treat the wastewater generated from new development.

Long Island is located over a sole source aquifer system, which means that its residents obtain all of their drinking water from underground aquifers. It is, therefore, critically important that this valuable resource be protected and that wastewater treatment be handled in a way that minimizes impacts to the groundwater supply. Three major aquifers provide potable water for Long Island's 2.8 million people. While most of Nassau County is sewered with treated effluent disposed to surface waters, large areas of Suffolk County are unsewered with 70 percent of homes on septic systems. Over 150 smaller sewered areas have wastewater treatment plants which have groundwater discharges. The quality of the discharges from septic systems and treatment facilities directly impact groundwater quality.

The passing of the Clean Water Act in 1972 drove Nassau and Suffolk counties to develop an island-wide wastewater treatment management plan. These studies established eight hydrogeologic zones covering the two counties. Three of these zones are differen-

tiated as major deep recharge areas where rainfall percolates through the soil to recharge the underground aquifers. The remaining zones tend to be shallow flow zones that discharge to streams and marine waters. In addition to these designations, special groundwater protection areas have been established in locations where water quality is very good, and existing and future development is sparse, limiting the potential for contamination.

With this as a backdrop, wastewater treatment and water quality become major factors in land use decisions. In Suffolk County, for example, land that does not have access to capacity at a wastewater treatment facility is limited in the amount of wastewater flow that can be generated. In the deep recharge areas, wastewater flow is limited to 300 gallons per acre per day, roughly the equivalent of one single family home per acre. Outside the deep recharge areas, the limit increases to 600 gallons per acre per day. When projects are proposed that exceed these limits, then connection to an existing wastewater treatment facility must be made if one is available or a new wastewater treatment facility must be built. In some cases, a property owner can buy credits that relocate unused wastewater treatment capacity from a protected area, which ensures the preservation of that land. The price and availability of the credits varies with supply and demand.

Planning Studies

Through development of comprehensive plans, planners prepare township-wide or regional plans that identify where development should be located and what type of development should occur, considering community goals, economic development, social needs and environmental protection. Zoning ordinances may need to be amended to implement the recommendations of these plans.

Planners work with housing groups, social service agencies, and economic development agencies on the issue of affordable and workforce housing. Economic vitality depends on the availability of a suitable workforce. Many areas like Long Island suffer from a lack of housing for young people, seniors, the poor, and its workforce. Older suburban communities, such as Long Island, have less rental housing and fewer choices in housing types than newer communities. Multifamily housing of all types typically requires sewerage.

Long Island is currently embracing transit-oriented development (TOD), which seeks to cluster new development around transit access, such as train stations and bus terminals. This concentrates new mixed land uses in existing centers and discourages sprawl. Notable examples include proposed developments in the Village of Hempstead and the hamlets of Wyandanch and Ronkonkoma. In each case, sewage treatment capacity is a critical factor. In Hempstead, treatment capacity was available, but an aging sewer conveyance system would need to be upgraded to handle the capacity. In Wyandanch, an unsewered area, the decision was made to implement

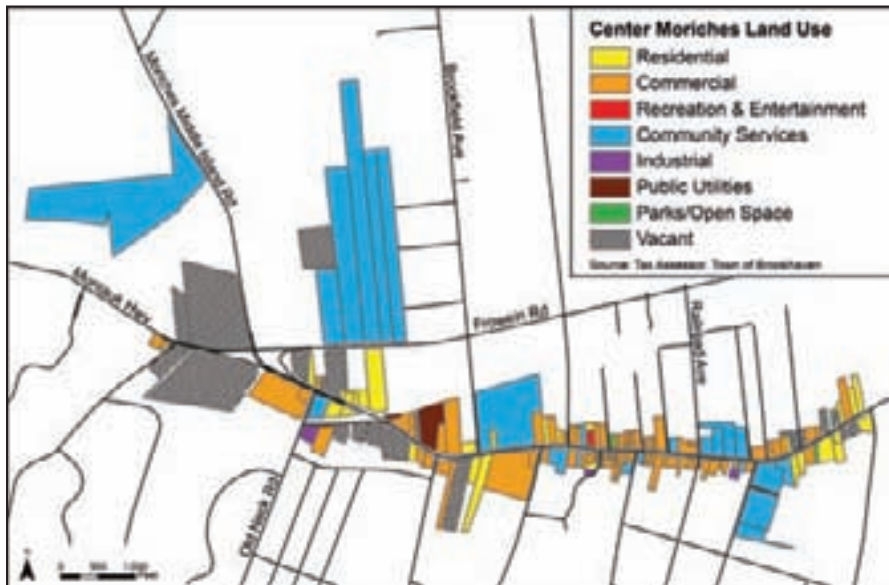


Sewer service connection area and zoning in downtown Sag Harbor, NY on the south fork of eastern Long Island

Source: Camemnon Engineering with information provided by Village of Sag Harbor

continued on page 36

sewering and connect to an existing plant. In Ronkonkoma, a new plant will be constructed. In each community, the development could not occur without addressing wastewater treatment capacity.



This map from a sewerage feasibility study shows land use within the Long Island hamlet of Center Moriches. Planning for future development is required to properly size and estimate cost for potential infrastructure.



This map is a result of field studies by planners to determine land use within the communities bordering the Forge River in Long Island.

Prioritizing Sewering Needs

Since the expense of sewerage is too high to consider sewerage all of Long Island, areas need to be prioritized. So how are these land use decisions made? There are many factors to consider. Often the need for the project will be a major consideration. Will the project revitalize an impoverished area or one with many vacant businesses? Is there a market for new development? Will the cost of providing wastewater treatment be offset by new revenues from property taxes and sales taxes from new residences and businesses? How expensive will it be to connect: is it just conveyance to an existing facility that can accept additional flow or is a new facility needed? Will the location benefit environmentally by protecting groundwater; or, in an environmentally sensitive area, by protecting surface waters?

Source: Cameron Engineering

Recently, Suffolk County undertook studies of several unsewered areas to determine the viability of sewerage, as well as to look at potential expansions of existing sewer districts. In these studies, initial steps included documenting existing conditions and working with each community to determine its vision for the future. A field assessment and data analysis documented current land uses, approximate building footprints and assessed valuations. Based on community input, scenarios were prepared that examined how changes in zoning could result in land use changes. Changes such as taller buildings, more lot coverage, and different types of uses can affect the potential build-out of a community and the amount of wastewater capacity required. In some cases, an unsewered community may have concerns that sewers could bring more development thereby changing the character of the community, or that sewers may increase competition to current commercial property owners that could affect businesses.

Often a market study will be performed to see if there is unmet demand for residential, retail or office space, and if the community vision is something that will attract investment. Planners work with the market study results and stakeholders to determine what might be an appropriate density for new developments or redevelopments. Planners estimate the build-out of these denser areas, accounting for existing or revised zoning and development incentives and restrictions. From these calculations they determine future wastewater flows. Such calculations enable wastewater engineers to size the collection and treatment systems needed.

Source: Cameron Engineering

Next Steps

When sewerage is indicated, environmental, technical, legal and regulatory challenges must be identified, as well as the potential cost to property owners. Factors affecting cost include the number of connections, the size of the area



Source: Cameron Engineering

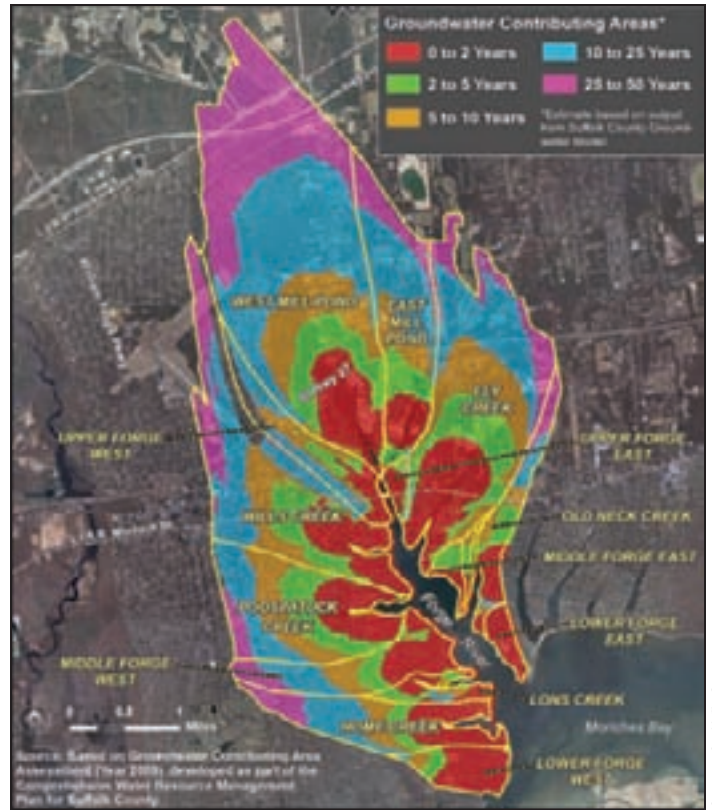
The Forge River in Long Island has suffered from high groundwater nitrogen levels from untreated wastewater effluent. Planners evaluated remedial measures to improve water quality.

to be covered by the conveyance system, the type of conveyance system and treatment process, as well as available capacity, cost to add additional capacity or the need for a new treatment plant. A major component of this cost information includes the operation and maintenance costs that will remain after the capital costs have been resolved. As with many projects, there is an economy of scale when projecting operation and maintenance costs. Often this favors a more expansive project to spread costs among many property owners. The cost per gallon to treat wastewater decreases once a certain threshold has been met. This concept is not always applicable for capital costs. For example, the cost per parcel to sewer an area with larger lots may not be more economically viable than the cost of sewerage a concise downtown area of smaller lots. Therefore, a cost benefit analysis should be conducted to ensure that the costs of building and operating the treatment system are more than offset by environmental, social and economic benefits.

If sewerage is found to be feasible, the boundaries of the district need to be established (or expanded); a sewer district formed (or expanded); and the project analyzed for environmental impacts through the State Environmental Quality Review Act. Once a project has reached this critical phase, planners must closely examine the multiple impacts of sewerage a community including: traffic, visual quality, noise, ecological resources, and more. Mitigation measures may be required, such as revising the treatment facility location, or making traffic improvements to address the increased activity resulting from sewerage the area. The community is involved in both the formation/expansion of a district via a public referendum, as well as through public review of the environmental studies.

Environmental Benefits

Planners also look at the environmental implications of sewerage. They work with environmental scientists and engineers to examine where sewerage would be most protective of surface water quality. Many coastal bays and harbors suffer from the effects of high nitrogen concentrations that lead to low oxygen levels, algae blooms and degraded water quality. This nitrogen comes from onsite wastewater systems (cesspools and septic systems) that discharge their partially treated effluent to groundwater, as well as from past agricultural practices. Groundwater travels to the bays and harbors releasing



Source: Suffolk County

Groundwater contributing areas to the Forge River in Long Island are shown here. These areas were delineated to quantify the nitrogen contribution and prioritize remedial solutions for each sub-watershed.

the nitrogen to surface waters. For example, the degradation of the impaired Forge River from excess nitrogen contributions which fuel algae blooms that create low oxygen conditions toxic to aquatic life, has led the county and a town to investigate sewerage the surrounding areas. While previous agricultural establishments in the area may have been the impetus for the initial studies, recent studies have concluded that the continual effect from the septic system contributions on the river may keep it forever impaired without addressing wastewater management.

For each of these analyses, planners are key players, working with municipal leaders, communities, the development community, economists, engineers and scientists to arrive at equitable land use and environmental decisions, including ensuring groundwater and surface water protection through availability of wastewater treatment.

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Importance of Business Development in Environmental Careers

by Wendi Richards

We all entered the environmental profession for different reasons, but I doubt most of us ever stopped to consider it from a business perspective. As teenagers, we may have aspired to lofty goals to help the environment and eventually discovered that those goals often only became reality through some form of business enterprise. In the wastewater industry, business development takes on many shapes and forms, but all are united in the common purpose of protecting the environment while keeping people gainfully employed.

As a professional engineer, I transitioned through various positions – first as a teaching assistant in graduate school, to the first female sanitary engineer in Onondaga County, to a consulting engineer for nearly 20 years, to my current position managing process equipment sales in upstate NY. Business development has been a common theme throughout my career. After working in education and in both the public and private sectors with clients ranging from students, rate payers, municipalities, industries and consulting engineers, I have gained a unique perspective of the engineering field.

Pinnacle of Skill Development

In consulting, an engineer's natural career progression often begins by reviewing detailed shop drawings and doing calculations. Working as an entry-level professional, business development was far from my mind as I focused on expanding my engineering skills, learning all I could about planning, designing and the construction of water and wastewater facilities. After years of persistent skill development, an engineer can advance to project or senior project engineer, taking on new and more complex responsibilities, such as writing sections of extensive facilities planning reports or designing whole portions of a large plant upgrade. Interfacing with people from other disciplines, such as architects and structural and electrical engineers occurs at this level. With still more experience, a project engineer could take on the role of project manager where, instead of completing technical work directly, she or he manages teams of project engineers who carry out the work. At this point, interactions with regulators and customers become commonplace and communication and organizational skills prevail. Often, as relationships with clients deepen, one may even progress to the role of client service manager.

So, what does all this have to do with business development?

Business development appears to me to be a pinnacle – something best achieved after one has acquired technical skills to do the work, organizational skills to manage the work, and interpersonal skills to manage the clients. After all, how can work be obtained without understanding exactly what it is or how much effort is required to complete it? How can project proposals be won without first establishing business relationships with customers?

Many times, engineers arrive at a crossroads approximately 10 to 15 years into their careers questioning whether to pursue project/client management or a purely technical role. Often an excellent project manager is assumed to be good at developing business, however, as many engineers find out, this is not the case. A large number of engineers are quite comfortable remaining excellent



Courtesy of Wendi Richards

In her office at Siewert Equipment Company, Wendi Richards discusses the cost effectiveness of equipment with a client.

project managers and opting out of business development for various reasons. Still others thrive as technical experts who may be offered opportunities to develop business by providing the technical solutions to a request for a proposal without being involved in the client relationship directly. A young professional would, therefore, benefit from discussing options and long-term goals with his or her employer up front and periodically. For those who choose to pursue business development, the following tips may be useful to know.

Customers Come First

Business development is about taking care of the customers first and foremost, while expanding the overall business in the process. It takes a team approach to pull this off – one cannot do it alone. Teaming may take several forms. The team may consist of co-workers inside your organization who each have a role in maintaining customer relationships, such as those frequently visiting wastewater plant staff or providing equipment service. The team also may include professionals outside of your organization including regulators who review process solutions, funding agencies, or others whose unique services or products and experience may complement those of your organization.

You have to put yourself in your customer's shoes – view the world from his/her perspective and listen to the challenges the customer faces. This sounds easy, but it isn't. You have to ask questions like "why?" and "how?" to better understand the customer's needs.

You need to be aware of the customer's schedule and budget constraints and the impact this has on the client's decisions to solve challenges.

After the "selling" stage is over, an organization needs to follow up with great customer service throughout the project.

It certainly helps if you have the good fortune of having worked for a customer for several years, allowing familiarity with the customer's facilities and development of a trusting relationship.

Building Business

Networking: Sooner or later you will deal with new customers. You may have to demonstrate your level of expertise and prove your experience through some form of written or verbal communication. Socializing is often a part of business development. How does a female engineer, in particular, navigate this aspect of her career?

Fortunately, there are professional organizations, such as NYWEA, that facilitate communications among customers and business developers of all types. After all, every engineer must take on the role of either a customer or business developer at some time or other, whether as a municipal representative, consultant, operator, vendor or educator. Luckily, professional organizations have codes to help define boundaries for certain behaviors so that no lines are crossed or blurred. Such codes allow us the freedom to interface with customers who may be bound by other laws preventing interaction with sales representatives at another social venue. The networking opportunities that professional organizations provide are valuable as forums in which to exchange new ideas and technologies and build relationships. Professional organizations also allow us to grow as leaders by facilitating participation on committees or boards to serve greater needs.

In addition to professional organizations that uphold proper social behavior, there is also the Order of the Engineer, which is a visible sign to the public that an engineer has pledged the Obligation of the Engineer. The Obligation contains parts of the Canon of Ethics of major engineering societies. Initiates, as they accept it voluntarily, pledge to uphold the standards and dignity of the engineering profession and to serve humanity by making the best use of Earth's precious wealth. I took this pledge at the SUNY

College of Environment Science and Forestry, my alma mater for my BS and MS degrees. I take this pledge seriously and look to ensure that equipment solutions are in the best interest of the public and not for my personal best interest. Often, personal professionalism and integrity are most telling to customers and can help one establish trusting client relationships.

What is encouraging for women in business development is that there are far more of us women in leadership roles today than ever before. This includes women holding influential positions in politics, education, industry, municipalities and authorities. Such female county executives, mayors, deans, directors, commissioners and chief operators often prefer to socialize, confide in and seek advice from other female professionals. Most organizations would, therefore, benefit from recognizing this trend and developing more opportunities for female business professionals who can speak the language of this new group of leaders.

What's Trending?: Developing a business includes increasing one's customer base while simultaneously modifying products or services to best meet customer needs. Part of my role as a manager of process equipment sales is to recognize trends in the water and wastewater treatment industry and ensure that our products and

One would be wise to never let one's technical engineering skills fade in the midst of business development.

continued on page 43

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Courtesy of Ken Shubinowski

Building professional social relationships is an important aspect in interpersonal skills development and networking for business development. Here, Wendi Richards (2nd from right) enjoys attending this NYWEA scholarship fundraising event with other environmental colleagues (left-right): Jerry Connolly (Siewert), Ed Hernandez (Delaware Engineering), Mark Koester (Koester Associates), Michelle Hernandez and Will Stradling (Siewert).

technical solutions keep up with those trends. Sometimes this means researching the best products and meeting with potential manufacturers to ensure that their products satisfy customer needs. Furthermore, the needs of our customers range from small to large and industrial to municipal, so not every size fits all. Due to the diversity of customers, there is a multitude of products, each suited to a particular customer type. In addition, as regulations that impact the water and wastewater industry change over the years, products and solutions will also change to meet the new regulations. It is precisely under these circumstances that retaining technical engineering expertise while developing business is critical to success. It is not easy to keep up with and independently evaluate the latest industry advancements due to the limitations on most professionals' time.

As a process equipment sales manager, my job is to know what the best technologies are, who offers the best ones, and which ones will last. This can save my customers time. In my opinion, one would be wise to never let one's technical engineering skills fade in the midst of business development. The need for both strong technical and communication skills is consistently apparent in my daily interactions, and I am confident that such skills bring a lot of added value to customers.

Life Style of the Business Developer

The life style often associated with business development or sales is one of being on the road and living out of a suitcase. While this is not conducive to family life for most people, there is a balance that can be achieved.

For example, as a consulting engineer at a large national firm, I often traveled to other states once a month for design work. Luckily in my case, this travel did not occur when I was raising young children but at a time when my children were more self-sufficient. For business development, travel is often necessary to establish relationships with customers located far and wide. However, travel does not need to consume one's personal life. In particular, a team approach can help alleviate the need to travel exclusively by relying on co-workers to assist in the process of business relationships. In

addition, getting out of the office to travel can breathe fresh air into your career as you vastly expand your contacts and experiences. Having an understanding "significant other" who trusts and supports you at home while you travel also helps immensely. If, on the other hand, you have a career that requires frequent relocation, repeatedly having to establish new local contacts for business development may be somewhat of a challenge.

Advantageous Traits

There are likely a few personality traits that favor a role as a business developer, gleaned from one's childhood experiences and extending to current daily habits and life style. For me, growing up with three older brothers and three older male cousins next door meant learning to be comfortable around "the boys." It taught me to hold my own when playing sports with them, to take risks like driving dirt bikes, to be comfortable around mechanical tools and engines, and to know how to react when they didn't always play fair. I play tennis competitively and expect and enjoy competition in the business world. Many business developers are active in biking, iron man competitions, marathons, etc. – all of which strengthen the body and the competitive spirit. You can't always win, but you can improve your game, and there are always some who stretch the rules. Of course, knowing how to live with rejection is a part of business development as well. That's where it helps in being comfortable taking risks. You can't be afraid to change the status quo if you want to stand out and offer your customers something better. I would add that patience and perseverance are traits that also come in handy.

Finally, as with any role, it helps to have passion to succeed in business development. Indeed, there are incredible personal and financial rewards for women who aspire to break into what has been traditionally a man's world. For me, the passion began with a love of the environment and a chance to use my skills in mathematics, science, and written communication to do something to protect it. That initial passion slowly morphed into the wonderful world of civil and environmental engineering, and now business development and sales.

I see a need for choices across New York for ever-changing products and services for water and wastewater treatment for both industries and municipalities. There are funding challenges that spur new and innovative methods to assist customers, including design-build and energy performance contracts. There is a need for women business enterprises to meet the funding quotas for many projects. In a tight economy, we need to do a better job of asking the right questions, listening and responding, with the ultimate goal of protecting the environment using the most cost effective strategies possible.

This complex process, in a phrase, is business development – the ability to effectively communicate technical expertise while creating cooperative, honest relationships with all parties involved.

Wendi Richards, MS, PE, is Manager of Process Equipment Sales with Siewert Equipment Company, and works out of Syracuse, NY. She may be reached at wrichards@siewertequipment.com. Siewert Equipment is based in Rochester, NY, with additional offices in Troy and Buffalo.



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Know Your Reputation and Advance Your Career

by Shari Harley

Unless you work in total isolation, you know that people have a tendency to talk *about* you – not *to* you. Many employees have no idea where they stand performance-wise in their organizations because, for the most part, colleagues or supervisors don't tell them. This lack of information leaves employees in the dark, not knowing what to do more, better or differently to benefit their careers.

If today was the day of your performance appraisal and I asked how your boss (or anyone else who provides input on your review) would rate you, you probably would not know. This lack of knowledge prevents you from managing your career. Not knowing someone's opinion doesn't mean you're not subject to it either. It's akin to getting a speeding ticket when you didn't know you were speeding – the cop doesn't care. He adds four points to your driving record, despite the fact you weren't aware of the speed limit. What's even more troubling is that employees often don't know all the people who impact their careers. People we interact with, even peripherally, often talk about us to the decision makers in our organizations. Often we don't know what is said about us, by whom or to whom. This lack of direct feedback presents obstacles to managing our careers and professional reputations.

Get the Truth and Eliminate Blind Spots

You may work for a manager who is generous and forthright with feedback, or you may not. If it's the latter, it doesn't really matter because you know there are people in your life who will tell you the truth (as they see it), if you ask them. I recommend assembling a core group of people who you can count on to tell you the truth. These are the people who know you well and have your back. They can be friends, family members, and current or past co-workers, customers or managers.

You might wonder, what can my mom or friends from high school or college tell me about how I behave at work? The answer is - a lot! We don't become different people when we go to work. We are who we are. If you're often late, cancel on commitments, or wear clothing that's not your friend, you most likely do those things both at home and at work. Likewise, if you devote great attention to detail, never break commitments, and always look great (in public), your friends and family know this.

The lack of direct feedback presents obstacles to managing our careers and professional reputations.

Identify a few people, personal and/or professional, who care about you and will tell you the truth. Inform these folks that you want to eliminate your blind spots. Ask them for specific feedback and promise that, no matter what they say and how hard it may be to hear, you will respond with, "thank you." Then be sure you do control your reaction. It's normal to become defensive when we receive feedback. But every time we become defensive, we train people it's not safe to tell us the truth. If you want people to be candid with you more than once, make it easy for them to share the

truth with you.

Questions to Ask Friends, Family and Co-workers:

- What's the first impression I make?
- If my co-workers were asked to talk about me when I wasn't present, what do you think they'd say?
- What do you think I'm like to work with?
- How have I exceeded your expectations in the past?
- How have I disappointed you in the past?

Questions to Ask Your Manager:

- What skills do I have that the organization values most?
- What contributions have I made that the organization values most?
- What mistakes have I made from which I need to recover?
- Who in the organization should I have a good relationship with?
- Who or what departments should I work closely with?
- Who impacts my reputation and the opportunities I have?

Yes, you can ask these questions and you won't feel mortified. Your boss will answer them and he (or she) won't be annoyed. I assure you, your boss has had few, if any, employees who have asked these questions and it'll be a refreshing change.

Remember, the right answer to feedback is, "thank you," regardless of what you may be thinking. The easier it is to give you feedback, the more you'll receive.

You may be thinking that what I'm suggesting is unrealistic. People either won't be honest, or you won't be able to take what you hear. The people who really care about you will be honest, and you can take it. You'll be better off than before you had these conversations. You might hear things that pleasantly surprise you. And, regarding the things you don't like – just because no one talked about them to you before, doesn't mean those behaviors didn't impact you. Now you can do something about them!

Take Control

We don't always know who talks about us and to whom. As a result, we don't always know all the people who impact our careers. If you don't know who whispers about you to the boss and upward to his boss – find out. Get out of the dark and take control of your reputation and your career!

Shari Harley is the author of the book, How to Say Anything to Anyone: A Guide to Building Business Relationships That Really Work, and leads Candid Culture, a training firm that is bringing candor back to the workplace, making it easier to tell the truth at work. Learn more about Candid Culture's training programs, watch videos and read an excerpt from Shari's new book at www.candidculture.com.



Photo courtesy of www.candidculture.com

Shari Harley, author, international business leadership trainer/consultant and certified speaking professional, helps bring candor back to the workplace.

Women in the Field Then and Now: 2004 to 2013

The following is an update of career profiles written by some of the women first featured in the Clear Waters Fall 2004 "Women in the Environmental Field" edition. Almost 10 years later, these women remain active with notable careers in the water quality field. The information here was written by these individuals for this Clear Waters special issue in hopes that other women considering this exciting and challenging field will find their careers and insights enlightening.



Sandra Allen

During the past 10 years, I was fortunate to continue to work on water related issues with New York State. After serving as the Director of the Division of Water at the Department of Environmental Conservation, I was charged with establishing the Clean and Safe Water Infrastructure Funding Initiative for which I had the pleasure of collaborating with a network of parties both statewide and nationally – including the New York Water Environment Association

and the Water Environment Federation – who share an interest in making sure water infrastructure receives the attention it needs.

Presently, I am the Director of Policy and Planning at the New York State Environmental Facilities Corporation where I work with my colleagues to improve and green our water infrastructure programs, as well as on pollution prevention and compliance assistance programs. I have learned to always listen to new ideas. Now more than ever, we need to find new ways to make progress. Also, I continue to be impressed by the strength of working with others. Working as a team gives your effort clout and resiliency for when things get tough. I look forward to continue working to protect our waters and to educate the public about their importance.



Lisa J. Derrigan

In the past nine years, I have been fortunate to continue employment with Malcolm Pirnie, although it now is part of ARCADIS as a result of a 2009 merger.

One of the biggest lessons I have learned over these several years is not to be afraid to push the boundaries that go along with a typical consulting career. I was able to successfully negotiate a part-time work schedule that includes a flexible summer slate, allowing me to better balance my

work with family.

I also have been able to stay active in the New York Water Environment Association (NYWEA) even with my part-time schedule. My involvement with NYWEA continues to provide great opportunities for networking, acquiring technical knowledge and developing friendships with colleagues across the state. I served as co-chair of the NYWEA Awards Committee for four years, and continue to serve on this committee. One of the most rewarding aspects of participating on the committee is helping to recognize

deserving colleagues in our field and seeing the personal pride that these awards bring them.

Libby Ford

I remain employed by Nixon Peabody, now 35-plus years, and I still love it! My work is navigating the intersection between what is technically feasible and what is legally required, and often I must apply a healthy dose of business sense. Most of my projects are related to water, but the focus shifts as regulations and their enforcement change. In the last year, I've performed work on water and wastewater treatment and discharge issues, abatement and demolition issues for power plants, TMDL (total maximum daily load) related issues, some water-related municipal financing or alternate financing, as well as across-the-board stormwater issues.

At this stage in my career, I find myself often playing the unofficial role of project manager on work which involves not only a client and one or more of my firm's attorneys, but also an outside environmental consultant. I also am expected to do a great deal of business development, which I've become comfortable with over the years because I focus on where and how Nixon Peabody can bring value to a project (especially with our small in-house group of environmental, health and safety engineers and scientists).

I continue to believe strongly in third party certifications when they are issued by an accredited entity. Consequently, I have taken the steps necessary (including having my skills and knowledge examined by other credentialed environmental professionals) to be certified as a Qualified Environmental Professional, a Certified Hazardous Materials Manager and a Certified Environmental Professional. While this may seem like an excess of initials, each of these credentials covers a specific aspect of what I do as an environmental professional.

Finally, because I continue to believe that environmental professionals gain as much as they give when they volunteer their time and energies to professional organizations and environmental causes, I remain heavily involved in the New York Water Environment Association, the Water Environment Federation and the Institute of Professional Environmental Practice (a certifying agency for environmental professionals).

Donna Hager

I have learned a great deal about engineering, from both technical and business perspectives, since 2004. My career path has included engineering design, project and program management, client management, construction management and business development. While working at AECOM almost a decade later, I continue to view engineering as an exciting, yet very challenging profession.



I believe job satisfaction depends on finding the right balance that works best for the individual professional. There are plenty of opportunities in the engineering field for women as reflected in the different roles I've served, so don't be misled that it is a limited career path. For the future of the profession, I think succession planning is essential, and knowledge transfer is even more critical. Some good advice I received was to stay close to people you respect, ask them a lot of questions, and learn as much as you can from them every day. I also have gained so much personally and professionally as a member of the New York Water Environment Association's Program and Public Outreach committees, and I always encourage co-workers to join, be active and network too!



Kathleen M. O'Connor

Life has changed considerably since I was profiled in 2004. I've been promoted to Senior Project Manager at the New York State Research and Development Authority, and I serve on the New York Water Environment Association Board of Directors while navigating the complexities of juggling family and career.

I've witnessed quite a transformation in the water/wastewater industry concerning attitudes toward innovation, energy efficiency and climate change.

Sessions at NYWEA conferences on these topics, once relegated to the last time slot of a meeting and attracting only a few attendees, have morphed into their own specialty conferences that focus solely on those topics. Revolutionary concepts, such as "life after activated sludge," zero net energy facilities, and resource recovery (as opposed to wastewater treatment) are now the focus of regular forums. I am so proud of the way our industry and the professionals within it are evolving to better serve the environment and their clients.



Patricia M. Pastella

Wow! What a decade for career change! I concluded my very fulfilling consulting career at Stearns & Wheler in 2008 to accept the role of Commissioner for Onondaga County Department of Water Environment Protection. While commissioner, I had the pleasure of making significant improvements to the work atmosphere, as well as laying the groundwork for several water quality improvement projects relating to combined sewer overflows and their

construction. The commissioner position was a great opportunity for me to make some positive improvements to the operation of that department and in water quality.

I left the commissioner job in 2011 to work directly on the construction management of those county projects. This started my career with C&S Design Build as Construction Program Manager. This proved to be a great experience for me to see that the projects I had initiated while with the county reached their completion. Construction management is exciting, fast paced, challenging and

a lot of fun. In this capacity, one needs to go where the projects are located. I knew my time in this role would be limited, as traveling from job-to-job does not suit my lifestyle. Another opportunity presented itself with the Development Authority of the North Country (DANC) as Water Quality Division Manager, which I could not pass up. Since April 2013, I have been working at the DANC, managing its water and wastewater contract operations. I oversee a team of 14 that is responsible for operating and maintaining the water and wastewater treatment plants and sewer systems for several communities throughout Jefferson and St. Lawrence counties. In addition to the contract operations, the DANC owns, operates and maintains two major water distribution systems and a sewer collection system. These systems serve the Fort Drum complex as well as several other communities in the western part of Jefferson County.

My broad experience in design, construction and public administration has helped me to enhance my career and expand into related areas. I have been fortunate to be able to switch jobs for better opportunities in my profession to suit my circumstances when there are many people in today's marketplace who cannot find jobs.

Wendi Richards

After leaving C&S Engineers, I worked for four years at Brown and Caldwell as a Principal Engineer and then Supervising Engineer. I managed its Syracuse office, setting and meeting business goals in municipal wastewater collection and treatment. I managed engineering staff as well as planning and design projects. I maintained client relationships, prepared team arrangements, and technical and cost proposals. In addition, I provided technical leadership in process mechanical, instrumentation and plumbing design.

I am currently the Process Engineering Manager at Siewert Equipment, responsible for the development and management of all aspects of process technology applications and equipment sales for the water and wastewater municipal and industrial markets in New York State. This has allowed me to meet and serve a large number of professionals across New York. I also have become much more active in the New York Water Environment Association since 2004, currently serving on its state Board of Directors, the Central Chapter board, and the statewide committees for Program and Member Education.

While raising my three children, I was fortunate to find receptive employers who allowed me the opportunity for a flexible work schedule without compromising engineering career advancement. Of course, I had to prove my value and commitment to the employer in order to gain this benefit.



Thanks to Donna Hager, Vice President of AECOM in New York, NY, for assisting with contacting authors and compiling these updates for Clear Waters.





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One Woman's Rise to WWTP Management in NYC Department of Environmental Protection

by *Tanya May Jennings*

The Department of Environmental Protection in New York City (NYCDEP) is a large community of talented individuals that operates and manages 14 wastewater treatment facilities located throughout the city. The NYCDEP employs over 1,800 people, the majority of whom are male with a few females distributed throughout the system's wastewater treatment plants.

One woman, Maria Duran Waller, has earned advancement through the ranks at NYCDEP, becoming the first female engineer as well as its first deputy chief at a WWTP. Duran Waller attributes female and male mentors along the way for helping guide her through the rough spots and onto the best path for her career climb.

Challenges in Career Climbing

Duran Waller started working for the city in 1985 when Andrea Valencia, a NYCDEP employee, recruited her as she attended Bronx Community College to obtain an electronics technology degree. Advancing in positions that included technician, operator, and health and safety officer, Duran Waller currently serves as the deputy chief in charge of maintenance at the Hunts Point WWTP. Out of all of her jobs, Duran Waller finds her current position to be her most challenging, interesting and rewarding.

At Hunts Point, she is tasked to perform the following functions: plan an effective use of staffing in preventive and corrective maintenance of equipment at the facility; monitor and update inventory of replacement parts and commodities using CMMS (the computerized maintenance management system); coordinate and prioritize work to be performed by support staff (electricians, instrumentation technicians, machinists); plan and coordinate requirement contractors to perform preventive and corrective maintenance; coordinate equipment to be sent out on reports; monitor safety work practices, such as LOTO (lock out, tag out), confined space, hot work, personal protective equipment and SOPs; and draft standard operating procedures when needed.

When asked about her experience as a wastewater specialist, Duran Waller commented: "I felt challenged as an operator to learn the many versatile aspects of the job because I could be used as an operator, or a mechanic. Both aspects require that you know hydraulics, mathematics, physics, biology, electrical, plumbing, masonry, carpentry, how to communicate effectively, and more."

She mastered these functions, progressed through this male dominated field and succeeded; yet, there still are some challenges Duran Waller faces as a female leader and supervisor. They arise, she believes, primarily because most of her male counterparts are not accustomed to working with a woman in a managerial role.

Her advice to women for dealing with such situations while climbing the ladder may not be new, but it remains effective: "Work twice as hard. If you don't succeed, don't be afraid and keep trying. Take classes and coursework to constantly improve yourself and increase your knowledge."

Consider This!

Duran Waller believes that any woman looking for a "nontraditional job" that has plenty of room for promotion, good benefits and a reasonable salary, should consider working in the wastewater



Photo courtesy of Public Employee Press

Maria Duran Waller when she was the Health and Safety Officer at Wards Island Water Pollution Control Plant. She currently is Deputy Chief of Maintenance at Hunts Point WWTP.

industry. She does caution that this field is not for every woman (or man for that matter). Let's face it, "the odors can be very pungent, and the environment ... well, let's just say, you have to be cut out for this kind of work. You have to be willing to carry your own weight, and a woman may have to work harder to get noticed or recognized for achievements," she noted.

This should not discourage or deter women from entering the field. Waller Duran can certainly attest that, while challenging, her journey to a top managerial job at NYCDEP, has been a very satisfying one.

Tanya May Jennings is the Operator Certification Program Administrator for NYWEA in Syracuse, NY and may be reached at tmj@nywea.org.



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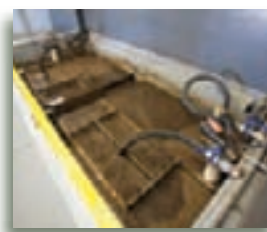
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Operator Quiz

Test No. 101 – Mathematics

The following questions are designed for trainees as they prepare to take the ABC wastewater operator test. It is also designed for existing operators to test their knowledge. Each issue of *Clear Waters* will have more questions from a different section of wastewater treatment. Good luck!

- What is the calculated BOD of an influent sample if initial DO = 8.07, final DO = 1.8 with an 8 ml non-diluted sample?
 - 157.8
 - 258.4
 - 208.6
 - 122.23
- How many pounds of solids are in a 750,000 gallon aeration tank if the MLSS concentration is 1,650 mg/L?
 - 10,321 pounds
 - 13,761 pounds
 - 10,231 pounds
 - 20,642 pounds
- If a wasting pump has a fixed pump rate of 250 GPM, and your calculation indicates you must waste 126,000 gallons, what hourly cycle rate do you set the timer?
 - Turn pump on 21 minutes every day
 - Turn pump on 504 minutes every hour
 - Turn pump on 42 minutes every day
 - Turn pump on 21 minutes every hour
- A positive displacement pump is connected to a 25' wide x 125' long x 12' side water depth aerobic digester. How long will it take to empty the contents of the digester if the pump rate is 225 gallons per minute?
 - 15.3 hours
 - 2.8 hours
 - 20.8 hours
 - 15.6 hours
- A centrifuge is fed sludge with a concentration of 3.4% solids. If the sludge feed rate is set at 50 gallons per minute, what is the centrifuge loading rate in pounds per hour?
 - 763 lbs/hour
 - 850 lbs/hour
 - 735 lbs/hour
 - 960 lbs/hour
- Calculate the surface loading rate for a treatment plant with 4 clarifiers each with a 100 foot diameter. The plant has an influent flow of 35 MGD.
 - 279 gal/sq ft
 - 950 gal/sq ft
 - 4,459 gal/sq ft
 - 1,115 gal/sq ft
- Calculate the flow velocity in feet/minute if 7.5 MGD of flow passes through a channel that is 3' wide x 4' deep, and the depth of flow is 15 inches.
 - 186 ft/min
 - 58 ft/min
 - 202 ft/min
 - 46.5 ft/min
- Determine the pounds per day of primary solids removed at a plant with a flow rate of 1.5 MGD and the following data:

Influent TSS = 250 mg/L, Primary Effluent TSS = 150 mg/L,
Final Effluent TSS = 12 mg/L

 - 1,101 lbs/day
 - 1,251 lbs/day
 - 982 lbs/day
 - 2,977 lbs/day
- A sewage pump is located above the wet well which is 8 feet deep and the pump is pumping to an above ground clarifier with 12 feet depth of water. The pump manufacturer has given you the pump characteristics curve which shows Total Dynamic Head vs. flow rates. If the operating wet well water depth is 6 feet, what is the total dynamic head in order to determine pumping rate from the chart? Assume the top of the wet well and the bottom of the clarifier are at the same elevation.
 - 12 feet
 - 20 feet
 - 14 feet
 - 10 feet
- A sewage pump is located above the 8-foot diameter wet well which is 8 feet deep and the pump is pumping to an above ground clarifier. The flow meter on the pump is not operating and you want to calculate the pumping rate by measuring the drop in wet well water level during when inflow to wet well is minimal? If the drop in water level in one minute is 2 feet, what is the approximate pumping rate in gallons per minute?
 - 250 GPM
 - 375 GPM
 - 500 GPM
 - 750 GPM
- An industrial plant has organic waste discharge which contains 1,450 mg/L of BOD and discharges 5,000 gallons per day into sewers. If the surcharge rate is \$1.00 per lbs of BOD above 250 mg/L then what will be the *daily amount* to charge this customer for excess BOD discharge?
 - \$5.00
 - \$25.00
 - \$50.00
 - \$75.00
- Your treatment plant is operating at 50% organic design capacity. The plant is designed to process 2,000 lbs of BOD per day. A food processing plant wants to bring 6,000 gallons per day of their waste with 12,000 mg/L of BOD for treatment at your plant. What is their daily organic loading to decide if you have the capacity to treat?
 - 600 lbs
 - 60 lbs
 - 160 lbs
 - 120 lbs

Answers on page 61.

Tanya May Jennings works for the New York Water Environment Association in Syracuse as the Operator Certification Program Administrator. For those who have questions concerning operator certification requirements and scheduling, please contact her at 315-422-7811 ext. 4/tmj@nywea.org, or visit www.nywea.org/OpCert.



NYSERDA Partners with Professional Research Foundations to Promote Innovation and Sustainability in New York State

by Kathleen O'Connor



Partnering with Professional Research Foundations

The New York State Energy Research and Development Authority (NYSERDA), through its Environmental Research and Development Program, has worked to promote innovation and sustainability in drinking and clean water utilities for over three decades. For more than 10 years, NYSERDA has partnered with the Water Research Foundation and the Water Environment Research Foundation in this effort. Collaborative projects have spanned topics including energy benchmarking, optimizing wastewater and solids operations, including resource recovery and solids reduction, preparing for and adapting to the effects of climate change, optimizing ultraviolet disinfection, and using microbial fuel cells for treatment of sanitary sewerage.

What are WRF and WERF?

The Water Research Foundation (www.waterrf.org), formerly the American Water Works Association Research Foundation (AwwaRF), is a recognized leader in water research that is dedicated to advancing the science of water. Since 1966, the foundation, a non-profit organization, has worked with a variety of professional partners to identify, prioritize, fund, manage and communicate scientifically-sound research across the globe. Foundation research is conducted with scientific integrity under the guidance of experts in a variety of fields.

The Water Environment Research Foundation (WERF) (www.werf.org) is America's leading independent scientific research organization dedicated to wastewater and stormwater issues. Formed in 1989, WERF, also a nonprofit organization, operates with funding from subscribers (i.e., wastewater treatment plants, stormwater utilities, regulatory agencies, industry, equipment companies, engineers, environmental consultants) and the federal government. All research is peer reviewed by leading experts.

Accessing Partnership Final Project Reports

All final project reports from this partnership, in addition to all of NYSERDA water and wastewater-related Research and Development Program final project reports, can be accessed free-of-charge through NYSERDA's Municipal Water and Wastewater Facilities page: www.nyserderda.ny.gov/water. The link to the reports can be found in the left-hand column on the page (*Final Reports for Water and Wastewater Technology Development Demonstration Projects*). Following is a list of some of the reports, in order of publication date, which can be found at the site:

- *Toolbox for Water Utility Energy and Greenhouse Gas Emission Management* (Foundation, 2013)– The primary objective of this project was evaluating the many energy management and greenhouse gas (GHG) accounting tools currently available, and developing a

harmonized “language” so that the most effective tools could be used across differing facilities.

- *Barriers to Biogas Use for Renewable Energy* (WERF, 2012) – The primary objective of this project was determining the barriers faced by wastewater utilities in implementing anaerobic digester gas-related combined heat and power projects so that mechanisms for overcoming these barriers can be developed.
- *Energy Efficiency Best Practices for North American Drinking Water Utilities* (Foundation, 2011) with companion report, *Energy Efficiency in Wastewater Treatment in North America: A Compendium of Best Practices and Case Studies of Novel Approaches* (WERF, 2010) – The primary objective of these projects was identifying and compiling best practices for the energy efficient operation of drinking water and wastewater industry assets in North America. They were part of a larger project managed by the Global Water Research Coalition (*Energy Efficiency in the Water Industry: A Compendium of Best Practices and Case Studies*).
- *Electricity Generation from Anaerobic Wastewater Treatment in Microbial Fuel Cells* (WERF, 2011) – The primary goal of this project was demonstrating that a multiple anode/cathode granular activated carbon configuration microbial fuel cell could effectively remove COD from a dilute wastewater stream at the pilot scale and produce sustainable electricity.
- *Optimization of UV Disinfection* (AwwaRF, 2007) – The objective of this project was developing practical tools for optimizing the validation, design, and operation of ultraviolet disinfection systems for drinking water applications.
- *Energy Index Development for Benchmarking Water and Wastewater Utilities* (AwwaRF, 2007) – The primary objective of this project was creating metrics that allow comparison of utility energy use across differing facilities. (Note: the metrics served as the basis for the USEPA's original Portfolio Manager Tool for wastewater treatment facilities.)

The Partnerships Continue

The NYSERDA and WERF have recently expanded their partnership to include projects that focus on achieving zero net energy wastewater treatment. A project is underway to characterize the energy balances of more than 20 plant configurations, identify energy reduction and onsite power production opportunities for the configurations, generate case studies of zero net energy wastewater facilities, and facilitate triple bottom line (TBL) planning for wastewater solids management. Additionally, two foundation projects will be wrapping up in the near future; these and all project final reports will be added to the Municipal Water and Wastewater Facilities page as they become available.

Kathleen O'Connor, PE, is Senior Project Manager with the NYS Energy and Research Development Authority based out of Albany, NY, and may be reached at kmo@nyserderda.ny.gov.

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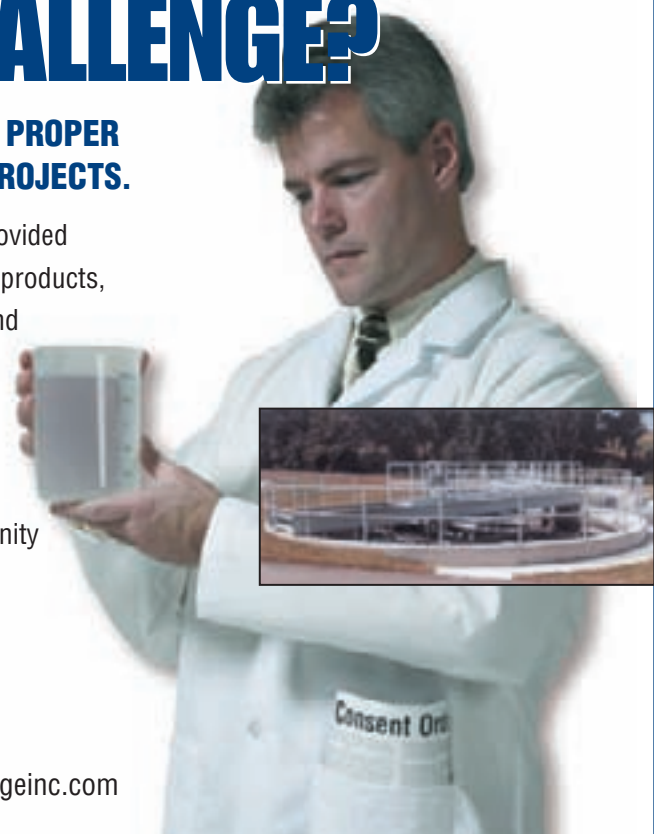
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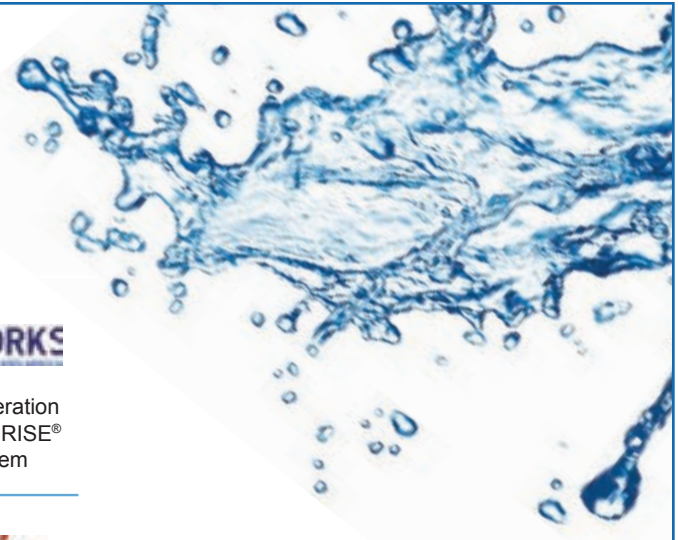
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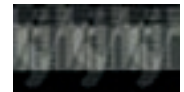
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After Superstorm Sandy: Army Corps and Public (even Mermaids) Back on Beach

by JoAnne Castagna

Waves of colorful sea creatures and mermaids flooded the Coney Island boardwalk in Brooklyn, NY this summer for the annual Mermaid Parade. Almost a year earlier, in the very same spot, Hurricane Sandy with her massive waves stormed ashore, and not in a very festive mood.

After the “super storm” retreated, leaving the beach a mess, it seemed the parade – which draws thousands of costumed participants each year – may not return. But the mermaids did, showing tremendous community support in an event that’s ironically a celebration of the sea. One of the mermaids, who is also a Brooklyn resident, said that during the parade there was talk of how Coney Island has bounced back even stronger and that the resilience and heart of the community is incredible.

Also returning to Coney Island Beach is the US Army Corps of Engineers (USACE) – New York District. The beach is one of the district’s many coastal projects and one of the first beaches on which it is replenishing sand that was lost from Sandy. This work is part of a multi-phase project USACE is performing for coastal communities to help reduce their risks from future storms.



Photo by Greg Kohler, AC Photos

In September, crews were setting up to place sand on Coney Island beach.

Hurricane Sandy Devastation

In late October 2012, Hurricane Sandy’s 80 mile-per-hour winds and 30-foot high waves pounded the eastern coast of the United States. The storm made its way from Florida up to Rhode Island. New York and New Jersey, both with areas in the USACE NY District, were hit especially hard. The surge of sea water inundated coastal communities – flooding roads, transportation systems and damaging electrical facilities causing widespread power outages.

Immediately after the storm, the USACE (or Army Corps) was on the ground responding, both through its own response authorities and providing disaster response assistance for the Federal Emergency Management Agency. The Army Corps trained response teams from around the nation came to the region to assist the NY District in unwatering subway tunnels,

providing temporary emergency electrical power to critical facilities, removing tons of debris and closing barrier island breaches.

Sandy is also responsible for 60 deaths, \$19 billion in damages and millions of cubic yards of sand removed from miles of coast. This sand loss makes coastal communities extremely vulnerable to future storms.

In January 2013, Congress signed the Hurricane Sandy Disaster Relief Appropriations Act of 2013 or the “Sandy Bill” giving the Army Corps funding and authority to take steps to restore coastal projects and navigation channels impacted by Sandy, and reduce the future risk from storms to coastal communities in the northeastern US.

The Army Corps is carrying out this mission in several steps that are being performed simultaneously. Right now, USACE districts in the northeast are repairing and restoring previously constructed coastal projects impacted by Sandy, which include replacing lost sand on beaches. They are also progressing on projects and studies that were underway before Sandy. In addition, the Army Corps’ North Atlantic Division, which the NY District is part of, is working on the North Atlantic Coast Comprehensive Study that will provide strategies to help reduce risk from coastal storms to coastal communities.

Bringing Back the Sand

Hurricane Sandy removed roughly nine million cubic yards of sand from the NY District’s coastal projects in New York and northern New Jersey. The district is replacing this sand and restoring previously built dunes and beach berms, as well as repairing other risk reduction features like levees and tide gates.

Coast restoration projects, including replacing lost sand, are important to reducing coastal storm risks in the future. A beach’s size, shape and sand volume help determine how well the beach can reduce risk to a developed community during a storm. These beach elements offer a level of natural protection against hurricanes and coastal storms by absorbing and dissipating the energy of breaking waves and storm surge, an offshore rise of water. The USACE NY District is replacing the sand that was lost from Sandy, plus adding additional sand to restore beach projects back to their originally constructed designs. This means the placement of even more sand than was lost due to Sandy.

The district is dredging 17 million cubic yards of sand from navigation inlets and offshore borrow areas and placing it on five coastal projects in New York and two in New Jersey. In New York, this includes Coney Island, Rockaway Beach, Gilgo Beach, West of Shinnecock Inlet and Westhampton. The district is also repairing a risk reduction project in Oakwood Beach on Staten Island that involves repairing a damaged levee and tide gate. In New Jersey, this includes the Sea Bright to Manasquan Project and the Keansburg Project that includes Keansburg, East Keansburg and Laurence Harbor. The Keansburg Project will include sand replenishment and repairs to levees damaged by Sandy.

All of this work is expected to be completed by Fall 2014. While some of the coastal restoration work started during the height of



Close up of sand being pumped onto the beach of Coney Island, NY

beach season, the district has gone to great lengths to mitigate the impact on recreation.

“The beaches won’t be closed,” said Anthony Ciorra, chief of Coastal Restoration and Special Projects for the NY District. “We will only be closing off 1,000-foot sections of the beaches at a time to perform our work. Once a section is completed, we open it up with a newly restored beach ready for the public’s enjoyment and then we move to another portion. We really can’t afford not to work now. The hurricane season is upon us. It’s a matter of public safety.”

Restoring Navigation

Many people are not aware of Sandy’s unseen impacts offshore, including its impacts to navigation channels throughout the region. As part of post-Sandy recovery efforts, the Army Corps is also restoring dozens of navigation channels and structures throughout the northeast that were impacted by Sandy. This includes repairing breakwaters, jetties, bulkheads and revetments, as well as dredging federal navigation channels that were altered as a result of Sandy. The NY District has already begun this work in its area and it is all expected to be completed by Spring 2015.

In order to reduce costs and increase efficiency, the district is combining missions by using sand dredged from navigation channels to restore beach projects where feasible.

Pre-Sandy Work Lessened Blow

For years, the district has maintained coastal projects in New York and New Jersey and while the massive storm overwhelmed most coastal risk reduction projects, they still helped mitigate damages during the storm.

“Our projects are designed to reduce the level of damage from more frequent lower intensity storms, but I do believe our coastal projects did minimize Sandy’s impact,” Ciorra said. “Areas that had our projects fared better than areas that didn’t. Even New Jersey Governor Chris Christie mentioned this. These projects

didn’t totally eliminate damages, but definitely minimized them.”

New York City Mayor Michael Bloomberg agreed. His office stated that the Army Corps’ risk reduction project at Plumb Beach along the Belt Parkway in southern Brooklyn likely prevented a breach of the adjacent highway, thus protecting a vital transportation link.

Work on the first phase of the Plumb Beach Project included building a dune and beach berm to reduce risks to the highway and was done just before Sandy hit. Work on the second phase that includes construction of groins and a breakwater to ensure the longer term resiliency of the dune and beach berm is ongoing and will be done by the end of 2013.

Westhampton along the south shore of Long Island was another area where a NY District project performed well during Sandy, Ciorra

said. “In Westhampton where we had constructed a dune and berm, there were less damages to that community than in nearby areas that didn’t have any projects.”

Even projects not necessarily designed to reduce risk, like the restoration of marsh islands in Jamaica Bay, NY, may provide a blueprint for future approaches to coastal storm damage risk reduction.

“Marsh islands can act as a natural protective buffer to the mainland behind them during storms by dispersing wave energy,” said Lisa Baron, project manager in the NY District. “These wetlands and other ecological habitats such as dunes and reefs, are examples of nature-based infrastructure that contribute to coastal resiliency and ecosystem sustainability within the region and will aid in our defense against more frequent and lower level storms.”

Progress on Coastal Projects and Studies

When Hurricane Sandy hit, the USACE NY District had several projects that had been authorized by congress for construction, but not built. Some factors contributing to this included lack of federal or non-federal funding, lack of local support, or local opposition. The district also had several studies underway looking at coastal risk reduction for communities in New York and northern New Jersey.

After Sandy, and with funding from the Sandy Bill, the NY District is working on coordinating with local partners and moving unconstructed projects toward construction and advancing ongoing studies while incorporating lessons learned from Sandy.

Facing the Next Sandy

The Sandy Bill called on the Army Corps’ regional North Atlantic Division to study ways to help reduce risk from storms to coastal communities throughout the northeastern US. The

continued on page 59

continued from page 57

division assembled a team of professionals from its district offices, federal, state and local agencies, and academia to collaborate on the North Atlantic Coast Comprehensive Study. The team is studying the 31,000 miles of coast from Northern Virginia to Maine that falls under the division's responsibility. Its goal is to come up with a framework of strategies that can be used by agencies to protect coastal communities that were adversely affected by Sandy.

The team is studying 38 coastal areas to see how they can be better protected by using various measures, such as dunes, flood walls and bulkheads, just to name a few. Presently, the group is considering almost 30 different risk management measures, including some of the strategies proposed by the City of New York in its recently published report from its Special Initiative for Rebuilding and Resiliency.

"We are trying to place the right combination of measures in the right coastal locations based on the area's infrastructure, population, social and environmental vulnerabilities," said Lynn Bocamazo, with the NY District's Engineering Division, who is on the team.

Donald E. Cresitello, of the district's Planning Division, who is also on the team said, "There is a lot of interest in this study, especially from communities that were severely impacted by Sandy and have no federal projects or studies in their area. They want to be assured they are going to be included in the study and have some risk reduction from future storms. This study looks at those areas."

Ciorra added: "Most of our projects are designed to reduce the level of damage from more frequent lower intensity storms. The study may look at storms like Sandy that may become more frequent in the future. Because of this, the team may have to develop a more robust plan for these projects because the storm

that we estimated as being a 500-year storm event may now be a 100-year storm event." A 100-year storm event is a storm that has a one percent chance of occurring in any given year.

The team is doing this. The strategies they are developing will look to reduce the risk from a 100-year storm event, plus they are adding three-feet of stormwater to account for potential 100 years of sea level rise.

"What's going to be beneficial from this study is that it will provide agencies valuable information they can use to save time and resources on future studies. The environmental and economic analysis and models that will come from this study will already be prepared for others to benefit from," said Bocamazo.

The study will be completed in January 2015. A draft of the study will be available to the public for review and comment this winter. To view the draft and receive regular study updates, visit: <http://www.nad.usace.army.mil/CompStudy>.

Ultimately the public will benefit from the study. The Brooklyn resident who took part in the annual Mermaid Parade at Coney Island this summer said she is proud to call Coney Island her beach – a place for the city people to touch the sea.

"Next summer people are going to be very surprised at how significantly their beaches are going to change," said Ciorra. "They are going to be much bigger and wider. This work is going to be challenging and exciting. It's a unique opportunity the Army Corps has been given. We are going to be expected to deliver."

JoAnne Castagna, EdD, is Public Affairs Specialist and Writer for the US Army Corps of Engineers – New York District. She can be reached at joanne.castagna@usace.army.mil or follow her on Twitter at <http://twitter.com/joanmecastagna>. To learn more about the Post-Hurricane Sandy work the Army Corps' New York District is performing, visit: www.nan.usace.army.mil/Sandy.



Nellie Brown Presents at Women's Initiative Dinner

Nellie J. Brown, MS, CIH, Lead Programs Manager and Director of the Workplace Health and Safety Program for Cornell University Industrial and Labor Relations, was the invited speaker at the Women's Initiative Dinner held this summer in Syracuse. Approximately 25 women attended the NYWEA program which promotes sharing of technical knowledge, social networking and camaraderie among women NYWEA members and guests.



Photo courtesy of NYWEA

Brown presented the topic, "What Are Endocrine Disrupters? Emerging Chemicals of Concern in Water and Wastewater." The new kids on the block, endocrine-disrupting chemicals, are in our cleaning products, personal care products, plastic containers for food and water, pharmaceuticals, and many other materials, according to Brown. Their use means they eventually reach wastewater and drinking water. These are emerging chemicals of concern that interfere with the body's endocrine system – organs that control the body's processes. The discovery of endocrine-disrupting effects has meant that the classic dose-response relationship is not sufficient to understand chemical toxicity. Some chemicals have been discovered to produce a greater variety of adverse health effects than previously known. Some chemicals not previously thought to be a problem have turned out to be hazardous. Brown's talk explored some "endocrine-disrupting" chemicals, their routes of exposure, and how protection and prevention could be done.

NYWEA women are invited to learn and network also at NYWEA's 86th Annual Meeting in New York City on February 4–6, 2014 and keep in touch on future Women's Initiative meetings at nywea.org, and through their local chapters.

Interview with Former WEF President, Jeanette Brown (2010–2011)

by David Pecorini, 2013 Manhattan College (reprinted from Manhattan College newsletter)



“The thing that is so incredible about environmental engineering is when you walk outside and feel the water on your skin, look at the soil beneath your feet, and take that first breath of fresh air you can say I am truly making a difference in the world.”

– Jeanette Brown

Passion and energy are two qualities that every human being strives for when seeking out a career path. I had the luxury of interviewing a woman who has enough of these two qualities for every engineer at Manhattan College. Jeanette Brown is an environmental adjunct professor at Manhattan College who teaches the final design class for the undergraduate environmental engineers. She received her Master’s degree in environmental engineering from Manhattan College. Within five minutes of speaking with her you discover the true love she has for environmental engineering.

Q What factored into your decision to become an environmental engineer?

A It was just happenstance actually. In many ways when I went to college I never thought I would end up as an environmental engineer. I was interested in chemistry, chemical processes and things of that nature. I needed a job and there was one available at a wastewater treatment plant. When you get out of college and need a job, more than likely you just take whichever one is available. So I did not know anything about wastewater treatment, and I began to love it. I decided to go to school to get my Master’s in wastewater treatment at Manhattan College. It was because of that first job that I began to get caught up in the excitement of the field.

Q What is your favorite part of being an environmental engineer?

A It’s just such an exciting field. I will work at it as long as I live. I can’t imagine not doing environmental engineering. There is so much going on that you have to think about. With the complexities of society there are more and more things that get discharged into our waterways. We are beginning to understand the adverse

effects of such things and how we can treat them. I wish I was 20 years old again, there is so much still that has yet to happen and so much to learn. It’s the kind of profession that you are thankful to be in, but also that you see that there is so much left to be done.

Q What are some of your best experiences being president of the WEF, for example, having dinner with the King and Queen of Sweden?

A Yes, having dinner with the King and Queen of Sweden was memorable, but there were many other opportunities. I met many operators, ministers, and professionals of many different fields and skills. One banquet I sat next to one of the governmental administrators for Zimbabwe, Africa. It was so interesting that he was talking about pit toilets, and I’m there talking about how we can remove nitrogen from water.

It’s so diverse in what people have and don’t have. Here we fail to appreciate how everyone can turn on a faucet for drinking water. In parts of Africa they defecate in plastic bags and throw them into woods. I have travelled to many different places such as Sweden, Singapore, Brazil, Mexico, Canada, France and India. You begin to see all the cultures widening and they began to widen my thought process. The differences in education amongst these places became very evident to me. It made me understand why places like Singapore – that pays billions of dollars to have clean drinking water – places a user charge on their citizens and they don’t complain, but Americans complain about this fee all the time. The difference in mindset, education and the different level of material possessions people have is very large.

Travelling all over the world, I got to meet basic level operators who simply turned the pumps on and off, all the way to higher level theoretical college professors. These conversations have made me more knowledgeable and sympathetic to people who don’t have what we have. It made me think about all the scientific advances we have and potentially bringing them to other countries that don’t have anything and how we go about that.

I was also encouraged by the number of college students who showed a genuine passion in wanting to help people. Sometimes people read in the paper the problems young people get into, and that’s such a small minority, you don’t see what young people are really doing to try to improve the world. I met a young woman at Princeton, she won the Stockholm Junior Water Prize. It took her three years to invent a cell phone app which could determine in 20 seconds if the water was safe to drink. I found this interesting, while people in Africa don’t have toilets, many of them do have cell phones so she could take that technology and it could really help many of these villages with safe drinking water. It shows that she was genuinely interested as a 15 year old and when you see that interest in teenagers, I just say, wow, we have really interesting kids in all majors with so much potential.



Jeanette Brown, center, helps with the induction of Joe Fiegl, left, into the Select Society of Sanitary Sludge Shovelers with Operator-In-Chief Bill Grandner.

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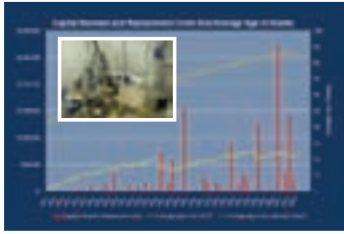
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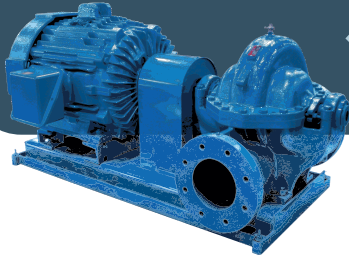
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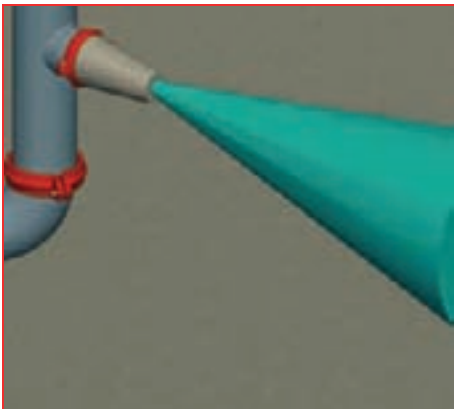
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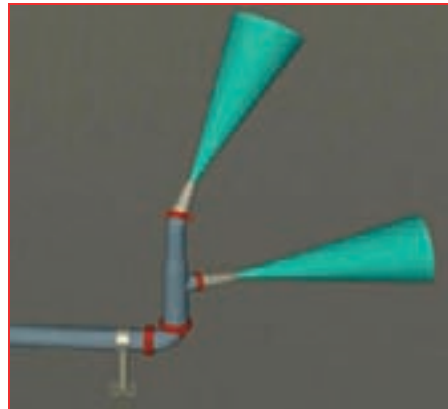
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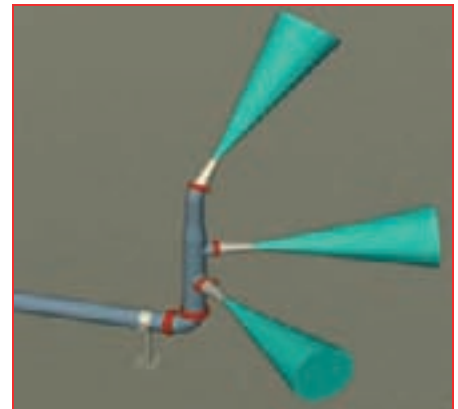
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