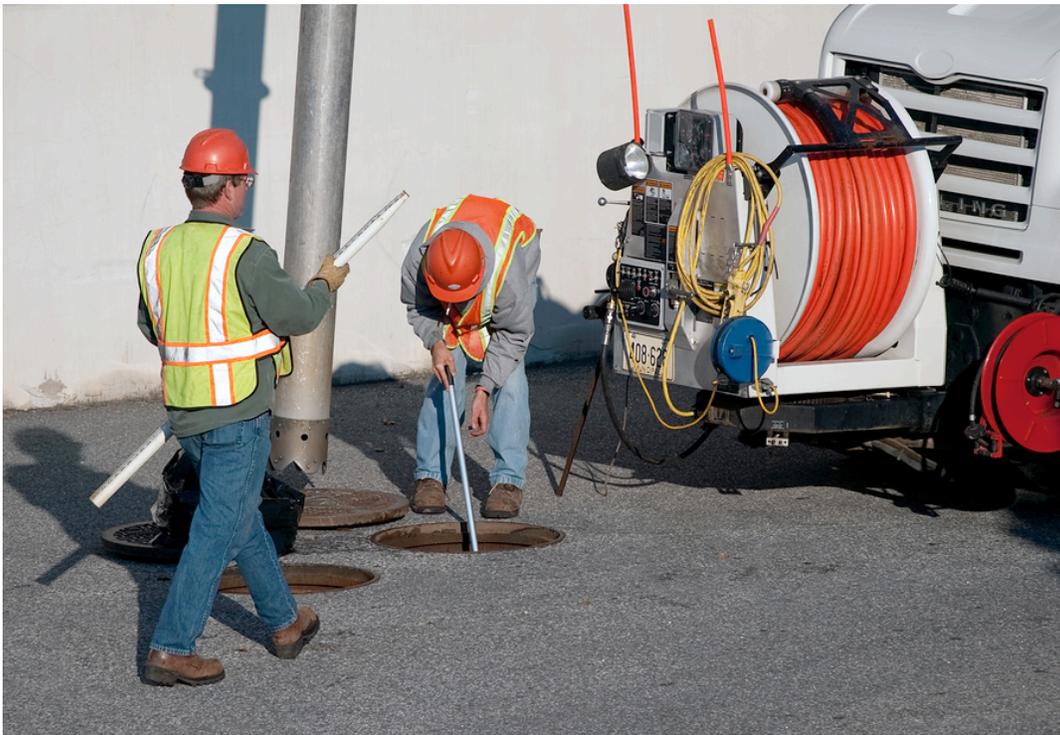




SAN DIEGO
WORKFORCE
PARTNERSHIP®

WATER AND WASTEWATER INDUSTRY OCCUPATIONAL OUTLOOK



January 2010

 **GREEN LMI**

Report Prepared by Green LMI Consulting, Inc.

Green LMI is a full-service labor market intelligence consulting firm, providing expertise in the analysis of labor force needs and workforce training data for industry, education, economic developers, and policymakers. Clients have looked to Green LMI for support in strategic decision-making and understanding future workforce trends in the green industry and beyond.

Special thanks to Donald Jones of San Diego Project: WaterWorks at Cuyamaca College for his insights on the water and wastewater industry in San Diego.

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Introduction

The San Diego Workforce Partnership, Inc. (the “Workforce Partnership”) has been in operation since 1974, when a joint powers agreement between the City and the County of San Diego created what is now a nonprofit public benefit corporation.

The Workforce Partnership funds job training programs to meet the region's demand for qualified workers. The programs benefit local employers, unemployed and recently laid-off adults, and at risk youth ages 14 to 21. In addition, the Workforce Partnership is keenly interested in understanding the emerging trends at work in San Diego’s labor workforce, to ensure a healthy balance of job supply and demand for our local industries. The Workforce Partnership invests a great deal of time and resources in studying and analyzing our local economy. These important findings, trends and labor market needs are highlighted in studies such as this, community forums and on websites.

Why Water?

Water is critically important to life, and San Diego sits at the end of the water pipeline. According to the City of San Diego, approximately ten to twenty percent of our drinking water comes from local rainfall in any given year. The remaining water is imported from two principal sources, the Colorado River and the Sacramento Delta.¹

Access to clean drinking water is necessary for public health and economic growth. According to the American Water Works Association (“AWWA”), Americans consume an estimated 339 billion gallons of water per day. Beyond household use, manufacturing, agriculture, healthcare, and many other industries rely heavily on reliable water supplies.²

In an area so reliant on imported water, policy makers are seeking options to provide an adequate supply of clean water, as well as to reduce the demand on our water resources. Wastewater agencies are likewise continually treating water for proper release into the environment or for reclamation and recycling. This comprehensive approach to water and wastewater management requires a healthy supply of well-trained workers, and may require new training programs to meet changing skill requirements for the workforce.

¹ <http://www.sandiego.gov/water/quality/>

² <http://www.awwa.org/careercenter/resources/docs/waterindustrytrends.cfm>

This report highlights labor market requirements and trends for San Diego's water and wastewater industries. The findings herein focus on the following twelve occupations that were identified by local water and wastewater agencies, the community college system, and the Workforce Partnership. The occupations are:

- Water Treatment Operator
- Electrician or Electrician Technician
- Water Distribution Operator
- Electronic Maintenance Technician or Instrument Technician
- Wastewater Treatment Operator
- Mechanic or Machinist
- Wastewater Collections Operator
- Engineer
- Water Quality Analyst (Lab Tech, etc.)
- Water Conservation/Water Resources Specialist
- Welder
- GIS Technician

This report includes a review of current literature, analysis of primary research collected from area water and wastewater agencies and operators, and a quantitative examination of existing water and wastewater programs in the region. It also follows the format of a recent report³ conducted by the San Francisco Bay Region Center of Excellence so that San Diego's data may be included with other regions in the state to assist in developing a more comprehensive approach to California's labor market demands in the water and wastewater industries.

The industry survey was sent to 38 employers in January of 2010, resulting in 19 responses with between 13-17 employers responding to each question. The survey included questions focused on employment size, growth, retirement rates, wages, skill preferences, employer needs, and interest in new training programs. The results of the survey are being used to develop recommendations for our region to ensure a strong and vibrant workforce for water and wastewater employers.



³ Water and Wastewater Occupations, San Francisco Bay Center of Excellence, November 2009, available at: <http://www.coecco.net/water>

Industry Overview

In order to maintain an adequate supply of clean water and a healthy environment, the water and wastewater industries are charged with collecting, treating, distributing, and, to a now greater degree, conserving or recycling water. Most of the employment related to these functions is found in local government and private utilities.⁴ In California, there are over 1,200 separate entities in the water and wastewater industries.⁵

It is important to note that there are significant differences between the goals, regulations, and workforce needs for water agencies and utilities and wastewater treatment facilities. Water systems are ultimately responsible for delivering clean water to homes and businesses, generally by pumping water from wells, reservoirs, rivers, or streams to water treatment plants and then to consumers. Wastewater systems, however, are charged with collecting agricultural runoff, sewage, rainwater, or other contaminated or “used” water, treating it, and either recycling or discharging it once it reaches acceptably safe levels. The water industry is generally governed by the Safe Drinking Water Act⁶, while the wastewater industry is generally regulated by the Clean Water Act⁷.

Industry Pressures

Water and Wastewater firms and departments are facing incredible pressures. Due to the water shortage in Southern California, firms are increasingly looking for new and innovative approaches to conserving and managing water supply, and for new ways to reclaim and recycle wastewater.

There are also severe national pressures facing the workforce. A 2006 Water Research Foundation study⁸ highlighted the following three key factors impacting the industry’s workforce:

- Baby boomer retirements
- Increased complexity of work (e.g. changing water quality and environmental regulations, technologies, facilities and processes)
- Shrinking pool of available, technically skilled and trained workers

⁴ *Id.*

⁵ *Id.*

⁶ 42 U.S.C. § 300, *et seq.*, as amended.

⁷ 33 U.S.C. § 26, *et seq.*, as amended.

⁸ Water and Liquid Waste Treatment Plan and System Operators, Bureau of Labor Statistics, Occupational Outlook Handbook (2008-2009).

“The loss of current workers and fewer qualified replacements are occurring as our infrastructure ages, needs replacement, and must meet regulations. We need good people to drive results.”

The American Water Works Association 2008 State of the Industry Report confirmed that the industry is increasingly concerned with how to proactively address these factors. This annual report collects information on water professionals’ perceptions of the industry’s greatest challenges and in 2008, respondents identified workforce development as one of the top five critical concerns facing the sector.⁹

The report indicates that the water workforce is plagued by retirements and also more lucrative and higher-prestige jobs luring younger workers to other industries. The study quoted one respondent as saying, “The loss of current workers and fewer qualified replacements are occurring as our infrastructure ages, needs replacement, and must meet regulations. We need good people to drive results.”¹⁰

Shifting regulatory requirements, facilities, processes, procedures, and equipment, and inadequate knowledge management systems were identified as challenges compounding the anticipated retirement of Baby Boomer employees. It has also been noted that agencies have particular concern with ensuring that those who do enter the industry are prepared with the skills, knowledge and abilities necessary for success and that the industry itself can adequately articulate and assess for those requirements.

Given the advancements in technology, equipment, work processes and procedures, employers indicate that workers need to enter employment with proficiency in math, science, computers and technology and continue their learning on the job. Changes in regulatory requirements also mean ongoing training and development. San Diego water industry representatives indicate a need to improve both how they generate a pipeline of new, prepared employees as well as how they guarantee these workers can continue to upgrade skills once employed. Part of this challenge includes not only updating how to

⁹ Workforce Planning for Water Utilities - Successful Recruiting, Training and Retaining Operators and Engineers to Meet Future Challenges, Awwa Research Foundation, 2008.

¹⁰ <http://www.awwa.org/publications/AWWAJournalArticle.cfm?itemnumber=41500> (p.71).

deliver training and support, but also addressing how to effectively document and retain existing knowledge such that it can be passed on to a new generation of workers.¹¹

¹¹ *Id.*

The Water and Wastewater Workforce

Water and wastewater occupations include those that directly collect, treat, and distribute water, as well as those that maintain and repair the infrastructure. Because of the high percentage of public employment for operators and the large number of support positions that can work in any industry (such as welders and electricians), accurate labor market information is hard to come by. In 2006, there were an estimated 111,000 water and wastewater systems operators in the United States, and 80% worked for local governments (this figure does not include support positions)¹². According to the Bureau of Labor Statistics, 2008 employment of water and wastewater treatment plant system operators in San Diego alone represented 450 jobs.¹³

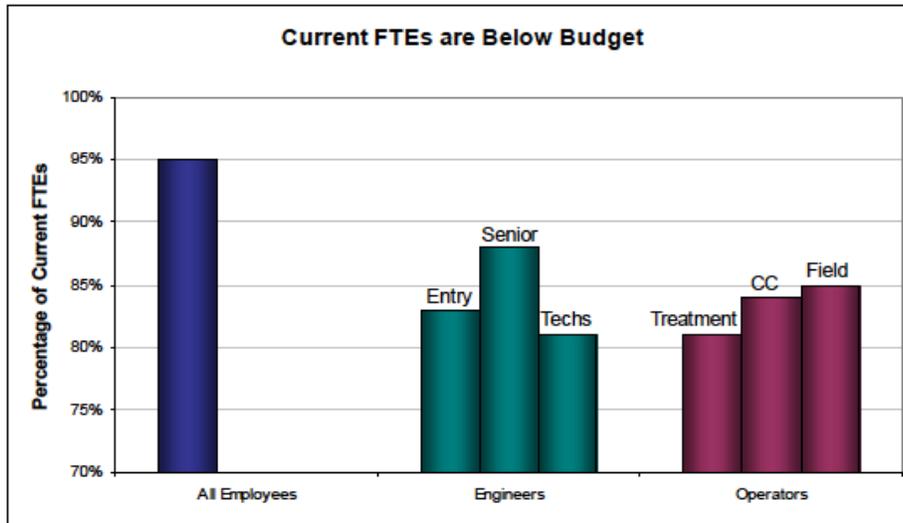
The Water and Wastewater Workforce is governed by certifications offered by the California Department of Public Health, the California Water Resources Board, the American Water Works Association (AWWA), the California Water Environment Association (CWEA), and the American Backflow Prevention Association (ABPA). Certification for Water Treatment Operators (D1-D5), Water Treatment Operators (T1-T5), and Waste Water Collections (Grade 1-5) are mandatory, while the others are voluntary. Please refer to Figure 1 below for additional information.

CERTIFICATION	GRADE / LEVEL	CERTIFYING BODY	TRAINING / PREPARATION LEVEL	MANDATORY?
Water Distribution Operator	D1 D2 D3 D4 D5	California Department of Public Health	A.A. or Certificate Program	✓
Water Treatment Operator	T1 T2 T3 T4 T5	California Department of Public Health	A.A. or Certificate Program	✓

¹² Water and Liquid Waste Treatment Plant and System Operators, Bureau of Labor Statistics, Occupational Outlook Handbook (2008-2009), <http://www.bls.gov>.

¹³ California Employment Development Department, <http://www.labormarketinfo.edd.ca.gov/>
 San Diego Workforce Partnership Green LMI Consulting, Inc.
 San Diego Water and Wastewater Industry Occupational Outlook

CERTIFICATION	GRADE / LEVEL	CERTIFYING BODY	TRAINING / PREPARATION LEVEL	MANDATORY?
Water Distribution Associate and/or Operator	1 2 3 4	American Water Works Association (AWWA)	A.A. or Certificate Program	
Wastewater Treatment	1 2 3 4 5	California State Water Resources Control Board	A.A. or Certificate Program	✓
Wastewater Collections	1 2 3 4	California Water Environment Association (CWEA)	A.A. or Certificate Program	
Laboratory Analyst	1 2 3 4	California Water Environment Association (CWEA) American Water Works Association (AWWA)* *Level 1 only	Level 1 - A.A. or 2-yr. Certificate Program Levels 2-4 typically require 4-yr degree	
Mechanical and Electrical	1 2 3 4	California Water Environment Association (CWEA)	Some training available at local colleges	
Backflow Tester	N/A	American Water Works Association (AWWA) American Backflow Prevention Association	Fee-based or credit course	
Cross Connection Control Specialist	N/A	American Water Works Association (AWWA)	Community College Course	
Water Conservation Practitioner	1 2	American Water Works Association (AWWA)	Courses Under Development	

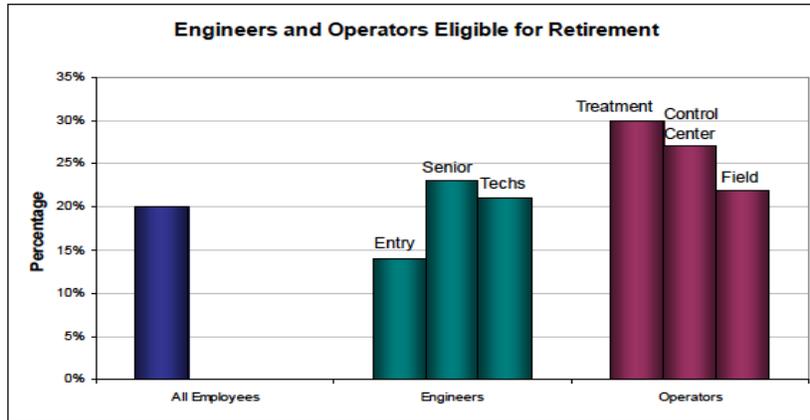


National Workforce Data

Source: Workforce Planning for Water Utilities - Successful Recruiting, Training and Retaining Operators and Engineers to Meet Future Challenges, Awwa Research Foundation, 2008

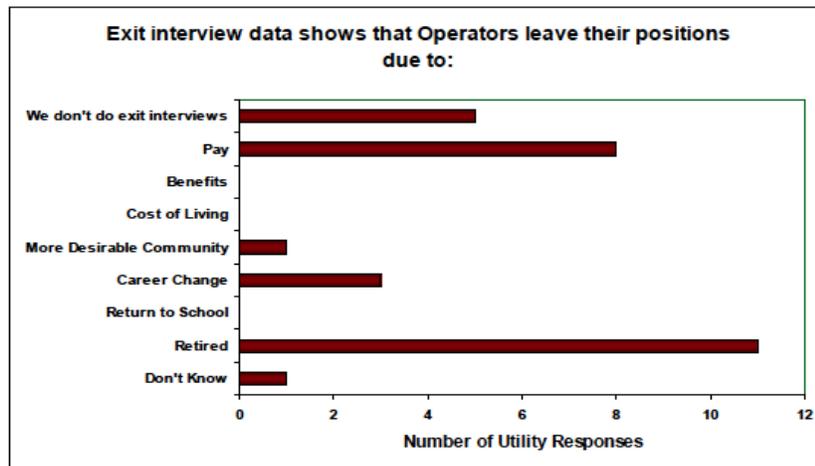
According to the Awwa Research Foundation, workforce issues in water and wastewater agencies are reaching a boiling point. Specifically, the report finds that a majority of utilities across the country are operating below their budgeted capacities, a phenomenon that directly impacts retention and training for existing employees. Overburdened staff no longer can take advantage of training opportunities and are experiencing lower job satisfaction rates as their duties increase.¹⁴

¹⁴ Workforce Planning for Water Utilities, p. 41-47.



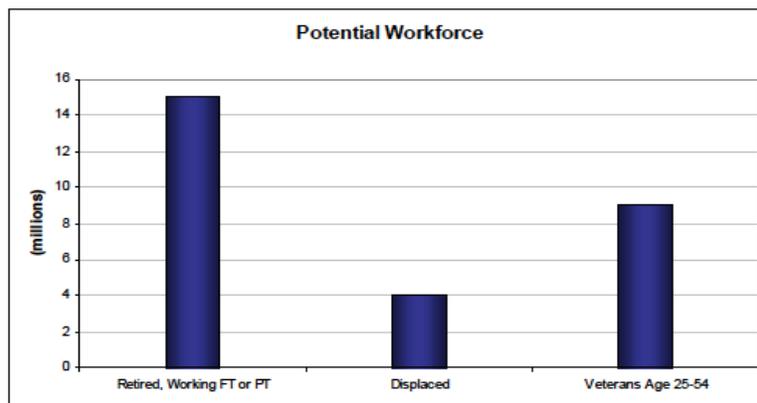
Source: Workforce Planning for Water Utilities - Successful Recruiting, Training and Retaining Operators and Engineers to Meet Future Challenges, Awwa Research Foundation, 2008

Compounding the current shortfall, nearly 30% of all operators across the country are



eligible to retire within five years, signaling an urgent staffing need. Slightly lower but still significant numbers of engineers in the industry are also eligible to retire. With the well documented recruitment and retention problems in the industry across the nation, the American Water Works Association is recommending new and innovative approaches and greater collaboration between training providers and employers to fill the current and widening shortfall of workers.¹⁵

Interestingly, the Awwa Research Foundation found that there are in fact many qualified



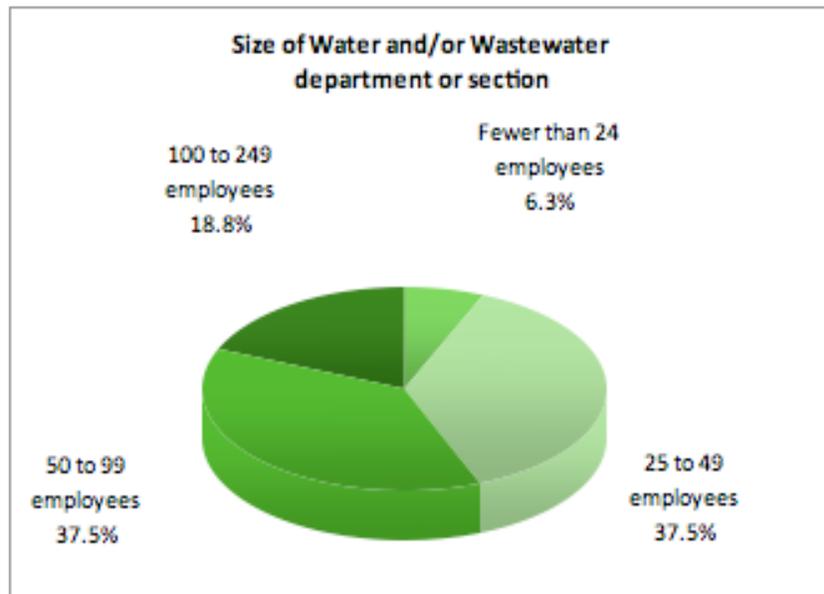
potential applicants in the labor pool, and that additional work is required by utilities to

¹⁵ *Id.*

find them, even in this down economy. Specifically, the report concludes that there are three new and relatively untapped pools of applicants, representing over 28 million potential applicants across the country. The pools are older workers, displaced workers, and veterans, and the Workforce Partnership has programs for and access to all three pools.¹⁶

San Diego County's Workforce Data

To gain a clearer picture of San Diego's local water and wastewater workforce, the Workforce Partnership surveyed the county's 38 major industry employers. The survey included questions regarding the number of employees, growth across the studied occupations, employer educational and skill preferences, wages, and other critical workforce information. Though San Diego's workforce data mirrors the national picture in many respects, there are also significant differences.



The Employers

The water and wastewater employers that completed the survey employed over 1,075 workers, indicating a total industry employment figure potentially as high as 3,000 in the county. 50% of employers indicated that they expect to increase the number of budget-

¹⁶ *Id.*

ed positions within their agency or department over the next three years, while 6% expect to have fewer positions. Similarly, 56% expect increases over the coming five year period, while 6% again expect fewer positions.

These employers are large. As seen in figure 2 below, roughly 6% of the firms surveyed had fewer than 24 employees.

Figure 2. Source: Primary Data Collection

Employment Growth

The following table contains the sample data collected for occupations in the Water and Wastewater study for utilities and/or agencies located in San Diego County. Employers were asked to detail their current employment, project future growth (new jobs), and estimate retirement eligibility (replacement jobs). For each occupation, the following job levels were included: apprentice or trainee, journey-level, and supervisory. In San Diego County, the sample data set includes information collected from 13-17 employers.

- The water and wastewater utilities and agencies that responded to the workforce survey collectively employ more than 460 workers in the target occupations. In five years, there may be as many as 100 new and replacement jobs for these positions.
- Water distribution operator is the largest occupation surveyed, with almost 100 jobs in 2009. Retirement eligibility for water distribution operators may reach 21% over the next five years and the demand for workers is estimated at more than 20 jobs (new and replacement jobs).
- Water conservation/water resources specialist has the highest replacement rate of 58%, although the sample employment is relatively low (28 positions).

OCCUPATION	2009 EMPLOYMENT	5-YR GROWTH	ELIGIBLE TO RETIRE (5 YR (REPL. RATE)	NEW AND REPL. JOBS (5-YR)
Water Treatment Operator	30	7%	30%	9
Water Distribution Operator	96	4%	21%	21

OCCUPATION	2009 EMPLOYMENT	5-YR GROWTH	ELIGIBLE TO RETIRE (5 YR (REPL. RATE))	NEW AND REPL. JOBS (5-YR)
Wastewater Treatment Operator	60	2%	19%	11
Wastewater Collections Operator	56	4%	10%	7
Mechanic/Machinist	35	0%	26%	5
Electrician/Electrician Technician	24	5%	39%	5
Electronic Maintenance Technician/Instrument Technicians	38	8%	33%	12
Water Quality Analyst (Lab Tech, etc.)	13	8%	33%	3
Welder	5	20%	67%	1
GIS Technician	17	0%	6%	1
Engineer	58	12%	29%	19
Water Conservation/Water Resources Specialist	28	0%	58%	10
Total	460	5%	24%	104

It is important to note that these data are not extrapolated to the universe of employers at this time, but due to the relative sizes of the firms not yet responding, employment projections should increase by approximately two hundred percent.

In addition to these data, San Diego stands to benefit from the Poseidon Desalination Project, which is expected to provide up to 50 million gallons per day (56,000 acre-feet per year (AFY)) of water through its seawater desalination plant and associated water delivery pipelines. Poseidon expects the plant to be operational by 2012 and to generate 2,100 construction jobs and 400 new permanent jobs.¹⁷

Wage Information

Water and Wastewater Occupations in San Diego County pay well. Wages range from a minimum of approximately \$37,000 to over \$136,000 per year. Monthly wages are shown in Figure 3 below¹⁸.

OCCUPATION	APPRENTICE / TRAINEE	JOURNEY LEVEL (MIN-MAX)	SUPERVISORY (MIN-MAX)
Water Treatment Operator	\$3,664	\$4,956 - \$6,024	\$5,799 - \$7,776
Water Distribution Operator	\$3,578	\$4,172 - \$5,751	\$5,775 - \$7,739
Wastewater Treatment Operator	\$3,562	\$4,183 - \$5,822	\$5,660 - \$7,868
Wastewater Collections Operator	\$3,110	\$3,446 - \$4,437	\$5,216 - \$7,131
Water Quality Analyst (Lab Tech, etc.)	\$4,290	\$4,657 - \$5,996	\$7,664 - \$10,219
Welder	no info	\$4,224 - \$5,680	no info
GIS Technician	\$4,349	\$4,779 - \$6,367	\$6,711 - \$8,920
Engineer	\$6,586	not asked	\$8,481 - \$11,402

¹⁷ <http://www.carlsbad-desal.com/benefits.asp>

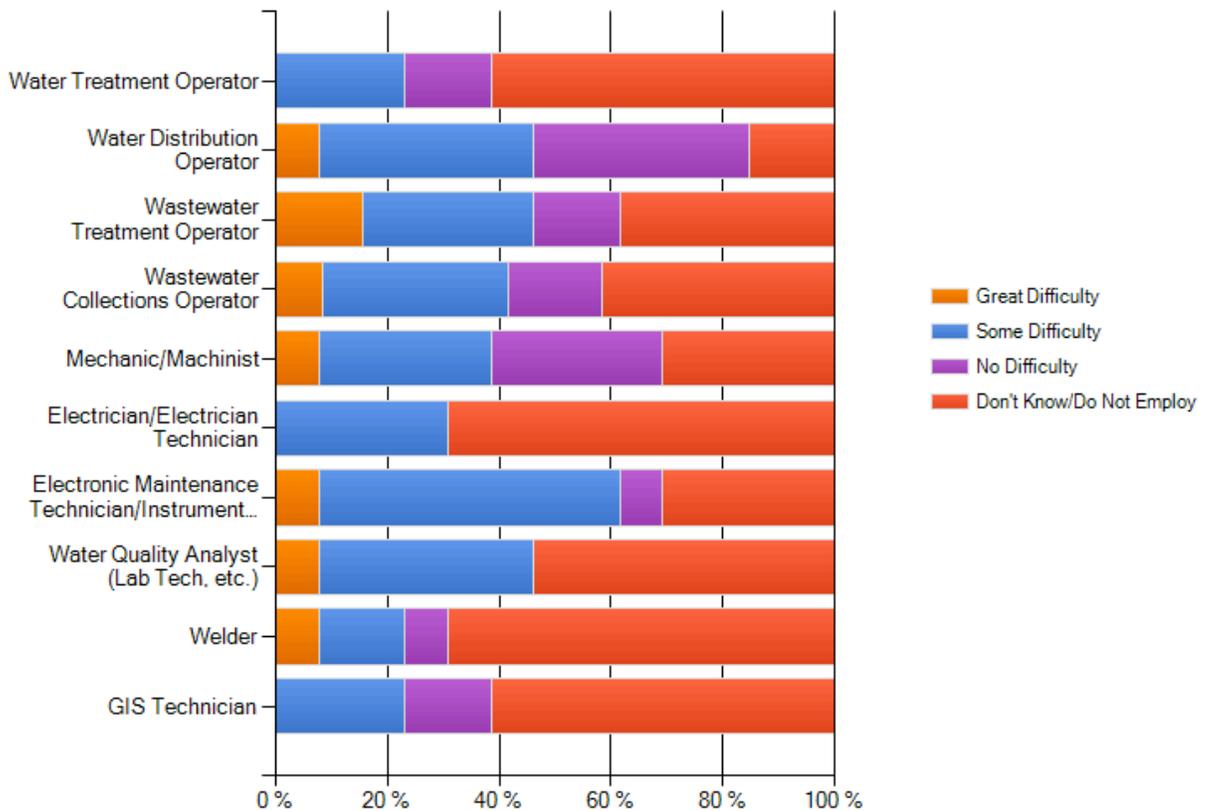
¹⁸ Primary Data Collection. Wages are monthly, and do not include benefits.

OCCUPATION	APPRENTICE / TRAINEE	JOURNEY LEVEL (MIN-MAX)	SUPERVISORY (MIN-MAX)
Water Conservation/Water Resources Specialist	\$3,990	\$4,436 - \$5,545	\$6,052 - \$8,001

Difficulty Hiring

Employers indicated that they had difficulty hiring for several occupations, most notably

Does your organization have "great difficulty," "some difficulty," or "no difficulty" finding applicants who meet the organization's hiring standards for each occupation?



Electronic Maintenance Technician, Wastewater Treatment Operator, and Water Distribution Operator.

Existing Regional Training Providers

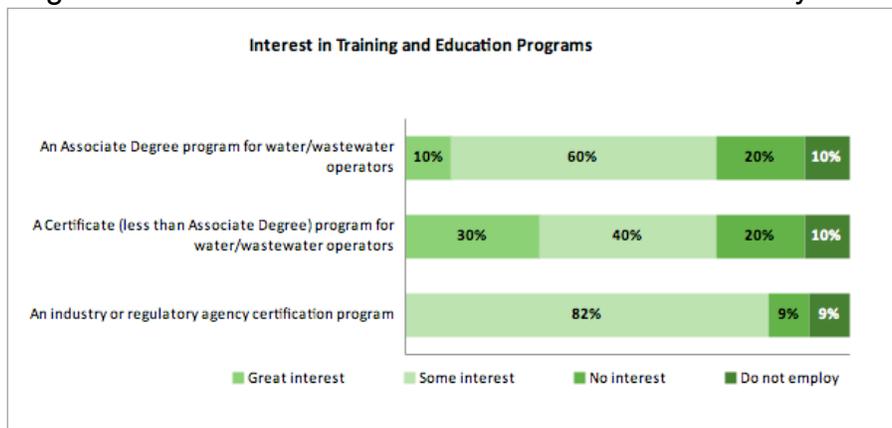
San Diego County has multiple training programs for the occupations studied in this report. In addition to the trade programs at San Diego City College and Palomar College that train for support positions, there are two specific water programs at the community colleges in the region. The region also boasts strong engineering programs, including the Jacobs School of Engineering at the University of California San Diego, and the Department of Civil, Construction and Environmental Engineering at San Diego State University, as well as continuing education courses at the e-Learning Center at the California State University at San Marcos.

Training for water-related occupations is coordinated through Project: WaterWorks, an industry-driven, regional collaborative grant sponsored by California Community Colleges' Economic and Workforce Development Program. Project: WaterWorks is housed at Cuyamaca College and is a joint initiative with Palomar College. Its purpose is to foster partnership with regional community colleges that offer water related courses, Southern California water agencies, industry vendors, state and national professional associations to address regional workforce development issues.

Palomar College offers Associate of Arts degrees and certificates in Water Technology and Wastewater Technology. These programs prepare students for entry level treatment, operation, and distribution occupations in San Diego County. Over the past five years, Palomar has awarded nearly 7 degrees and 18 certificates per year.

Cuyamaca College offers A.A. degrees and certificates in Water and Wastewater Technology, as well as a fee-based backflow tester training. A newer program, Cuyamaca awarded 13 degrees and 12 certificates in the 2008-2009 academic year.

Employ-
a strong
certificate
for water



ers have
interest in
programs
and

wastewater operators, (70%; 30% with great interest) and also for Associate Degrees for operators (70%, 10% with great interest). They are also particularly interested in industry certificates (82%).

Conclusions and Recommendations

The local workforce data show that there will be low to moderate growth of new water and wastewater positions, but that retirements and replacement positions will reach critical levels over the next five years. Existing programs have done a good job filling the pipeline with new workers, producing nearly fifty new technicians with certificates or associates degrees each year. However, a dearth of programs throughout the state and the knowledge drain that often accompanies mass retirements will significantly affect the workforce in the future.

The industry should respond by:

- Use San Diego's existing training model as an example for the rest of California to relieve pressure on San Diego's water and wastewater workforce.
- Develop continuing education classes that rely on experienced workers training existing workers for advanced certifications.
- Respond to the need for additional training courses in water conservation technology.
- Prepare training programs that support emerging occupations

