WEST VIRGINIA WATER WORKFORCE SURVEY

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WestVirginiaUniversity.
APPALACHIAN COMMUNITY TECHNICAL ASSISTANCE AND TRAINING

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EXECUTIVE SUMMARY

The Appalachian Community Technical Assistance and Training (ACTAT) Program launched the West Virginia Water Workforce Survey in July 2023 to solicit input from the state's water workers about the greatest challenges and opportunities to the workforce. The survey collected data about four key topics:

1. Operator demographics
2. Current trends and challenges in operator recruitment
3. Current trends and challenges in operator retention
4. Utility management issues that may affect operator recruitment and retention

Key results for each topic are summarized briefly below.

Respondent Demographics

The anonymous, online survey generated 146 total responses, including 84 from operators and 62 from managers. The survey reveals a significant generational gap among water workers in the state, with approximately 92% of respondents aged 35 or above, indicating a pressing need to attract younger talent. Furthermore, only 12% of operators identified as female, highlighting gender disparities within the workforce.

Operator Recruitment

Over half of operators (53%) and managers (56%) expressed concerns about the adequacy of operator numbers to sustain utility operations. Key barriers that hinder the hiring of adequate operators cited by managers include a lack of qualified applicants and issues with pay rates and certification requirements. Managers indicated that the lack of qualified applicants reflects a lack of operator license, lack of experience, failure to pass a drug test, and failure to meet minimum education requirements. While some efforts are made to hire trainees and apprentices, 34% of managers do not currently offer such positions.

Operator Retention

A significant portion of operators (24%) and managers (26%) are currently eligible for retirement, with over half of operators (57%) and managers (53%) planning to retire within the next nine years. Overall, 72% of operators reported being happy at work, with benefits and work tasks being the highest rated factors contributing to workplace satisfaction. However, dissatisfaction with pay is prevalent, with 44% of operators expressing dissatisfaction with their pay. Operators earn an average hourly wage of $26.53, compared to an expected average of $32.36, indicating a gap between expectations and reality. Utilities reported substantial challenges with operator turnover, highlighting a need for targeted retention strategies. Operators ranked the highest priority retention strategies as (1) increased pay, (2) better benefits, and (3) creating incentive programs.

Other Issues for Utility Management

Operator certification processes in the state were investigated as a possible barrier to operator recruitment and retention, but results suggested that this is not a major barrier to operator advancement in the state. However, improving support for operator certification may represent a valuable opportunity to increase operator retention. Key operational challenges cited by survey respondents included aging infrastructure, difficulty hiring and retaining skilled staff, excessive inflow and infiltration or water loss, and inadequate utility rates to sustain operations.

Conclusion

The findings underscore the urgent need for proactive measures to address recruitment and retention challenges in the water and wastewater industry in West Virginia. Collaboration between utilities and stakeholders is crucial to ensure a sustainable and skilled workforce for the future.

INTRODUCTION

Adequate access to safe drinking water and wastewater treatment is a prerequisite for economic development in rural communities, as new industries cannot be successful when these basic resources are lacking (Hunter et al., 2010). In rural communities, for each dollar spent building water or wastewater infrastructure, $15 are created in private investment and $14 are added to the local property tax base (Bagi, 2002). The U.S. Infrastructure Investment and Jobs Act that was signed into law in November 2021 represents a historic investment in the water infrastructure in the U.S., providing $55 billion to renew and replace aging water infrastructure across the country.

This investment represents an important opportunity for the state of West Virginia to improve its water infrastructure. The West Virginia Section of the American Society of Civil Engineers (WV ASCE) rates both the drinking water and wastewater infrastructure in the state with a report card rating of D (WV ASCE, 2020). In West Virginia alone, utilities are currently seeking roughly $302 million to meet their drinking water infrastructure needs and $395 million for wastewater infrastructure needs (WV ASCE, 2020). Nationally, over 35% of buried drinking water distribution pipes are at least 35 years old (Selvakumar and Tafuri, 2012). Investment in West Virginia's water and wastewater infrastructure is essential to enable utilities to provide safe, clean water in order to comply with federal and state regulations, protect community health, and provide the foundation for economic growth in the state. However, investments in the workforce who operate and maintain this infrastructure are also critically needed.

Building a strong and sustainable water workforce is of imminent importance, given that a substantial portion of today's water workforce is nearing retirement age. The median age of water treatment operators is 46.4, compared to the national median across all occupations of 42.8 years (Kane and Tomer, 2018). Rural communities are particularly vulnerable to the impacts of a lack of trained water sector workers. Across West Virginia's 55 counties, there are 350 small community water systems (US EPA, 2015), each requiring a trained operator and associated staff. The need for skilled water professionals is particularly critical to the health and well-being of these small communities, and the associated opportunities for careers in the water sector are numerous. The impacts of the aging water workforce are likely to affect rural communities operating small systems disproportionately due the prevalence of systems operated by one or a few water professionals who possess a wealth of institutional knowledge that may not be formally documented. This potential loss of knowledge and experience as those professionals retire could be particularly devastating without a strong pipeline to provide the next generation of trained water sector professionals.

As current water sector professionals near retirement, it is increasingly critical to develop strategies to support the recruitment and retention of new workers into careers in water and wastewater. The West Virginia Infrastructure Survey previously revealed that succession planning and staff recruitment and retention were among the greatest challenges for drinking water and wastewater infrastructure and utility operations in the state (Garner, 2022). In its State of the Industry Report, the American Water Works

Association (AWWA) ranked aging workforce and anticipated retirement as the sixth most prominent concern for water professionals (AWWA, 2023a). Nationally, it is projected that nearly a third of all water workers will retire within the next decade (Monks, 2021). In an analysis of the factors driving this growing need to strengthen the water workforce, the Brookings Institution has identified several key needs on a national scale (Kane and Tomer, 2018):

- *Acknowledge the varying scale and capacity of different communities and utilities across urban and rural areas in particular in order to expand the water workforce opportunity.*
- *Emphasize that the water workforce needs greater public visibility, especially when trying to reach younger workers and other prospective job candidates.*
- *Consider barriers to support a more diverse water workforce, including the importance of looking for talent in places that may not traditionally have attracted as much attention.*
- *Investigate why identifying and hiring skilled workers remains a struggle for many utilities and other water employers, including the lack of proactive recruitment strategies.*
- *Note the need for more extensive work experience and on-the-job training in the water sector, including the frequent difficulty to equip workers with hard and soft skills.*
- *Examine the ongoing need to retain and grow talent within the water sector, including the development of new competencies and adapting skills to new demands and technologies.*

Implementation of these recommendations within West Virginia requires a deeper understanding of the current challenges to recruitment and retention of water workers in the state. The Appalachian Community Technical Assistance and Training Program launched the West Virginia Water Workforce Survey in July 2023 to solicit input from the state's water workers about the greatest challenges and opportunities to the workforce. They survey addresses four key objectives:

1. Collect data about operator demographics.
2. Identify current trends and challenges in operator recruitment.
3. Identify current trends and challenges in operator retention.
4. Collect data about relevant utility management issues that may affect operator recruitment and retention.

This data will provide an evidence-based foundation for developing a roadmap to tackle challenges related to operator recruitment and retention in the state.

METHODS

Study Design

Two complementary surveys were developed to solicit input on challenges, barriers, and opportunities that water and wastewater utilities face in trying to recruit and retain drinking water and wastewater operators in West Virginia. One survey targeted operators, which includes both certified and non-certified utility staff that have worked as drinking water and/or wastewater operators in West Virginia. The second survey targeted managers, which includes decision-makers (i.e., managers, owners, directors, mayors, board members, council members) of permitted utilities in West Virginia that can provide responses from the perspective of the overall utility. Only participants 18 years of age or older were eligible to complete the surveys. The survey design and protocol were approved by the West Virginia University Institutional Review board under protocol #2302733195.

Survey Development

The survey questions were modeled after the Kentucky Water Workforce Survey (KWWS), conducted by the Kentucky Water Resources Research Institute (KWRRI, 2022; Ormsbee et al., 2023). The authors of the KWWS provided feedback to guide the development of the survey based on their experiences with implementation of the KWWS and opportunities to collect additional data of value for interpretation of findings. The operator survey questions were designed to gather demographic information and solicit individual experiences related to recruitment and retention from operators working in the field. A copy of the survey questions for operators is included in Appendix A. The manager survey questions were designed to identify the challenges and barriers that utilities face in recruiting and retaining drinking water and wastewater operators. A copy of the survey questions for managers is included in Appendix B. Surveys were developed as web-based surveys in Qualtrics and included multiple choice, text entry, slider, and Likert scale question types. All questions were optional and no identifying information was collected.

Survey Distribution

Surveys were open for five weeks from July 5, 2023 through August 8, 2023. Surveys were distributed using e-mail and postcard mailers. Operator and utility e-mails were compiled from the following sources: (1) drinking water operator e-mails provided by the West Virginia Department of Health and Human Resources, (2) wastewater facility e-mails extracted from West Virginia Public Service Commission annual reports, and (3) e-mails of past participants in ACTAT operator trainings. In total, 622 e-mail invitations were delivered successfully directly to operator and facility e-mails. In addition, the survey link was distributed via e-mail to leaders of various water organizations, training providers, and relevant agencies within the state, who were asked to distribute the survey to potential participants. Reminder e-mails were sent after three weeks. Postcard mailers containing survey links and QR codes were also sent to treatment facilities in

the state. Drinking water treatment facility addresses were provided by the West Virginia Department of Environmental Protection. Wastewater treatment facility addresses were collected from the Environmental Protection Agency's Clean Watershed Needs Survey Dashboard (US EPA, 2023). In total, 310 postcards were sent to drinking water treatment facilities and 320 to wastewater treatment facilities. Postcards were also distributed directly to operator and manager contacts made in person during the survey window during ACTAT training and outreach activities.

E-mail and postcard links and QR codes directed potential participants to a webpage providing information about: (1) eligibility to participate in the survey, (2) informed consent to participate in the survey, (3) criteria for selecting the appropriate version of the survey (i.e., operator vs. manager), (4) incentives in the form of gift card drawings, and (5) links to the surveys.

At the end of the survey, participants were provided a link to visit a separate Qualtrics form to enter a drawing to win a gift card. There were two gift card drawings at the end of each week for the five-week duration of the survey - one drawing was for the operator survey respondents and one drawing was for the manager survey respondents. A random number generator was used to select the winners. Each winner received a $20 Amazon gift card. In total, between the two surveys, ten $20 gift cards were awarded.

Data Analysis

Upon completion of the survey, data collected via Qualtrics was downloaded for analysis in Microsoft Excel. In summarizing the results of individual questions, respondents are defined as the number of participants who responded to that question. Because all questions were optional, the number of respondents may vary between questions. Responses that were not in appropriate format for each question (e.g., non-numeric responses to numeric questions) were removed from the dataset.

RESULTS

Overview of Survey Results

In total, 84 responses were received for the operator survey and 62 responses were received for the manager survey during the survey window. Responses to all questions on the operator survey are provided in Appendix C and responses to the manager survey are provided in Appendix D. The survey questions can be grouped into five major categories, summarized in Table 1.

***Table 1**: Major survey categories and corresponding questions*

Categories	Operator Survey Questions	Manager Survey Questions
General demographic questions about the respondent and the utility	1, 2, 3, 4, 8, 12, 13, 15, 16, 18	1, 2, 6, 7, 8
Questions related to operator recruitment	5, 6, 20, 21, 22, 24, 27	12, 13, 14, 16, 19, 20, 21, 22, 23, 24, 25, 29, 30, 31
Questions related to operator retention	10, 11, 14, 19, 23, 25, 30, 31, 33, 35, 36, 37, 38	3, 4, 5, 11, 15, 17, 18, 26, 27, 28, 34, 35, 36
Questions related to the operator certification process	7, 9	
Questions related to broader utility issues and communication with decision- makers	17, 26, 28, 29, 32, 34	9, 10, 32, 33

Demographic Data

At a minimum, four survey responses were received from each West Virginia Regional Planning and Development Council region (**Figure 1**), including both operator and manager responses [O18, M6]. Region 6 accounted for the most responses (24), and Regions 1, 2, 4, 6, 7, 8, and 9 each included at least 10 survey respondents.

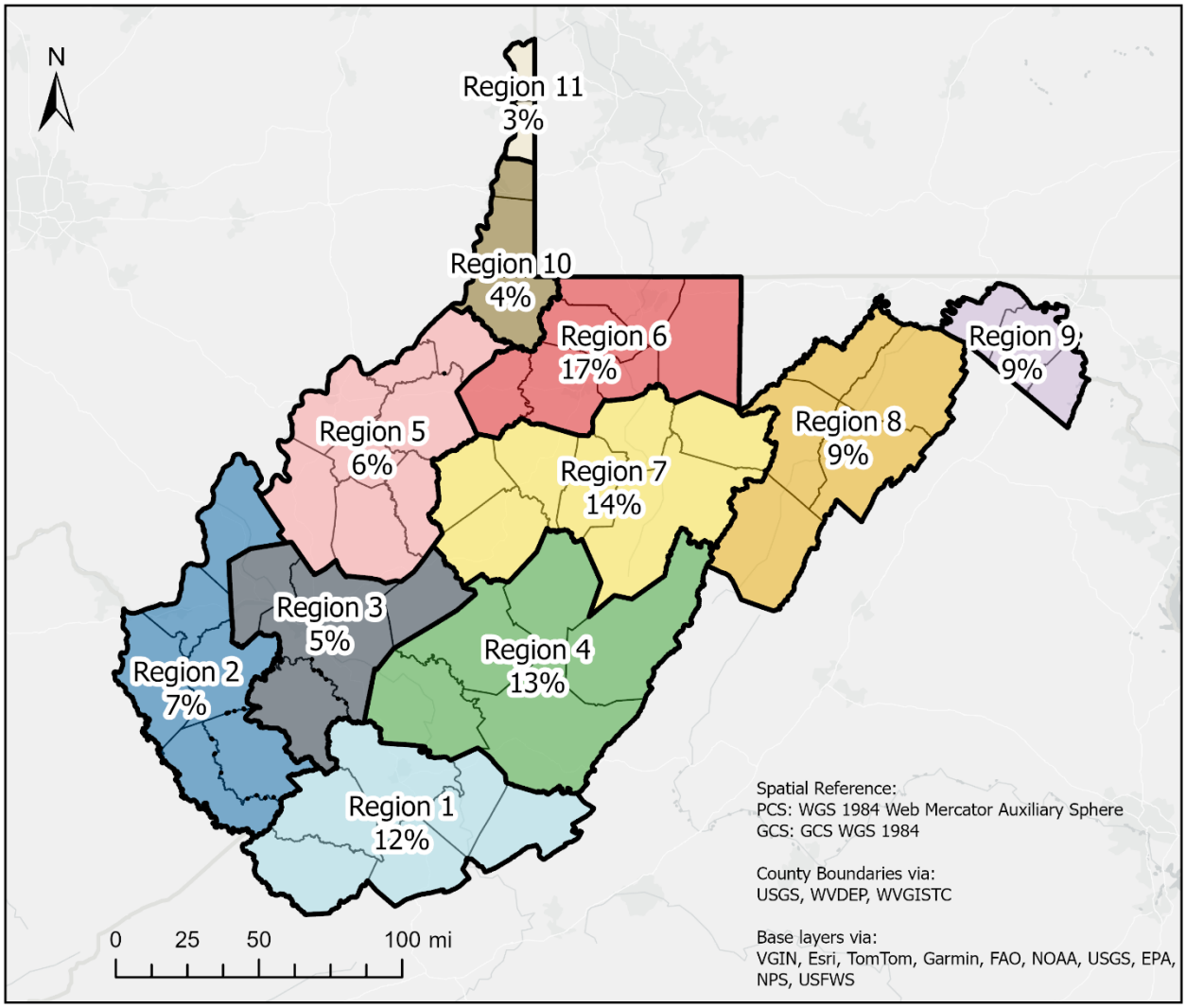

***Figure 1**: Spatial distribution of operator and manager survey respondents by West Virginia Regional Planning and Development Council (n=138)*

The operator survey contained a wide range of demographic questions to assess whether the survey results were representative of a diversity of respondents. Most operator survey respondents represented mid-to-late career stages [O1], with those 45 to 64 years of age accounting for 67% of total responses (**Figure 2**). Nearly 92% of respondents were at least 35 years of age. Hence, younger respondents accounted for far less of the total (8%), indicating a generational gap in operator employment in the state. Nationally, 45.2% of water workers and 42.4% of workers across all fields are between the ages of 35 and 54 (Kane and Tomer, 2018), compared to 47.6% of survey respondents, indicating a full pipeline of middle aged workers in water jobs. Just 10.2% of water workers nationally are below the age of 24, compared to 12.5% across all workers (Kane and Tomer, 2018), but only 3.6% of respondents were in this age group. These results, if representative of the state workforce as a whole, suggest a striking lack of young workers entering the water workforce in WV.

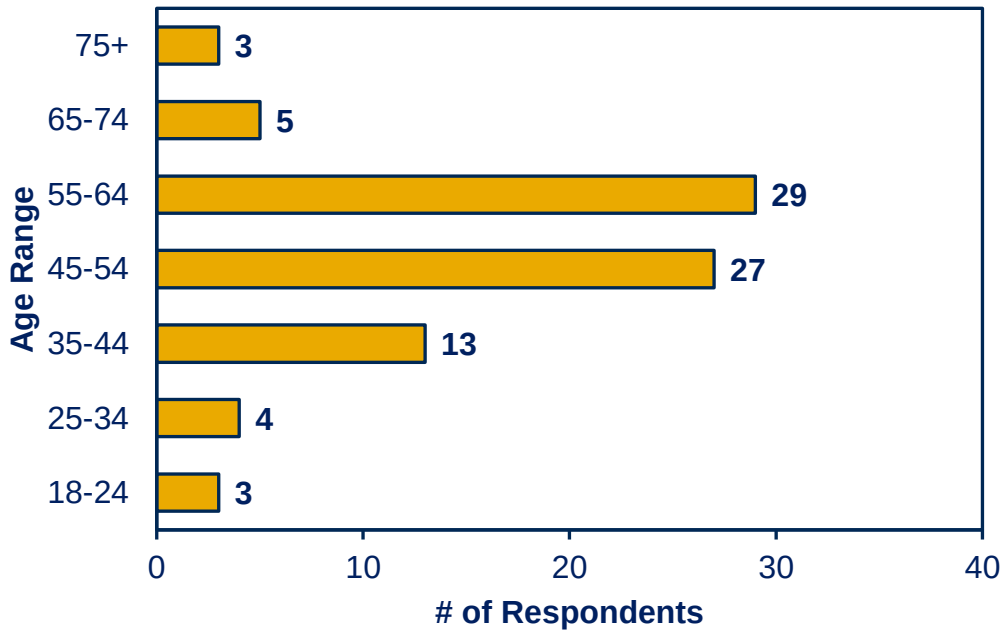

***Figure 2**: Age of operator survey respondents (n = 84)*

Of the respondent pool, the majority of operators identified as white (96%) and male (87%) [O2, O3]. Only 12% of the surveyed operator workforce identified as female. If this surveyed group is reflective of the state as a whole, a substantial lack of gender and ethnic diversity is evident in the field. Nationally, 66.7% of water workers are white and 14.9% are women (Kane and Tomer, 2018).

When polled on highest level of education [O4], most operators had completed high school or G.E.D. equivalent education (65%) (**Figure 3**). Alternatively, 35% of those who responded had achieved a post-secondary degree of some type, including trade school, associate degree, bachelor's degree, or master's degree.

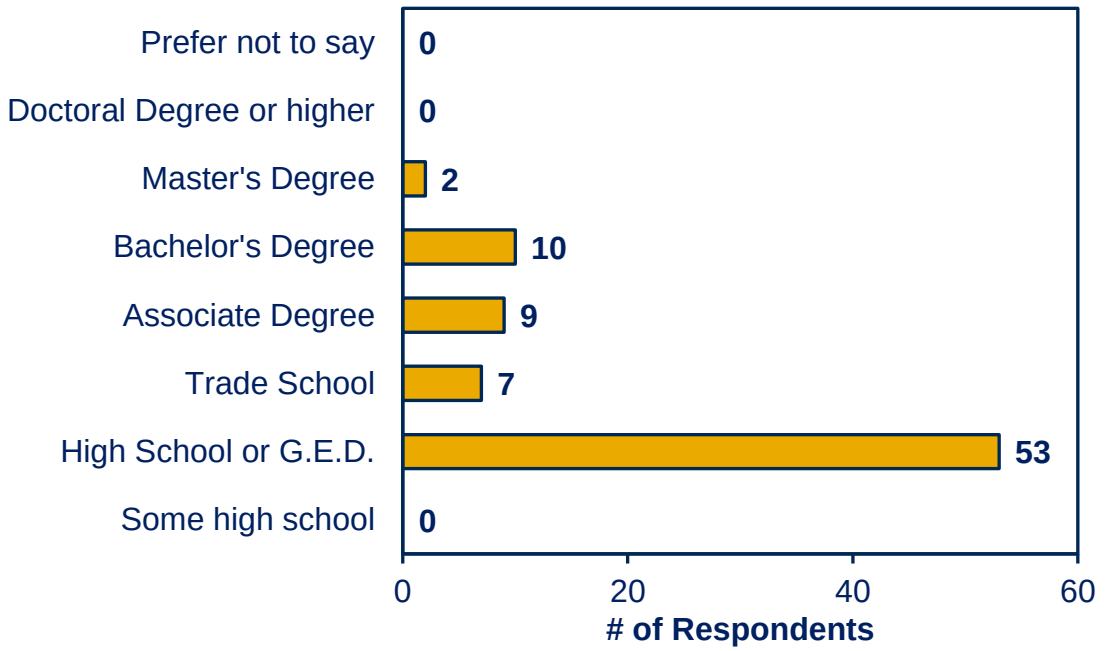

***Figure 3**: Highest degree of education completed by operator survey respondents (n = 81)*

When asked to describe their utility, managers and operators often reported working in a multifaceted environment, responsible for multiple aspects of both drinking water and wastewater utility systems. **Figure 4** shows the percentage of respondents that selected each of the following descriptors to highlight their area of work: drinking water treatment, drinking water distribution, wastewater treatment, and/or wastewater collection [O15, M7].

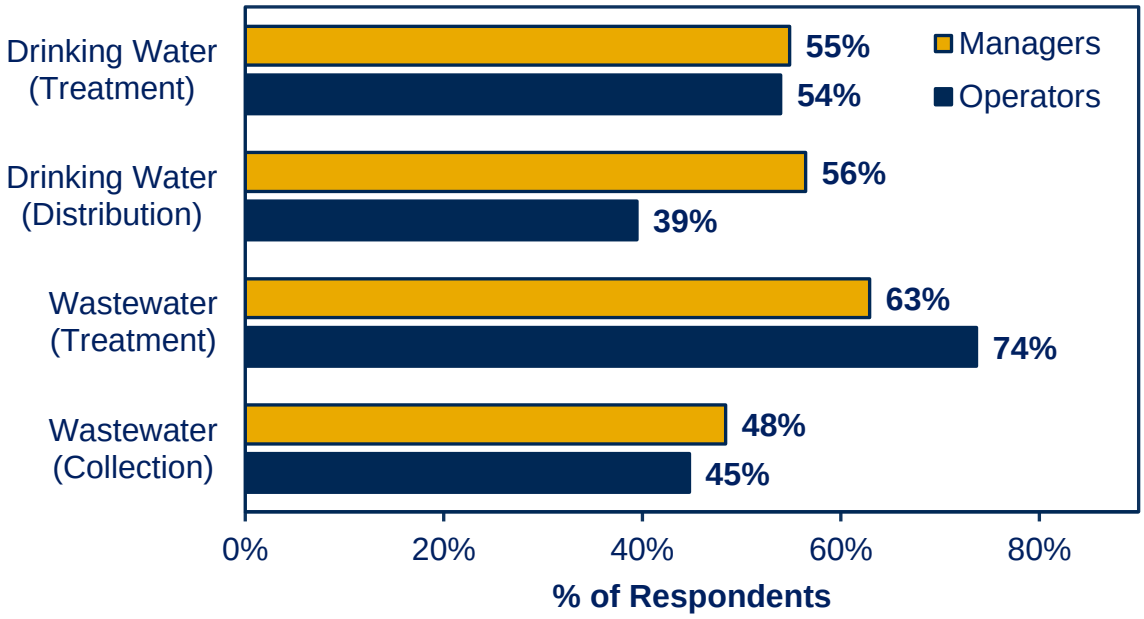

***Figure 4**: Reported type of utility respondents work at, separated by managerial responses (n=62) and operator responses (n=76)*

As shown in **Figure 5**, survey respondents mainly work at small utilities within the state, serving 10,000 persons or less (69% of total responses) [O16, M8]. Only 6% of respondents indicated working for a utility that services a population of 50,000 or greater.

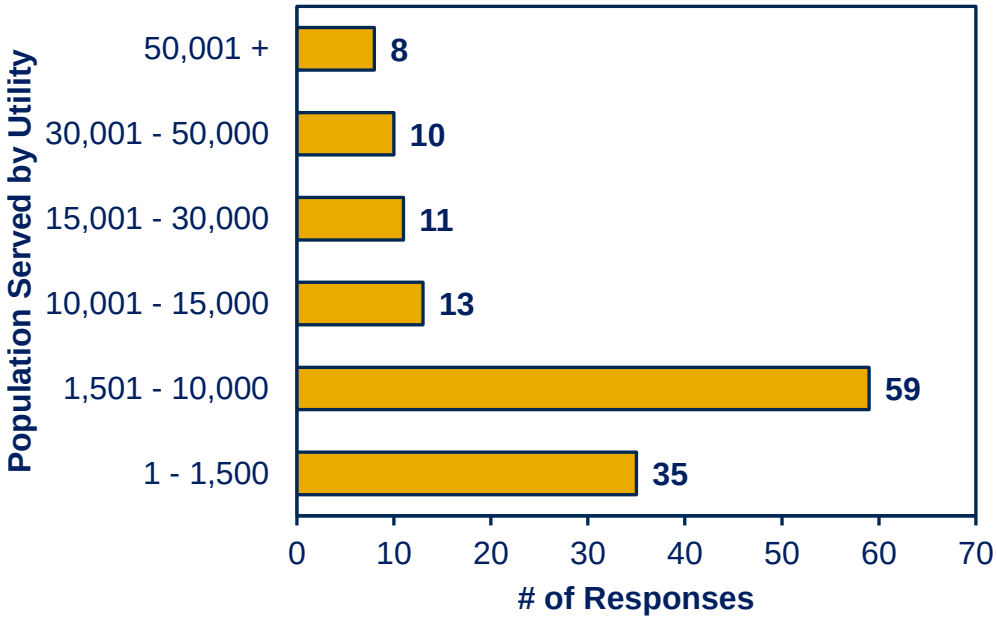

***Figure 5**: Population directly served by each respondent's utility (n=136)*

While the majority of operators reported working for a single utility (**Figure 6**), approximately 20% reported working at two facilities [O8]. Nearly 12% of operators reported working for three or more facilities.

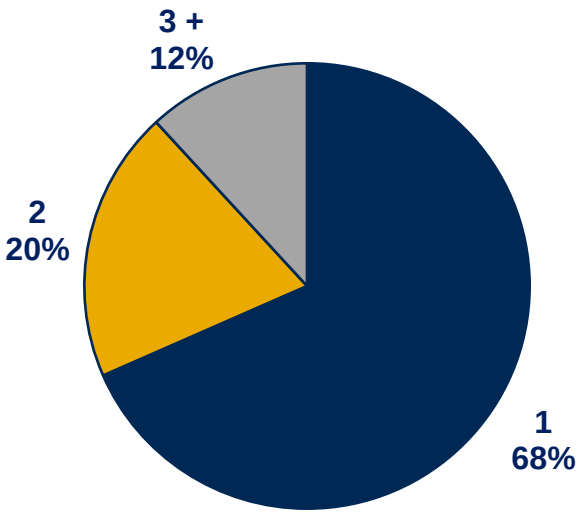

Figure 6*: Number of water or wastewater facilities that each operator reported working at (n=76)*

Operator Recruitment

The operator recruitment results provide insight into current trends and challenges with operator recruitment in WV. These issues were addressed through the results of the individual operator and manager surveys and by assessing multiple factors that go into operator recruitment in WV.

Are operator positions filled?

Managers were asked to provide information about the number of operator positions included in their utility budgets versus the number of operator positions currently filled at their utility [M13, M14]. Of the respondents that provided numeric values, most utilities in the state are filling their budgeted operator positions. On average, respondents reported that 92% of budgeted operator positions are currently filled (**Figure 7**). The positions assessed were drinking water treatment operators (93% of positions filled), drinking water distribution operators (97%), wastewater treatment operators (90%), and wastewater collection operators (93%). Some utilities have filled more positions than they have budgeted for, indicating that they need more staff for routine operation. Utilities may fill their budgeted operator positions, but over half of the managers surveyed believe their utility does not have enough operators.

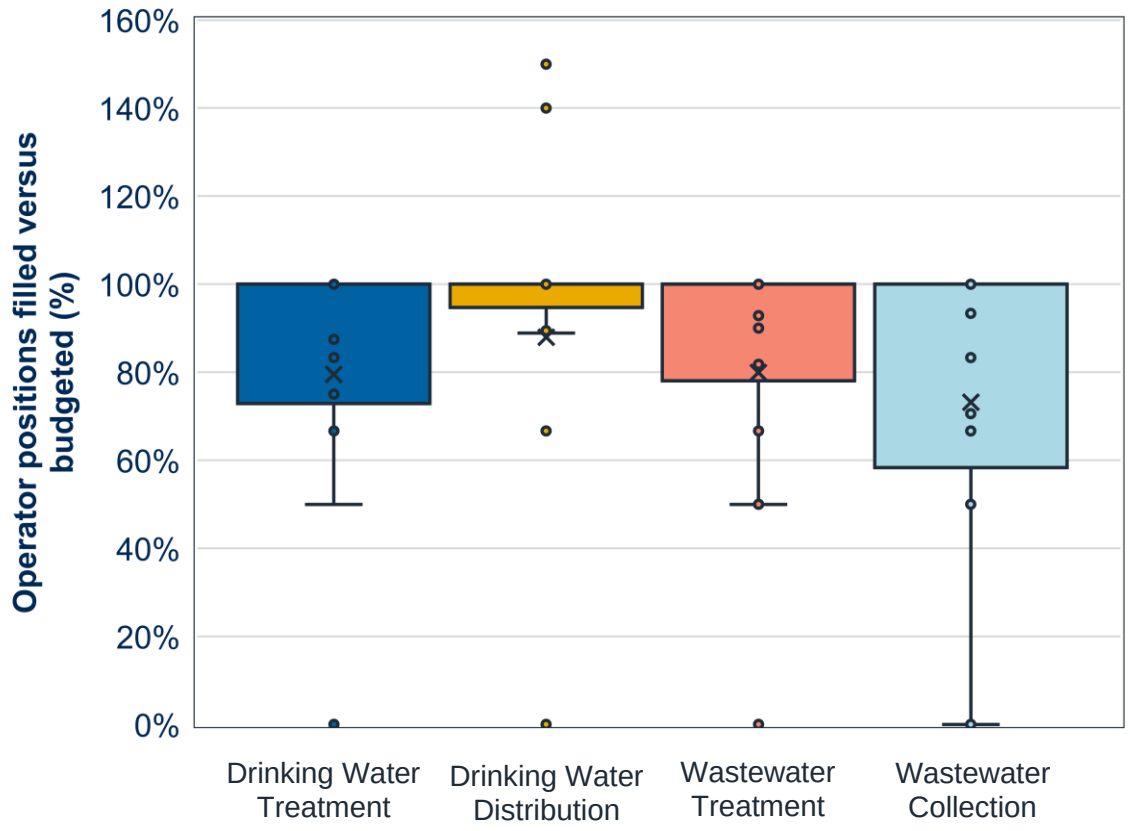

***Figure 7**: Percentage of budgeted operator positions that are filled (n=114). Note that some respondents provided more than one response if their utility performs more than one function (i.e., drinking water treatment, drinking water distribution, etc.).*

Do utilities have enough operators?

Many operators and managers believe that their utility does not have enough operators for regular and effective operations. A total of 53% of operators [O27] and 56% of managers [M16] responded that this was the case. These results allude to the fact that there is a utility operator recruitment issue in the state and that WV utilities could benefit from more operators.

Operator starting age

As noted in the demographic section, 92% of operators surveyed were over the age of 35, with 76% over the age of 45 (Figure 2), demonstrating that most of the workforce is relatively senior with fewer people entering the industry at a young age. Of the surveyed population, 52% of the operators started their position under the age of 30 and 70% started before the age of 35 [O6] (**Figure 8**). The survey results show that most of the current operators in the state started their position under the age of 35, but currently only 8% of surveyed operators are under the age of 35. If these results accurately reflect the ages of operators in the water industry throughout WV, there needs to be a

focus on recruiting younger operators to ensure future sustainability of water and wastewater operations.

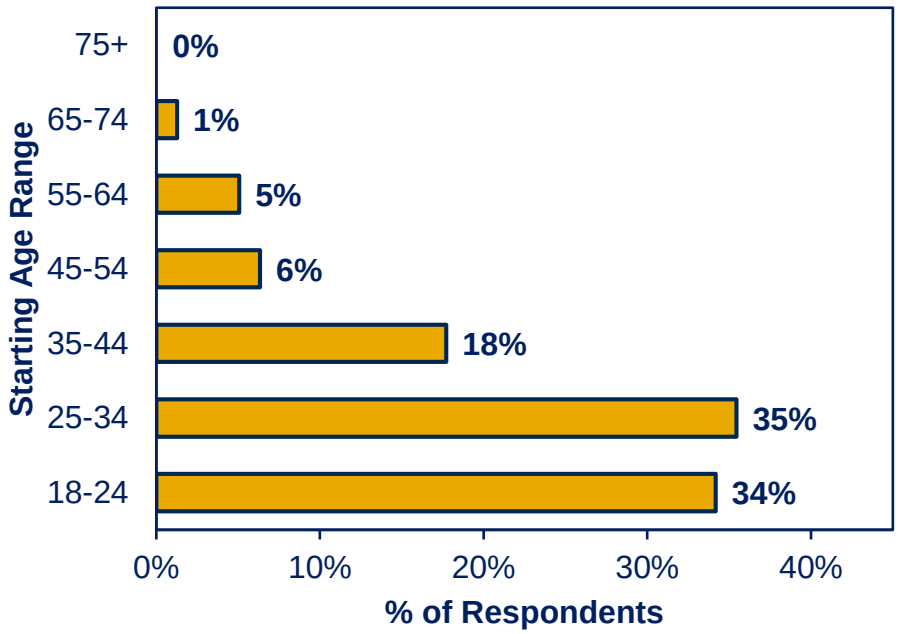

***Figure 8**: Operator starting age (n=79)*

How do operators find jobs?

Most surveyed operators [O5] (66%) stated that they found their job through a friend or family member (**Figure 9**). Other notable methods were through the newspaper (33%) or an online job post (29%). The majority of managers surveyed [M29] responded that they advertised open operator positions in the newspaper (76%) (**Figure 10**). Other popular ways to spread the word were through online job posts (e.g., Indeed, LinkedIn, ZipRecruiter; 53%) and social media (e.g., Facebook, Twitter; 49%). These two results are well aligned considering operators often find jobs through the newspaper and online job posts and that is where utilities frequently share open positions. Word of mouth through family and friends was also a notably effective way to share and advertise operator jobs. Advertising through word of mouth for open positions at utilities could help recruit qualified professionals. Correspondingly, a utility's involvement in the community may increase opportunities to share job openings.

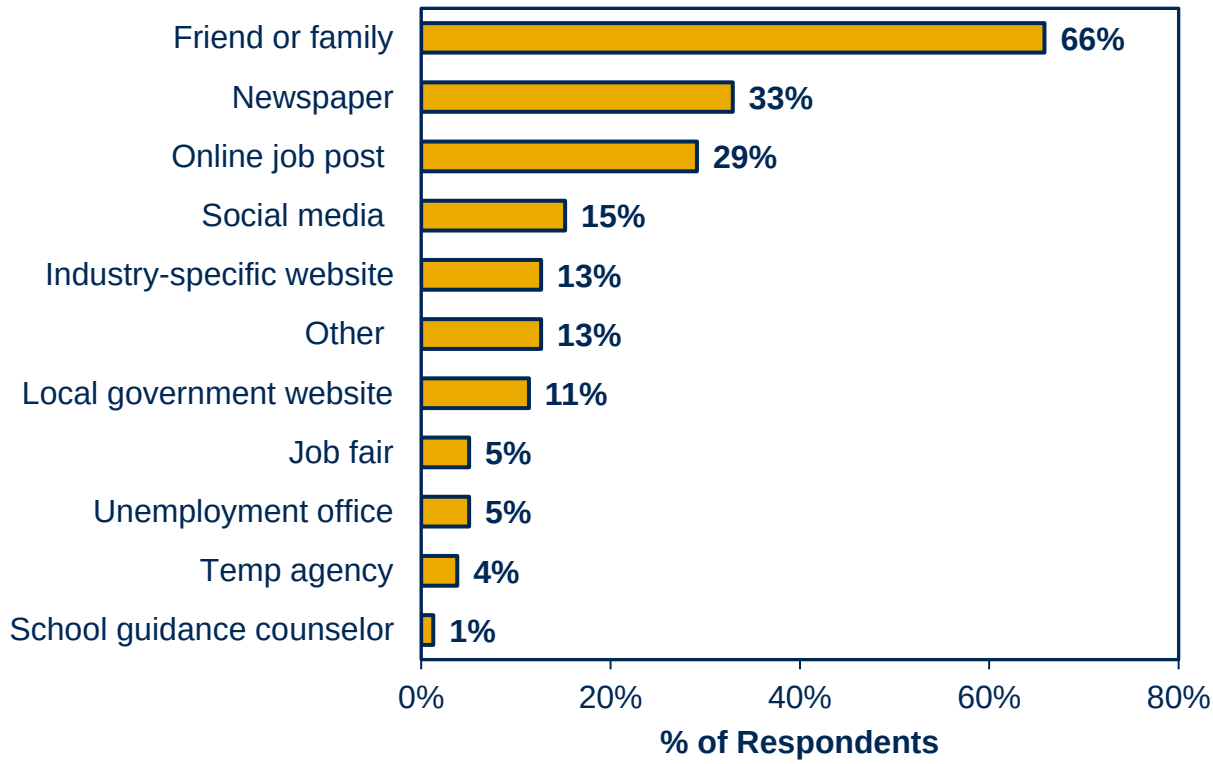

***Figure 9**: Resources used by operators to find jobs in the water industry (n=79)*

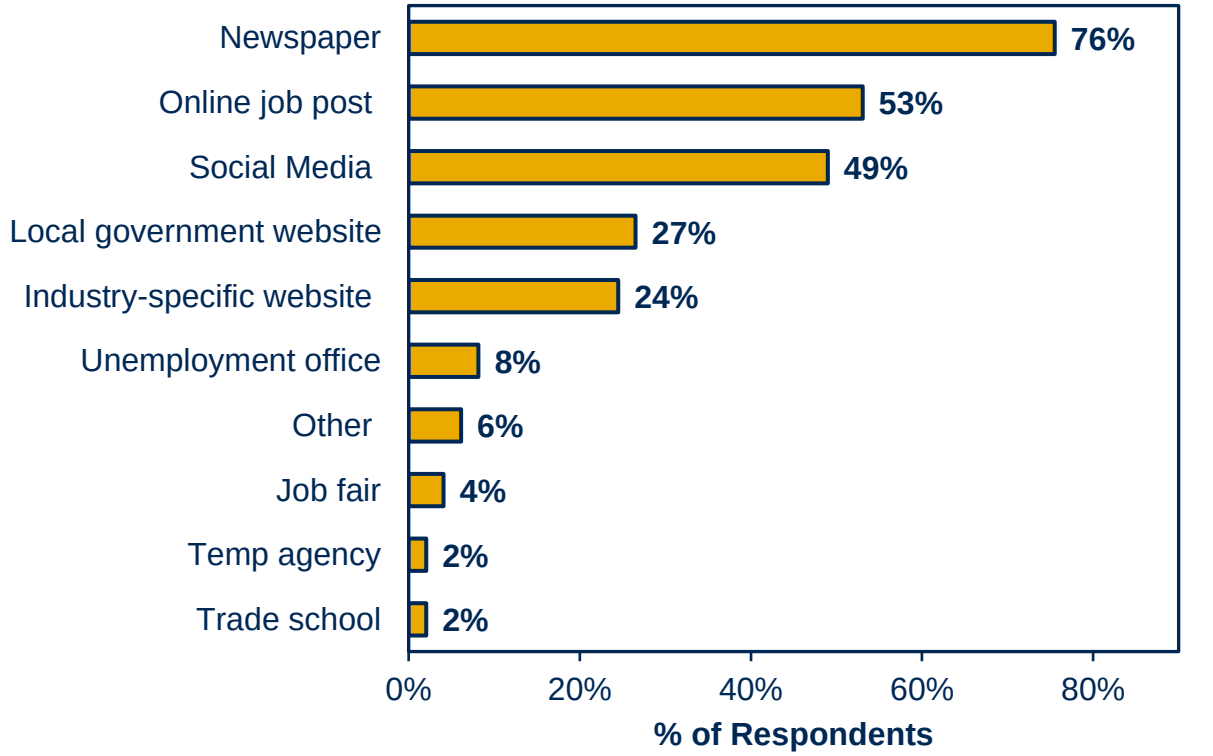

***Figure 10**: Resources managers use to advertise utility jobs (n=49)*

What barriers create challenges to hiring operators?

Managers were asked to provide input on the barriers encountered when trying to hire operators [M30]. Of the respondents, 78% of managers surveyed selected that they face at least one barrier while hiring operators (**Figure 11**). A total of 62% of surveyed managers believe that there is a lack of qualified applicants to fill the operator positions at their utilities and 59% stated that the rate of pay is a barrier. In addition, 12% of managers stated that the COVID-19 pandemic has decreased the number of applicants for jobs [M33]. Other barriers that managers face are financial limitations at the utility, city council or utility board approving new positions, applicants being unwilling to become certified, certification requirements, the certification process, the lack of benefits provided, the type of work, and that the available shifts are not desirable. One notable response received in conjunction with the "other" option was that operator positions "are not well promoted for women."

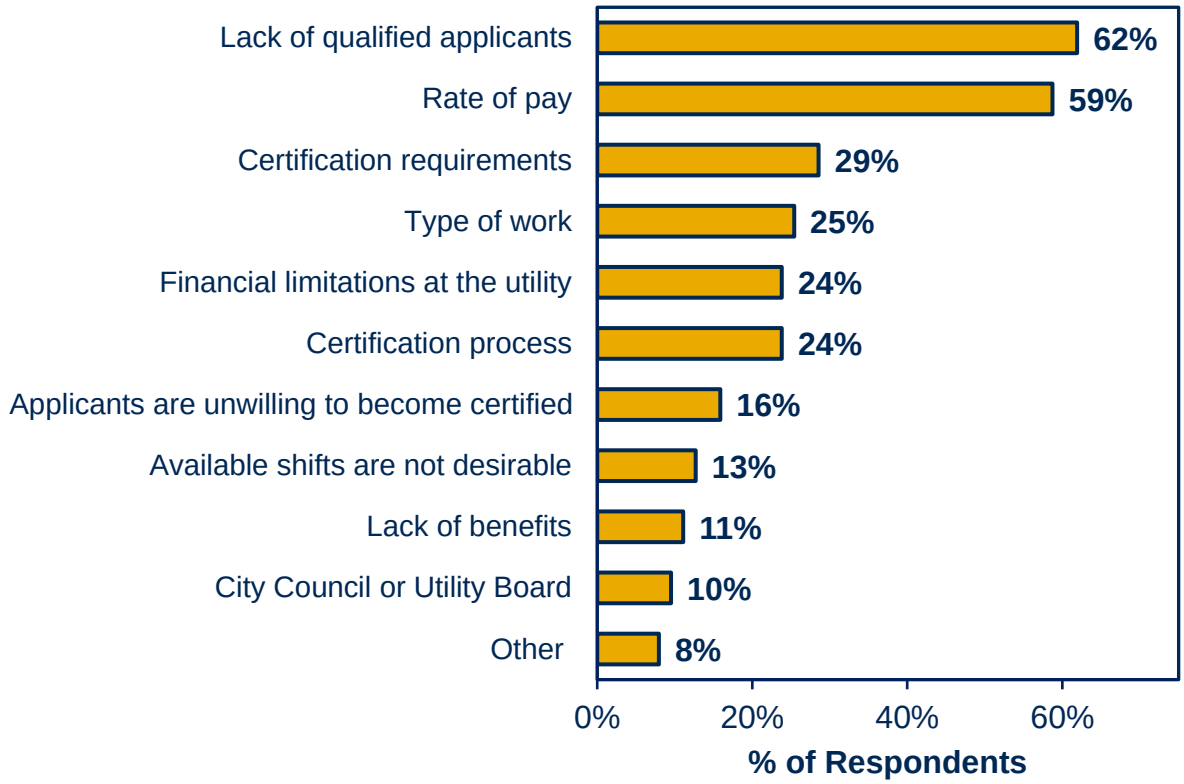

***Figure 11**: Barriers to hiring operators (n=63)*

What factors contributed to a lack of qualified applicants?

Managers reported difficulties when trying to hire operators because applicants lack the qualifications the utility is seeking [M31]. Of managers surveyed, 59% indicated that lack of an operator license presented a barrier to hiring applicants and 51% indicated that applicants lack experience in relevant positions (**Figure 12**). These results highlight the potential benefit of internship and apprenticeship programs in the state to make sure

high school graduates and young people interested in the water industry have the proper skillset to work. Increasing outreach and education about the water industry within WV would provide opportunities for young professionals to gain awareness of opportunities for these training programs to obtain the proper qualifications and experience prior to applying for operator positions. Utilities could also consider changing the methods they use for advertising open operator positions. Changing the resources used for advertising open positions may reach a more qualified audience.

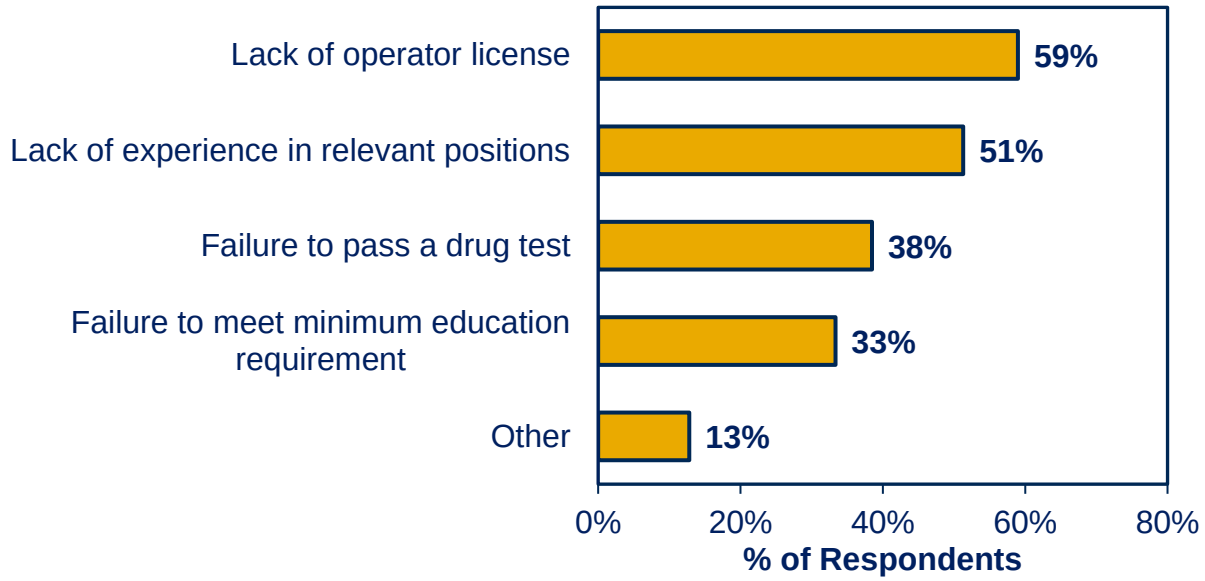

***Figure 12**: Qualifications that managers report have been lacking among operator applicants that prevent their hire (n=39)*

Starting wage

Managers reported that rate of pay was a major barrier contributing to challenges hiring operators. The mean starting wage for an entry level drinking water operator was $16.36 per hour and it was $15.76 for entry-level certified wastewater operators (Figure 13) [M25]. Higher starting and hourly wages could increase the interest in operator positions and help recruit younger people into the water industry. Even though the average hourly wage for operators is higher than the average starting wage, applicants may look for jobs in other fields that are willing to pay higher rates from the start of their position.

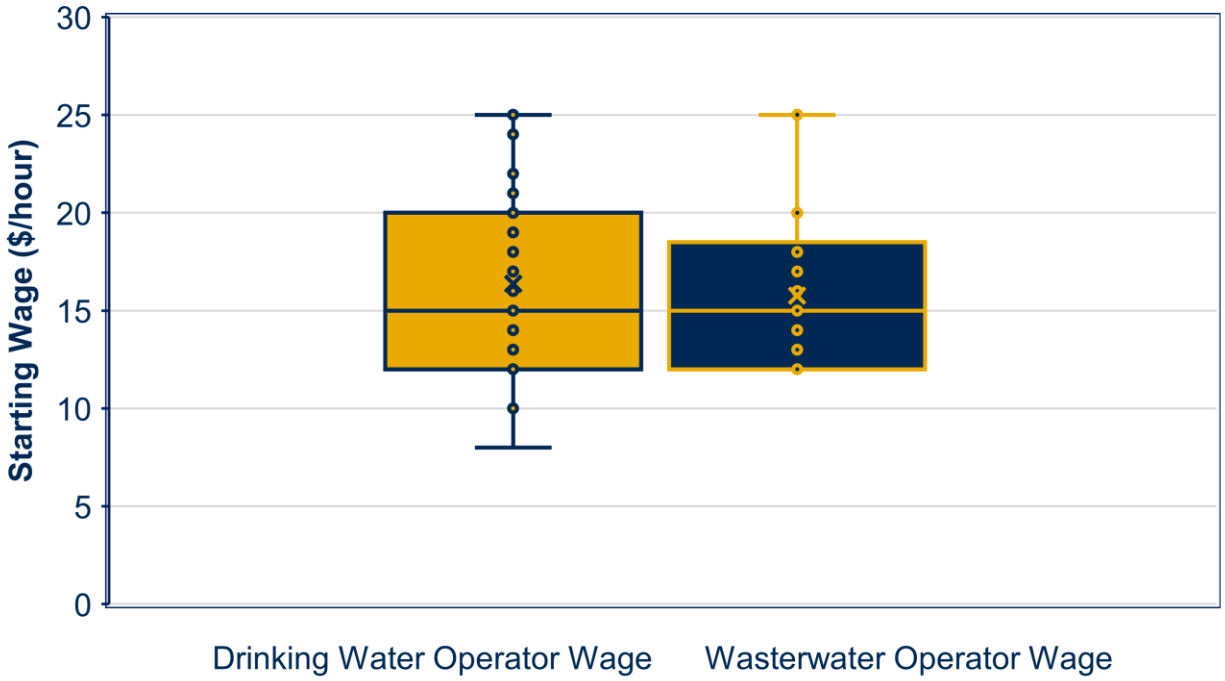

***Figure 13**: Drinking water vs wastewater operator starting hourly wage (drinking water n=33, wastewater n=34)*

Benefits

While rate of pay is a challenge to hiring, a range of benefits are offered to utility operators that may make these positions more appealing to applicants. Most utilities provide health insurance, retirement benefits, paid sick and vacation days, paid time and travel to attend various trainings, and paid holidays for operators. Based on the operator survey results [O22], the most common benefits that operators are provided with are health insurance (95%), paid sick and vacation days (95%), and paid holidays (93%) (**Figure 14**). The most common benefits that managers stated that their utility provides are paid holidays (97%), paid sick and vacation days (97%), and paid time to travel and attend trainings (95%) [M12]. Benefits provide an incentive for applicants and workers at the utility.

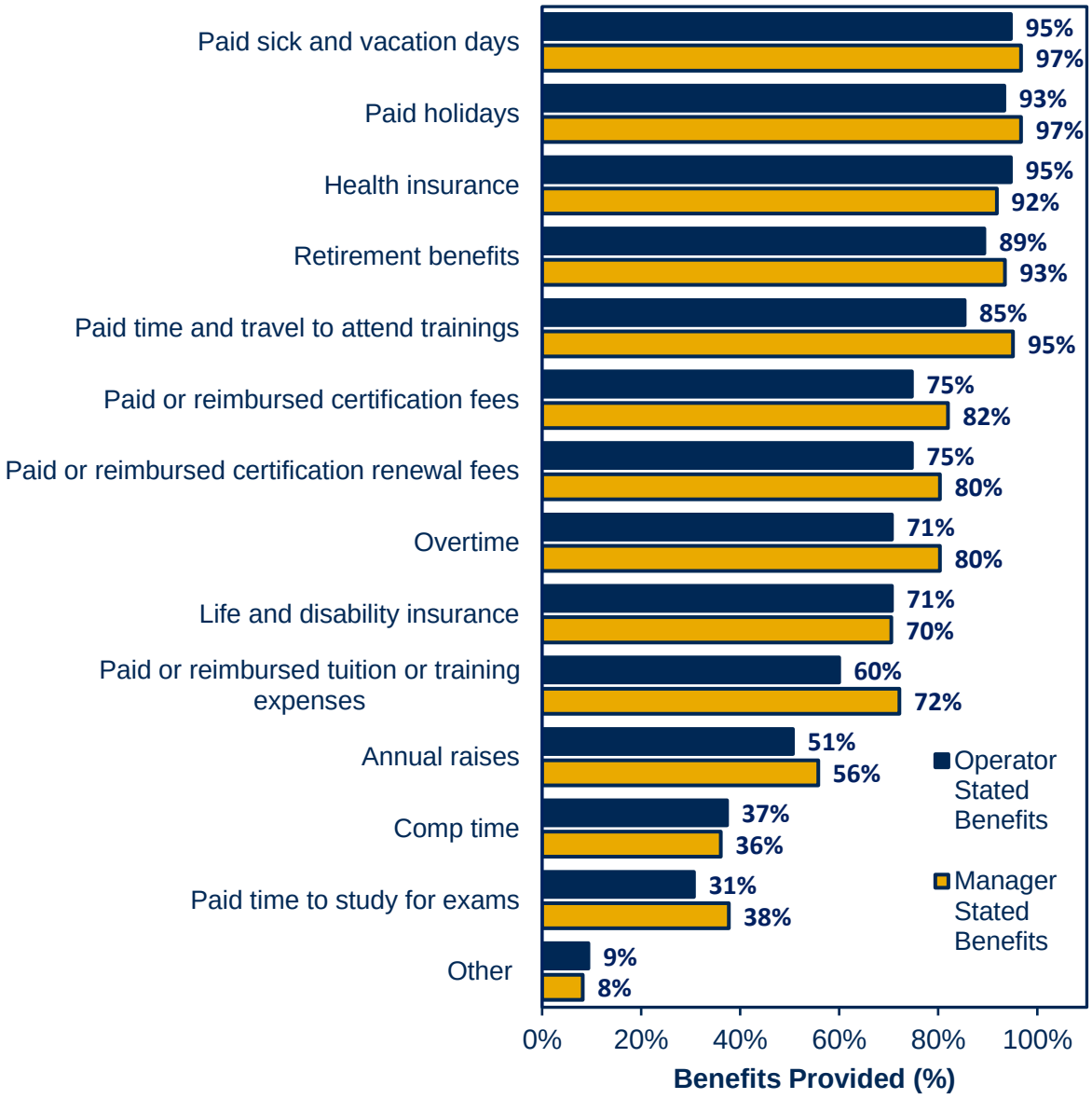

***Figure 14**: Operator benefits (manager stated benefits n=61, operator stated benefits n=75)*

Although the number of benefits provided by utilities seems to be satisfactory across the board, there are still WV utilities that provide minimal to no benefits. 14% of operators did not list any benefits, which allows the assumption that their utility does not provide benefits or that they are working in a position ineligible for benefits. A lack of benefits could result in an operator recruitment barrier. Most professionals looking for a full-time position are seeking benefits and utilities that do not provide these benefits are less likely to recruit new operators. Only 31% of operators stated that they receive paid time to study for exams, without this benefit it is unlikely that individuals will be able to complete the certifications that managers are seeking [O22]. Increasing the benefits offered may improve operator recruitment.

Trainee/apprenticeship programs

A total of 63% of managers stated they hire trainees, apprentices, or high school interns [M19]. Of these, 47% of managers stated that they hire trainees, 8% hire apprentices, and 8% hire high school interns. However, 34% of managers do not hire any of these positions. An increase in these opportunities would allow young individuals to better prepare for operator positions considering a lack of qualified applicants is a major barrier for managers looking to fill operator positions in the state. High school interns and apprentice positions are important positions that provide the utility with more resources as well as introducing a greater number of young individuals to the water industry. The high percentage of utilities that do not hire any of these positions could be a direct correlation with the data that states managers are not receiving applications from qualified applicants.

Only 40% of operators stated that their utility has a trainee or apprentice program [O24]. However, 69% of managers stated that their utility has a formal trainee program that allows on-site supervision and hands-on training to operators in training [M20]. This discrepancy between operator and manager responses could indicate that these programs are underutilized when they do exist, leading to a lack of awareness among operators. The results show that a greater number of utilities have formal trainee programs than hire trainees or apprentices, further supporting the notion that these programs are underutilized. The results also show that operators are not taking full advantage of the resources at their utility, or they are not informed about the programs that have been put in place.

Youth/community outreach

A total of 78% of managers stated that they would be willing to host a paid high school intern if given the opportunity [M21]. While the majority of managers said yes, those who said no were concerned about having resources available to pay the intern as well as not having enough staff to train and supervise the intern at their utility. Having a position for high school interns at utilities around the state exposes more students to the water industry and better prepares high school graduates for full time positions at utilities.

Only 31% of managers stated that their utility participates in youth and community outreach [M22]. The activities that are provided by utilities around the state include facility tours, participation in job fairs and career day at high schools and universities in WV, and community outreach. An increase in community involvement has the potential to introduce youth to opportunities in the water industry.

Managers shared that they would be more likely to participate in youth and community outreach if they had access to existing materials (27%), a partnering organization that would conduct outreach (26%), and if they knew they could inform high school students about careers in the water industry (28%) (**Figure 15**). Addressing the concerns that are limiting managers from participating in youth and community outreach has the potential

to increase recruitment opportunities. Utility collaboration around the state could provide shared resources that make outreach easier for each utility. Involvement in the community increases educational opportunities and awareness about water industry careers.

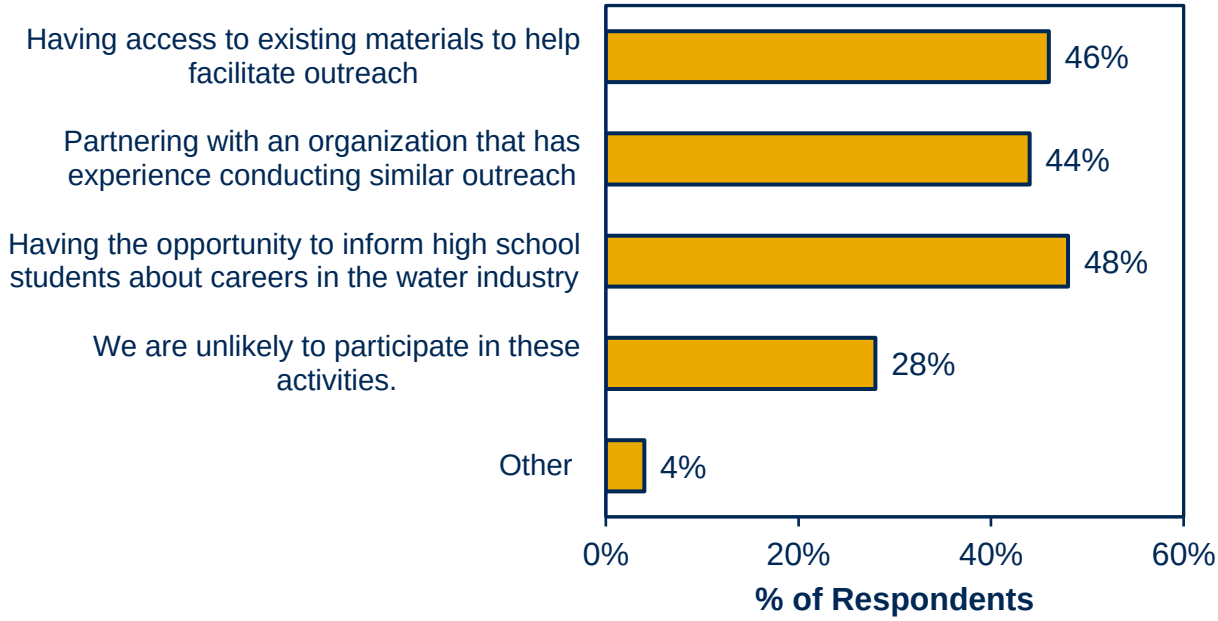

***Figure 15**: Factors that increase utility participation in youth/community outreach (n=50)*

Operator Retention

This section describes survey results related to trends in retirement outlook, the duties of operators at work, their job satisfaction, and trends in retention and pay. This section is critical for various reasons – to understand what the WV workforce will look like in 5-10 years and identify potential mechanisms to recruit and retain satisfied water and wastewater operators.

Work experience

Operators and managers were asked about the number of years they have worked at their current utility [O19, M3]. Interestingly, the greatest number of operators (37%) and managers (44%) reported having only worked at their current utility for 1-9 years (Figure 16). This is interesting because the water industry is known to have an aging workforce (e.g., **Figure 8**), but this result suggests a high degree of mobility among employees moving between water utilities or companies rather than just starting in the industry. In contrast, many operators (28%) and managers (18%) reported working at their current utility for over 25 years.

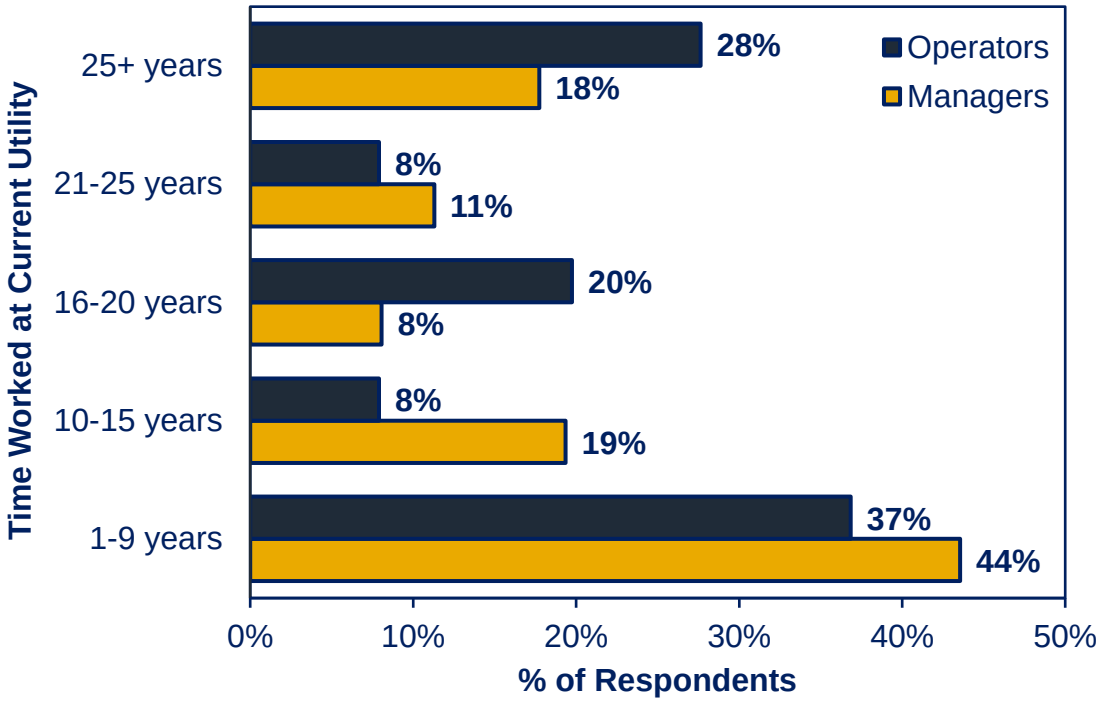

***Figure 16**: Number of years worked at current utility (operators n=76, managers n=62)*

Operators were polled to determine how many hours they work each week [O14]. Over 70% of utility operators work 40-49 hours each week (Figure 17), but almost a quarter work 50 or more hours, which indicates there are often demanding work hours for water and wastewater operators.

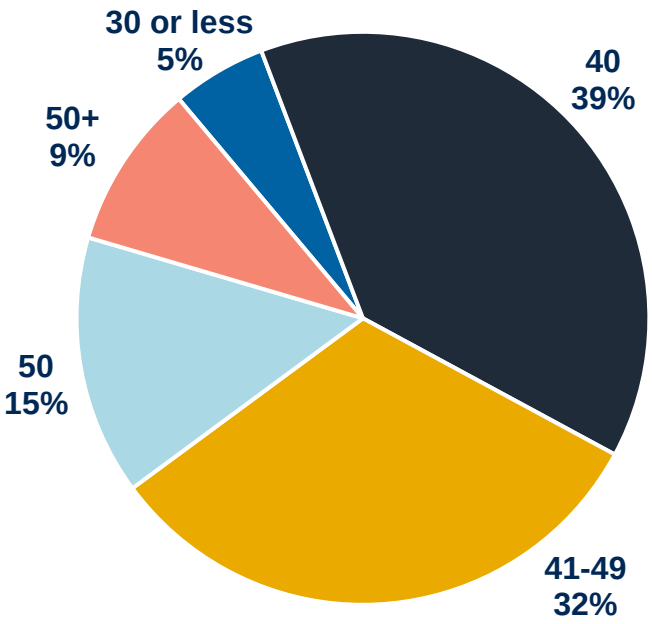

***Figure 17**: Number of hours worked weekly for operators (n=75)*

Retirement eligibility

Operators and managers answered a series of questions about their retirement eligibility and timeline to retirement [O10, O11, M4, M5, M17, M18]. The results indicated that 24% of operators and 26% of managers are currently eligible for retirement (Figure 18). However, it is more concerning that over half of the operators and managers plan to retire (or are already retired) within the next 9 years (Figure 19). These results emphasize the need for recruitment and training of young professionals so that the water industry is not greatly lacking utility operators and managers after the next ten years.

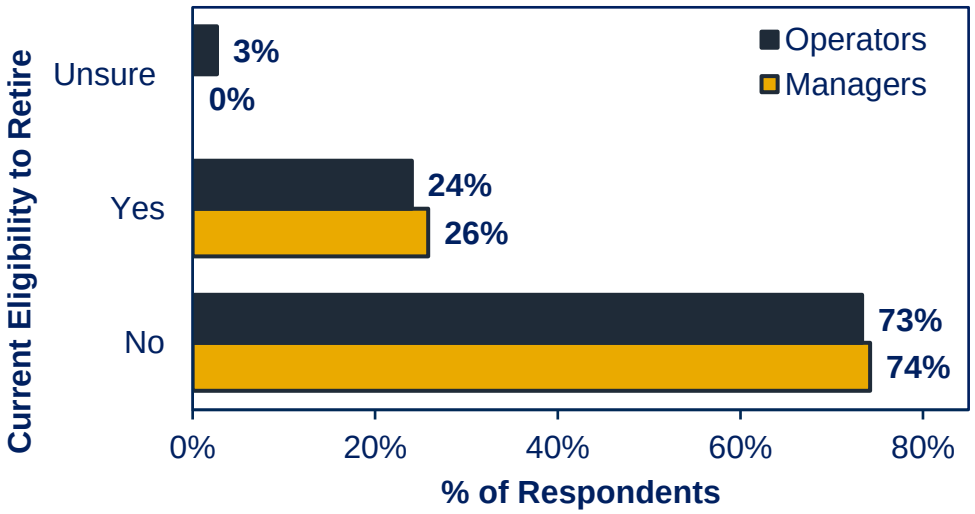

***Figure 18**: Eligibility for retirement (operators n=75, managers n=62)*

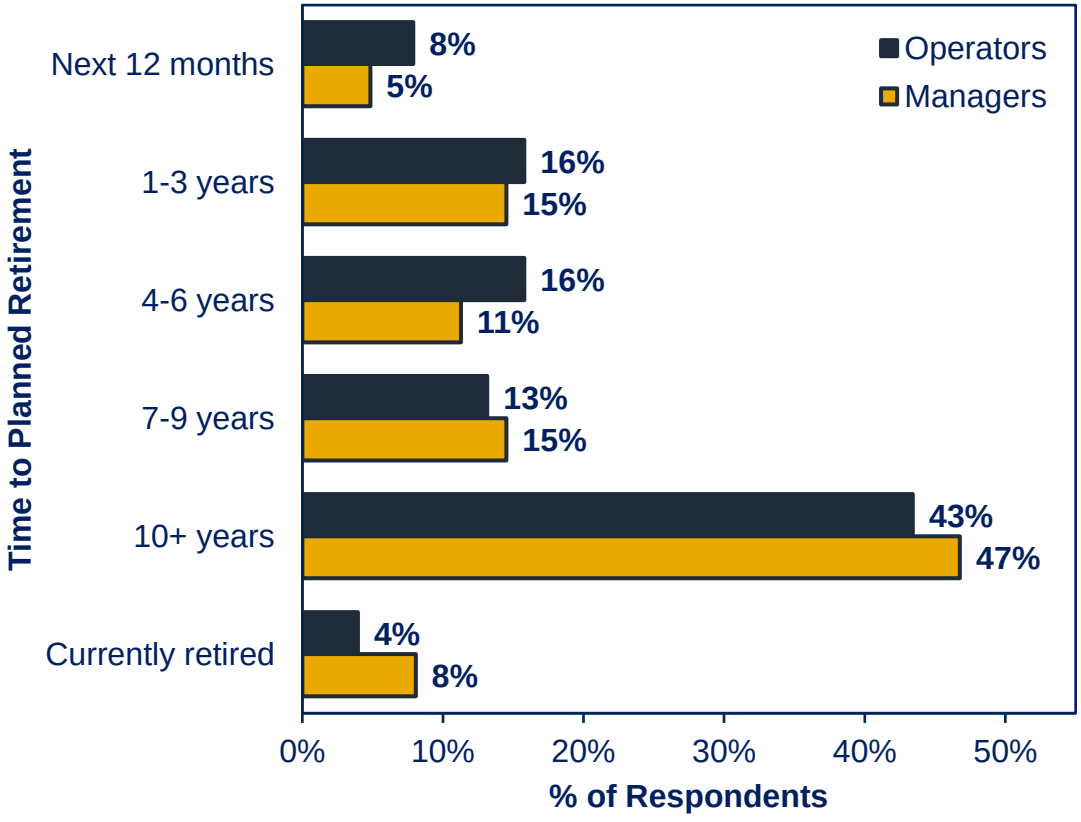

***Figure 19**: Timeline to planned retirement (operators n=76, managers n=62)*

What does an operator do?

Respondents were asked if their jobs (or jobs of operators at their utilities) entail duties beyond system/treatment duties [O23, M27] to better understand the operators' work dynamic and employee experience. Only 1% of operators and 2% of managers reported that operators at their utility are responsible solely for operator duties (**Figure 20**). Additional common responsibilities included equipment maintenance, office work, and city maintenance. Notably, the percentage of operator and manager responses indicating operator responsibilities include office work and equipment maintenance duties were quite different. This could potentially mean that managers are relatively unaware of the specific duties the operators complete within these realms or that operators perceive office work to be more taxing or time-consuming than other duties. Operators who responded that they were responsible for "other" duties included responsibilities consisting of heavy equipment operation, compliance monitoring and reporting, training and safety, laboratory managing, solid disposal, painting, cleaning, removing snow, and maintenance. Managers selecting "other" duties reported that operators at their utility are responsible for other duties such as solid disposal, painting, cleaning, removing snow, lawn care, hydrant testing, other system testing, and maintenance as job duties for their operators.

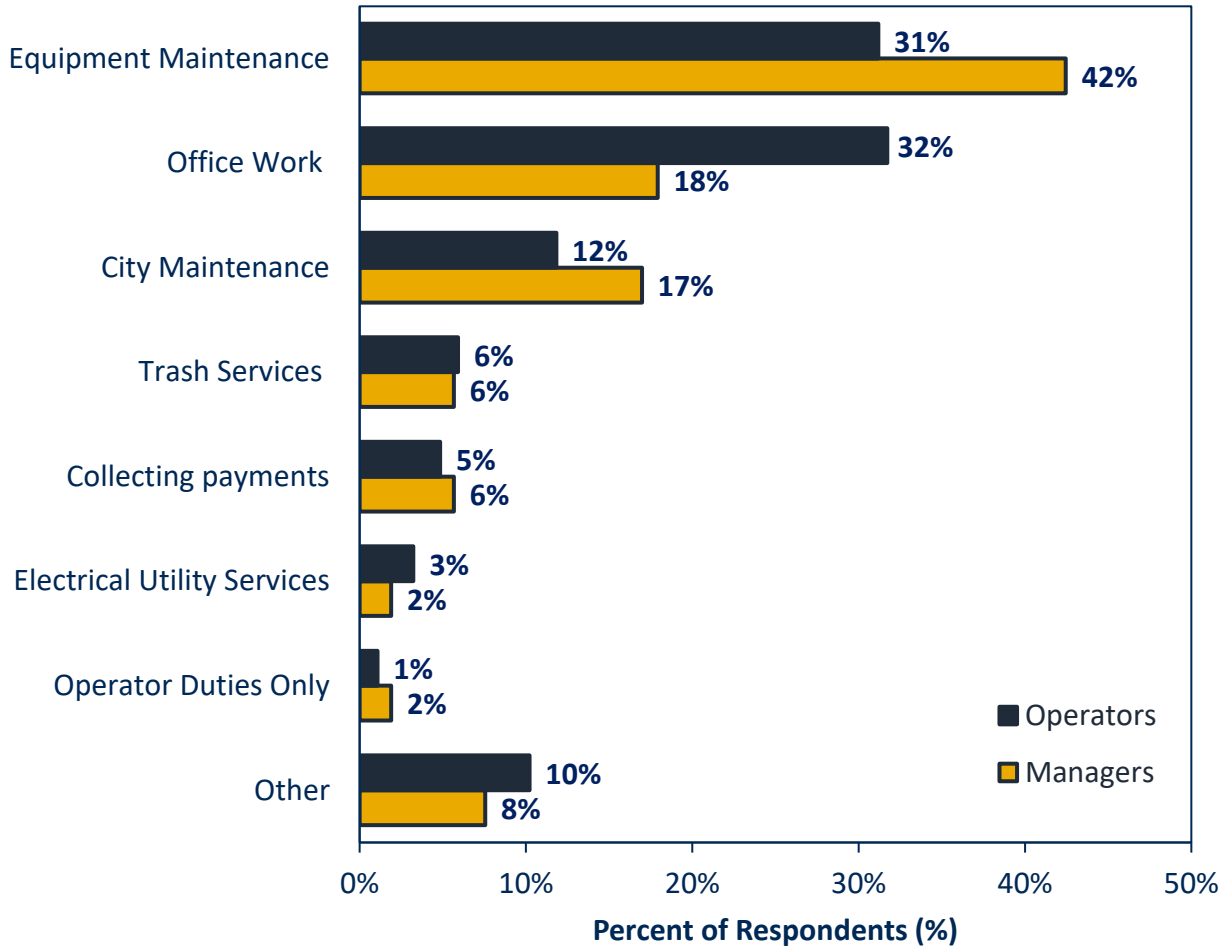

***Figure 20**: Duties that operators are responsible for other than their system/treatment duties (operators n=75, managers n=48)*

Trends in retention

Managers were asked how many drinking water treatment, drinking water distribution, wastewater treatment, and wastewater collection operators have left their utility in the last 2 years [M15]. The results indicate that at least one utility from each category experienced 5 or more operators leaving in the last 2 years, which is a significant number of operators and can take a great toll on the utility. Significantly, 45-56% of WV utilities have lost 1-5+ operators in the last 2 years. However, this corresponds to 44-55% of utilities losing zero operators in the last 2 years.

Figure 21 demonstrates operator turnover by utility type, which is defined as the percentage of operators who left the utility in the last two years with respect to the number of budgeted operator positions. Average turnover rates were 30% for drinking water treatment utilities, 32% for drinking water distribution utilities, 22% for wastewater treatment utilities, and 28% for wastewater collection utilities. Notably, there were

respondents from drinking water distribution and wastewater collection utilities that reported 250% turnover in operator positions over the last two years. This is significant because it greatly impacts the utilities' ability to adequately collect, treat, or distribute water or wastewater.

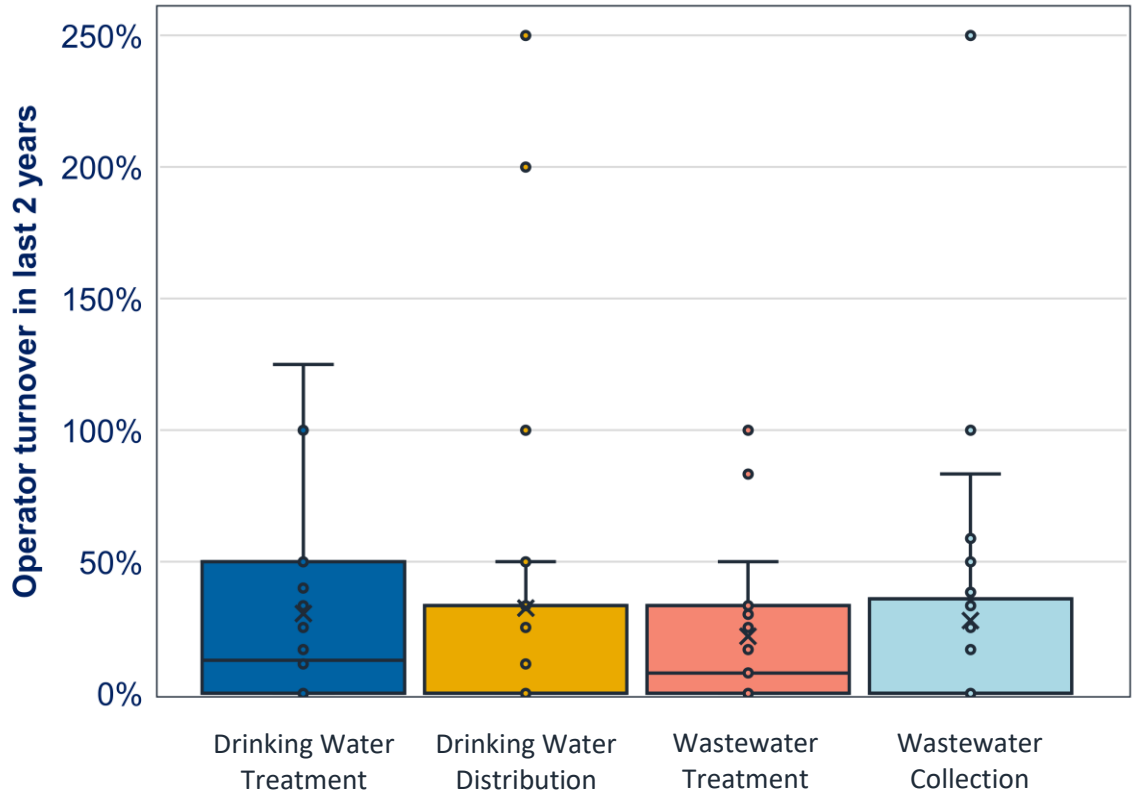

***Figure 21**: Operator turnover (percentage of operators who left the utility in the last two years with respect to the number of budgeted operator positions, grouped by operator position type (drinking water treatment n=20, drinking water distribution n=20, wastewater treatment n=21, wastewater collection n=21)). *If both [M13] and [M15] were not answered then the data was excluded.*

The question that remains is, why are operators leaving their operator jobs? Question M35 asked managers to select all reasons that operators have given for leaving the job with the following options: retiring, better pay with other opportunity, better benefits with other opportunity, want out of water industry, career advancement with other opportunity, undesirable work hours, too much responsibility, too many regulations, certification exam/process too difficult, or other. Forty five percent of managers stated that operators left their utility for better pay or better benefits with other opportunity or for career advancement (Figure 22).

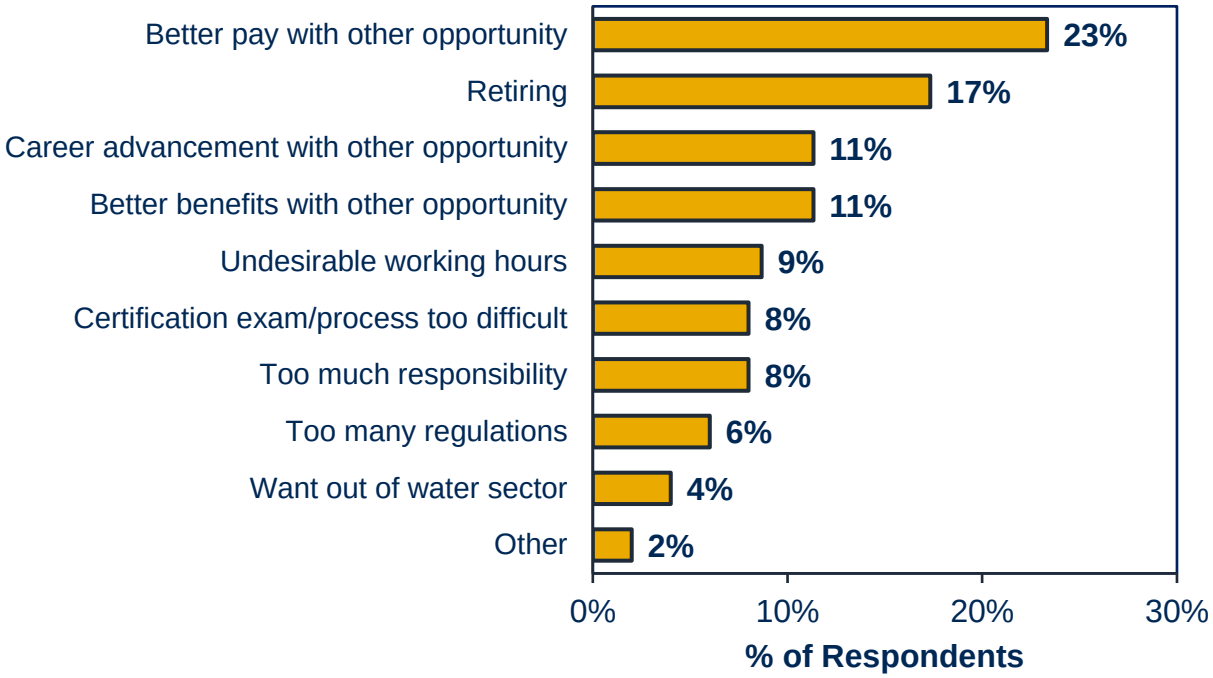

***Figure 22**: Reasons operators give for leaving the job, as reported by managers (n=49)*

Operator job satisfaction

The majority (72%) of operators reported being happy at work, but 14% of operators consider themselves unhappy at work (Figure 23) [O33].

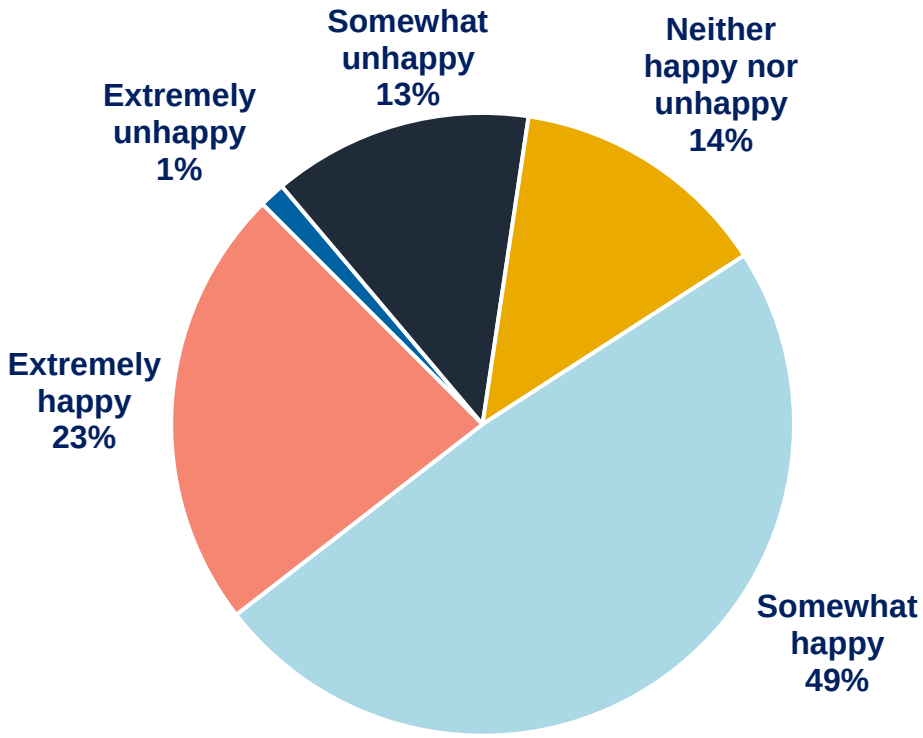

***Figure 23**: Operators response to how happy they are at work (n=74)*

The operators answered a series of questions about their satisfaction with various work factors which include pay, shift availability, hours, workload, type of work, and the certification exam and renewal process [O35].

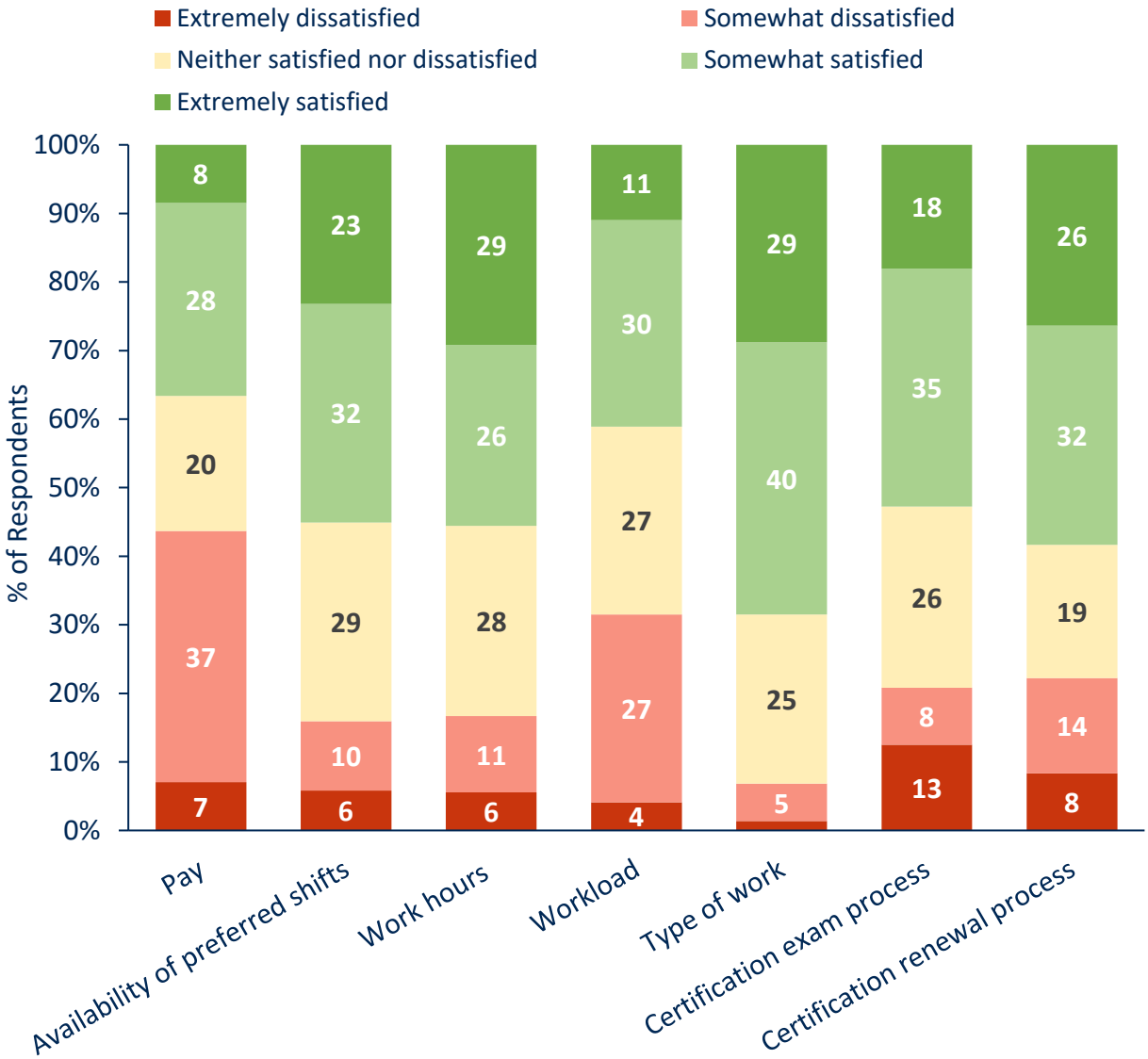

Figure **24** below displays the operators' responses ranging from extremely dissatisfied to extremely satisfied for each factor. There were very few extremely dissatisfied responses, and results were dominated by responses of somewhat or extremely satisfied for all factors. One factor that stands out is pay, where 44% of operators are somewhat or extremely dissatisfied with their pay.

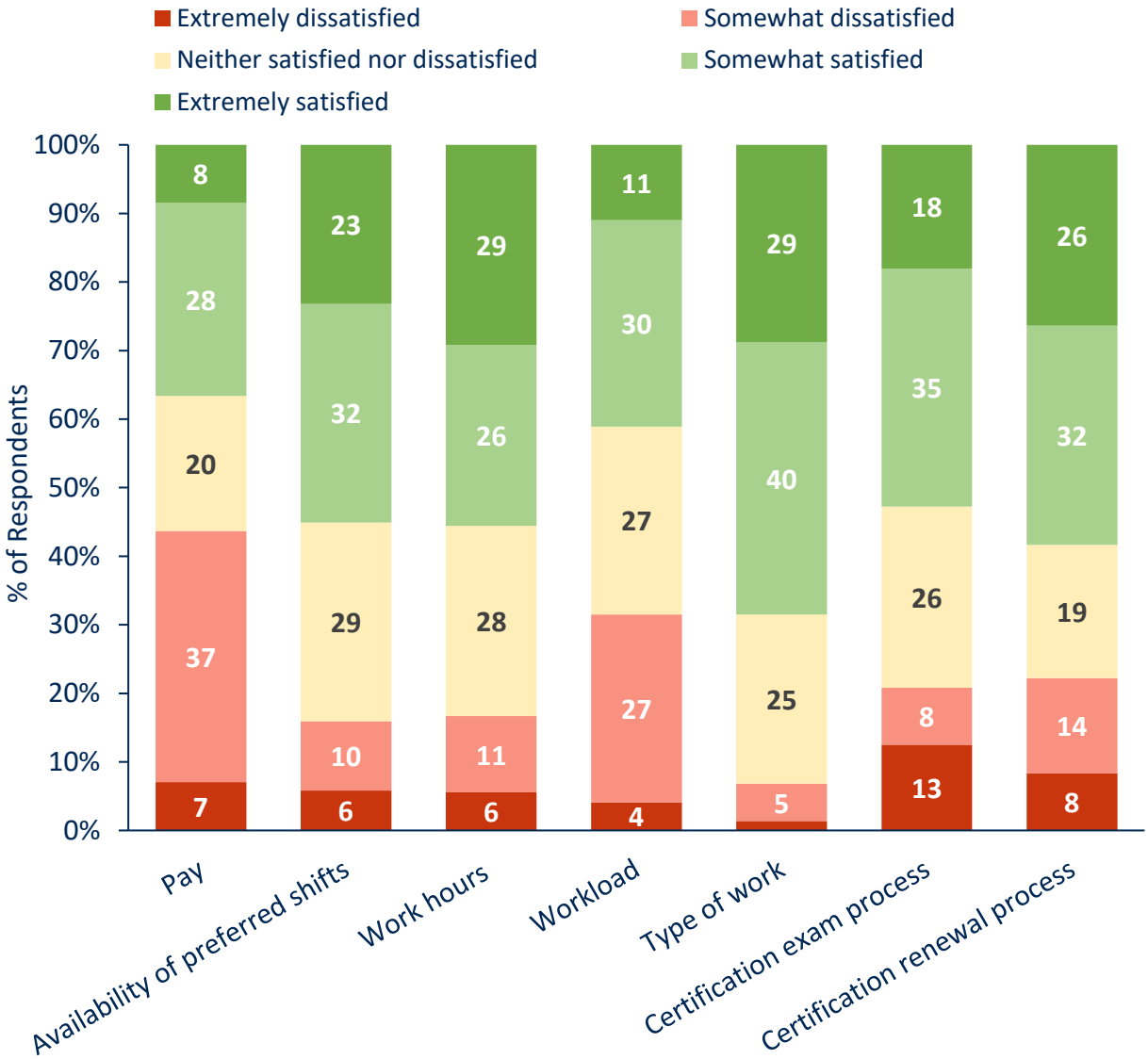

***Figure 24**: Operators job satisfaction with various factors such as pay (n=71), availability of shifts (n=69), work hours (n=72), workload (n=73), type of work (n=73), certification exam process (n=72) and the certification renewal process (n=72).*

Operators were asked to indicate their agreement of disagreement with a series of statements aimed to assess their perception of workplace attributes [O36]. Their responses can be seen in Figure 25. Many factors contribute to happiness at work, but notably, 70% of operators are satisfied with their benefits and 77% enjoy their work tasks. Conversely, 50% of operators disagree with the statement “I am being paid a fair amount for the work I do.”

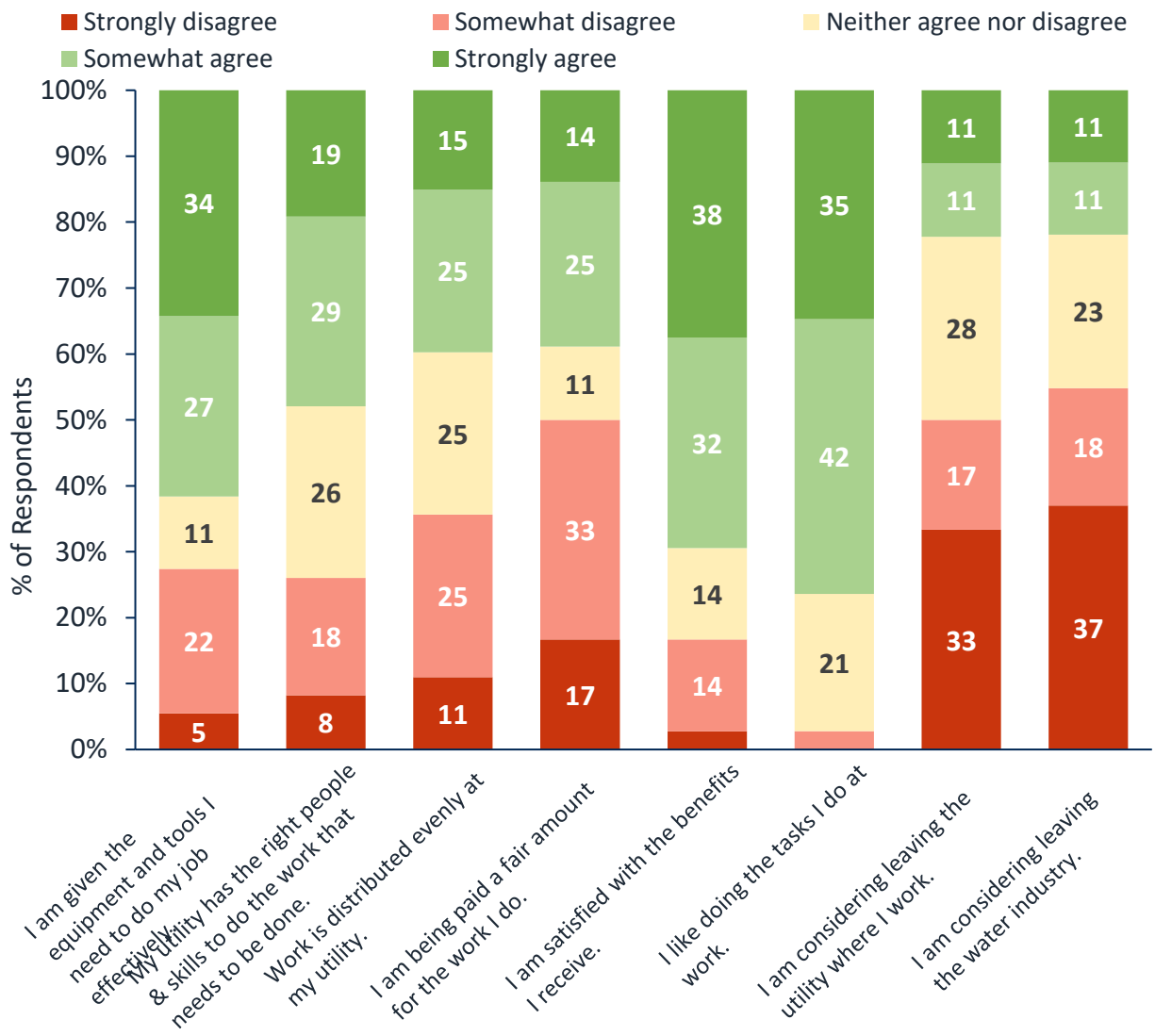

***Figure 25**: Operators response to question 36: Consider the following statements and indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each (n=72-73)*

Managers were asked similar questions about their perception of operators' job satisfaction [M34] as well as a few questions about succession plans [M36]. Notable differences were observed between the operators and manager response about operator job satisfaction (Figure 26, Figure 27). The managers' responses are generally more skewed toward satisfied than dissatisfied and include more 'neither satisfied or dissatisfied' which may suggest that there is a lack of communication about job satisfaction between operators and managers. A key finding of the managers' survey was a lack of succession planning. Only 20% of managers indicated that their utilities have a succession plan in place in case a utility manager leaves or retires and only 44% indicated that they have a succession plan in case an operator leaves or retires.

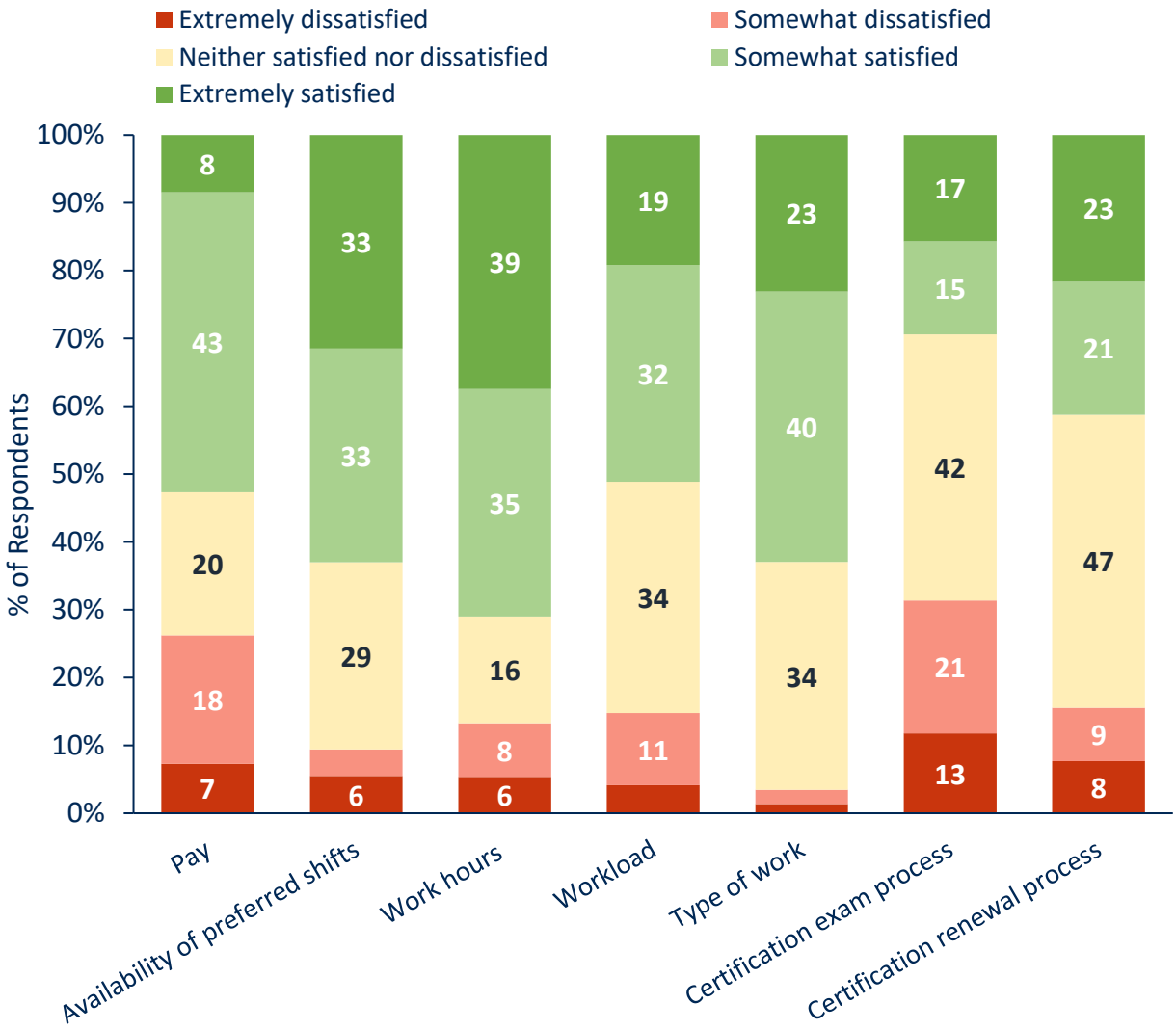

***Figure 26**: Managers perception of the operators' satisfaction with various factors such as pay (n=49), availability of shifts (n=48), work hours (n=49), workload (n=48), type of work (n=48), certification exam process (n=48) and the certification renewal process*

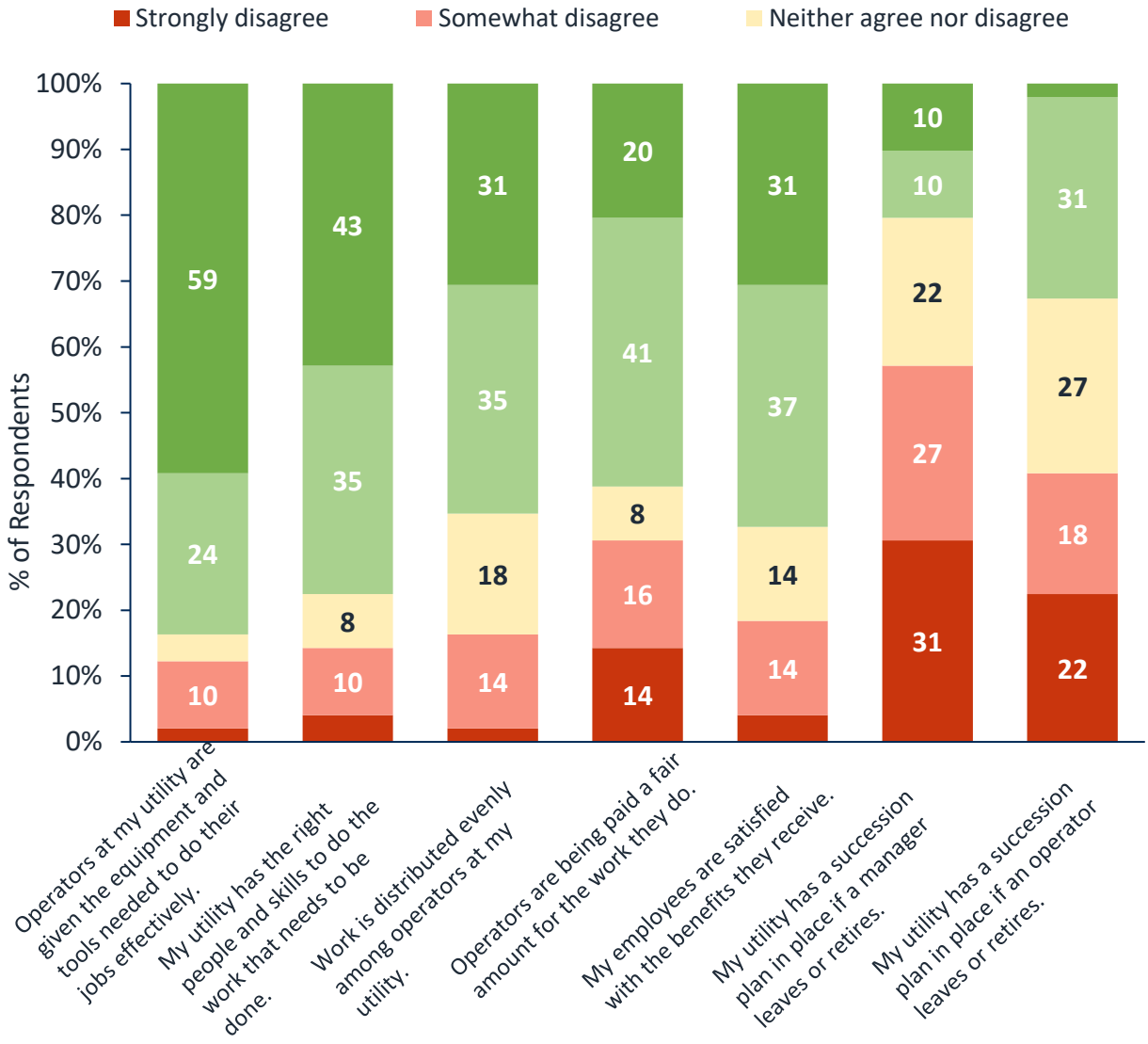

***Figure 27**: Managers response to question 36: Consider the following statements and indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each (n=49).*

Gap between actual and expected pay

As described above, operator job satisfaction results indicated that 44% of operators are somewhat or extremely dissatisfied with their pay and 50% indicated that they do not feel they are paid a fair amount for their work. To gain further insight into pay rates and their role in operator retention, a series of questions were asked about actual and expected wages.

Of the respondents who provided numeric input, the average hourly wage for an operator was $26.53 [O20] while the average expected hourly wage was $32.36 [O21]

(Figure 28). These numbers reveal that the operators that were surveyed are making $5.83 per hour less than they expected to be making, on average. The expected pay gap varied according to utility size: $5.50 for utilities serving 1-1,500 (n=20), $7.67 for utilities serving 1,501-10,000 (n=27), $6.22 for utilities serving 10,001-15,000 (n=9), $2.75 for utilities serving 15,001-30,000 (n=8), $0.75 for utilities serving 30,001-50,000 (n=4), and $5.5 for utilities serving 30,000+ people (n=4). Only 15% of operators reported making at least as much as they expected. A lower hourly wage could correspond with challenges to operator recruitment and retention. The 2023 AWWA Compensation Survey indicates that the average wage for a licensed water or wastewater system plant operator I (i.e., lead operator, shift supervisor, or crew leader) was $30.25/hour for systems serving 5,000-9,999 people or $25.93 for systems serving less than 5,000 people (AWWA, 2023b). For operator II positions (i.e., plant operator), the average wage was $27.18/hour for systems serving 5,000-9,999 people or $24.44 for systems serving less than 5,000 people (AWWA, 2023b). While higher salaries are expected at larger utilities, this demonstrates that the average operator salary of respondents is less than that of even the average small water and wastewater utilities serving at least 5,000 people nationally.

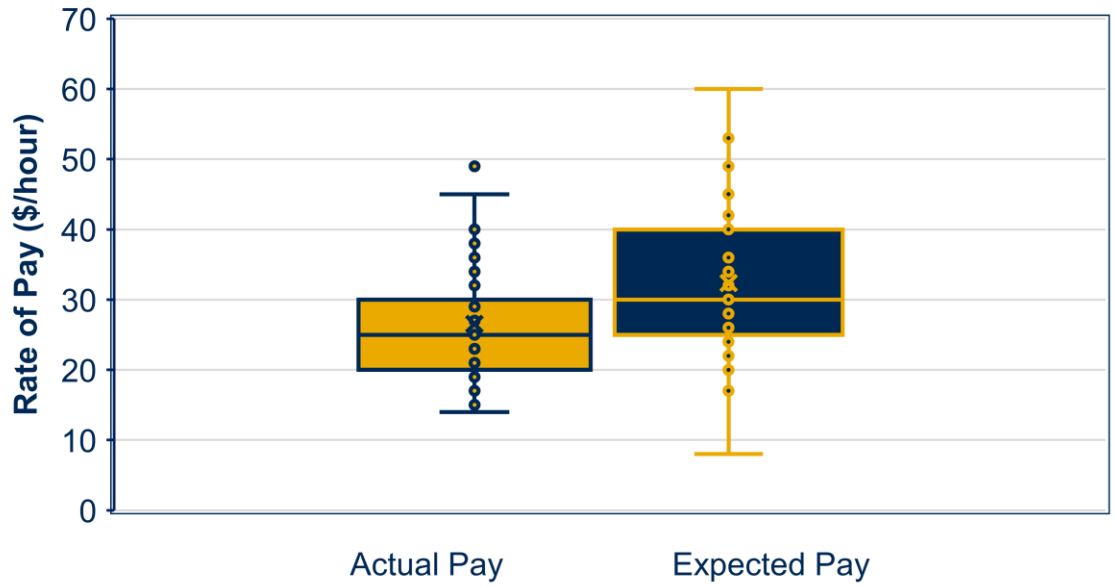

***Figure 28**: Operator's actual versus expected pay (n=72)*

To gain insight into the maximum wage attainable for operators, managers were asked to provide the highest hourly wage that a certified operator at their utility may be paid [M26]. Approximately 58% of drinking water system managers and 62% of wastewater system managers state that their maximum hourly wage falls between 21 and 30 dollars per hour which corresponds to an annual salary of $43,680 to $62,400 for full-time employees (Figure 30).

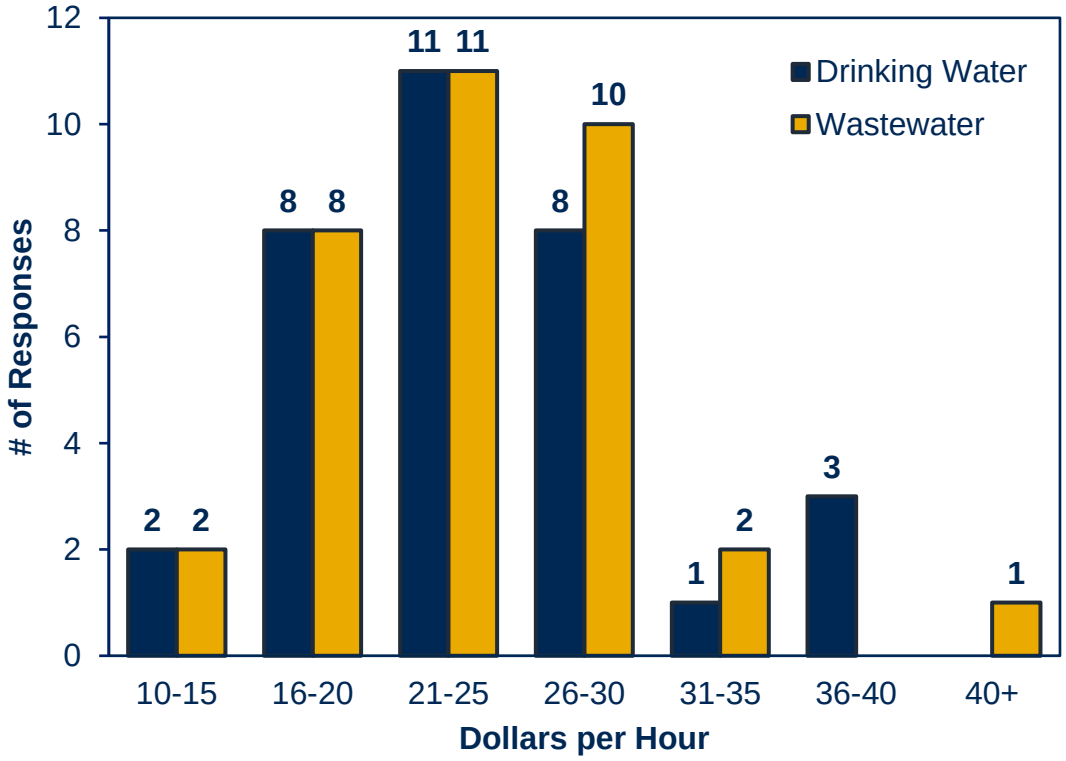

***Figure 29**: Maximum wage for wastewater and drinking water operators, as reported by managers (wastewater n=34, drinking water n=33)*

Do operators feel appreciated?

Most operators (63%) responded that they felt moderately to greatly appreciated by their utility (Figure 30), but that leaves almost 40% of operators not feeling appreciated [O30]. Operators were also asked if managers listen to their opinions on matters they deal with on a daily basis [O31], and 65% responded that their managers always or almost always listen to them (Figure 31). The remaining 35% of operators believe their managers listen to their opinions never, very little, or around half the time.

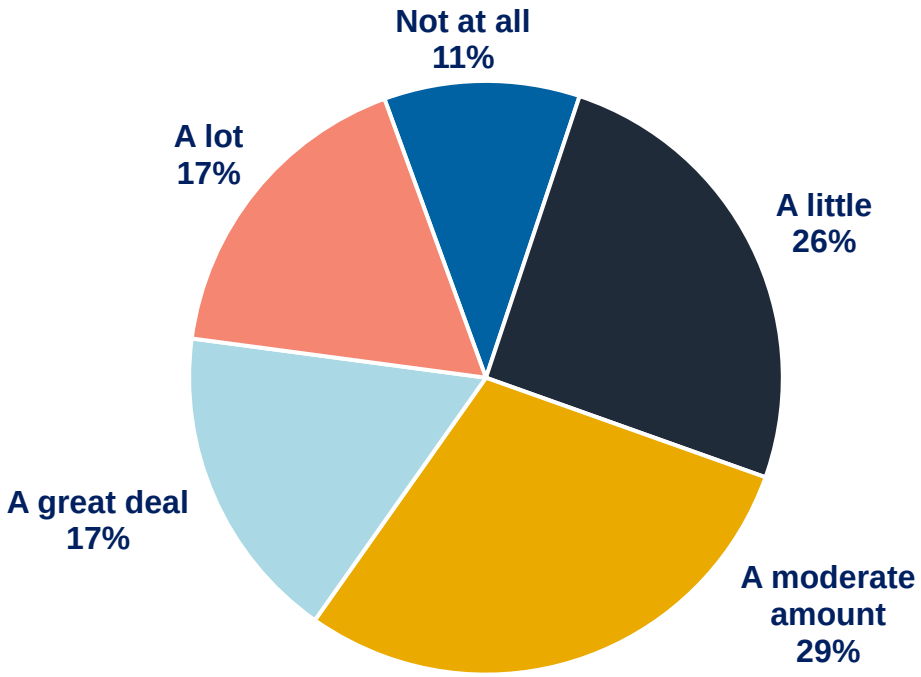

***Figure 30**: Operators response to if they feel appreciated by their utility (n=75)*

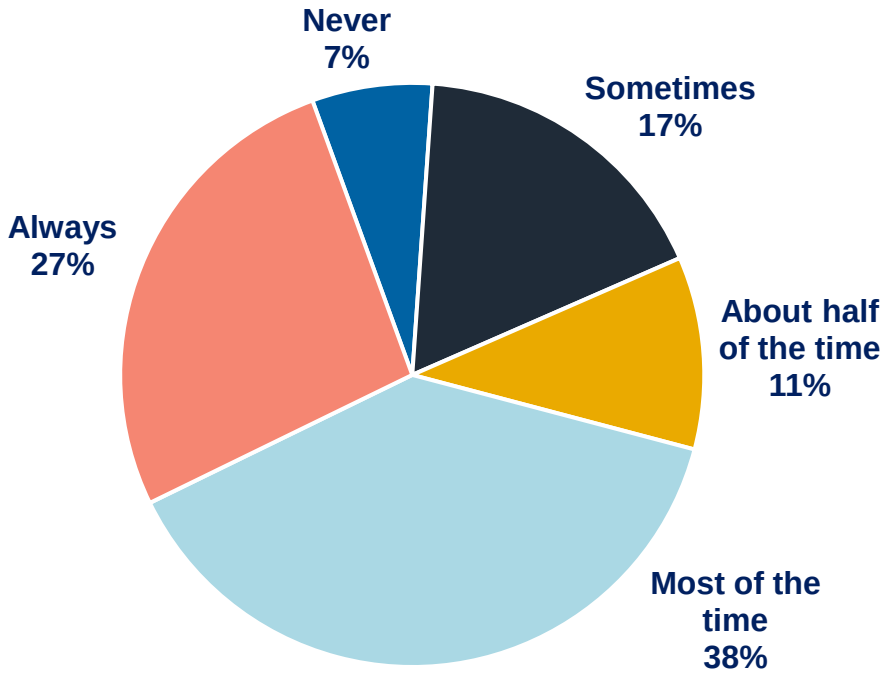

***Figure 31**: Operators' response to whether managers listen to their opinions on matter that they must deal with on a daily basis (n=75)*

Managers were asked to select the ways their utility rewarded and/or showed appreciation to their operators [M28], with 37% of managers indicating they offer pay increases for certification achievements as the most common way to reward operators. In addition, 21% offer pay increases for employee performance (Figure 32).

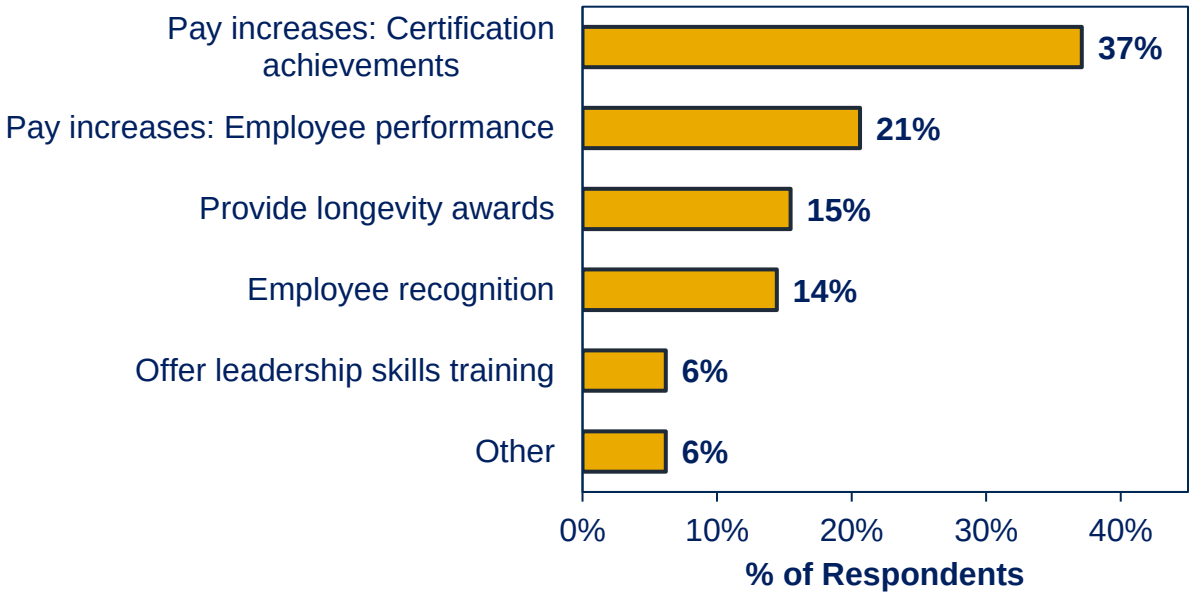

***Figure 32**: Managers' response to how utility rewards and/or shows appreciation to their operators (n=45)*

Opportunities for career advancement

Operators and managers were asked if their utility offered career advancement or promotions [O25, M11], and the majority of operators (65%) and managers (74%) responded that they do have advancement or promotion opportunities (Figure 33).

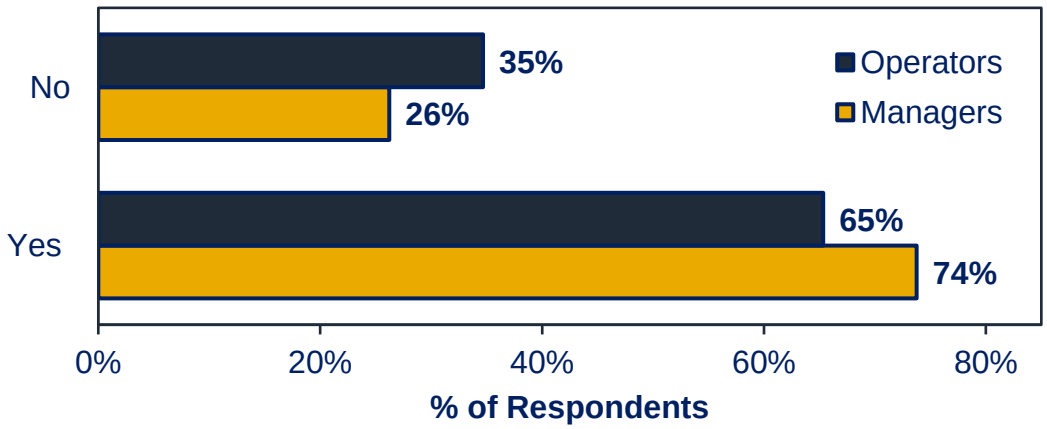

***Figure 33**: Response to whether their utility offered opportunities for promotions and career advancement (operators n=75, managers n=61)*

Motivation to work in the water industry

Based on results documented thus far, working as a water utility operator may consist of long hours and unsatisfactory pay. Questions were included to ask: why are operators motivated to work in this industry? Figure 34 displays the results of asking operators how important the following factors were for them to work in the water industry: pay and benefits, providing a service to the community, protecting the environment, working close to home, safe working environment, and predictable hours [O37]. Most operators agree that all of these factors are moderately to extremely important for their reason to work in the water industry.

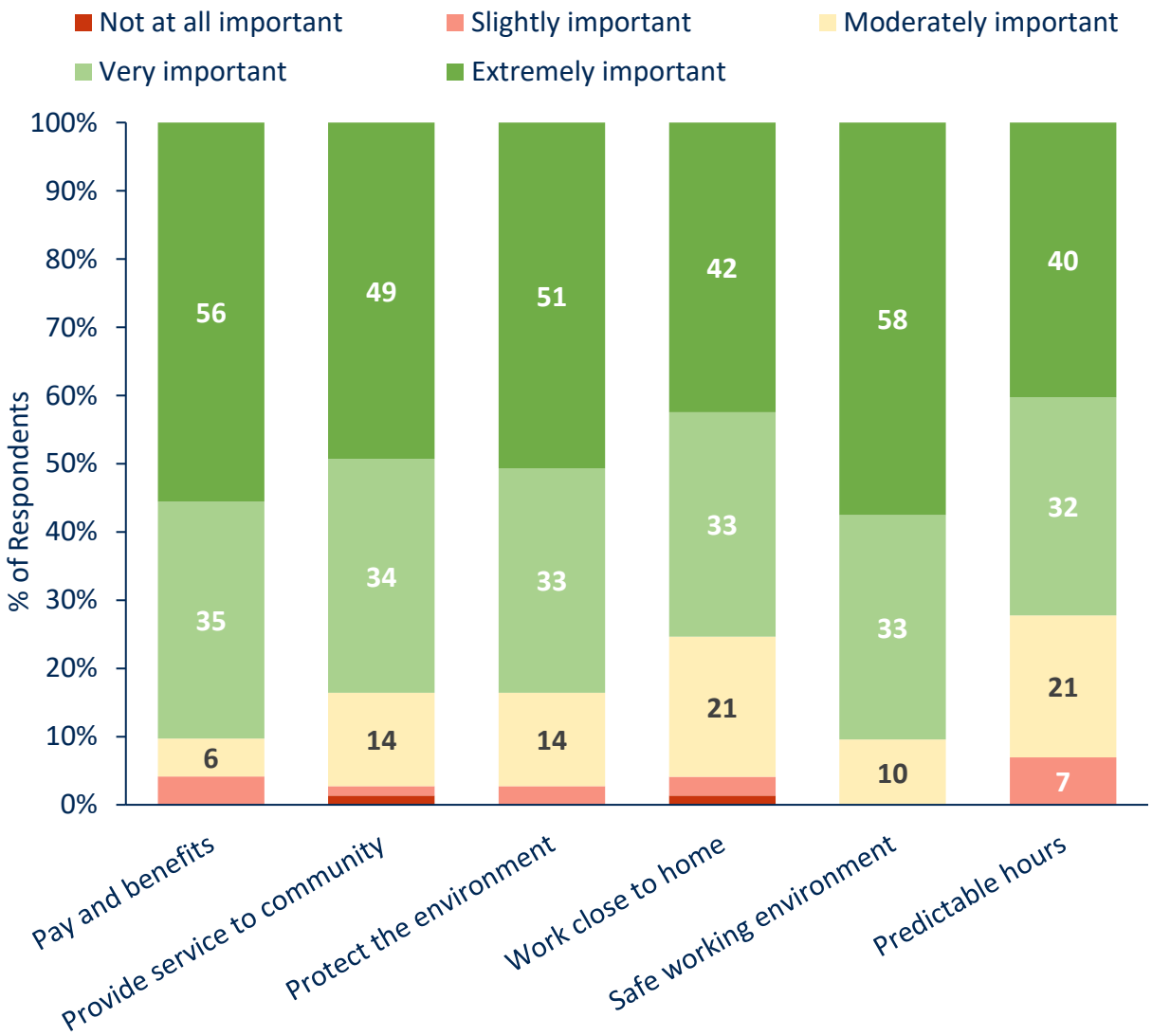

***Figure 34**: Operators' response to their motivations to work in the water industry including pay and benefits (n=72), provide a service to the community (n=73), protect the environment (n=73), work close to home (n=73), safe working environment (n=73), and predictable hours (n=72)*

Perception of importance of utility service

The services provided by drinking water and wastewater utility operators protect public health, the environment, and water quality. To better understand how operators believe the importance of their work is perceived as a possible motivation for choosing work in water and wastewater, operators were asked to rank how their work was perceived [O32]. Interestingly, operators reported that their work was generally perceived as being important, with 80% of respondents indicating that the city council or utility board thought their work was at least moderately important (Figure 35). Eighty-eight percent indicated family and friends thought their work was at least moderately important, 92% indicated co-workers thought their work was at least moderately important, and 93% indicated their supervisors thought their work was at least moderately important. Operators ranked the perception of the community to have the lowest overall perception of the importance of their work, with 4% indicating the community thinks their work is extremely important, 16% indicating very important, 36% indicating moderately important, 32% slightly important, and 12% not at all important.

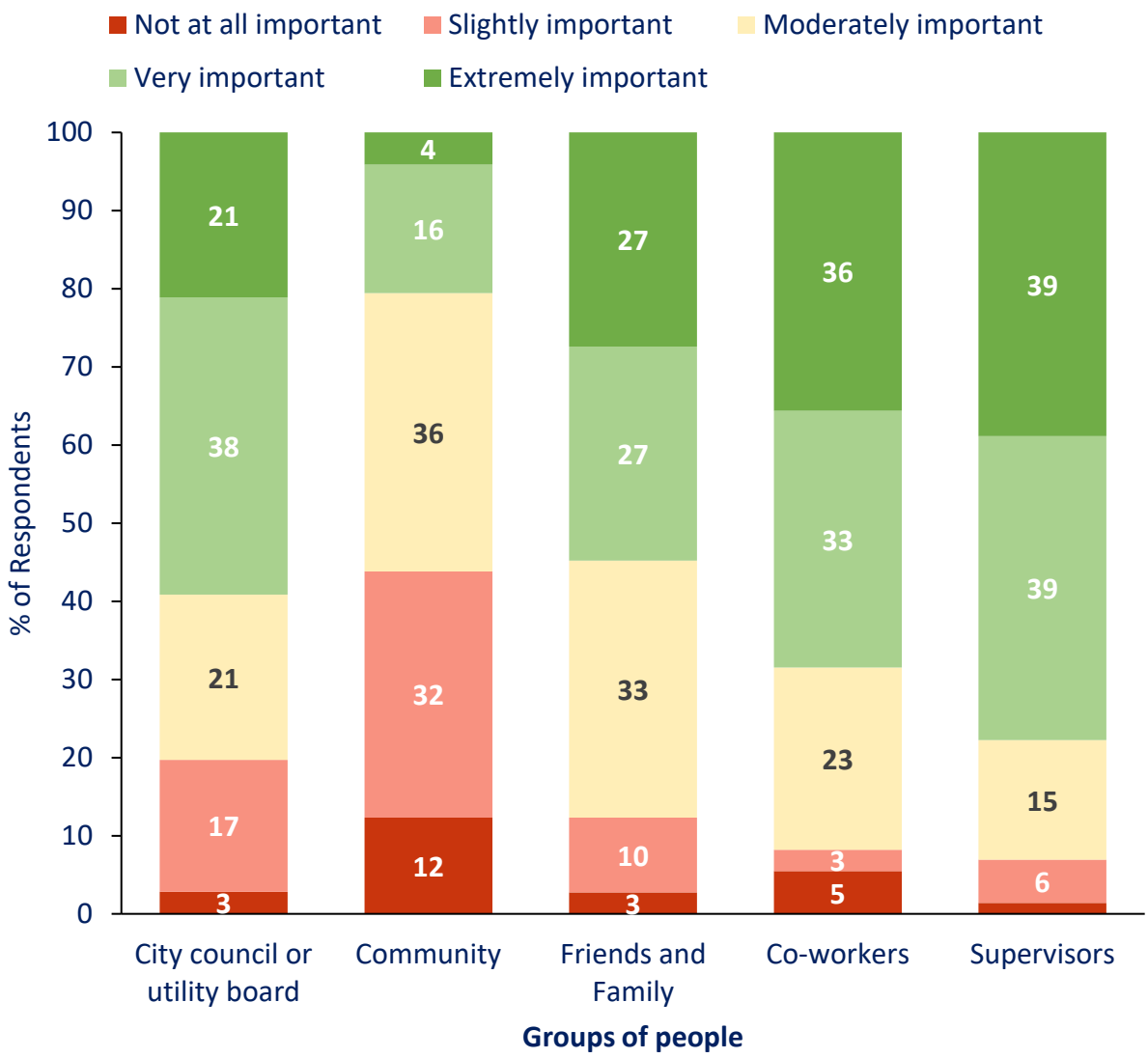

***Figure 35**: Perception of the importance of operator work, ranked by operators (n=73)*

Solutions for retaining satisfied operators

The ultimate questions are: What can we do to retain operators in the water industry and how do we keep those operators satisfied with their jobs? Considering the retirement eligibility and number of operators who have left or have considered leaving the water industry, it is critical that water utilities take into consideration the satisfaction and opinions of their operators. Some specific actions that could be applied by the utility in order to retain its operators were explicitly identified and ranked by the operators themselves [O38]. Ranked in order of importance, these included:

1. Increase pay (average rank: 1.2)
2. Provide better benefits (3.6)
3. Create incentive programs (4.3)

4. Have more certified operators on staff (4.7)
5. Provide new equipment and supplies (5.4)
6. Provide overtime pay (5.5)
7. Offer more training opportunities (6.5)
8. Offer more professional development and career advancement (6.6)
9. Provide comp time (7.2)

Operator Certification

Several questions were included to investigate whether the current operator certification process is a potential barrier to operator recruitment and retention. Ninety-eight percent of survey respondents reported holding a license, with the remaining 2% being an operator in training (OIT) [O9]. No respondents reported being unlicensed or without an OIT (**Figure 36**, **Figure 37**). Twenty-six percent of respondents reported holding only a drinking water license and 35% reported holding only a wastewater license. Five percent noted holding both a wastewater license and a drinking water OIT. Overall, 38% of respondents reported holding both a drinking water and wastewater license.

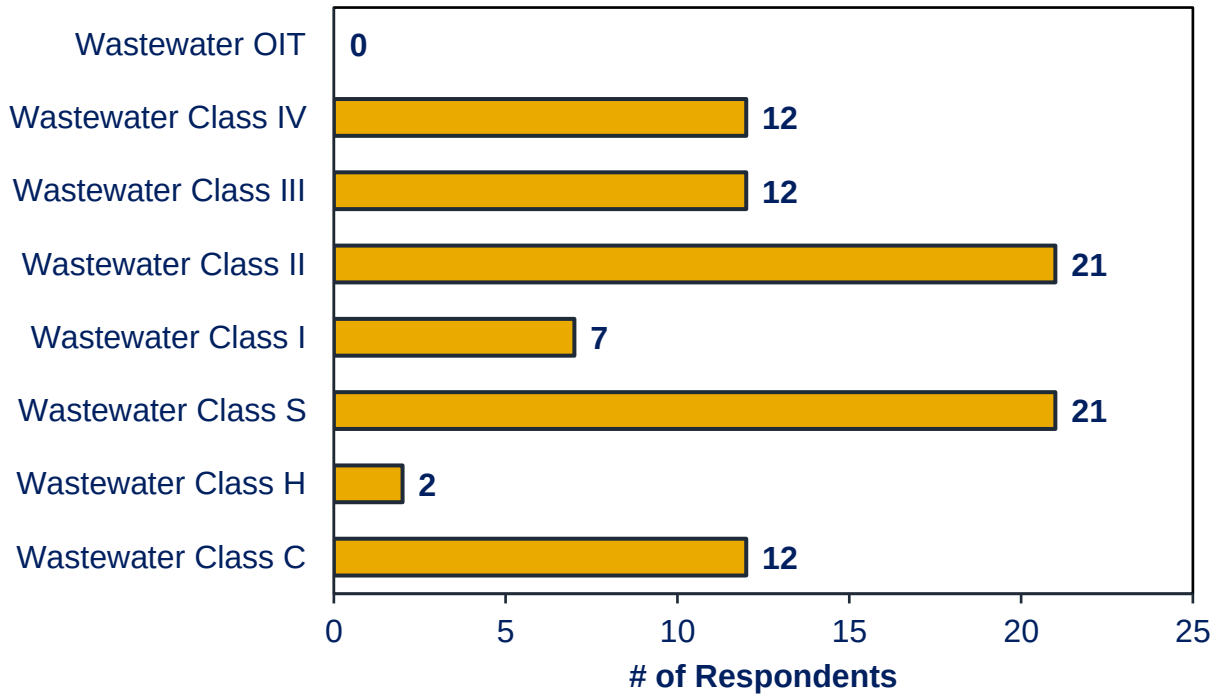

***Figure 36**: Wastewater licenses held by respondents (n=76 respondents across all license types: wastewater and drinking water)*

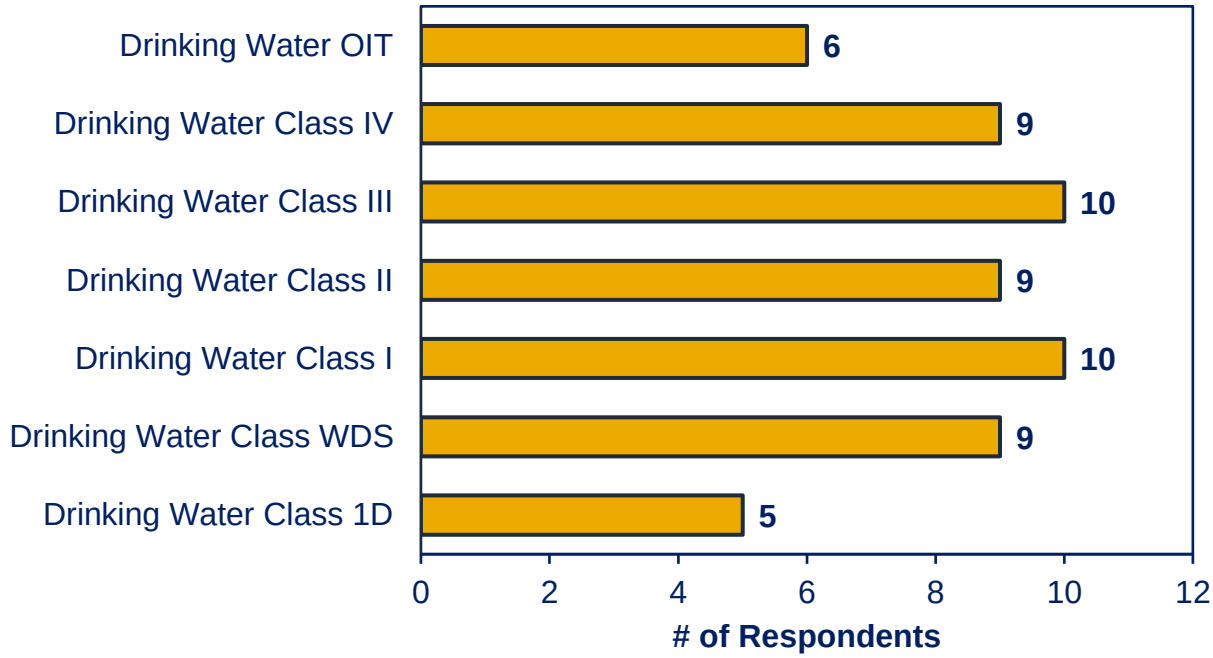

***Figure 37**: Drinking water licenses held by respondents (n=76 respondents across all license types: wastewater and drinking water)*

Respondents typically pursued certification relatively quickly after entering their first operator position [O7]: 57% in less than one year, 25% after one year, and 14% after two years. Some utility managers reported offering operators benefits to encourage and support certification [M12]:

- Paid time and travel to attend trainings (95%)
- Paid or reimbursed certification fees (82%)
- Paid or reimbursed certification renewal fees (80%)
- Paid time to study for exams (38%)

Utility managers reported that the certification process could be a barrier to hiring (37% of respondents) [M30]. While managers reported that they perceive most operators to be neither satisfied nor dissatisfied with the certification exam process (41%), 20% reported that operators were somewhat dissatisfied and 6% were extremely dissatisfied [M34]. Managers generally reported that operators were neither satisfied nor dissatisfied with the certification renewal process (45%), with only 8% being somewhat dissatisfied and no respondents noting operators were extremely dissatisfied. When asked what reasons operators give for leaving the job, 24% of managers reported that the certification exam and process were too difficult [M35]. While improving support for operator certification may represent a valuable opportunity to increase operator retention, these do not suggest that the operator certification process is a major barrier to operator advancement.

Other Issues for Utility Management

Several additional questions were included to gain insight into basic issues related to drinking water and wastewater utility management in WV.

Impacts of COVID-19

Given the widespread challenges in hiring and retaining workers that arose across fields during the COVID-19 pandemic, managers were asked whether their utilities had experienced a range of impacts to recruiting, retention, and general utility operations [M33, O34]. Seventy-four percent of utility managers reported experiencing delays in receiving chemicals and other essentials, 43% reported increased stress, 32% reported a decreased number of applicants for jobs, and 30% reported decreased revenue (**Figure 38**). Only 21% of respondents reported that none of the presented impacts had been observed by their utility. Operators were similarly asked about utility impacts observed since the start of the COVID-19 pandemic [O34]. Forty-five percent of operators reported increased workload, 44% reported increased stress, 27% reported increased work hours, 27% reported lower workplace morale (**Figure 39**). Forty-one percent of respondents reported that none of the impacts listed were experienced.

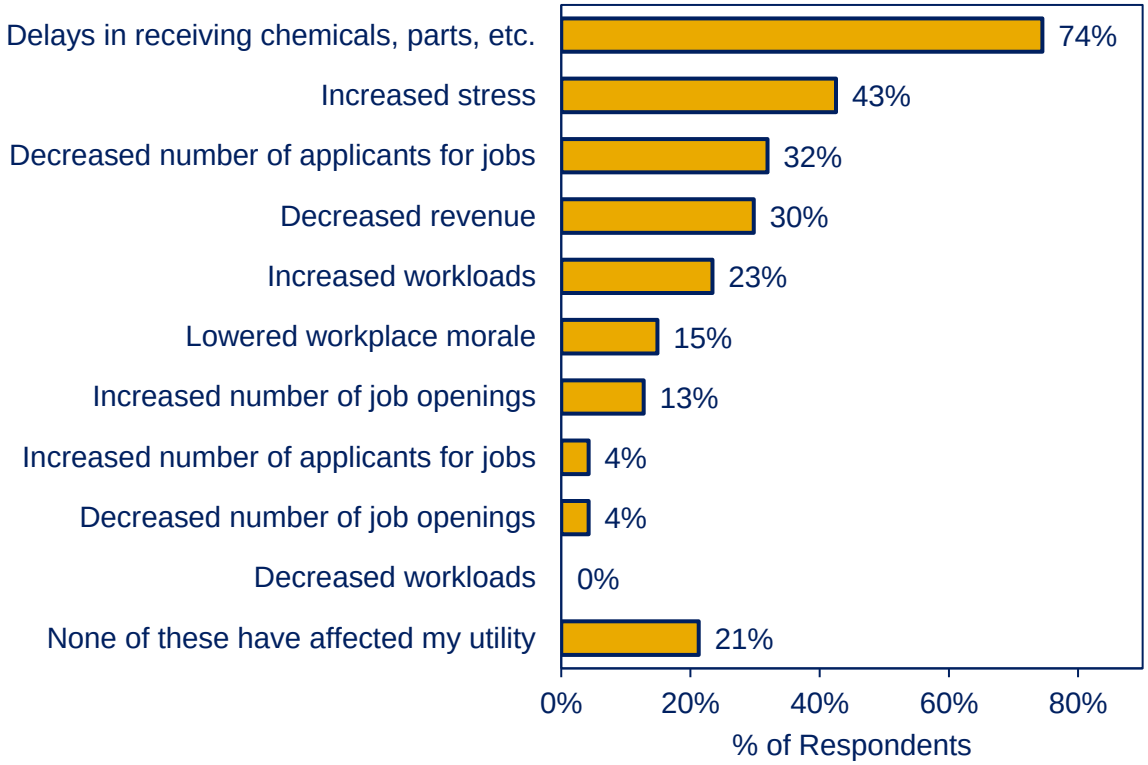

***Figure 38**: Impacts of COVID-19, as reported by utility managers (n=47)*

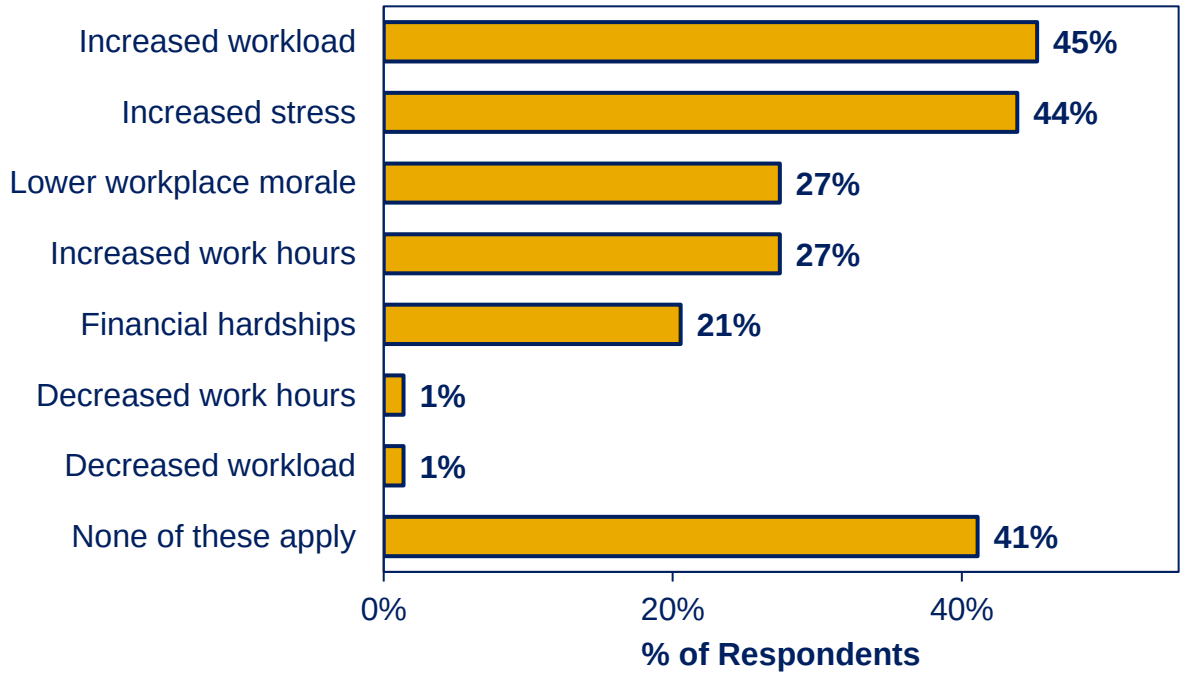

***Figure 39**: Impacts of COVID-19, as reported by utility operators (n=73)*

Operational Challenges

Operators and managers were asked to provide general input on the greatest challenges to utility operations [O26, M10]. Approximately 84% of operators and 69% of managers stated that aging infrastructure is one of the main operational issues (**Figure 40**). Correspondingly, 56% of the operators and 39% of the managers indicated excessive inflow and infiltration, while 30% of operators and 34% of managers indicated excessive water loss as major challenges.

Personnel issues were also prevalent, with 75% of operators and 63% of managers indicating that difficulty hiring and retaining skilled staff was a major challenge. Declining customer population (25% of operators, 20% of managers) and inadequate utility rates (37% of operators, 34% of managers) were also common responses. Finally, inadequate asset management and planning for capital improvement (26% of operators, 22% of managers) and lack of support or resources to apply for grant/loan funding (21% of operators, 22% of managers) were also frequently noted.

***Figure 40**: Operational challenges for WV utilities, as reported by utility operators (n=73) and managers (n=59)*

CONCLUSIONS

The WVWWS results shed light on significant trends and challenges within the water and wastewater industry in West Virginia. The findings underscore a pressing need for more operators and highlight various factors contributing to recruitment difficulties. While most utilities are currently filling their budgeted operator positions, a substantial proportion of managers and operators express concerns about the shortage of qualified personnel. Moreover, the aging workforce, coupled with a lack of younger professionals entering the industry, raises alarms about future sustainability. Barriers such as insufficient pay, limited benefits, and the perceived difficulty of the certification process further exacerbate recruitment challenges.

To address these issues, proactive measures are essential. Initiatives like internship and apprenticeship programs could cultivate a pipeline of skilled workers, while increasing outreach and education about water industry careers can attract younger individuals. Utilities should also consider revising their recruitment strategies, focusing on avenues beyond traditional advertising, and offering competitive wages and comprehensive benefits packages to attract and retain talent. Additionally, enhancing support for operator certification and providing avenues for career advancement can foster job satisfaction and long-term retention. Collaboration among utilities and community involvement can amplify these efforts, creating a supportive environment for recruiting and retaining operators. Ultimately, concerted action is necessary to ensure the resilience and effectiveness of water and wastewater operations in WV for years to come.

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APPENDIX A: OPERATOR SURVEY

West Virginia Water Workforce Survey - Utility Operators

Start of Block: Block 1

Start of Block 1 The following questions ask about you and your career as an operator.

Please use the arrows at the bottom of the screen to move through the survey.

Page Break

Q1 What is your age?

- 18-24 (1)
- 25-34 (2)
- 35-44 (3)
- 45-54 (4)
- 55-64 (5)
- 65-74 (6)
- 75+ (7)

Page Break

Q2 What is your gender?

- Male (1)
- Female (2)
- Non-binary (3)
- Not listed (4) _____
- Prefer not to say (5)

Page Break

Q3 What is your ethnicity? (Select all that apply)

- [ ] Latino or Hispanic or Spanish origin of any race (1)
- [ ] American Indian or Alaskan Native (2)
- [ ] Asian (3)
- [ ] Native Hawaiian or Other Pacific Islander (4)
- [ ] Black or African-American (5)
- [ ] White (6)
- [ ] Other/Unknown (7) _____
- [ ] Prefer not to say (8)

Page Break

Q4 What is the highest degree or level of education you have completed?

- ○ Some high school (1)
- ○ High School or G.E.D. (2)
- ○ Trade School (3)
- ○ Associate Degree (4)
- ○ Bachelor's Degree (5)
- ○ Master's Degree (6)
- ○ Doctoral Degree or higher (7)
- ○ Prefer not to say (8)

Page Break

Q5 What resources have you used in the past to find jobs in the water sector? (Select all that apply)

- [ ] Newspaper (1)
- [ ] Online job post (e.g., Indeed, ZipRecruiter, CareerBuilder, LinkedIn, etc.) (2)
- [ ] Job fair (3)
- [ ] School guidance counselor (4)
- [ ] Unemployment office (11)
- [ ] Industry-specific website (e.g., WVRWA, WEF Career Center, AWWA) (5)
- [ ] Social media (e.g., Facebook, Twitter, etc.) (6)
- [ ] Local government website (7)
- [ ] Temp agency (8)
- [ ] Friend or family (9)
- [ ] Other (please specify): (13) _____

Page Break

Q6 How old were you when you started working as an operator?

_____

Page Break

Q7 How long were you in that job before you tested for your first certification?

- ○ Less than 1 year (1)
- ○ 1 year (2)
- ○ 2 years (3)
- ○ 3 years (4)
- ○ 4 years (5)
- ○ 5+ years (6)
- ○ Not applicable (7)

Page Break

Display This Question:

If Q7 = 3 years

Or Q7 = 4 years

Or Q7 = 5+ years

Q7a Why did it take 3 or more years to test for your first certification? (Select all that apply)

- ☐ My utility didn't support it (1)
- ☐ Too expensive (2)
- ☐ The certification process was overwhelming (3)
- ☐ I was concerned that I could not pass the exam (4)
- ☐ Personal reasons (5)
- ☐ Other (please specify) (6) _____

Page Break

Q8 How many utility systems do you work for?

_____

Page Break

Q9 What level of license(s) do you hold? (Select all that apply)

- [ ] I don't have a license (1)
- [ ] Wastewater Class C (2)
- [ ] Wastewater Class H (3)
- [ ] Wastewater Class S (4)
- [ ] Wastewater Class I (5)
- [ ] Wastewater Class II (6)
- [ ] Wastewater Class III (7)
- [ ] Wastewater Class IV (8)
- [ ] Wastewater OIT (9)
- [ ] Drinking Water Class 1D (10)
- [ ] Drinking Water Class WDS (11)
- [ ] Drinking Water Class I (12)
- [ ] Drinking Water Class II (13)
- [ ] Drinking Water Class III (14)
- [ ] Drinking Water Class IV (15)
- [ ] Drinking Water OIT (16)

Page Break

Display This Question:

If Q9 != I don't have a license

Q9a Is your license active?

- ○ Yes, one or more of my licenses is active (1)
- ○ No (2)

Page Break

Display This Question:

If Q9a = No

Q9b Why is your license inactive? (Select all that apply)

- ☐ Renewal fees are too expensive (1)
- ☐ I am retired (2)
- ☐ I no longer work in this industry (3)
- ☐ Jobs in this industry don't provide adequate pay and/or benefits (4)
- ☐ Too many regulations (5)
- ☐ Too much responsibility (6)
- ☐ Certification exam and process is too difficult (7)
- ☐ Unable to find a job (8)
- ☐ Other (please specify): (9) _____

Page Break

Q10 Are you currently eligible to retire?

- ○ Yes (1)
- ○ No (2)
- ○ I'm not sure (3)

Page Break

Q11 When do you plan to retire?

- ○ Within the next 12 months (1)
- ○ In 1 - 3 years (2)
- ○ In 4 - 6 years (3)
- ○ In 7 - 9 years (4)
- ○ In 10+ years (5)
- ○ I am retired. (6)

End of Block: Block 1

Start of Block: Block 2

Intro The following questions ask about the utility where you currently work. If you work at multiple utilities, please answer the questions for the utility where you work the greatest number of hours per week. If you are not currently working as an operator, answer the questions about your most recent job as an operator.

Page Break

Q12 Which of the following best describes your role at the utility?

- ○ Certified operator (1)
- ○ Operator trainee (2)
- ○ Contract operator (3)
- ○ Other (please specify): (4) _____

Page Break

Q13 Are you a supervisor or manager at the utility?

- ○ Yes (1)
- ○ No (2)

Page Break

Q14 On average, how many hours do you work per week?

_____

Page Break

Q15 Which of the following describe your utility? (Select all that apply)

- [ ] Drinking water treatment (1)
- [ ] Drinking water distribution (2)
- [ ] Wastewater treatment (3)
- [ ] Wastewater collection (4)

Page Break

Display This Question:

If Q15 = Drinking water treatment

Or Q15 = Drinking water distribution

Q15a What class is your drinking water treatment or distribution utility?

- ☐ Class 1D (1)
- ☐ Class R (2)
- ☐ Class WDS (3)
- ☐ Class I (4)
- ☐ Class II (5)
- ☐ Class III (6)
- ☐ Class IV (7)

Page Break

Display This Question:

If Q15 = Wastewater treatment

Or Q15 = Wastewater collection

Q15b What class is your wastewater treatment utility?

- ☐ Class C (1)
- ☐ Class H (2)
- ☐ Class S (3)
- ☐ Class I (4)
- ☐ Class II (5)
- ☐ Class III (6)
- ☐ Class IV (7)
- ☐ Advanced (8)

Page Break

Q16 How many people does your utility directly serve? Select the highest range for the drinking water or wastewater services provided.

- ○ 1 - 1,500 (1)
- ○ 1,501 - 10,000 (2)
- ○ 10,001 - 15,000 (3)
- ○ 15,001 - 30,000 (4)
- ○ 30,001 - 50,000 (5)
- ○ 50,001 + (6)

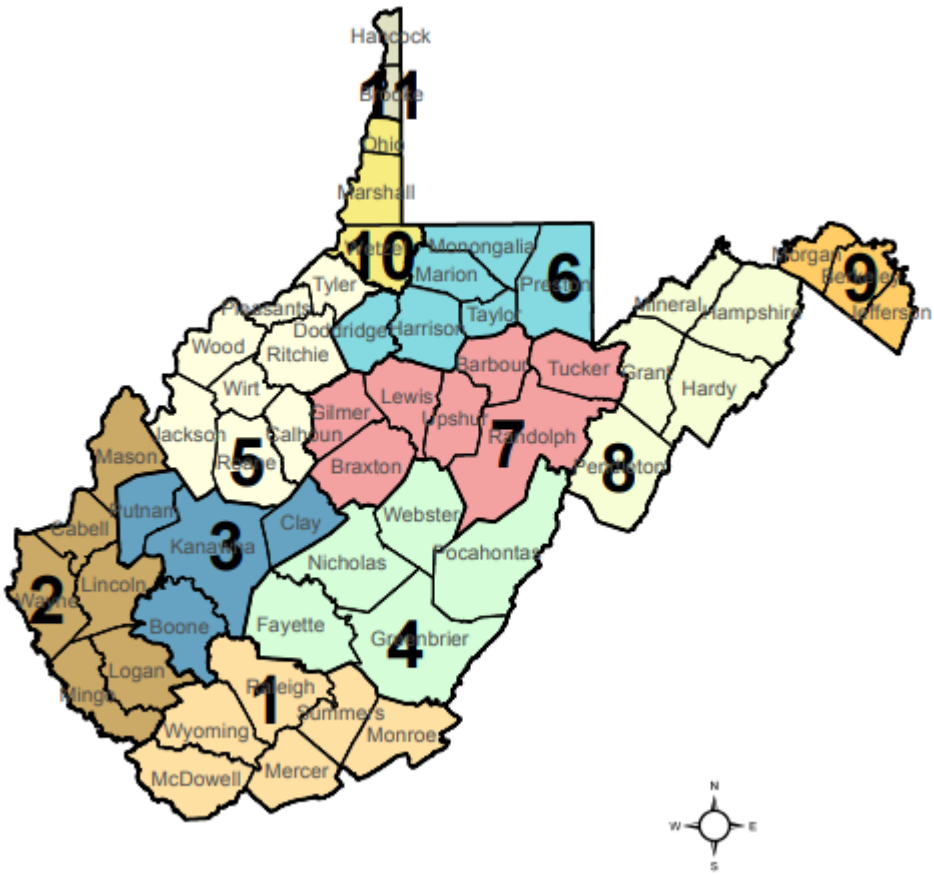
Page Break

Q17 Is your utility regulated by West Virginia’s Public Service Commission (PSC)?

- ○ Yes (1)
- ○ No (2)
- ○ I'm not sure (3)

Page Break

Q18 What regional planning and development council is your utility in? If your utility is in more than one region, please choose the one where your main office is located. A map of regions is provided below for reference.



Region 1 (McDowell, Mercer, Monroe, Raleigh, Summers, and Wyoming Counties) (1)

Region 2 (Cabell, Lincoln, Logan, Mason, Mingo, and Wayne Counties) (2)

Region 3 (Boone, Clay, Kanawha, and Putnam Counties) (3)

Region 4 (Fayette, Greenbrier, Nicholas, Pocahontas, and Webster Counties) (4)

Region 5 (Calhoun, Jackson, Pleasants, Ritchie, Roane, Tyler, Wirt, and Wood Counties) (5)

Region 6 (Doddridge, Harrison, Marion, Monongalia, Preston, and Taylor Counties) (6)

Region 7 (Barbour, Braxton, Gilmer, Lewis, Randolph, Tucker, and Upshur Counties) (7)

- ○ Region 8 (Grant, Hampshire, Hardy, Mineral, and Pendleton Counties) (8)
- ○ Region 9 (Berkeley, Jefferson, and Morgan Counties) (9)
- ○ Region 10 (Marshall, Ohio, and Wetzel Counties) (10)
- ○ Region 11 (Brooke and Hancock Counties) (11)

Page Break

Q19 How many years have you worked at the utility?

- ○ Less than 1 year (1)
- ○ 1 - 3 years (2)
- ○ 4 - 6 years (3)
- ○ 7 - 9 years (4)
- ○ 10 - 15 years (5)
- ○ 16 - 20 years (6)
- ○ 21 - 25 years (7)
- ○ 26 - 30 years (8)
- ○ 30+ years (9)

Page Break

Q20 Using the slider below, move the bar to the number that corresponds with your hourly wage.

0 10 20 30 40 50 60 70 80 90 100

Hourly Wage ($) ()	

Q21 Using the slider below, move the bar to the number that corresponds with what you think your hourly wage should be.

0 10 20 30 40 50 60 70 80 90 100

Hourly Wage ($) ()	

Page Break

Q22 What benefits does your utility provide? (Select all that apply)

- [ ] Health insurance (1)
- [ ] Retirement benefits (2)
- [ ] Life and disability insurance (3)
- [ ] Paid sick and vacation days (4)
- [ ] Paid holidays (5)
- [ ] Annual raises (6)
- [ ] Overtime (7)
- [ ] Comp time (8)
- [ ] Paid time and travel to attend trainings (9)
- [ ] Paid or reimbursed tuition or training expenses (10)
- [ ] Paid or reimbursed certification fees (11)
- [ ] Paid or reimbursed certification renewal fees (12)
- [ ] Paid time to study for exams (13)
- [ ] Other (please specify): (14)

_____

Page Break

Q23 What job duties are you responsible for at your utility, other than basic system/treatment works? (Select all that apply)

- [ ] Office work (1)
- [ ] Collecting payments (2)
- [ ] Equipment maintenance (3)
- [ ] Trash services (4)
- [ ] Natural gas services (5)
- [ ] Electrical utility services (6)
- [ ] City maintenance (e.g., mowing) (7)
- [ ] Other (please specify): (8) _____
- [ ] I am not responsible for any other job duties (9)

Page Break

Q24 Does your utility have a trainee or apprentice program?

- Yes (1)
- No (2)
- I'm not sure (3)

Page Break

Q25 Does your utility offer opportunities for promotions and career advancement?

- ○ Yes (1)
- ○ No (2)

Page Break

Q26 What type of operational challenges does your utility face? (Select all that apply)

- [ ] Excessive water loss (1)
- [ ] Excessive inflow and infiltration (2)
- [ ] Declining customer population (3)
- [ ] Aging infrastructure (4)
- [ ] Difficulty hiring and retaining skilled staff (5)
- [ ] Inadequate utility rates (6)
- [ ] Inadequate source of water (7)
- [ ] Poor source water quality (8)
- [ ] Inadequate receiving water (9)
- [ ] Inadequate asset management and planning for capital improvement (10)
- [ ] Non-compliance with permit and regulatory requirements (11)
- [ ] Lack of trust from customers regarding water quality, service, rates, etc. (12)
- [ ] Lack of community and economic development planning (13)
- [ ] Lack of support from leadership (e.g., city council or utility board) (14)
- [ ] Lack of support or resources to apply for grant/loan funding (15)
- [ ] Other (please specify): (16) _____

End of Block: Block 2

Start of Block: Block 3

Intro3 The following questions ask about your thoughts and opinions on your current job as well as the water industry as a whole.

Page Break

Q27 In your opinion, does your utility have enough operators?

- ○ Yes (1)
- ○ No (2)

Page Break

Q28 How well do your utility's decision makers (e.g., city council or utility board) understand what you do in your job?

- ○ Extremely well (1)
- ○ Very well (2)
- ○ Moderately well (3)
- ○ Slightly well (4)
- ○ Not well at all (5)

Page Break

Q29 How often do your utility's decision makers (e.g., city council or utility board) communicate with the operators?

- Very frequently (1)
- Frequently (2)
- Occasionally (3)
- Rarely (4)
- Never (5)

Page Break

Q30 Do you feel appreciated by your utility?

- ○ A great deal (1)
- ○ A lot (2)
- ○ A moderate amount (3)
- ○ A little (4)
- ○ Not at all (5)

Page Break

Q31 Do your managers listen to your opinions on matters that you deal with on a daily basis?

- Always (1)
- Most of the time (2)
- About half the time (3)
- Sometimes (4)
- Never (5)

Page Break

Q32 The services provided by drinking water and wastewater utility operators protect public health, the environment, and water quality. Consider each of the following groups of people and tell us, in your opinion, do they think the work you do is not at all important, slightly important, moderately important, very important, or extremely important?

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
City council or utility board (1)	○	○	○	○	○
Community (2)	○	○	○	○	○
Friends and Family (3)	○	○	○	○	○
Co-workers (4)	○	○	○	○	○
Supervisors (5)	○	○	○	○	○

Page Break

Q33 How happy are you at work?

- ○ Extremely happy (1)
- ○ Somewhat happy (2)
- ○ Neither happy nor unhappy (3)
- ○ Somewhat unhappy (4)
- ○ Extremely unhappy (5)

Page Break

Q34 Since the start of the COVID-19 pandemic, have you experienced any of the following? (Select all that apply)

- ☐ Increased workload (1)
- ☐ Decreased workload (2)
- ☐ Increased work hours (3)
- ☐ Decreased work hours (4)
- ☐ Lower workplace morale (5)
- ☐ Financial hardships (6)
- ☐ Increased stress (7)
- ☐ Other (please specify): (8) _____
- ☐ None of these apply (9)

Page Break

Q35 Consider each of the following and indicate whether you are extremely dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, or extremely satisfied with that aspect of your job.

	Extremely dissastisfied (1)	Somewhat dissatisfied (2)	Neither satisfied nor dissatisfied (3)	Somewhat satisfied (4)	Extremely satisfied (5)
Pay (1)	○	○	○	○	○
Availability of preferred shifts (2)	○	○	○	○	○
Hours (3)	○	○	○	○	○
Workload (4)	○	○	○	○	○
Type of work (5)	○	○	○	○	○
Certification exam process (6)	○	○	○	○	○
Certification renewal process (7)	○	○	○	○	○

Page Break

Q36 Consider the following statements and indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I am given the equipment and tools I need to do my job effectively. (1)	○	○	○	○	○
My utility has the right people and skills to do the work that needs to be done. (2)	○	○	○	○	○
Work is distributed evenly at my utility. (3)	○	○	○	○	○
I am being paid a fair amount for the work I do. (4)	○	○	○	○	○
I am satisfied with the benefits I receive. (5)	○	○	○	○	○
I like doing the tasks I do at work. (6)	○	○	○	○	○
I am considering leaving the utility where I work. (7)	○	○	○	○	○

I am considering leaving the water industry. (8)	○	○	○	○	○

Page Break

Q37 Consider the following and indicate if each factor is an important motivation for you to work in the water industry. Indicate if the factor is not at all important, slightly important, moderately important, very important, or extremely important.

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Pay and benefits (1)	○	○	○	○	○
Provide a service to the community (2)	○	○	○	○	○
Protect the environment (3)	○	○	○	○	○
Work close to home (4)	○	○	○	○	○
Safe working environment (5)	○	○	○	○	○
Predictable hours (6)	○	○	○	○	○

Page Break

Q38 The following is a list of things that utilities can do to encourage operators to stay in the water industry. In your opinion, which are the most effective? Rank them from most effective to least effective by dragging and dropping the statements to reorder them. When you click on a statement to move it, you will see the rank you are giving it.

For example, if you think that increasing pay is the most effective way utilities can encourage operators to stay in the water industry, you will drag that statement to the top, giving it a rank of 1. Continue ranking the options from the most effective (rank of 1) to the least effective (rank of 8).

_____ Create incentive programs (1)
_____ Have more certified operators on staff (2)
_____ Increase pay (3)
_____ Offer more training opportunities (4)
_____ Provide better benefits (5)
_____ Provide comp time (6)
_____ Provide new equipment and supplies (7)
_____ Provide overtime pay (8)
_____ Offer more opportunities for professional development and career advancement (9)

Page Break

End Thank you for completing the survey. Please click the blue arrow on the right below to submit your responses.

End of Block: Block 3

APPENDIX B: MANAGER SURVEY

West Virginia Water Workforce Survey - Utility Managers

Start of Block: General Questions about Manager & Utility

Intro - Block 1 The following questions ask about the utility where you work and your role there as the utility manager or contact person. If you are the contact person for more than one utility, please complete separate surveys for each individual utility.

Please use the arrows at the bottom of the screen to move through the survey.

Page Break

Q1 Which of the following best describes your current position at the utility?

- Administrator (1)
- Manager (2)
- Administrative Assistant (3)
- Superintendent (4)
- Elected Official (5)
- Owner (6)
- Other (please specify): (7)
  _____

Page Break

Q2 Do you work part-time or full-time?

- Part-time (1)
- Full-time (2)

Page Break

Q3 How many years have you worked at the utility?

- Less than 1 year (1)
- 1 - 3 years (2)
- 4 - 6 years (3)
- 7 - 9 years (4)
- 10 - 15 years (5)
- 16 - 20 years (6)
- 21 - 25 years (7)
- 26 - 30 years (8)
- 30+ years (9)

Page Break

Q4 Are you currently eligible to retire?

- Yes (1)
- No (2)
- I'm not sure (3)

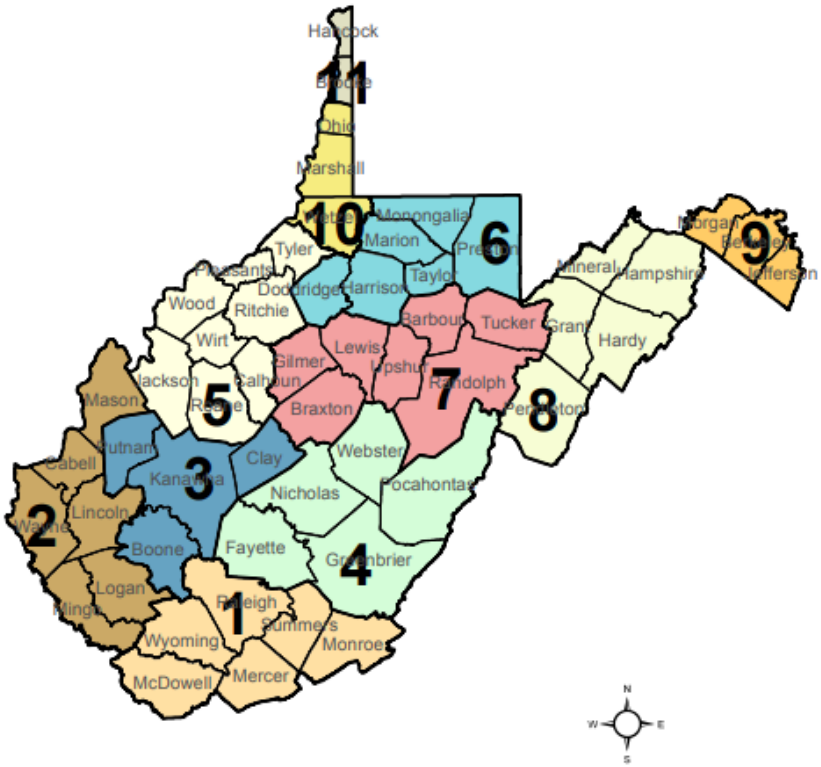
Page Break

Q5 When do you plan to retire?

- Within the next 12 months (1)
- In 1 - 3 years (2)
- In 4 - 6 years (3)
- In 7 - 9 years (4)
- In 10+ years (5)
- I am retired. (6)

Page Break

Q6 What regional planning and development council is your utility in? If your utility is in more than one region, please choose the one where your main office is located. A map of regions is provided below for reference.



- Region 1 (McDowell, Mercer, Monroe, Raleigh, Summers, and Wyoming Counties) (1)
- Region 2 (Cabell, Lincoln, Logan, Mason, Mingo, and Wayne Counties) (2)
- Region 3 (Boone, Clay, Kanawha, and Putnam Counties) (3)
- Region 4 (Fayette, Greenbrier, Nicholas, Pocahontas, and Webster Counties) (4)
- Region 5 (Calhoun, Jackson, Pleasants, Ritchie, Roane, Tyler, Wirt, and Wood Counties) (5)
- Region 6 (Doddridge, Harrison, Marion, Monongalia, Preston, and Taylor Counties) (6)
- Region 7 (Barbour, Braxton, Gilmer, Lewis, Randolph, Tucker, and Upshur Counties) (7)
- Region 8 (Grant, Hampshire, Hardy, Mineral, and Pendleton Counties) (8)
- Region 9 (Berkeley, Jefferson, and Morgan Counties) (9)
- Region 10 (Marshall, Ohio, and Wetzel Counties) (10)
- Region 11 (Brooke and Hancock Counties) (11)

Page Break

Q7 Which of the following describe your utility? (Select all that apply)

- Drinking water treatment (1)
- Drinking water distribution (2)
- Wastewater treatment (3)
- Wastewater collection (4)

Page Break

Display This Question:

If Q7 = Drinking water treatment

Or Q7 = Drinking water distribution

Q7a What class is your drinking water treatment or distribution utility?

- Class 1D (1)
- Class R (2)
- Class WDS (3)
- Class I (4)
- Class II (5)
- Class III (6)
- Class IV (7)

Page Break

Display This Question:

If Q7 = Wastewater treatment

Or Q7 = Wastewater collection

Q7b What class is your wastewater treatment utility?

- Class C (1)
- Class H (2)
- Class S (3)
- Class I (4)
- Class II (5)
- Class III (6)
- Class IV (7)
- Advanced (8)

Page Break

Q8 How many people does your utility directly serve? Select the highest range for the drinking water or wastewater services provided.

- 1 - 1,500 (1)
- 1,501 - 10,000 (2)
- 10,001 - 15,000 (3)
- 15,001 - 30,000 (4)
- 30,001 - 50,000 (5)
- 50,001 + (6)

Page Break

Q9 Is your utility regulated by West Virginia’s Public Service Commission (PSC)?

- Yes (1)
- No (2)
- I'm not sure (3)

Page Break

Q10 Which of the following operational challenges does your utility face? (Select all that apply)

- Excessive water loss (1)
- Excessive inflow and infiltration (2)
- Declining customer population (3)
- Aging infrastructure (4)
- Difficulty hiring and retaining skilled staff (5)
- Inadequate utility rates (6)
- Inadequate source of water (7)
- Poor source water quality (8)
- Inadequate receiving water (9)
- Inadequate asset management and planning for capital improvement (10)
- Non-compliance with permit and regulatory requirements (11)
- Lack of trust from customers regarding water quality, service, rates, etc. (12)
- Lack of community and economic development planning (13)
- Lack of support from leadership (e.g., city council or utility board) (14)
- Lack of support or resources to apply for grant/loan funding (15)
- Other (please specify): (16)

  _____

End of Block: General Questions about Manager & Utility

Start of Block: Questions about operators

Block 2 Intro The following questions ask about operator positions at your utility.

Page Break

Q11 Does your utility offer opportunities for promotions and career advancement?

- Yes (1)
- No (2)

Page Break

Q12 What benefits does your utility provide? (Select all that apply)

- Health insurance (1)
- Retirement benefits (2)
- Life and disability insurance (3)
- Paid sick and vacation days (4)
- Paid holidays (5)
- Annual raises (6)
- Overtime (7)
- Comp time (8)
- Paid time and travel to attend trainings (9)
- Paid or reimbursed tuition or training expenses (10)
- Paid or reimbursed certification fees (11)
- Paid or reimbursed certification renewal fees (12)
- Paid time to study for exams (13)
- Other (please specify): (14)
  _____

Page Break

Q13 How many operator positions has your utility budgeted for?

- Drinking Water Treatment Operators (1)
  _____
- Drinking Water Distribution Operators (2)
  _____
- Wastewater Treatment Operators (3)
  _____
- Wastewater Collection Operators (4)
  _____

Q14 How many operator positions at your utility are filled?

- Drinking Water Treatment Operators (1)
  _____
- Drinking Water Distribution Operators (2)
  _____
- Wastewater Treatment Operators (3)
  _____
- Wastewater Collection Operators (4)
  _____

Q15 How many operators have left their positions at your utility in the last 2 years?

- Drinking Water Treatment Operators (1)
  _____
- Drinking Water Distribution Operators (2)
  _____
- Wastewater Treatment Operators (3)
  _____
- Wastewater Collection Operators (4)
  _____

Page Break

Q16 In your opinion, does your utility have enough operators?

- Yes (1)
- No (2)

Page Break

Q17 How many operators are eligible to retire **now** at your utility?

_____

Q18 How many operators are eligible to retire **within the next 2-5 years** at your utility?

_____

Page Break

Q19 Does your utility hire trainees, apprentices, or high school interns? Select all that apply.

- Yes, we hire trainees (1)
- Yes, we hire apprentices (2)
- Yes, we hire high school interns (3)
- No (4)
- Other (please specify): (5)
  _____

Q20 Does your utility have a formal trainee program that allows on-site supervision and hands-on training to be provided to operators in training?

- Yes, on a full-time basis (1)
- Yes, on a part-time basis (2)
- No (3)

Q21 If your utility had the opportunity to participate in hosting a paid high school intern, would you be willing to host an intern?

- Yes (1)
- No (Why not?): (2)
  _____

Page Break

Q22 Does your utility participate in youth or community outreach activities, such as facility tours, school visits, youth camps, etc.?

- Yes (Describe the activities): (1) _____
- No (2)

Q23 What would make your utility more likely to participate in youth or community outreach activities? Select all that apply.

- Having the opportunity to inform high school students about careers in the water industry (1)
- Partnering with an organization that has experience conducting similar outreach (2)
- Having access to existing materials (e.g., presentation slides, flyers, etc.) to help facilitate outreach (3)
- Other (please specify): (4) _____
- We are unlikely to participate in these activities. (5)

Page Break

Q24 Does your utility have a formal documented pay scale for certified operators?

- Yes (1)
- No (2)

Page Break

Display This Question:

If Q7 = Drinking water treatment

Or Q7 = Drinking water distribution

Q25a Using the slider below, please move the bar to the number that corresponds with the **starting wage** for an entry-level certified drinking water operator at your utility.

0 6 12 18 24 30 36 42 48 54 60

Hourly Wage ($) ()

Display This Question:

If Q7 = Drinking water treatment

Or Q7 = Drinking water distribution

Q26a Using the slider below, please move the bar to the number that corresponds with the **highest** hourly wage a certified drinking water operator working at your utility is paid.

0 10 20 30 40 50 60 70 80 90 100

Hourly Wage ($) ()

Page Break

Display This Question:

If Q7 = Wastewater treatment

Or Q7 = Wastewater collection

Q25b Using the slider below, please move the bar to the number that corresponds with the **starting wage** for an entry-level certified wastewater operator at your utility.

0 6 12 18 24 30 36 42 48 54 60

Hourly Wage ($) ()	

Display This Question:

If Q7 = Wastewater treatment

Or Q7 = Wastewater collection

Q26b Using the slider below, please move the bar to the number that corresponds with the **highest** hourly wage a certified wastewater operator working at your utility is paid.

0 10 20 30 40 50 60 70 80 90 100

Hourly Wage ()	

Page Break

Q27 What job duties are operators responsible for at your utility, other than basic system/treatment works? (Select all that apply)

- Office work (1)
- Collecting payments (2)
- Equipment maintenance (3)
- Trash services (4)
- Natural gas services (5)
- Electrical utility services (6)
- City maintenance (e.g., mowing) (7)
- Other (please specify): (8)
  _____
- They are not responsible for any other tasks (9)

Page Break

Q28 How does the utility reward and/or show appreciation for its operators? (Select all that apply)

- Provide pay increases based on employee performance (1)
- Provide pay increases based on certification achievements (2)
- Provide longevity awards (3)
- Recognize employees for their contributions (e.g., suggesting cost saving measures) (4)
- Offer leadership skills training to employees (5)
- Other (please specify): (6)
  _____

End of Block: Questions about operators

Start of Block: Questions about recruitment and retention

Block 3 Intro The following questions ask for your thoughts and opinions about recruiting and retaining operators.

Page Break

Q29 When you have an open position for an operator at your utility, where do you advertise the position? (Select all that apply)

- Newspaper (1)
- Online job post (e.g., Indeed, ZipRecruiter, CareerBuilder, LinkedIn, etc.) (2)
- Job fair (3)
- Unemployment office (4)
- Industry-specific website (e.g., WVRWA, WEF Career Center, AWWA) (5)
- Social Media (e.g., Facebook, Twitter, etc.) (6)
- Local government website (7)
- Temp agency (8)
- Trade school (9)
- Other (please specify): (10)
  _____

Page Break

Q30 In your opinion, which of the following are barriers to hiring operators? (Select all that apply)

- Rate of pay (1)
- Financial limitations at the utility (2)
- City Council or Utility Board (3)
- Lack of qualified applicants (4)
- Applicants are unwilling to become certified (5)
- Certification requirements (6)
- Certification process (7)
- Lack of benefits (8)
- Type of work (9)
- Available shifts are not desirable (10)
- Other (Please specify): (11)

  _____

Display This Question:

If Q30 = Lack of qualified applicants

Q31 You indicated that a “lack of qualified applicants” was a barrier to hiring operators. What qualifications have been lacking among potential operator applicants that prevented your utility from hiring them? (Select all that apply)

- Lack of operator license (1)
- Lack of experience in relevant positions (2)
- Failure to meet minimum education requirement (3)
- Failure to pass a drug test (4)
- Other, please specify: (5)

  _____

Page Break

Q32 How well do your utility's decision-makers (e.g., city council, utility board) understand the challenge of recruiting and retaining operators?

- Not well at all (1)
- Slightly well (2)
- Moderately well (3)
- Very well (4)
- Extremely well (5)

Page Break

Q33 Since the beginning of the COVID-19 pandemic, has your utility experienced any of the following impacts? (Select all that apply)

- Increased number of job openings (1)
- Decreased number of job openings (2)
- Increased number of applicants for jobs (3)
- Decreased number of applicants for jobs (4)
- Increased workloads (5)
- Decreased workloads (6)
- Lowered workplace morale (7)
- Decreased revenue (8)
- Increased stress (9)
- Delays in receiving chemicals, parts, etc. (10)
- Other (please specify): (11)
  _____
- None of these have affected my utility (12)

Page Break

Q34 As the manager of the utility, you have firsthand knowledge about your operators' job satisfaction. Consider each of the following and indicate whether your operators are extremely dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, or extremely satisfied with that aspect of their job. If you aren't sure, you can mark the answer "I don't know."

	Extremely dissatisfied (1)	Somewhat dissatisfied (2)	Neither satisfied nor dissatisfied (3)	Somewhat satisfied (4)	Extremely satisfied (5)	I don't know (6)
Pay (1)	•	•	•	•	•	•
Availability of preferred shifts (2)	•	•	•	•	•	•
Hours (3)	•	•	•	•	•	•
Workload (4)	•	•	•	•	•	•
Type of work (5)	•	•	•	•	•	•
Certification exam process (6)	•	•	•	•	•	•
Certification renewal process (7)	•	•	•	•	•	•

Page Break

Q35 In your experience, what reasons do operators give for leaving the job? (Select all that apply)

- Retiring (1)
- They no longer want to work in the water sector (2)
- Renewal fees are too expensive (3)
- Better pay in another job opportunity (4)
- Better benefits in another job opportunity (5)
- Another job opportunity allows for career advancement (6)
- Too many regulations (7)
- Too much responsibility (8)
- Undesirable working hours (e.g., being on-call, working on holidays, shifts) (9)
- Certification exam and process are too difficult (10)
- Other (please specify): (11)
  _____

Page Break

Q36 Consider the following statements and indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Operators at my utility are given the equipment and tools needed to do their jobs effectively. (1)	•	•	•	•	•
My utility has the right people and skills to do the work that needs to be done. (2)	•	•	•	•	•
Work is distributed evenly among operators at my utility. (3)	•	•	•	•	•
Operators are being paid a fair amount for the work they do. (4)	•	•	•	•	•
My employees are satisfied with the benefits they receive. (5)	•	•	•	•	•

My utility has a succession plan in place if a manager leaves or retires. (6)	•	•	•	•	•
My utility has a succession plan in place if an operator leaves or retires. (7)	•	•	•	•	•

Page Break

Outro Thank you for completing the survey. Please click the blue arrow on the right below to submit your responses.

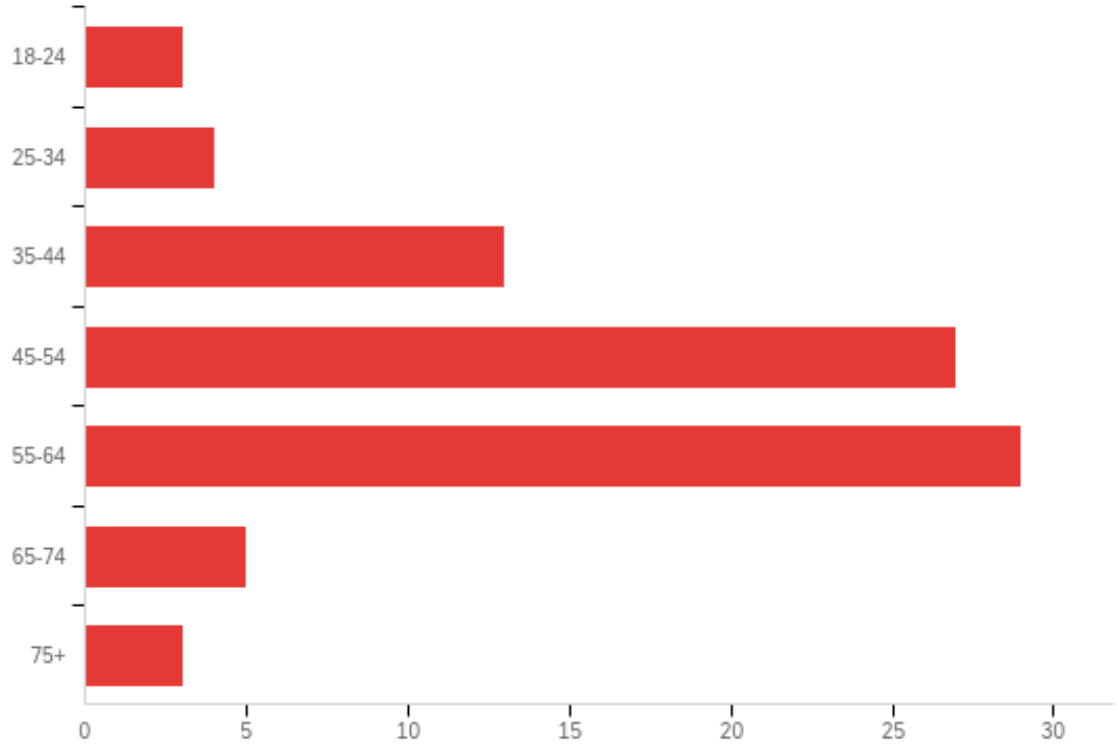
End of Block: Questions about recruitment and retention

APPENDIX C: OPERATOR SURVEY RESULTS

Report

West Virginia Water Workforce Survey - Utility Operators

Q1 - What is your age?

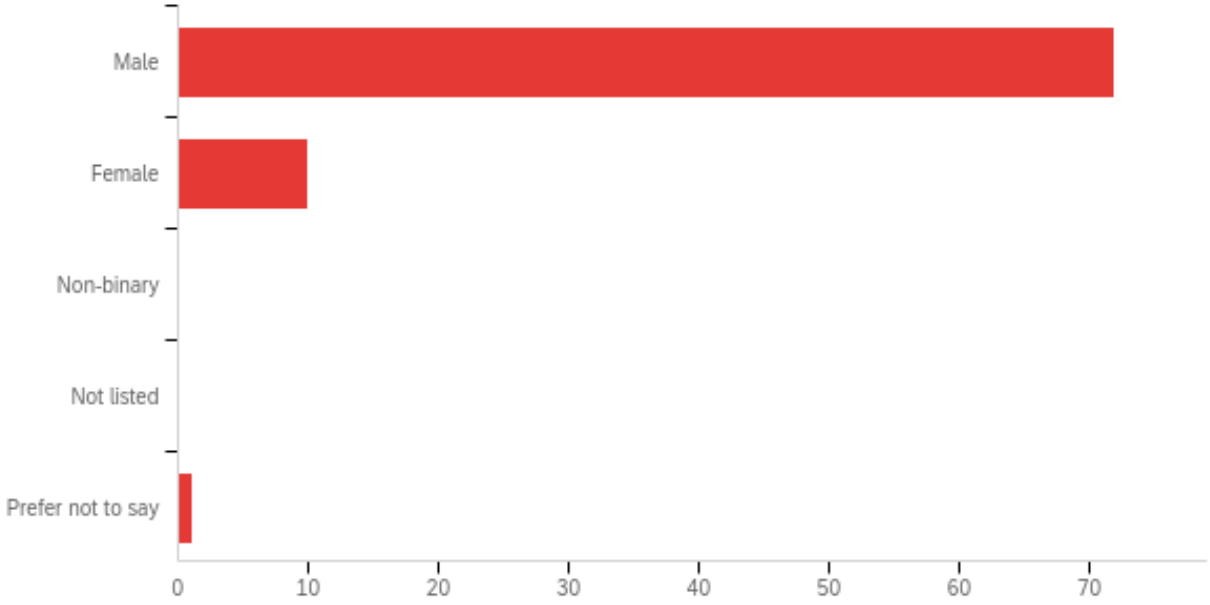


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is your age?	1.00	7.00	4.21	1.24	1.53	84

#	Answer	%	Count
1	18-24	3.57%	3
2	25-34	4.76%	4
3	35-44	15.48%	13
4	45-54	32.14%	27
5	55-64	34.52%	29

6	65-74	5.95%	5
7	75+	3.57%	3
	Total	100%	84

Q2 - What is your gender?

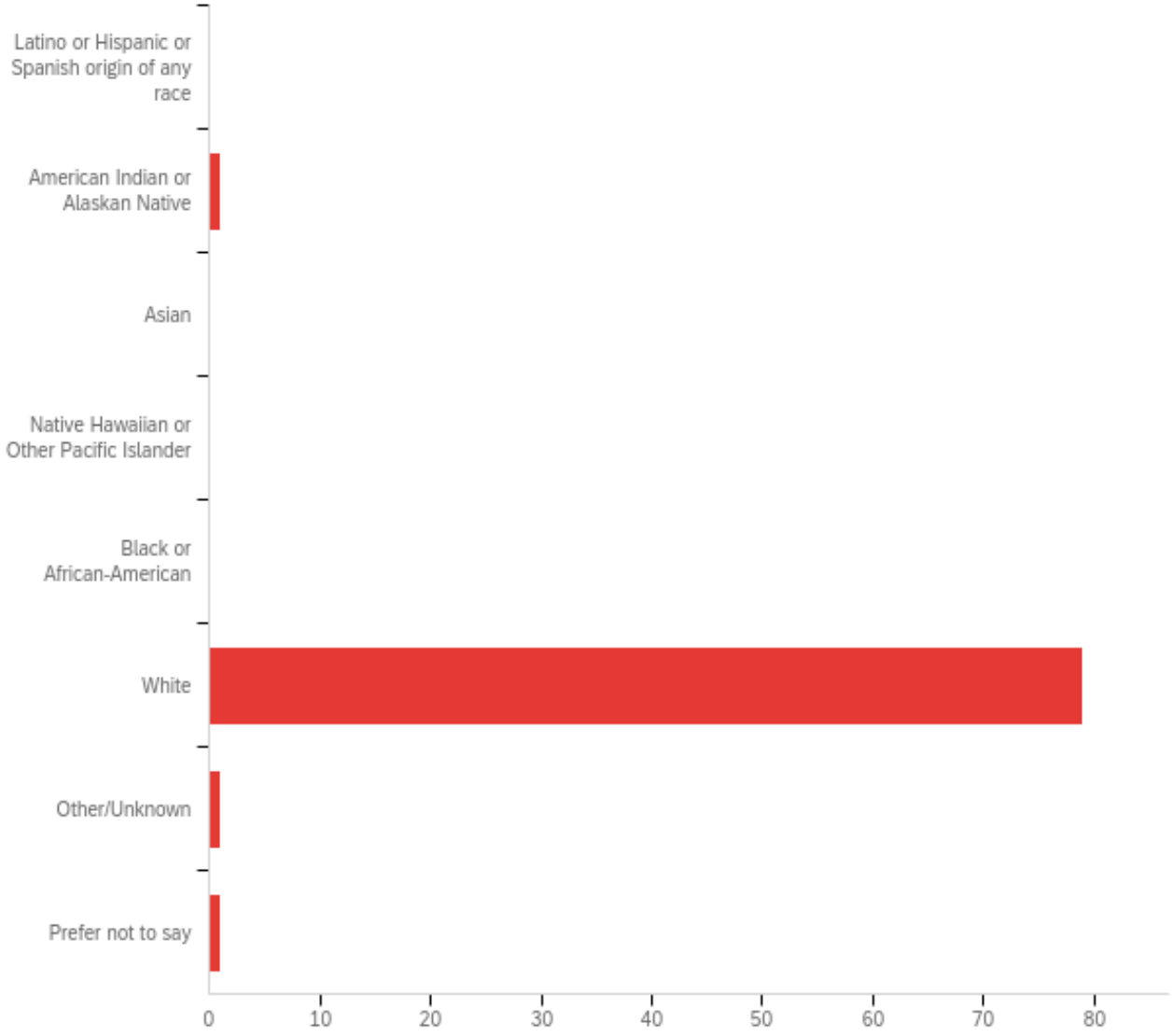


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is your gender? - Selected Choice	1.00	5.00	1.17	0.53	0.28	83

#	Answer	%	Count
1	Male	86.75%	72
2	Female	12.05%	10
3	Non-binary	0.00%	0
4	Not listed	0.00%	0
5	Prefer not to say	1.20%	1
	Total	100%	83

Q2_4_TEXT - Not listed
Not listed - Text

Q3 - What is your ethnicity? (Select all that apply)

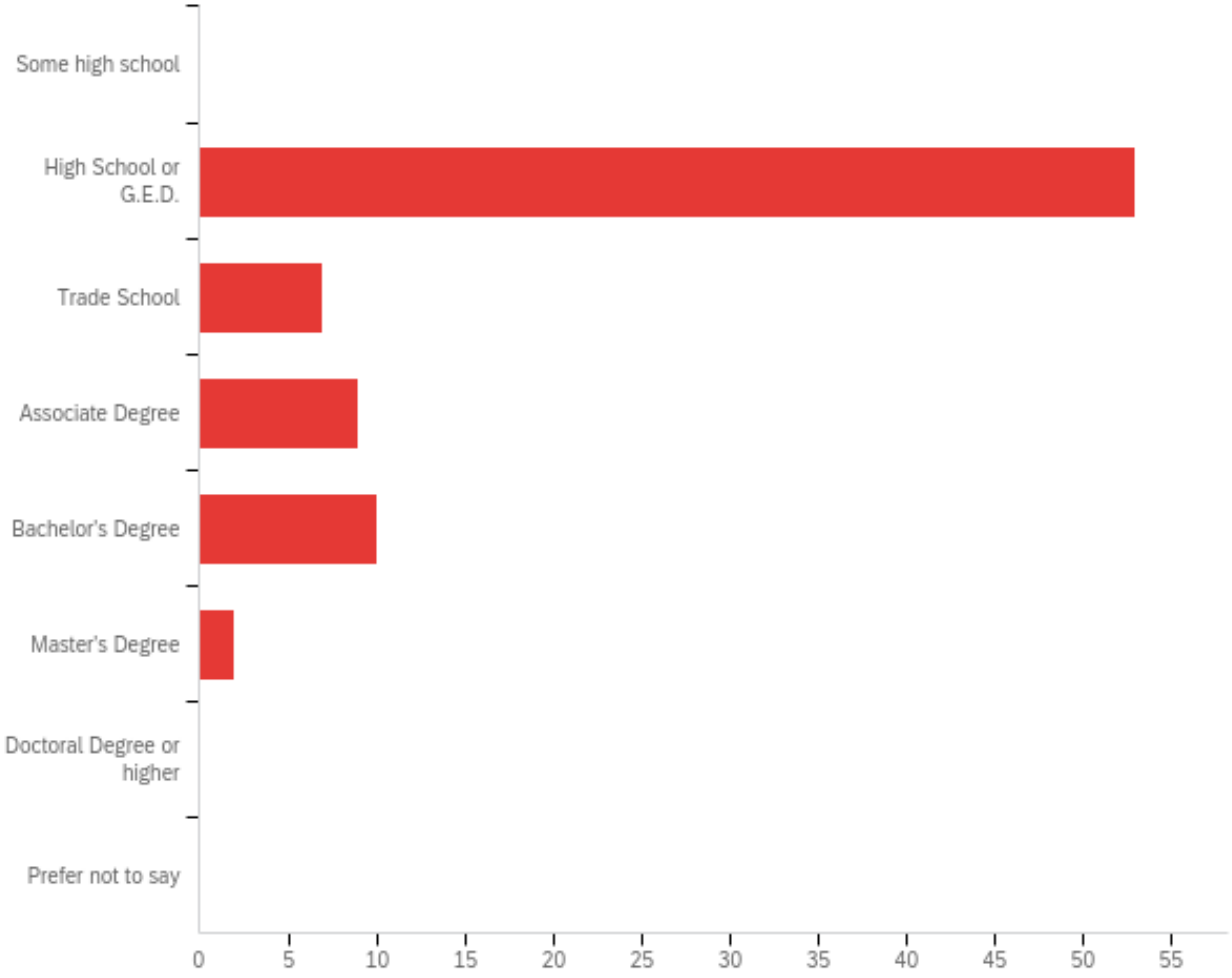


#	Answer	%	Count
1	Latino or Hispanic or Spanish origin of any race	0.00%	0
2	American Indian or Alaskan Native	1.22%	1
3	Asian	0.00%	0
4	Native Hawaiian or Other Pacific Islander	0.00%	0
5	Black or African-American	0.00%	0
6	White	96.34%	79
7	Other/Unknown	1.22%	1

8	Prefer not to say	1.22%	1
	Total	100%	82

Q3_7_TEXT - Other/Unknown
Other/Unknown - Text

Q4 - What is the highest degree or level of education you have completed?

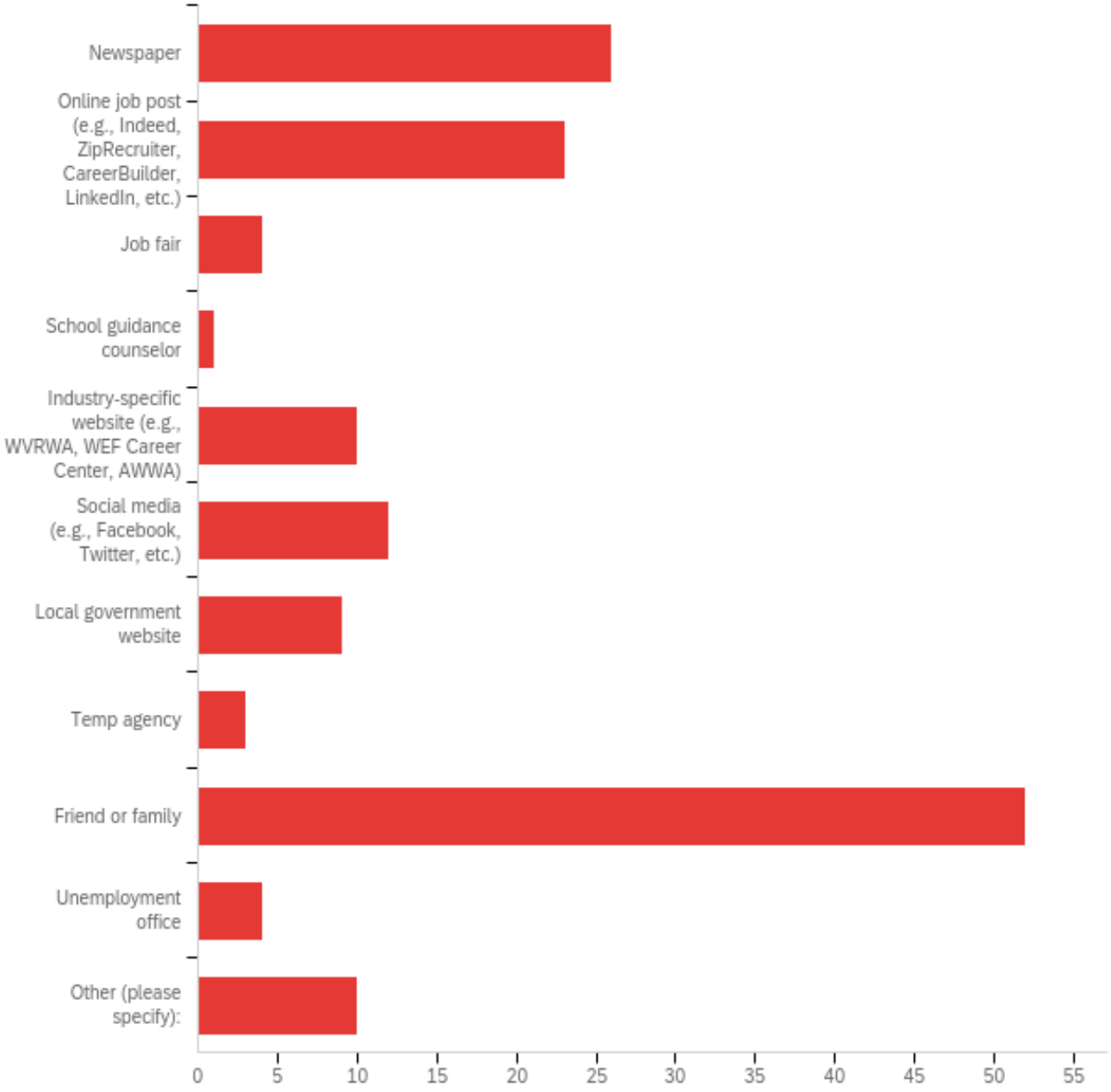


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is the highest degree or level of education you have completed?	2.00	6.00	2.78	1.20	1.43	81

#	Answer	%	Count
1	Some high school	0.00%	0
2	High School or G.E.D.	65.43%	53
3	Trade School	8.64%	7

4	Associate Degree	11.11%	9
5	Bachelor's Degree	12.35%	10
6	Master's Degree	2.47%	2
7	Doctoral Degree or higher	0.00%	0
8	Prefer not to say	0.00%	0
	Total	100%	81

Q5 - What resources have you used in the past to find jobs in the water sector? (Select all that apply)



#	Answer	%	Count
1	Newspaper	16.88%	26
2	Online job post (e.g., Indeed, ZipRecruiter, CareerBuilder, LinkedIn, etc.)	14.94%	23
3	Job fair	2.60%	4
4	School guidance counselor	0.65%	1

5	Industry-specific website (e.g., WVRWA, WEF Career Center, AWWA)	6.49%	10
6	Social media (e.g., Facebook, Twitter, etc.)	7.79%	12
7	Local government website	5.84%	9
8	Temp agency	1.95%	3
9	Friend or family	33.77%	52
11	Unemployment office	2.60%	4
13	Other (please specify):	6.49%	10
	Total	100%	154

Q5_13_TEXT - Other (please specify):

Other (please specify): - Text
Have worked in the water business over 50 years. Found no need to seek employment
WWT is just part of my many more duties
WV Rural Water Association
I have been here 25 years
Word of mouth
local contacts
I did not get my water license until I started at the municipality I am currently employed at.
Word of mouth
Word of mouth in the water operator community.
THRU MY PRESENT BUSINESS

Q6 - How old were you when you started working as an operator?

How old were you when you started working as an operator?
33
26
53
37
45
22
30
33
35
21
36
56
31
19
22
24
23
26
25
30
18
19
27
44
25

28

23

45

18

34

34

25

21

29

20

22

37

33

39

20

34

25

26

67

19

20

34

25

39

34

45

35

26

32

35

29

32

56

20

45

22

56

40

14

42

35

18

25

23

23

44

62

34 yrs. old

24

18

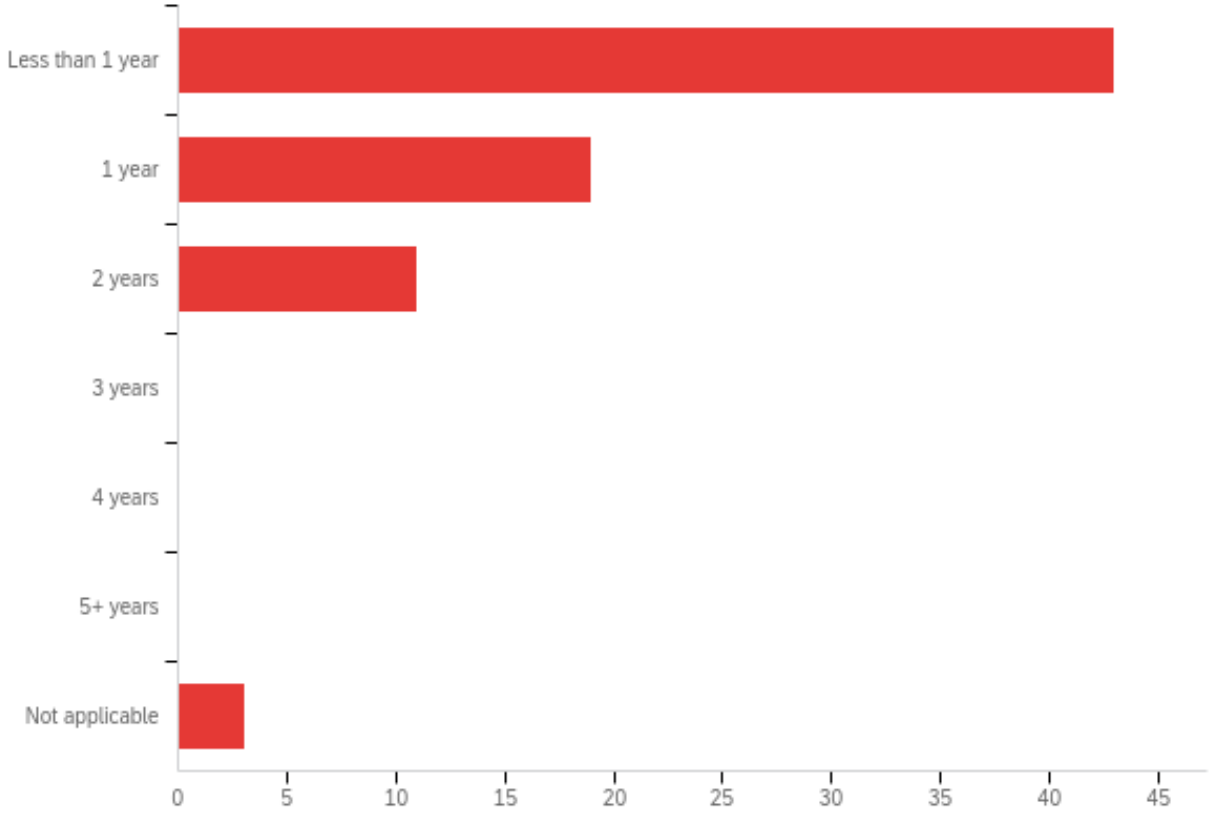
18

36

21

19

Q7 - How long were you in that job before you tested for your first certification?

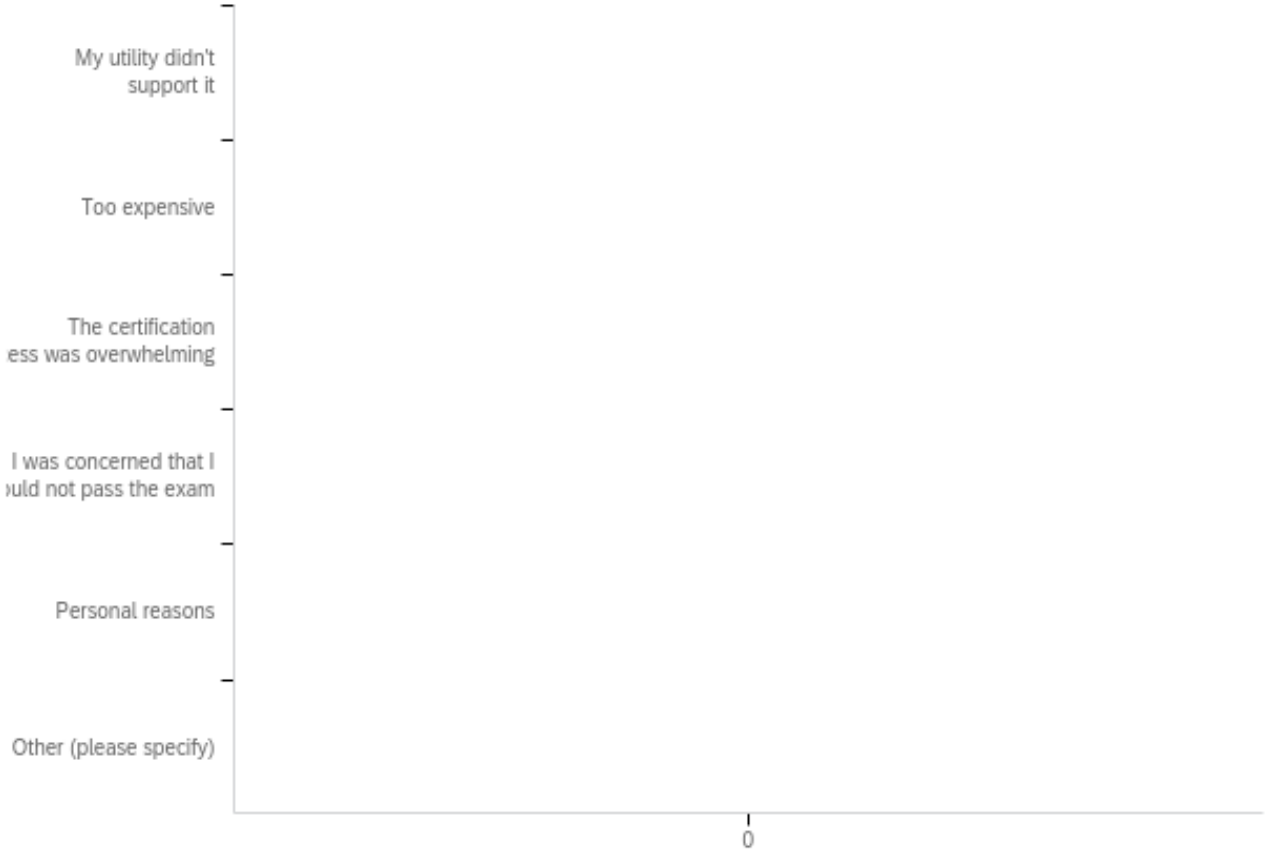


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How long were you in that job before you tested for your first certification?	1.00	7.00	1.78	1.28	1.65	76

#	Answer	%	Count
1	Less than 1 year	56.58%	43
2	1 year	25.00%	19
3	2 years	14.47%	11
4	3 years	0.00%	0
5	4 years	0.00%	0
6	5+ years	0.00%	0

7	Not applicable	3.95%	3
	Total	100%	76

Q7a - Why did it take 3 or more years to test for your first certification? (Select all that apply)



#	Answer	%	Count
1	My utility didn't support it	0.00%	0
2	Too expensive	0.00%	0
3	The certification process was overwhelming	0.00%	0
4	I was concerned that I could not pass the exam	0.00%	0
5	Personal reasons	0.00%	0
6	Other (please specify)	0.00%	0
	Total		0

Q7a_6_TEXT - Other (please specify)
Other (please specify) - Text

Q8 - How many utility systems do you work for?

How many utility systems do you work for?
1
1
1
1
1
1
1
1
1
Was 2
1
1
1
1
1
1
1
1
1
1
2
two
1
4
3
1

1

1

1

one

0

2

1

1

1

1

one at the moment

2

2

2

2

9

3

1

one

2

1

1

2

1 City of Salem WWTP

1

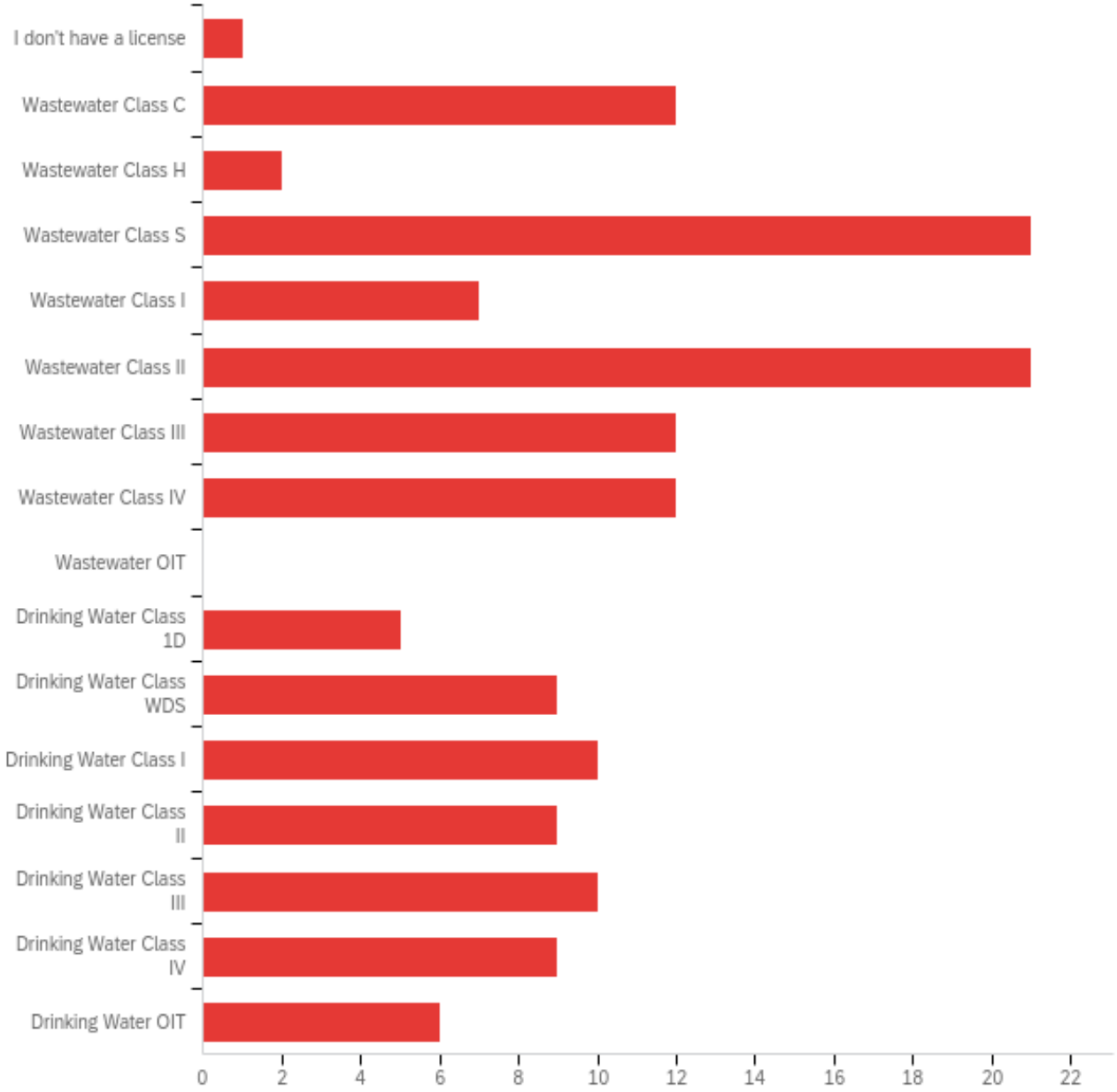
2

1

1

1, also help a package plant and wastewater pond.
1
1
2
1
one
1
2-
1
3
1
1 Utility System and 3 Private systems
2
1
1
1
2
one
1
1
4
1
3
1

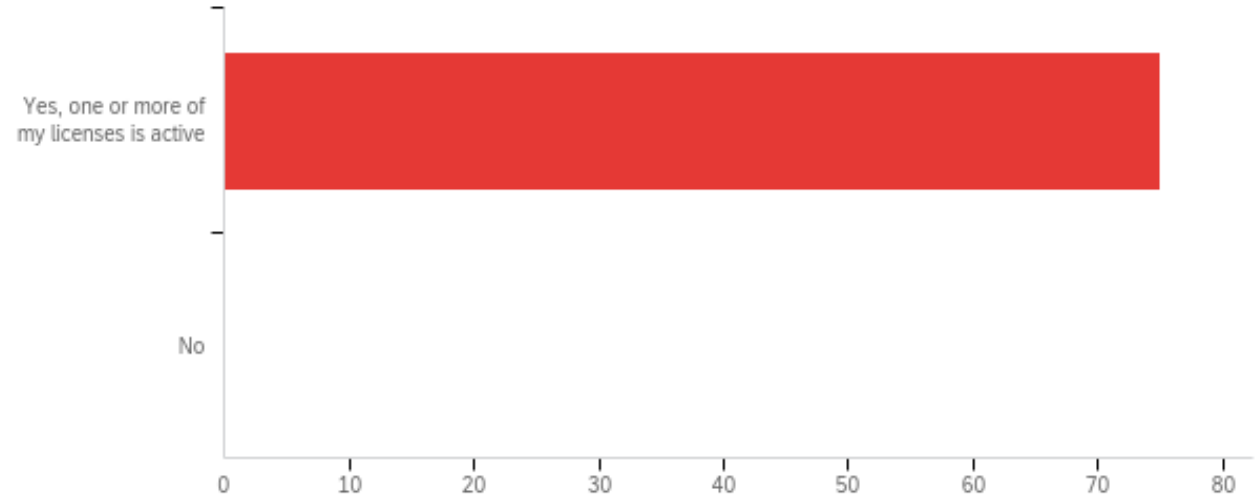
Q9 - What level of license(s) do you hold? (Select all that apply)



#	Answer	%	Count
1	I don't have a license	0.68%	1
2	Wastewater Class C	8.22%	12
3	Wastewater Class H	1.37%	2
4	Wastewater Class S	14.38%	21
5	Wastewater Class I	4.79%	7

6	Wastewater Class II	14.38%	21
7	Wastewater Class III	8.22%	12
8	Wastewater Class IV	8.22%	12
9	Wastewater OIT	0.00%	0
10	Drinking Water Class 1D	3.42%	5
11	Drinking Water Class WDS	6.16%	9
12	Drinking Water Class I	6.85%	10
13	Drinking Water Class II	6.16%	9
14	Drinking Water Class III	6.85%	10
15	Drinking Water Class IV	6.16%	9
16	Drinking Water OIT	4.11%	6
	Total	100%	146

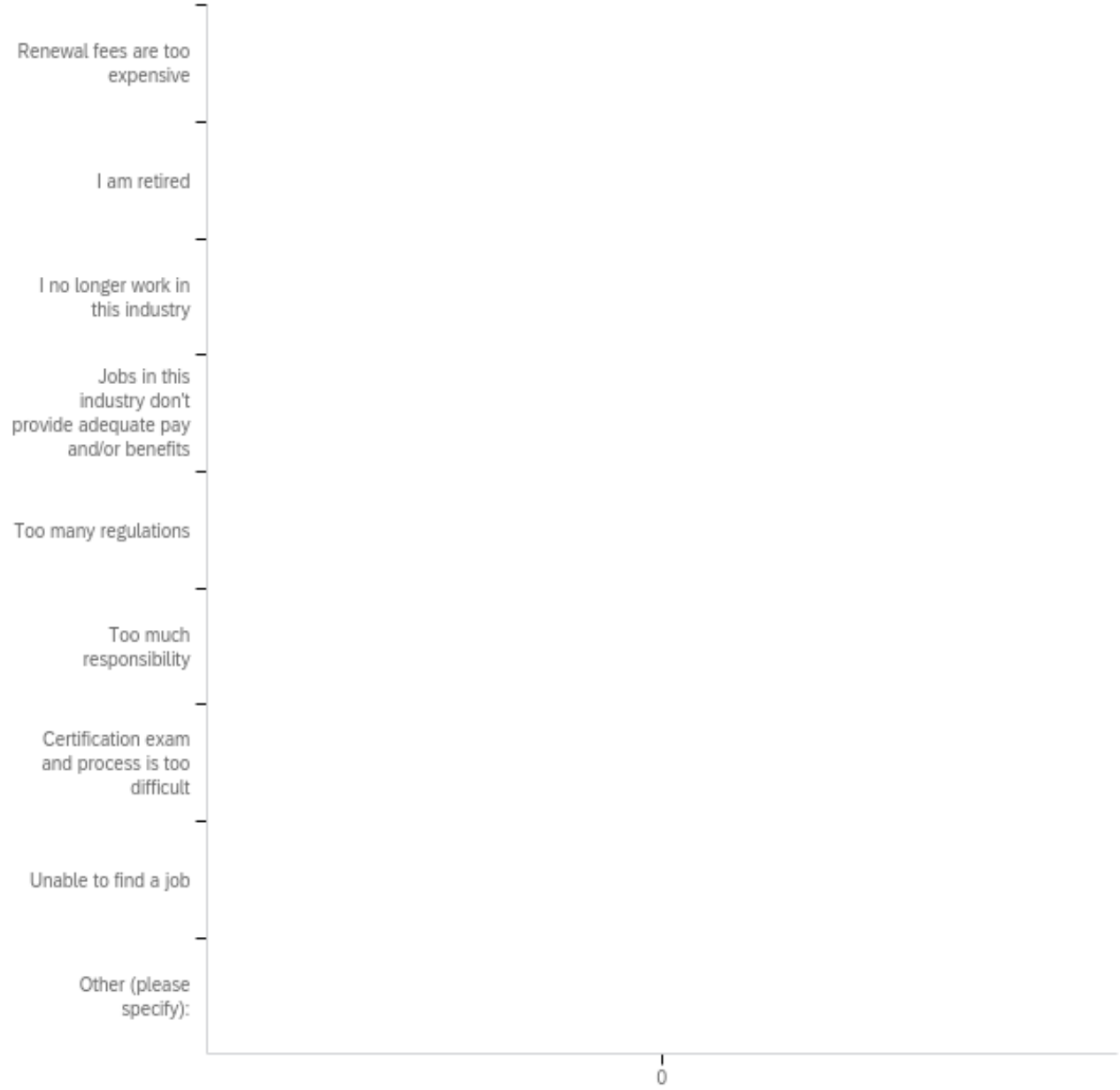
Q9a - Is your license active?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Is your license active?	1.00	1.00	1.00	0.00	0.00	75

#	Answer	%	Count
1	Yes, one or more of my licenses is active	100.00%	75
2	No	0.00%	0
	Total	100%	75

Q9b - Why is your license inactive? (Select all that apply)

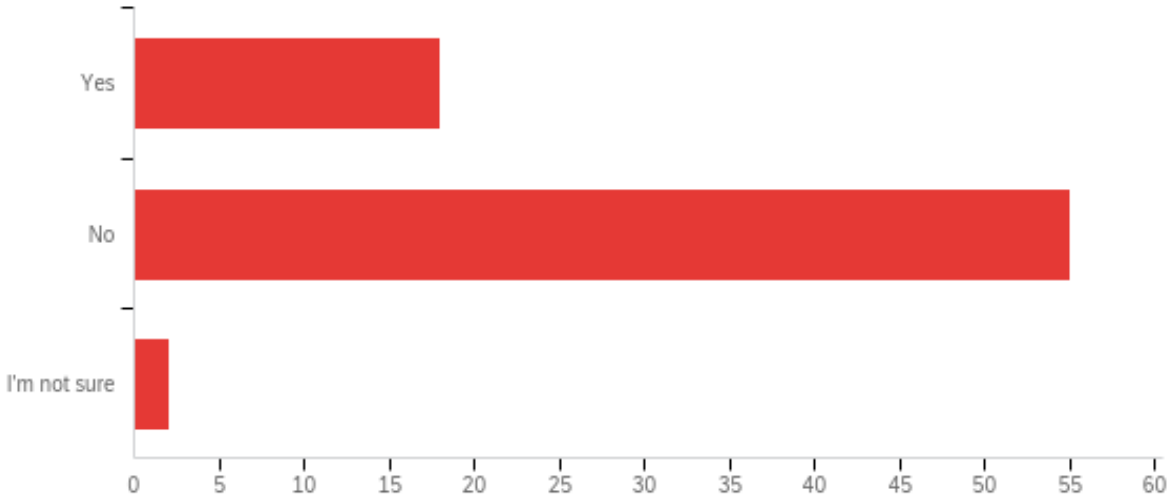


#	Answer	%	Count
1	Renewal fees are too expensive	0.00%	0
2	I am retired	0.00%	0
3	I no longer work in this industry	0.00%	0
4	Jobs in this industry don't provide adequate pay and/or benefits	0.00%	0
5	Too many regulations	0.00%	0

6	Too much responsibility	0.00%	0
7	Certification exam and process is too difficult	0.00%	0
8	Unable to find a job	0.00%	0
9	Other (please specify):	0.00%	0
	Total		0

Q9b_9_TEXT - Other (please specify):
Other (please specify): - Text

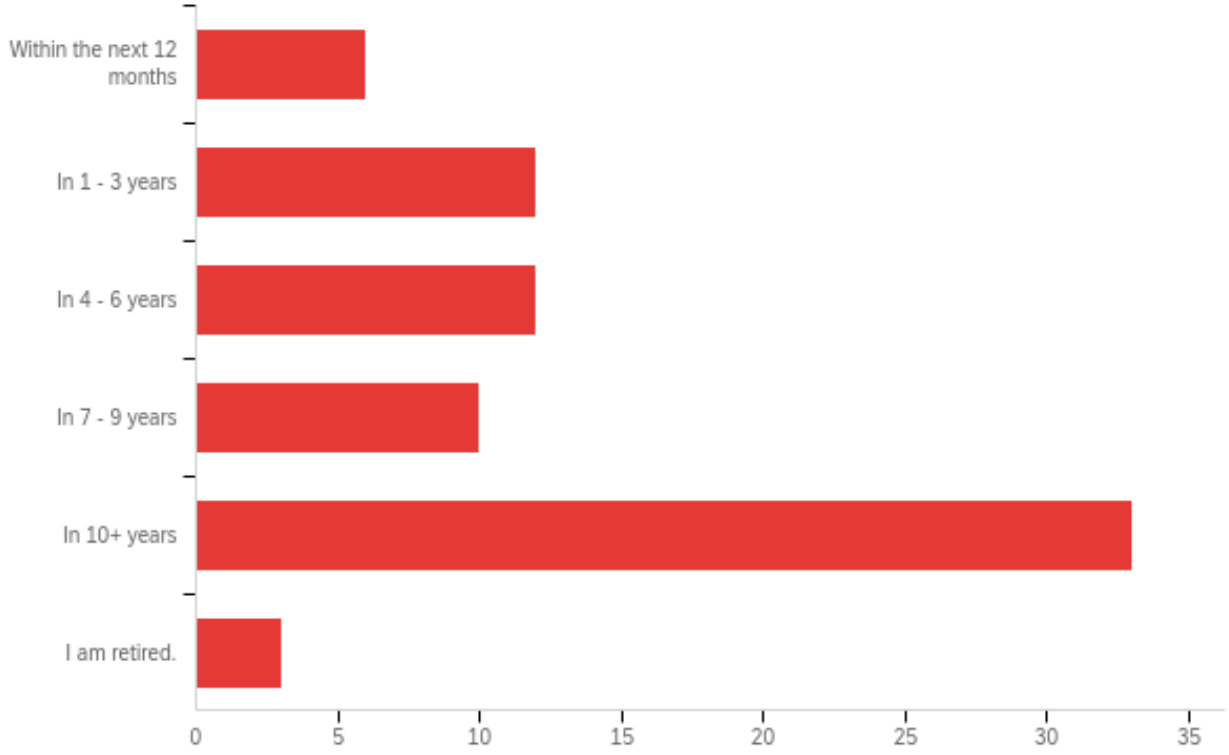
Q10 - Are you currently eligible to retire?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Are you currently eligible to retire?	1.00	3.00	1.79	0.47	0.22	75

#	Answer	%	Count
1	Yes	24.00%	18
2	No	73.33%	55
3	I'm not sure	2.67%	2
	Total	100%	75

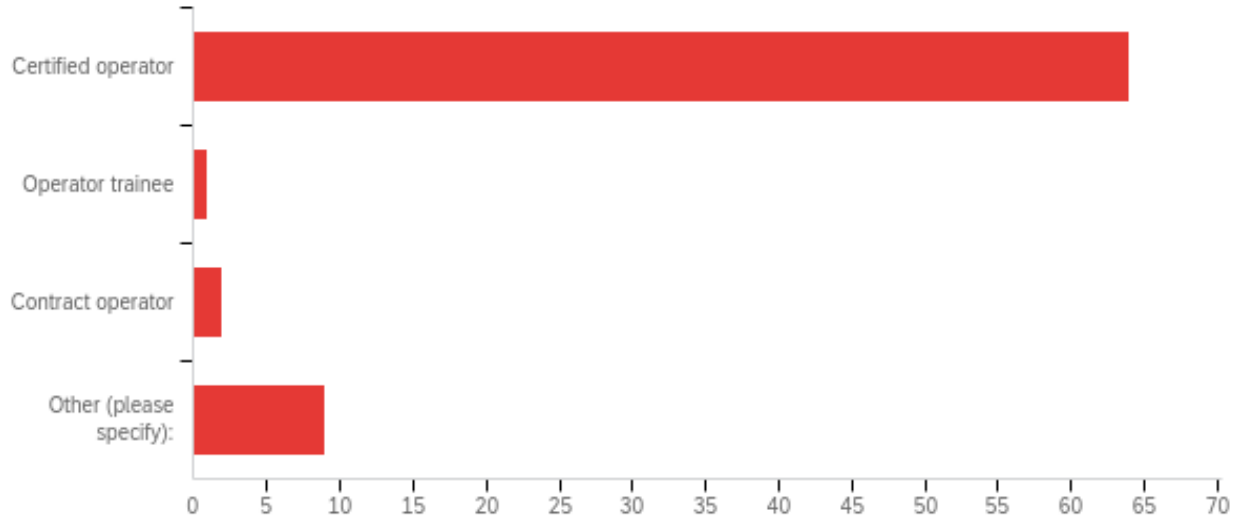
Q11 - When do you plan to retire?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	When do you plan to retire?	1.00	6.00	3.80	1.43	2.05	76

#	Answer	%	Count
1	Within the next 12 months	7.89%	6
2	In 1 - 3 years	15.79%	12
3	In 4 - 6 years	15.79%	12
4	In 7 - 9 years	13.16%	10
5	In 10+ years	43.42%	33
6	I am retired.	3.95%	3
	Total	100%	76

Q12 - Which of the following best describes your role at the utility?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Which of the following best describes your role at the utility? - Selected Choice	1.00	4.00	1.42	1.00	1.01	76

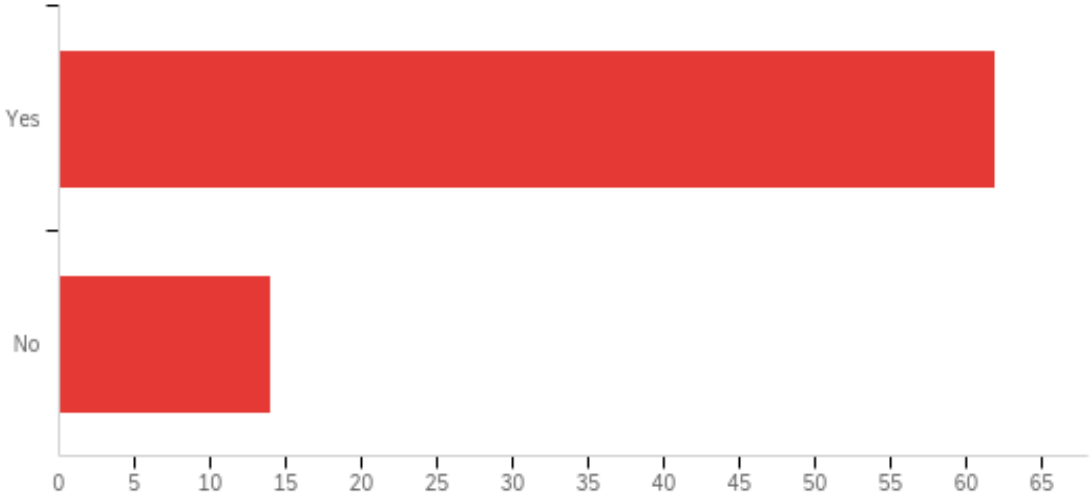
#	Answer	%	Count
1	Certified operator	84.21%	64
2	Operator trainee	1.32%	1
3	Contract operator	2.63%	2
4	Other (please specify):	11.84%	9
	Total	100%	76

Q12_4_TEXT - Other (please specify):

Other (please specify): - Text
Manager
Utilities superintendent
Chief Operator

Superintendent
chief operator
WWTP Chief Operator
Manager
Lab Super/Chief Operator
Treatment Operations Supervisor

Q13 - Are you a supervisor or manager at the utility?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Are you a supervisor or manager at the utility?	1.00	2.00	1.18	0.39	0.15	76

#	Answer	%	Count
1	Yes	81.58%	62
2	No	18.42%	14
	Total	100%	76

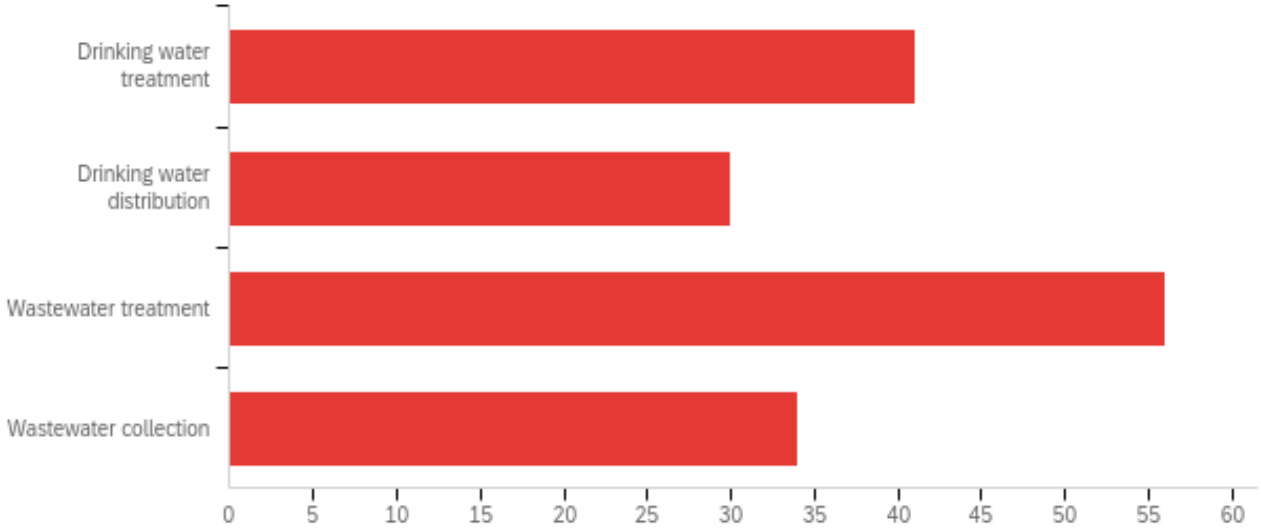
Q14 - On average, how many hours do you work per week?

On average, how many hours do you work per week?
44
50
45
40+
43
50
40
50
40
40
40
60
40
50
40
40
48
40
40
60
42
45
45
50
44

48
40
40
44
40
46
40
40
56
40
10
50
45
65
48
50
8
40
50
40
40-60
40
44
46
50
45
40
40

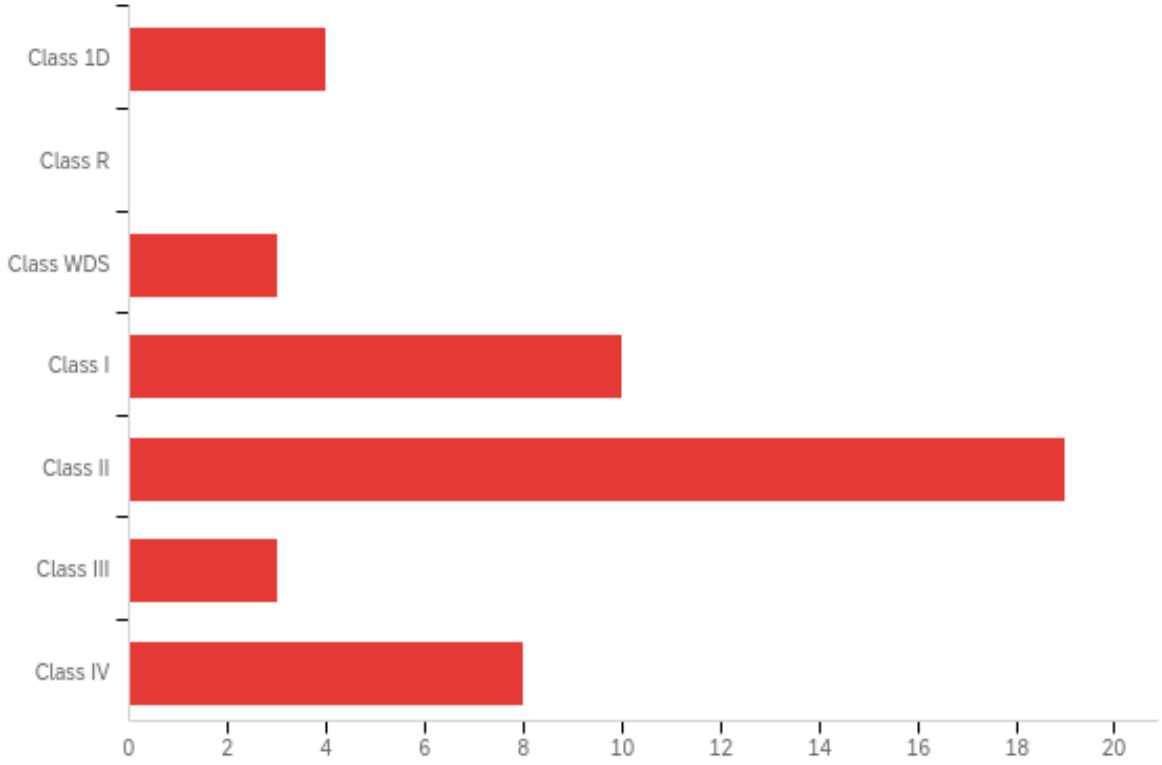
48
40
44
60
45-50
40
30
40+
40
65
40
50
I get paid for 40, but i am always on the clock.
40
25
40
40+
40
50+
45
40
45
50

Q15 - Which of the following describe your utility? (Select all that apply)



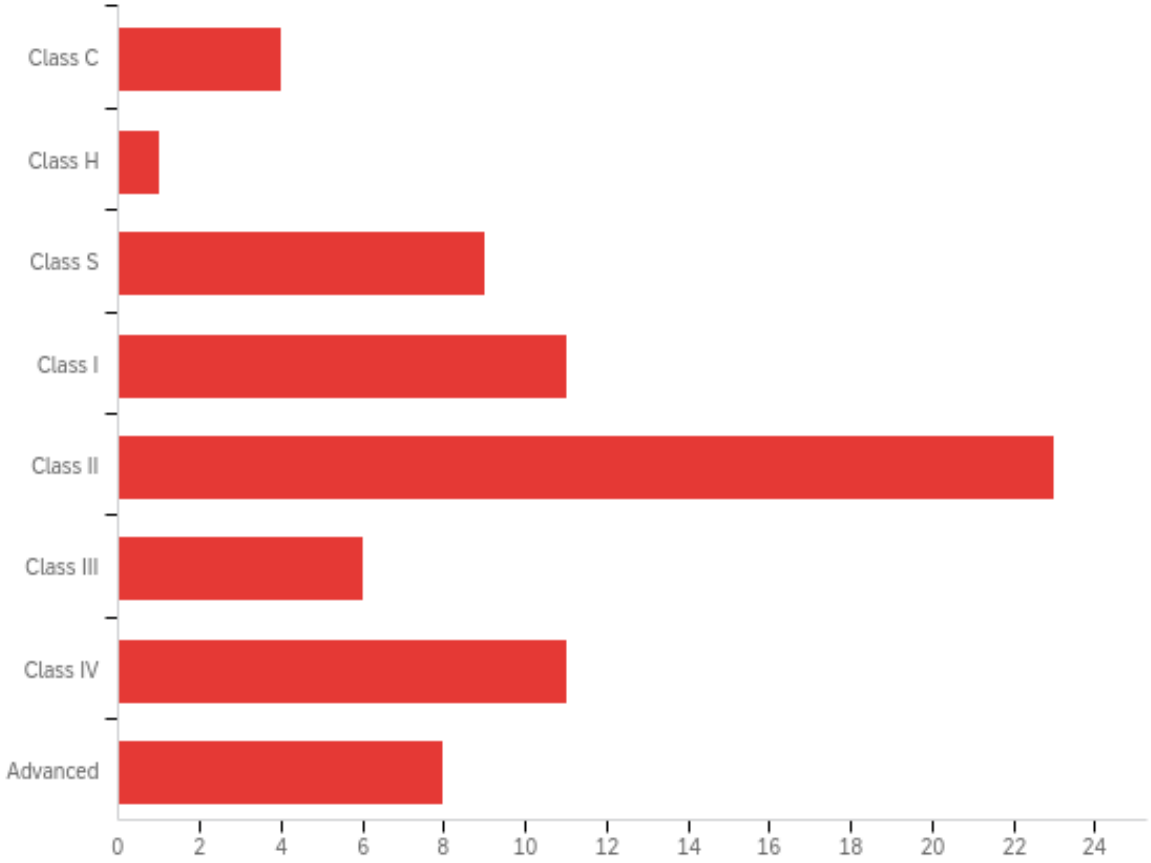
#	Answer	%	Count
1	Drinking water treatment	25.47%	41
2	Drinking water distribution	18.63%	30
3	Wastewater treatment	34.78%	56
4	Wastewater collection	21.12%	34
	Total	100%	161

Q15a - What class is your drinking water treatment or distribution utility?



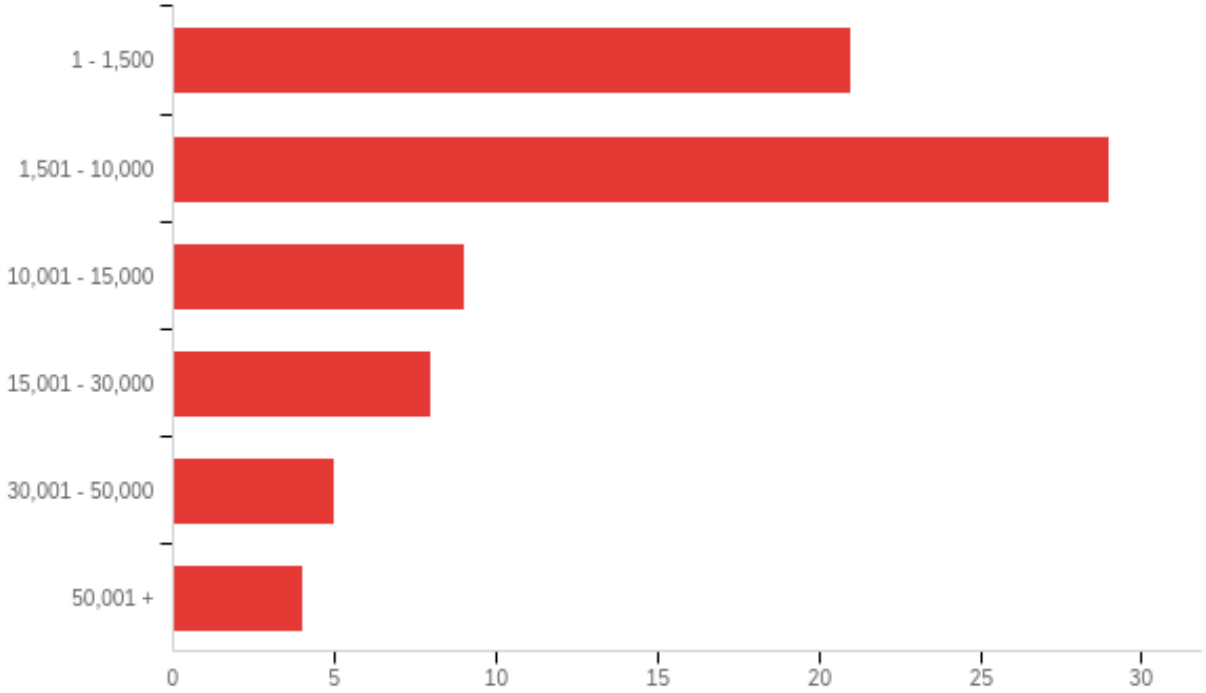
#	Answer	%	Count
1	Class 1D	8.51%	4
2	Class R	0.00%	0
3	Class WDS	6.38%	3
4	Class I	21.28%	10
5	Class II	40.43%	19
6	Class III	6.38%	3
7	Class IV	17.02%	8
	Total	100%	47

Q15b - What class is your wastewater treatment utility?



#	Answer	%	Count
1	Class C	5.48%	4
2	Class H	1.37%	1
3	Class S	12.33%	9
4	Class I	15.07%	11
5	Class II	31.51%	23
6	Class III	8.22%	6
7	Class IV	15.07%	11
8	Advanced	10.96%	8
	Total	100%	73

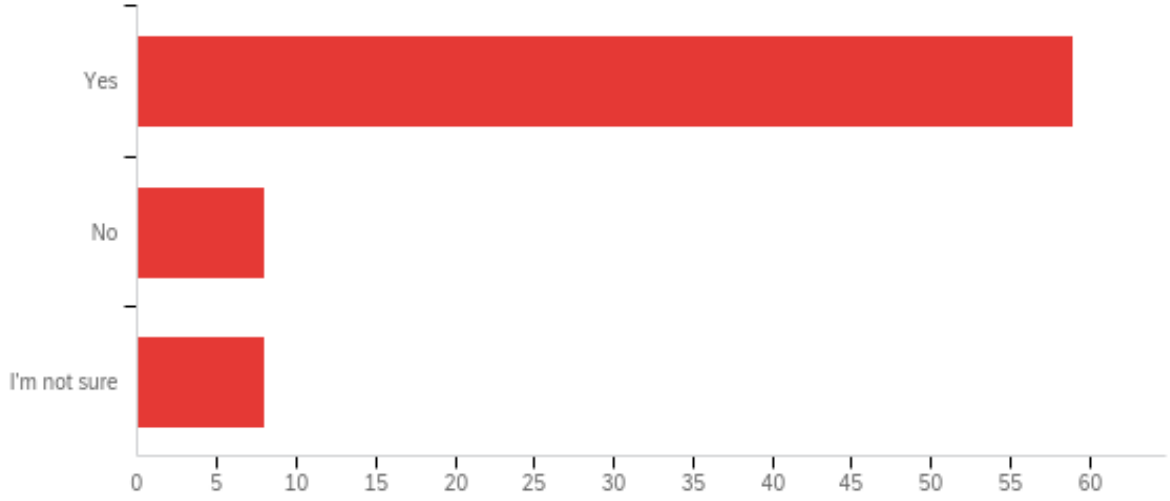
Q16 - How many people does your utility directly serve? Select the highest range for the drinking water or wastewater services provided.



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How many people does your utility directly serve? Select the highest range for the drinking water or wastewater services provided.	1.00	6.00	2.46	1.43	2.04	76

#	Answer	%	Count
1	1 - 1,500	27.63%	21
2	1,501 - 10,000	38.16%	29
3	10,001 - 15,000	11.84%	9
4	15,001 - 30,000	10.53%	8
5	30,001 - 50,000	6.58%	5
6	50,001 +	5.26%	4
	Total	100%	76

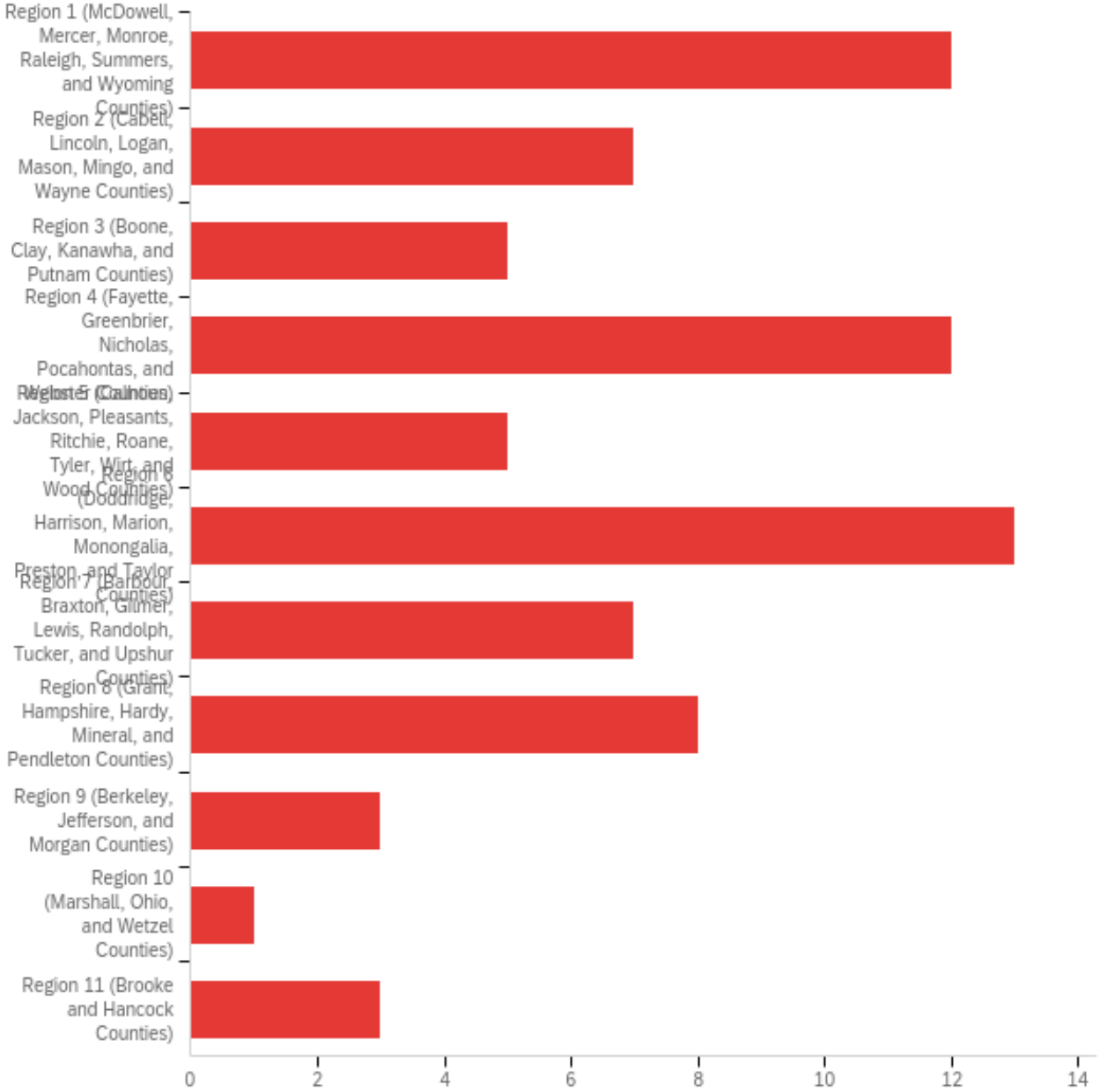
Q17 - Is your utility regulated by West Virginia's Public Service Commission (PSC)?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Is your utility regulated by West Virginia's Public Service Commission (PSC)?	1.00	3.00	1.32	0.66	0.43	75

#	Answer	%	Count
1	Yes	78.67%	59
2	No	10.67%	8
3	I'm not sure	10.67%	8
	Total	100%	75

Q18 - What regional planning and development council is your utility in? If your utility is in more than one region, please choose the one where your main office is located. A map of regions is provided below for reference.

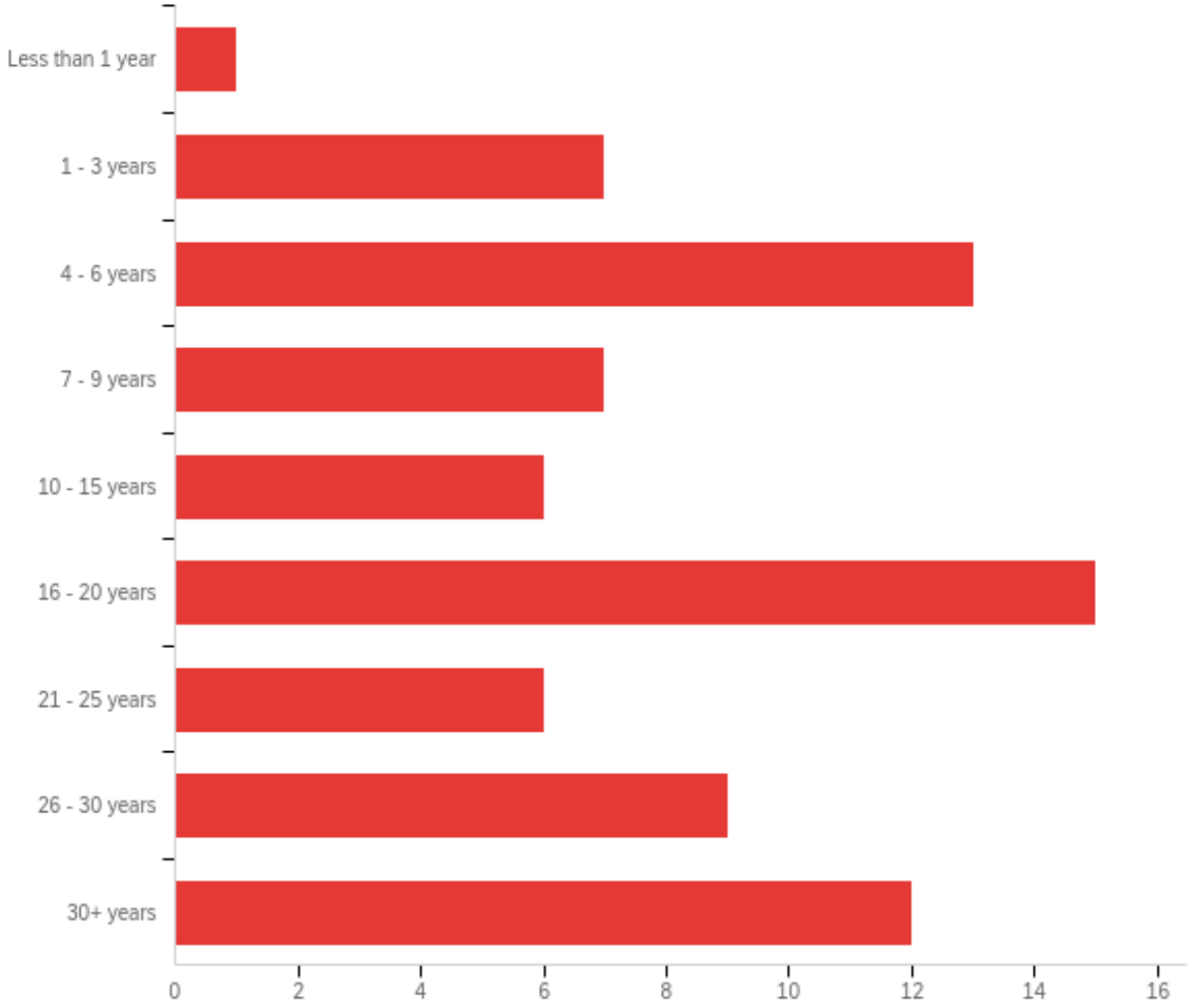


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What regional planning and development council is your utility in? If your utility is in more than one region, please choose the one	1.00	11.00	4.93	2.76	7.64	76

where your main office is located. A map of regions is provided below for reference.						

#	Answer	%	Count
1	Region 1 (McDowell, Mercer, Monroe, Raleigh, Summers, and Wyoming Counties)	15.79%	12
2	Region 2 (Cabell, Lincoln, Logan, Mason, Mingo, and Wayne Counties)	9.21%	7
3	Region 3 (Boone, Clay, Kanawha, and Putnam Counties)	6.58%	5
4	Region 4 (Fayette, Greenbrier, Nicholas, Pocahontas, and Webster Counties)	15.79%	12
5	Region 5 (Calhoun, Jackson, Pleasants, Ritchie, Roane, Tyler, Wirt, and Wood Counties)	6.58%	5
6	Region 6 (Doddridge, Harrison, Marion, Monongalia, Preston, and Taylor Counties)	17.11%	13
7	Region 7 (Barbour, Braxton, Gilmer, Lewis, Randolph, Tucker, and Upshur Counties)	9.21%	7
8	Region 8 (Grant, Hampshire, Hardy, Mineral, and Pendleton Counties)	10.53%	8
9	Region 9 (Berkeley, Jefferson, and Morgan Counties)	3.95%	3
10	Region 10 (Marshall, Ohio, and Wetzel Counties)	1.32%	1
11	Region 11 (Brooke and Hancock Counties)	3.95%	3
	Total	100%	76

Q19 - How many years have you worked at the utility?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How many years have you worked at the utility?	1.00	9.00	5.58	2.36	5.59	76

#	Answer	%	Count
1	Less than 1 year	1.32%	1
2	1 - 3 years	9.21%	7
3	4 - 6 years	17.11%	13
4	7 - 9 years	9.21%	7

5	10 - 15 years	7.89%	6
6	16 - 20 years	19.74%	15
7	21 - 25 years	7.89%	6
8	26 - 30 years	11.84%	9
9	30+ years	15.79%	12
	Total	100%	76

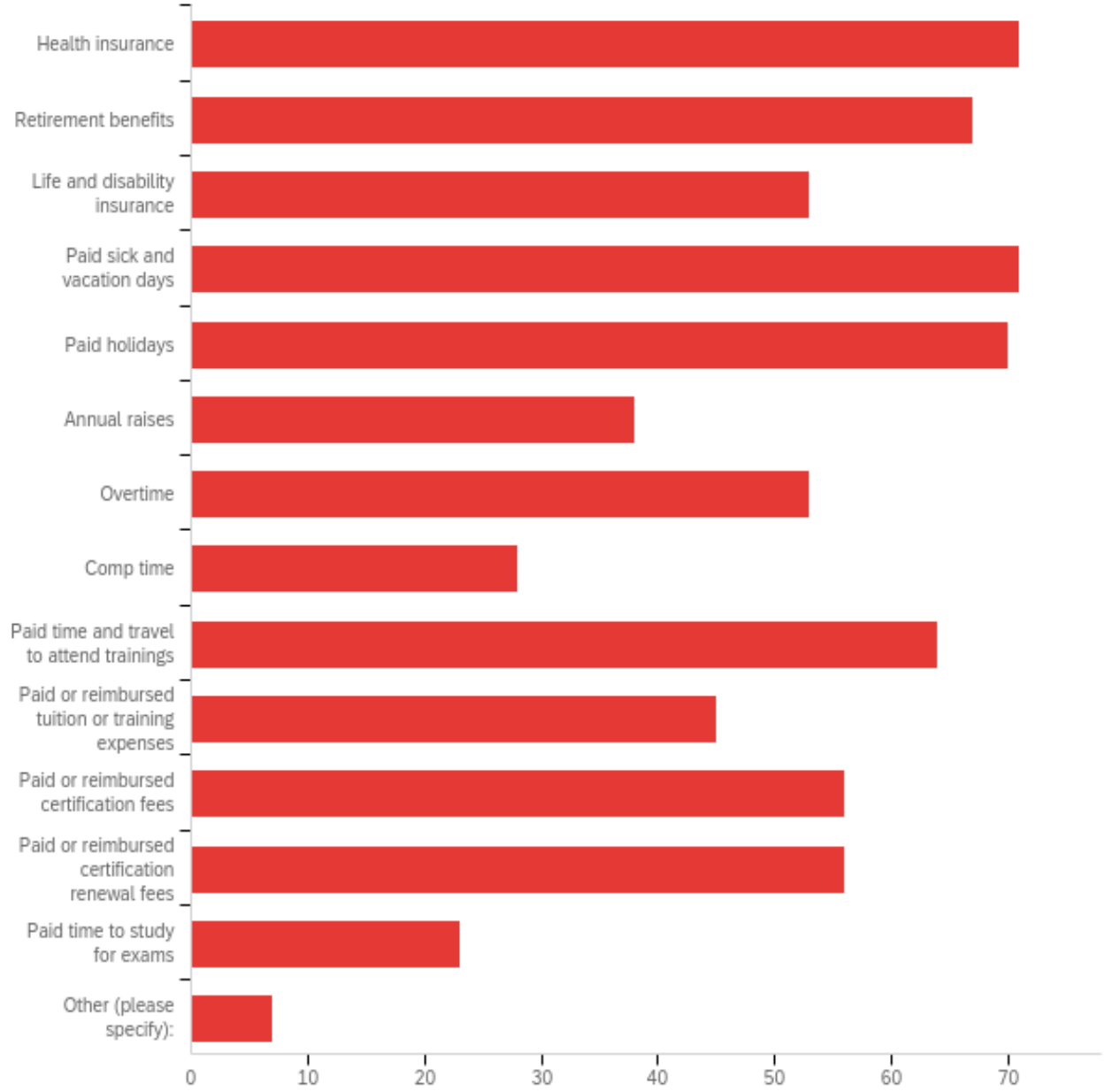
Q20 - Using the slider below, move the bar to the number that corresponds with your hourly wage.

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Hourly Wage ($)	0.00	50.00	25.81	9.49	90.02	74

Q21 - Using the slider below, move the bar to the number that corresponds with what you think your hourly wage should be.

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Hourly Wage ($)	8.00	60.00	32.36	9.61	92.29	72

Q22 - What benefits does your utility provide? (Select all that apply)



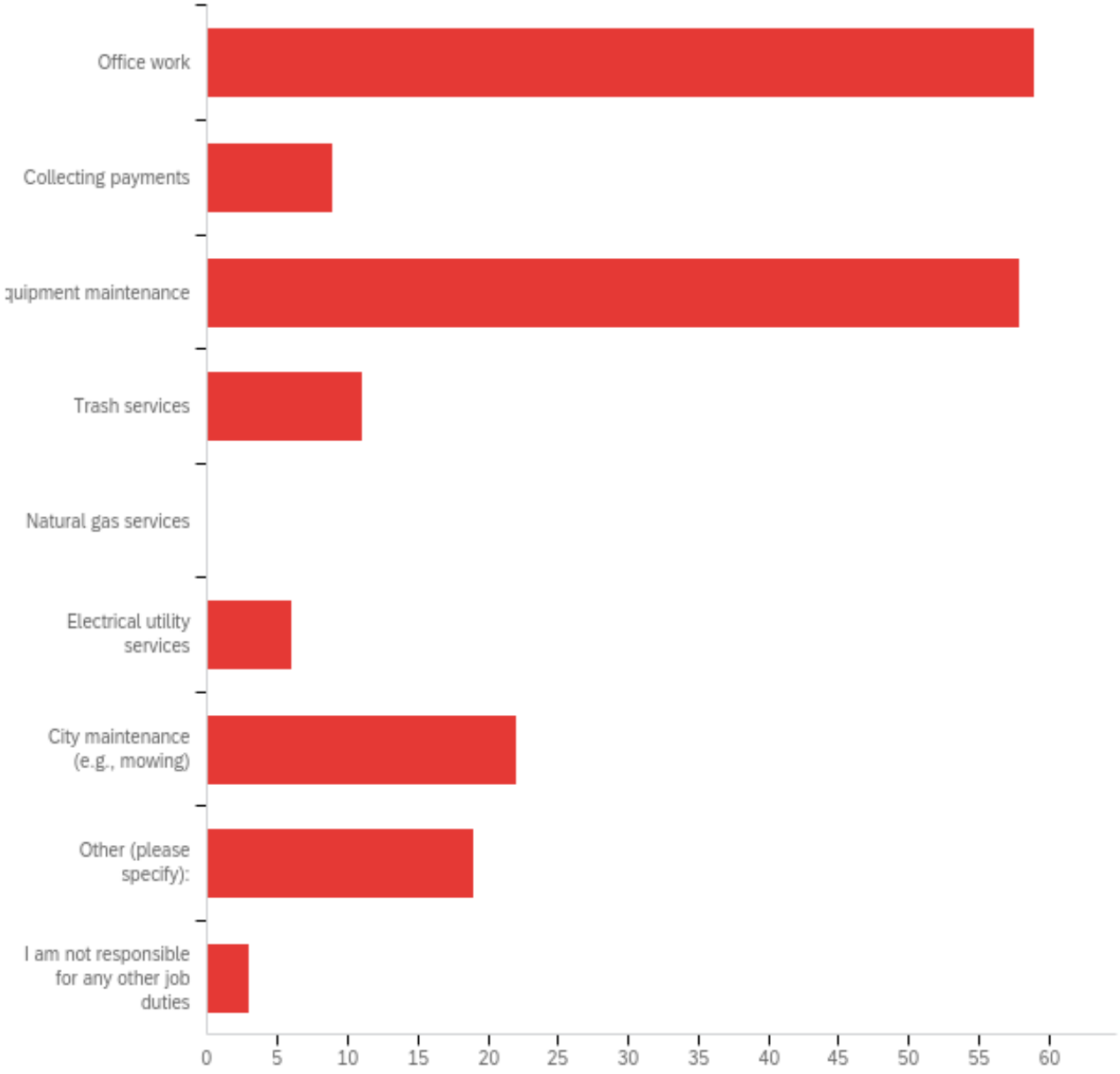
#	Answer	%	Count
1	Health insurance	10.11%	71
2	Retirement benefits	9.54%	67
3	Life and disability insurance	7.55%	53
4	Paid sick and vacation days	10.11%	71
5	Paid holidays	9.97%	70

6	Annual raises	5.41%	38
7	Overtime	7.55%	53
8	Comp time	3.99%	28
9	Paid time and travel to attend trainings	9.12%	64
10	Paid or reimbursed tuition or training expenses	6.41%	45
11	Paid or reimbursed certification fees	7.98%	56
12	Paid or reimbursed certification renewal fees	7.98%	56
13	Paid time to study for exams	3.28%	23
14	Other (please specify):	1.00%	7
	Total	100%	702

Q22_14_TEXT - Other (please specify):

Other (please specify): - Text
I now work part-time for this utliity, when I worked full-time they offered all of these things, but all of these are not offered as a part-time person.
Vehicle and phone
Volunteer
Clothing and Shoe allowance
Close to home, day shift job
401k
NONE

Q23 - What job duties are you responsible for at your utility, other than basic system/treatment works? (Select all that apply)



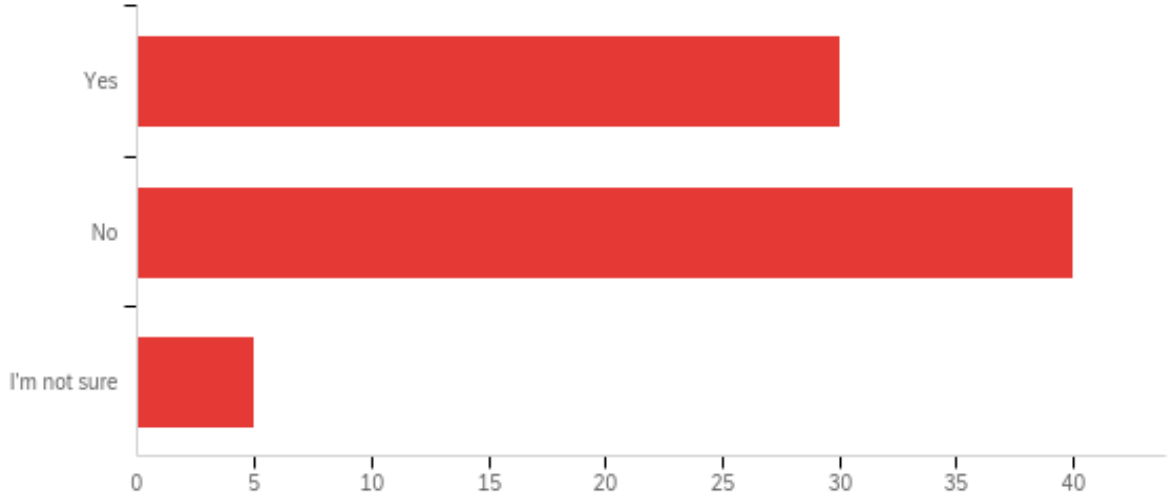
#	Answer	%	Count
1	Office work	31.55%	59
2	Collecting payments	4.81%	9
3	Equipment maintenance	31.02%	58
4	Trash services	5.88%	11

5	Natural gas services	0.00%	0
6	Electrical utility services	3.21%	6
7	City maintenance (e.g., mowing)	11.76%	22
8	Other (please specify):	10.16%	19
9	I am not responsible for any other job duties	1.60%	3
	Total	100%	187

Q23_8_TEXT - Other (please specify):

Other (please specify): - Text
Maintain Floodwal & Pump station
painting, cleaning, snow removal
Flood plain Manager
solids disposal
running a state park
Filing reports with WVDEP
assist water and maintenance dept as needed
Plant operation, distribution pump operation, chemical feed, water quality lab testing
Training and Safety
water and wastewater operations and plant and system maint.
Grounds keeping to all town property, building maintenance to all of the towns buildings.
Operator duties
Bac -T testing
compliance
Laboratory Manager
Water Treatment and related office duties
EXPANSION PROJECT
Water Treatment Plant Operation
Running Backhoe

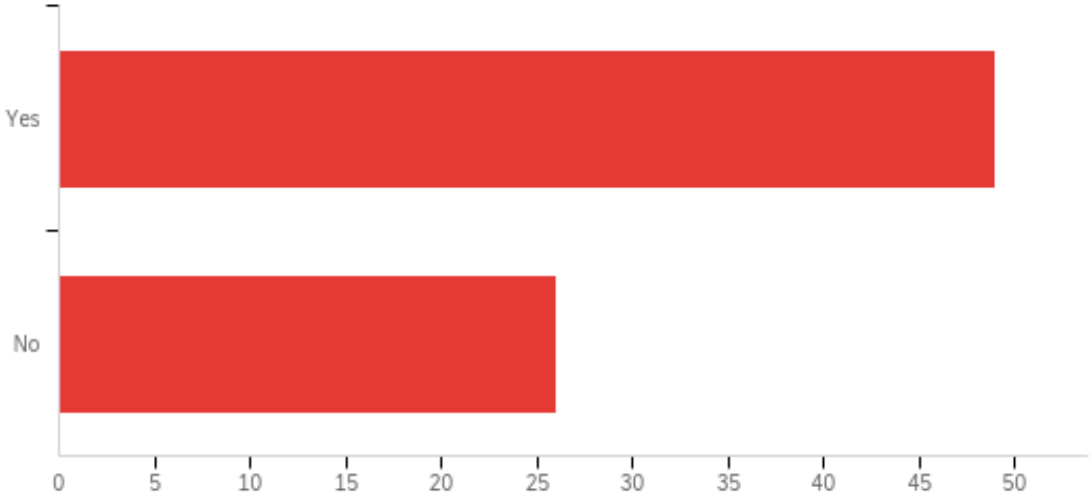
Q24 - Does your utility have a trainee or apprentice program?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Does your utility have a trainee or apprentice program?	1.00	3.00	1.67	0.60	0.36	75

#	Answer	%	Count
1	Yes	40.00%	30
2	No	53.33%	40
3	I'm not sure	6.67%	5
	Total	100%	75

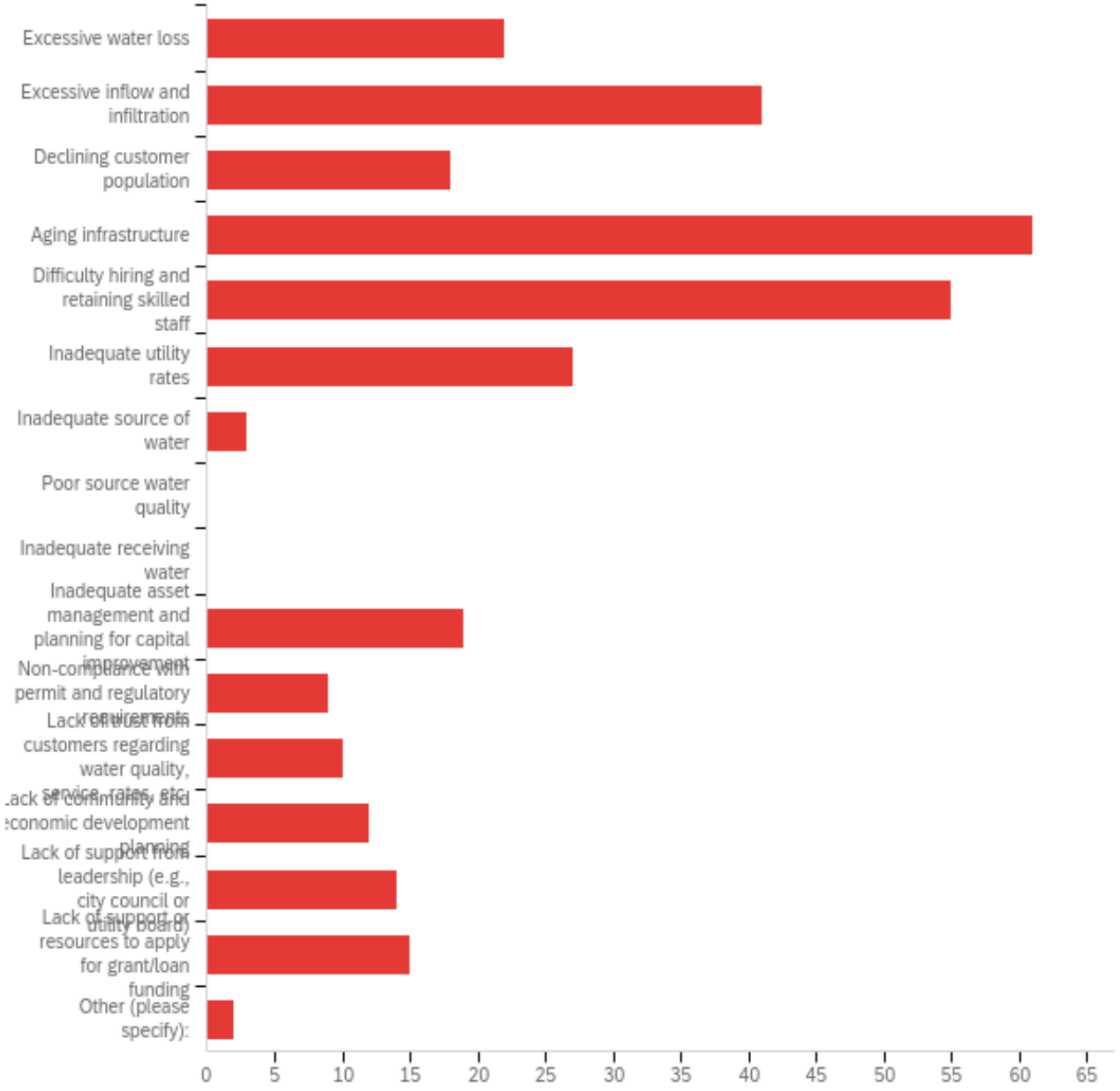
Q25 - Does your utility offer opportunities for promotions and career advancement?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Does your utility offer opportunities for promotions and career advancement?	1.00	2.00	1.35	0.48	0.23	75

#	Answer	%	Count
1	Yes	65.33%	49
2	No	34.67%	26
	Total	100%	75

Q26 - What type of operational challenges does your utility face? (Select all that apply)



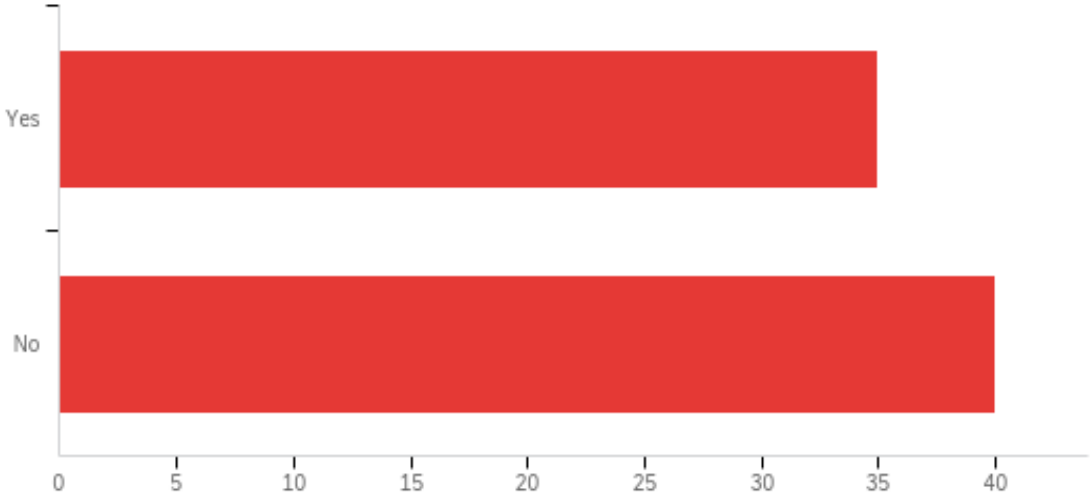
#	Answer	%	Count
1	Excessive water loss	7.14%	22
2	Excessive inflow and infiltration	13.31%	41
3	Declining customer population	5.84%	18
4	Aging infrastructure	19.81%	61

5	Difficulty hiring and retaining skilled staff	17.86%	55
6	Inadequate utility rates	8.77%	27
7	Inadequate source of water	0.97%	3
8	Poor source water quality	0.00%	0
9	Inadequate receiving water	0.00%	0
10	Inadequate asset management and planning for capital improvement	6.17%	19
11	Non-compliance with permit and regulatory requirements	2.92%	9
12	Lack of trust from customers regarding water quality, service, rates, etc.	3.25%	10
13	Lack of community and economic development planning	3.90%	12
14	Lack of support from leadership (e.g., city council or utility board)	4.55%	14
15	Lack of support or resources to apply for grant/loan funding	4.87%	15
16	Other (please specify):	0.65%	2
	Total	100%	308

Q26_16_TEXT - Other (please specify):

Other (please specify): - Text
daily and weekly variation of inflow
Campground all volunteer workers, Blue Well pump service when needed.

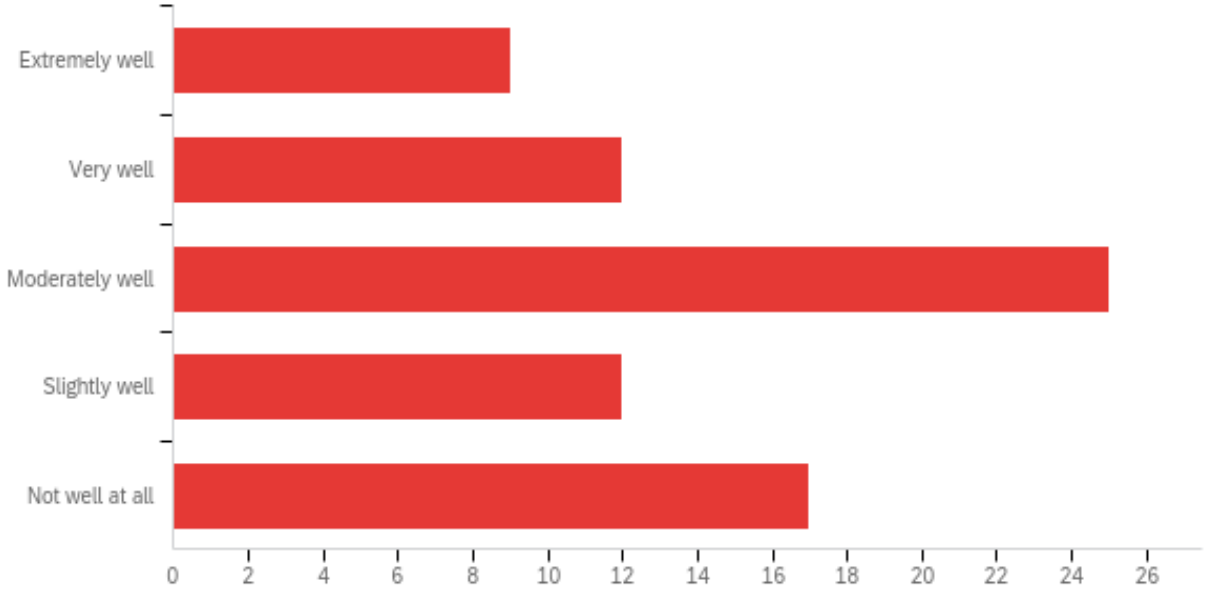
Q27 - In your opinion, does your utility have enough operators?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	In your opinion, does your utility have enough operators?	1.00	2.00	1.53	0.50	0.25	75

#	Answer	%	Count
1	Yes	46.67%	35
2	No	53.33%	40
	Total	100%	75

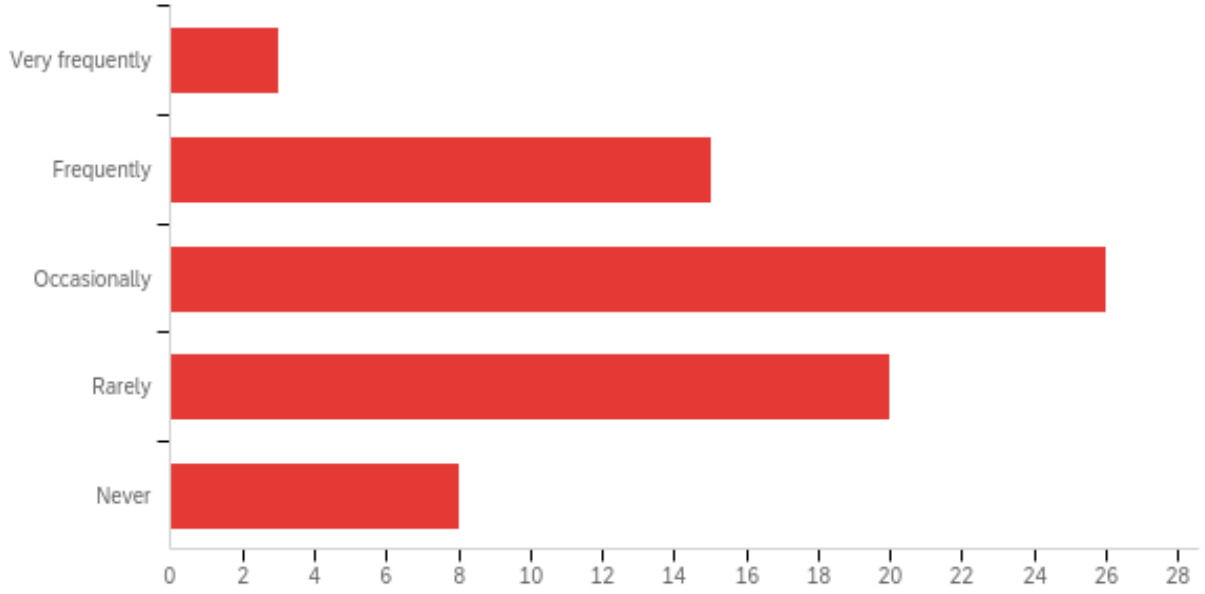
Q28 - How well do your utility's decision makers (e.g., city council or utility board) understand what you do in your job?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How well do your utility's decision makers (e.g., city council or utility board) understand what you do in your job?	1.00	5.00	3.21	1.29	1.66	75

#	Answer	%	Count
1	Extremely well	12.00%	9
2	Very well	16.00%	12
3	Moderately well	33.33%	25
4	Slightly well	16.00%	12
5	Not well at all	22.67%	17
	Total	100%	75

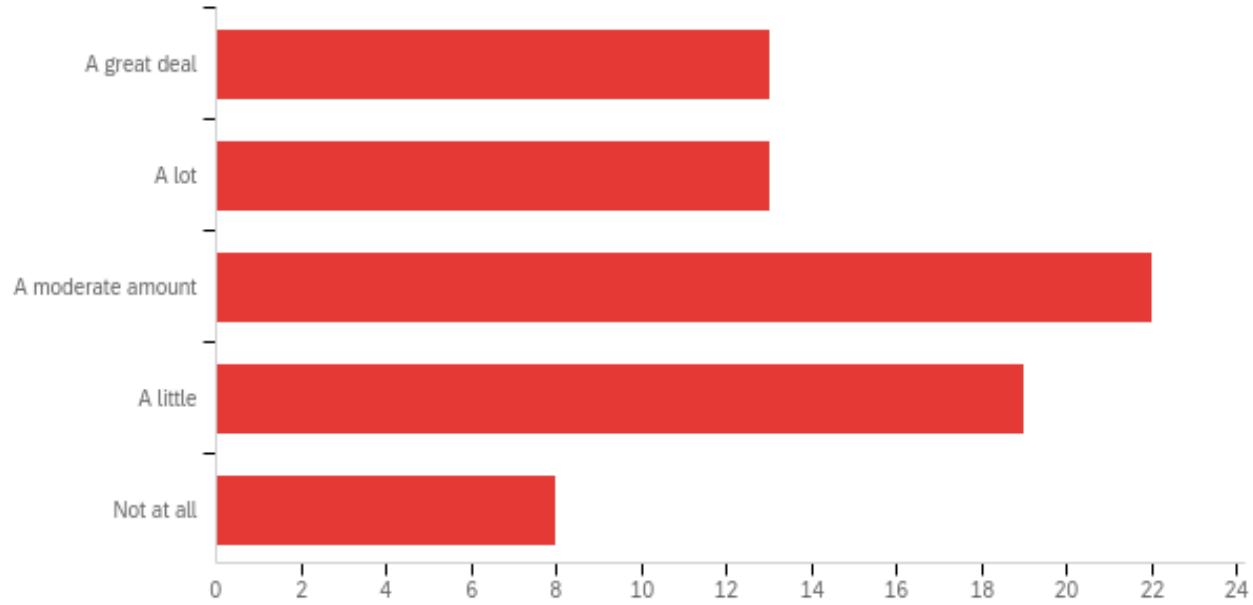
Q29 - How often do your utility's decision makers (e.g., city council or utility board) communicate with the operators?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How often do your utility's decision makers (e.g., city council or utility board) communicate with the operators?	1.00	5.00	3.21	1.03	1.05	72

#	Answer	%	Count
1	Very frequently	4.17%	3
2	Frequently	20.83%	15
3	Occasionally	36.11%	26
4	Rarely	27.78%	20
5	Never	11.11%	8
	Total	100%	72

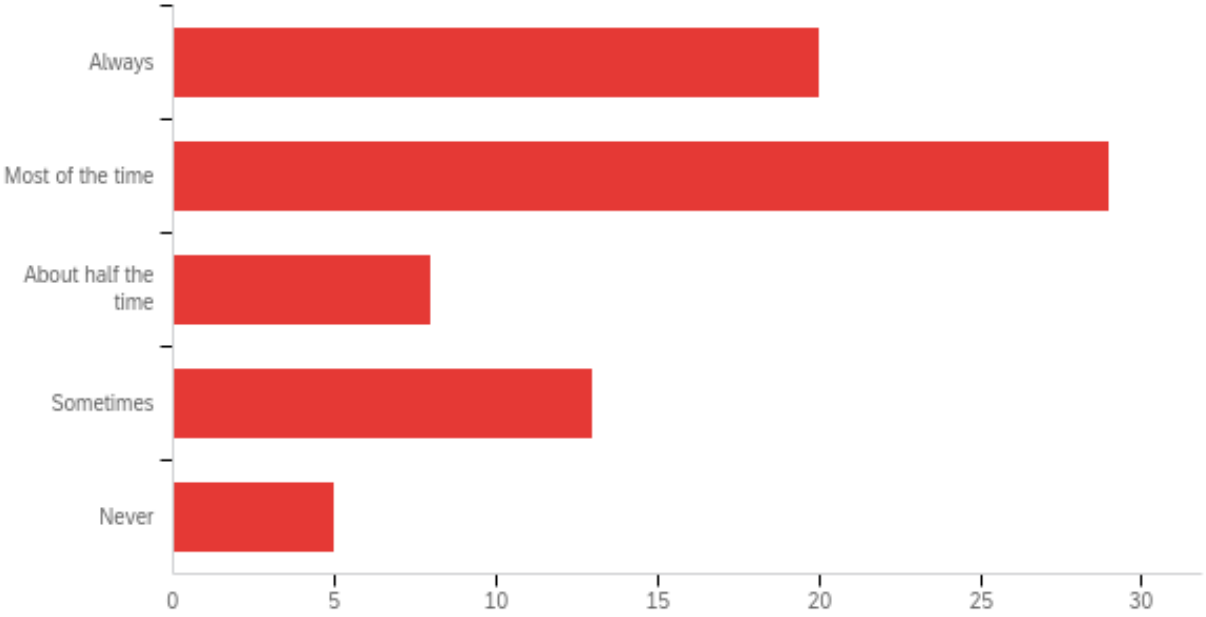
Q30 - Do you feel appreciated by your utility?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you feel appreciated by your utility?	1.00	5.00	2.95	1.24	1.54	75

#	Answer	%	Count
1	A great deal	17.33%	13
2	A lot	17.33%	13
3	A moderate amount	29.33%	22
4	A little	25.33%	19
5	Not at all	10.67%	8
	Total	100%	75

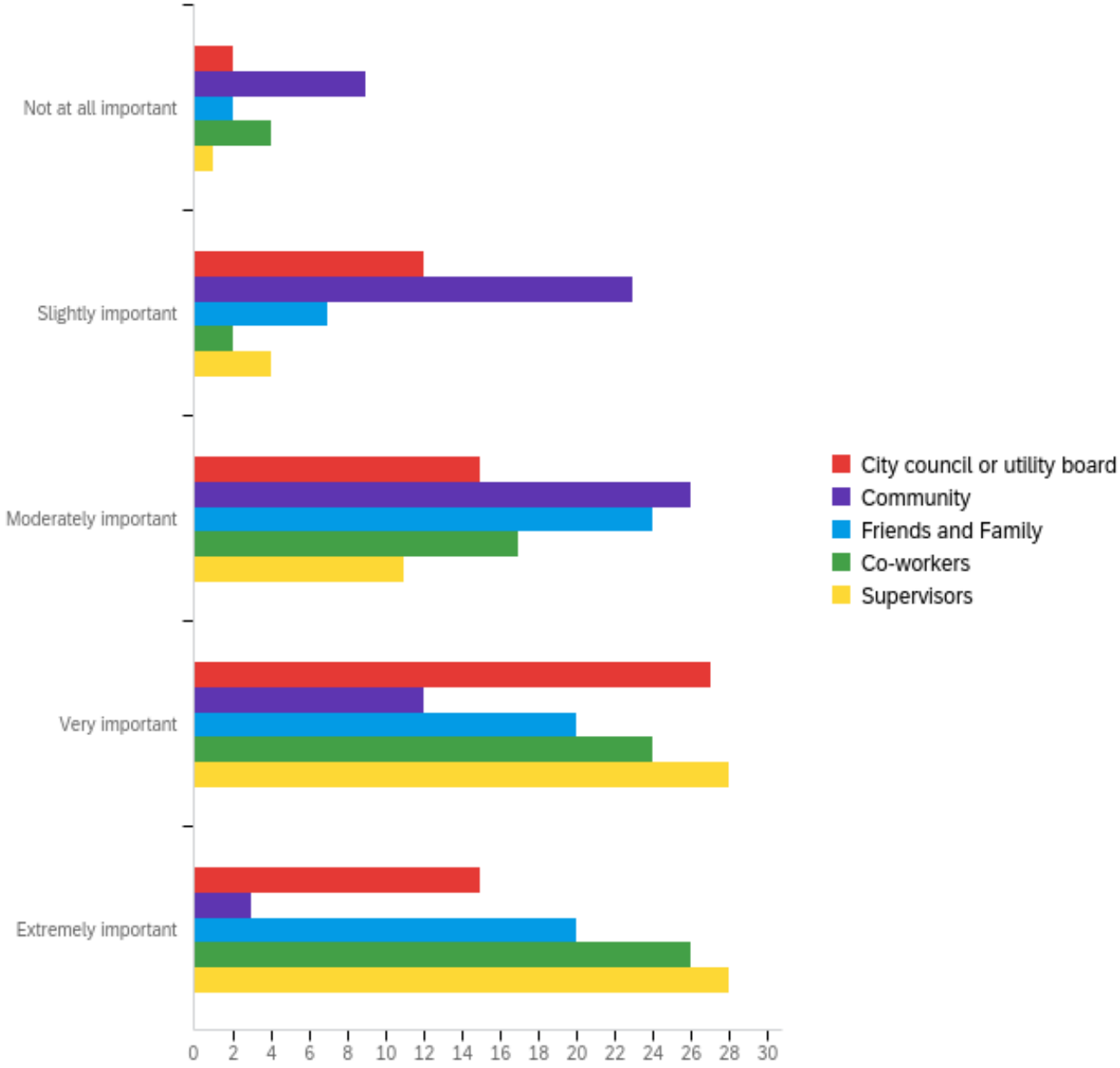
Q31 - Do your managers listen to your opinions on matters that you deal with on a daily basis?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do your managers listen to your opinions on matters that you deal with on a daily basis?	1.00	5.00	2.39	1.23	1.52	75

#	Answer	%	Count
1	Always	26.67%	20
2	Most of the time	38.67%	29
3	About half the time	10.67%	8
4	Sometimes	17.33%	13
5	Never	6.67%	5
	Total	100%	75

Q32 - The services provided by drinking water and wastewater utility operators protect public health, the environment, and water quality. Consider each of the following groups of people and tell us, in your opinion, do they think the work you do is not at all important, slightly important, moderately important, very important, or extremely important?

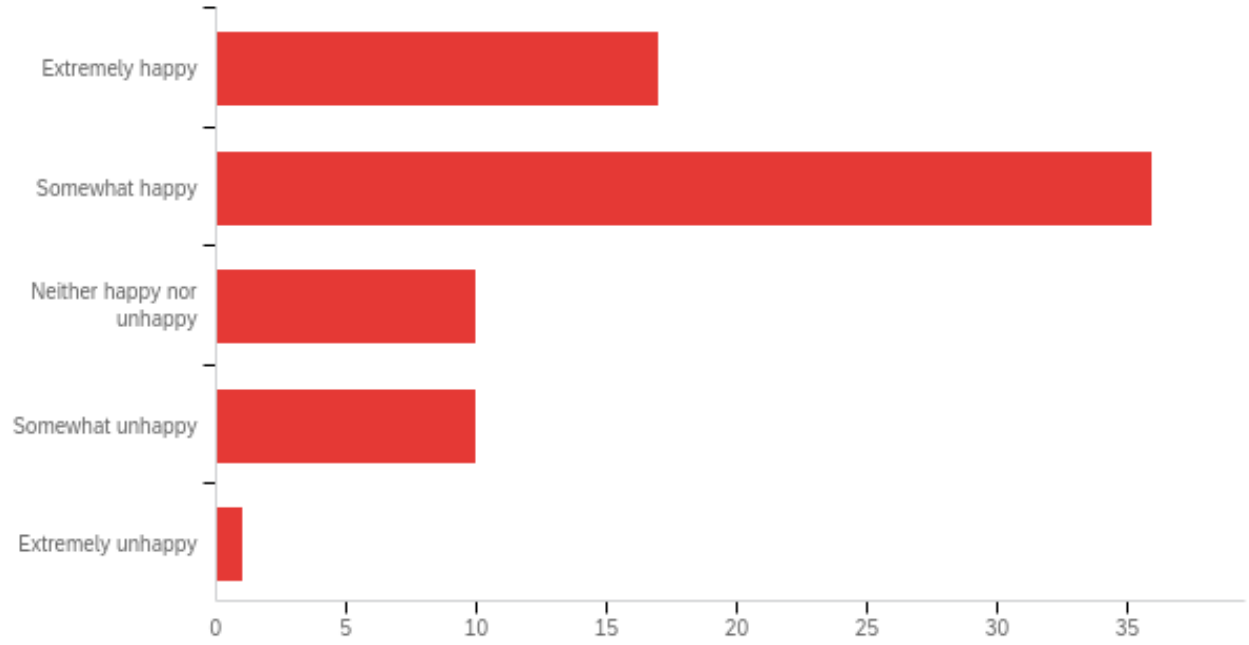


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	City council or utility board	1.00	5.00	3.58	1.08	1.17	71

2	Community	1.00	5.00	2.68	1.02	1.04	73
3	Friends and Family	1.00	5.00	3.67	1.06	1.12	73
4	Co-workers	1.00	5.00	3.90	1.09	1.18	73
5	Supervisors	1.00	5.00	4.08	0.94	0.88	72

#	Question	Not at all important		Slightly important		Moderately important		Very important		Extremely important		Total
1	City council or utility board	2.82%	2	16.90%	12	21.13%	15	38.03%	27	21.13%	15	71
2	Community	12.33%	9	31.51%	23	35.62%	26	16.44%	12	4.11%	3	73
3	Friends and Family	2.74%	2	9.59%	7	32.88%	24	27.40%	20	27.40%	20	73
4	Co-workers	5.48%	4	2.74%	2	23.29%	17	32.88%	24	35.62%	26	73
5	Supervisors	1.39%	1	5.56%	4	15.28%	11	38.89%	28	38.89%	28	72

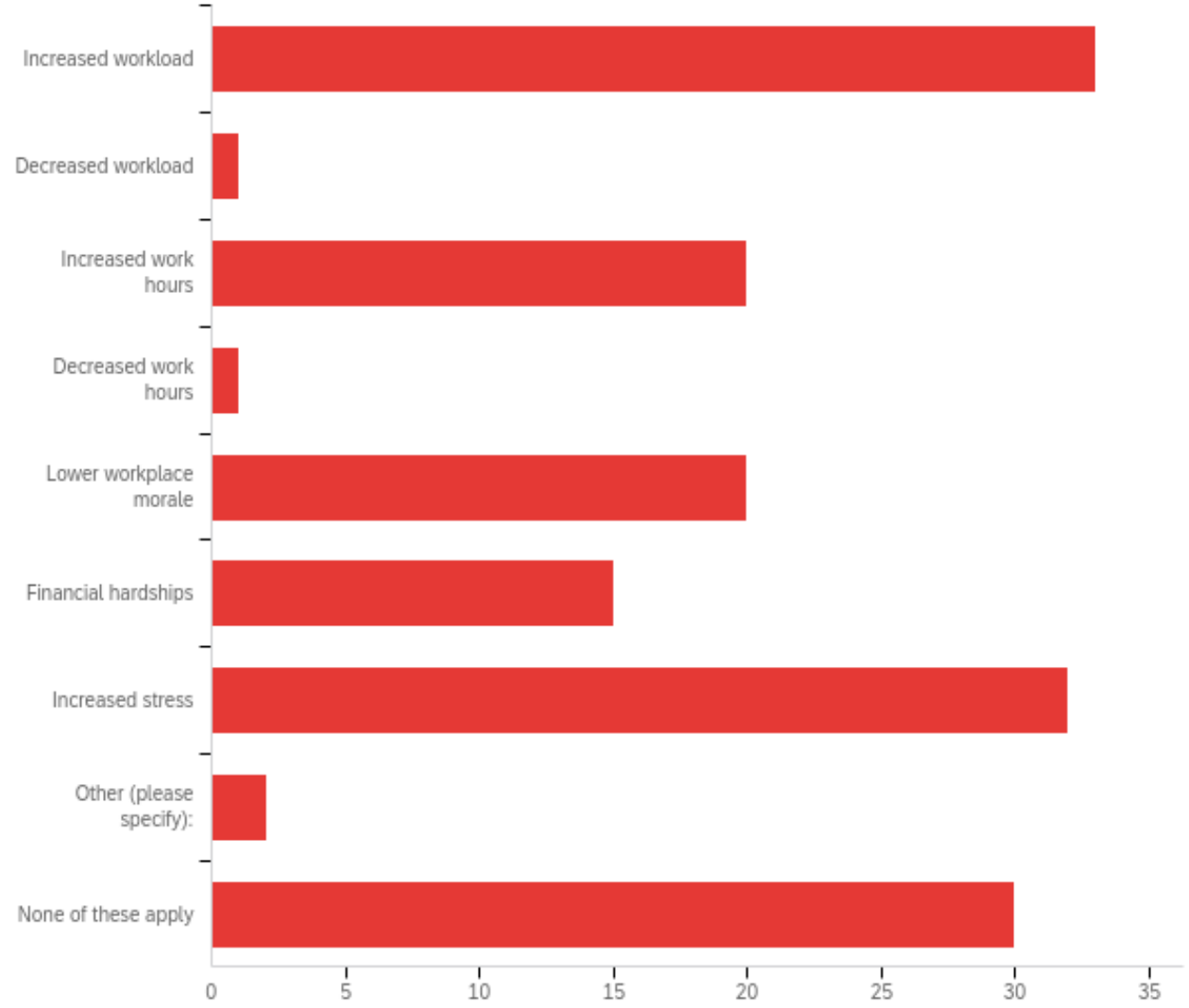
Q33 - How happy are you at work?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How happy are you at work?	1.00	5.00	2.22	0.99	0.98	74

#	Answer	%	Count
1	Extremely happy	22.97%	17
2	Somewhat happy	48.65%	36
3	Neither happy nor unhappy	13.51%	10
4	Somewhat unhappy	13.51%	10
5	Extremely unhappy	1.35%	1
	Total	100%	74

Q34 - Since the start of the COVID-19 pandemic, have you experienced any of the following? (Select all that apply)



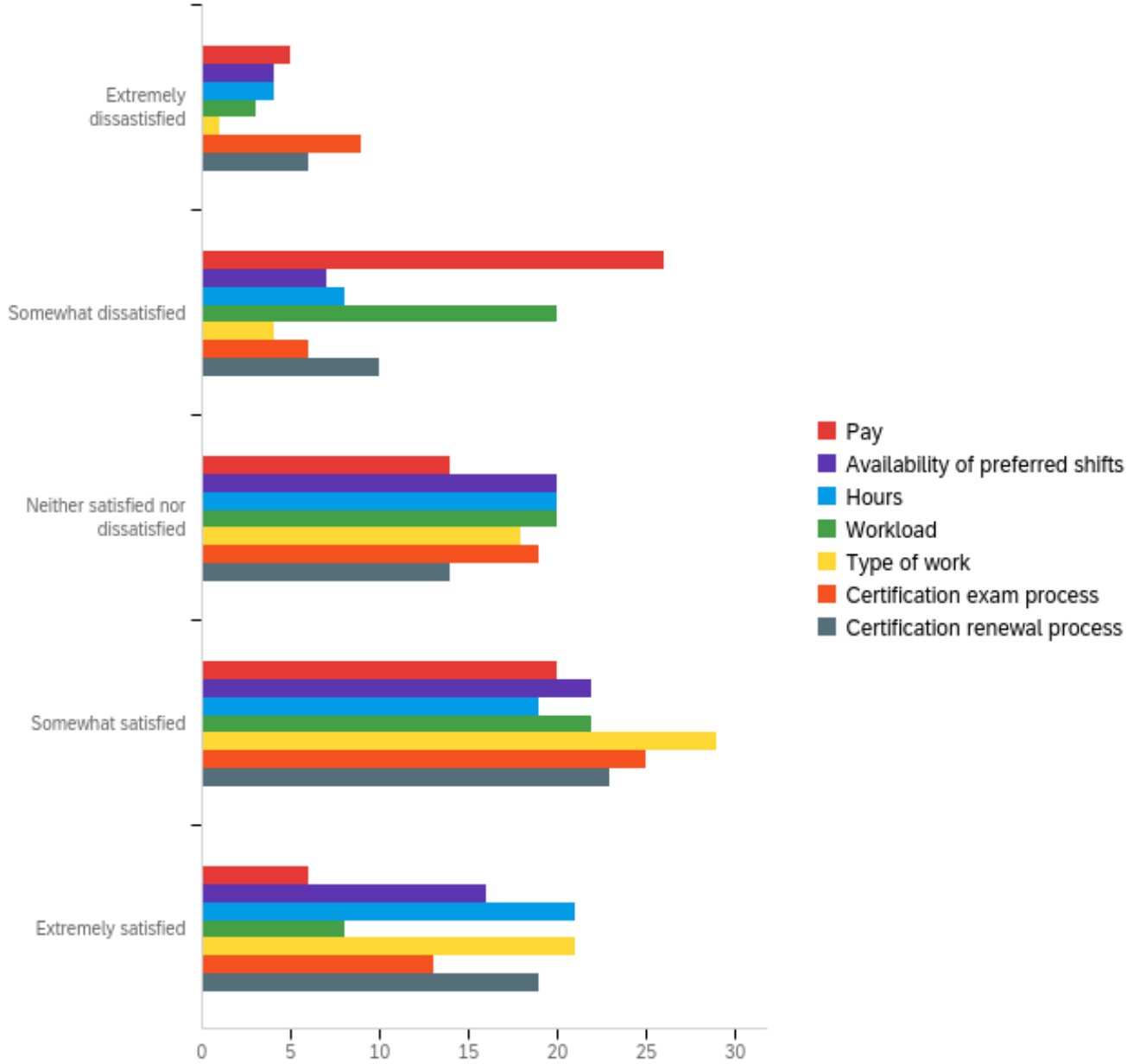
#	Answer	%	Count
1	Increased workload	21.43%	33
2	Decreased workload	0.65%	1
3	Increased work hours	12.99%	20
4	Decreased work hours	0.65%	1
5	Lower workplace morale	12.99%	20
6	Financial hardships	9.74%	15
7	Increased stress	20.78%	32

8	Other (please specify):	1.30%	2
9	None of these apply	19.48%	30
	Total	100%	154

Q34_8_TEXT - Other (please specify):

Other (please specify): - Text
Experienced all before
Parts availability

Q35 - Consider each of the following and indicate whether you are extremely dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, or extremely satisfied with that aspect of your job.

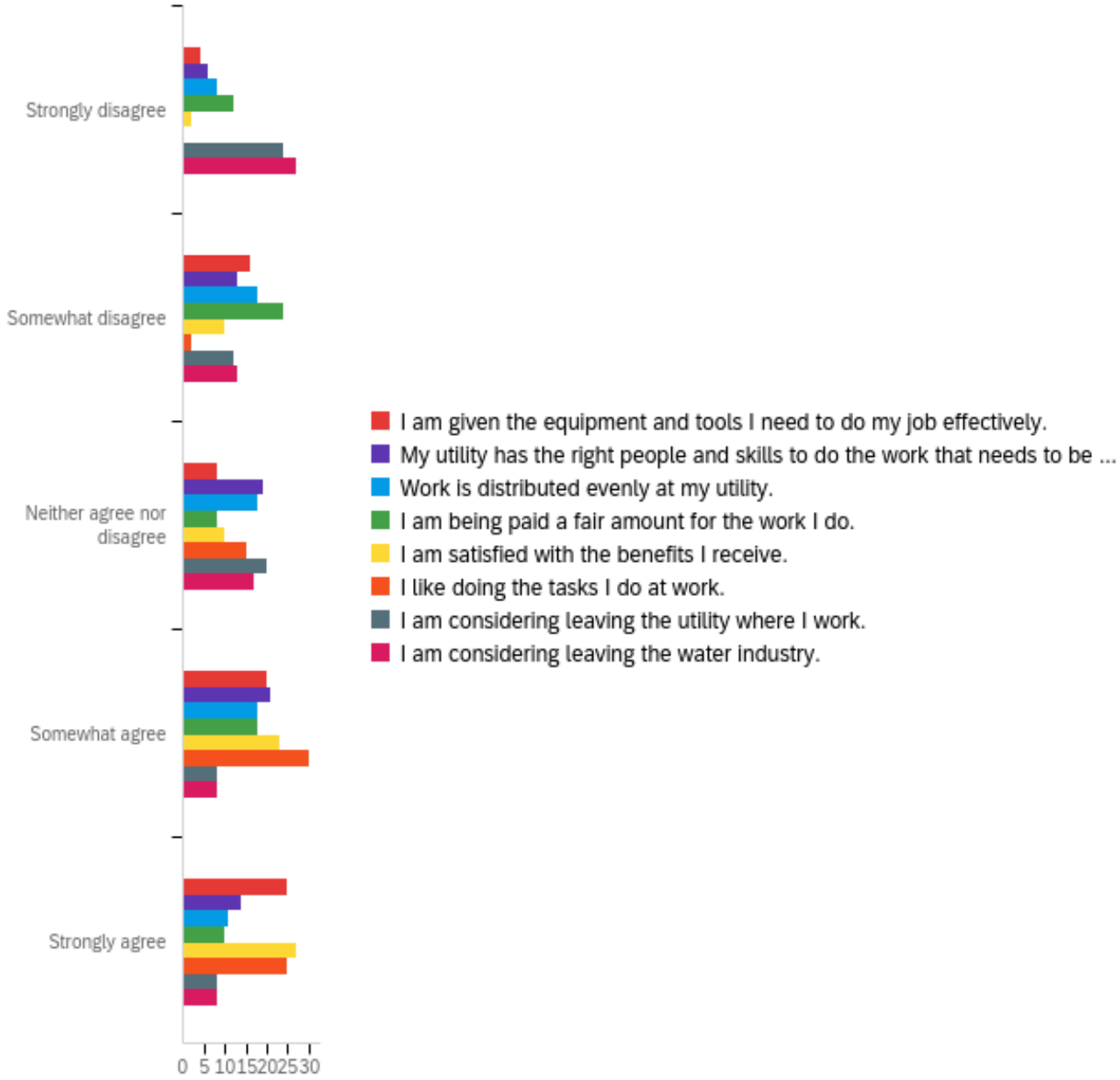


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Pay	1.00	5.00	2.94	1.12	1.26	71
2	Availability of preferred shifts	1.00	5.00	3.57	1.12	1.26	69

3	Hours	1.00	5.00	3.63	1.17	1.37	72
4	Workload	1.00	5.00	3.16	1.07	1.15	73
5	Type of work	1.00	5.00	3.89	0.93	0.86	73
6	Certification exam process	1.00	5.00	3.38	1.23	1.51	72
7	Certification renewal process	1.00	5.00	3.54	1.25	1.55	72

#	Question	Extremely dissastisfied		Somewhat dissatisfied		Neither satisfied nor dissatisfied		Somewhat satisfied		Extremely satisfied		Total
1	Pay	7.04%	5	36.62%	26	19.72%	14	28.17%	20	8.45%	6	71
2	Availability of preferred shifts	5.80%	4	10.14%	7	28.99%	20	31.88%	22	23.19%	16	69
3	Hours	5.56%	4	11.11%	8	27.78%	20	26.39%	19	29.17%	21	72
4	Workload	4.11%	3	27.40%	20	27.40%	20	30.14%	22	10.96%	8	73
5	Type of work	1.37%	1	5.48%	4	24.66%	18	39.73%	29	28.77%	21	73
6	Certification exam process	12.50%	9	8.33%	6	26.39%	19	34.72%	25	18.06%	13	72
7	Certification renewal process	8.33%	6	13.89%	10	19.44%	14	31.94%	23	26.39%	19	72

Q36 - Consider the following statements and indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each.



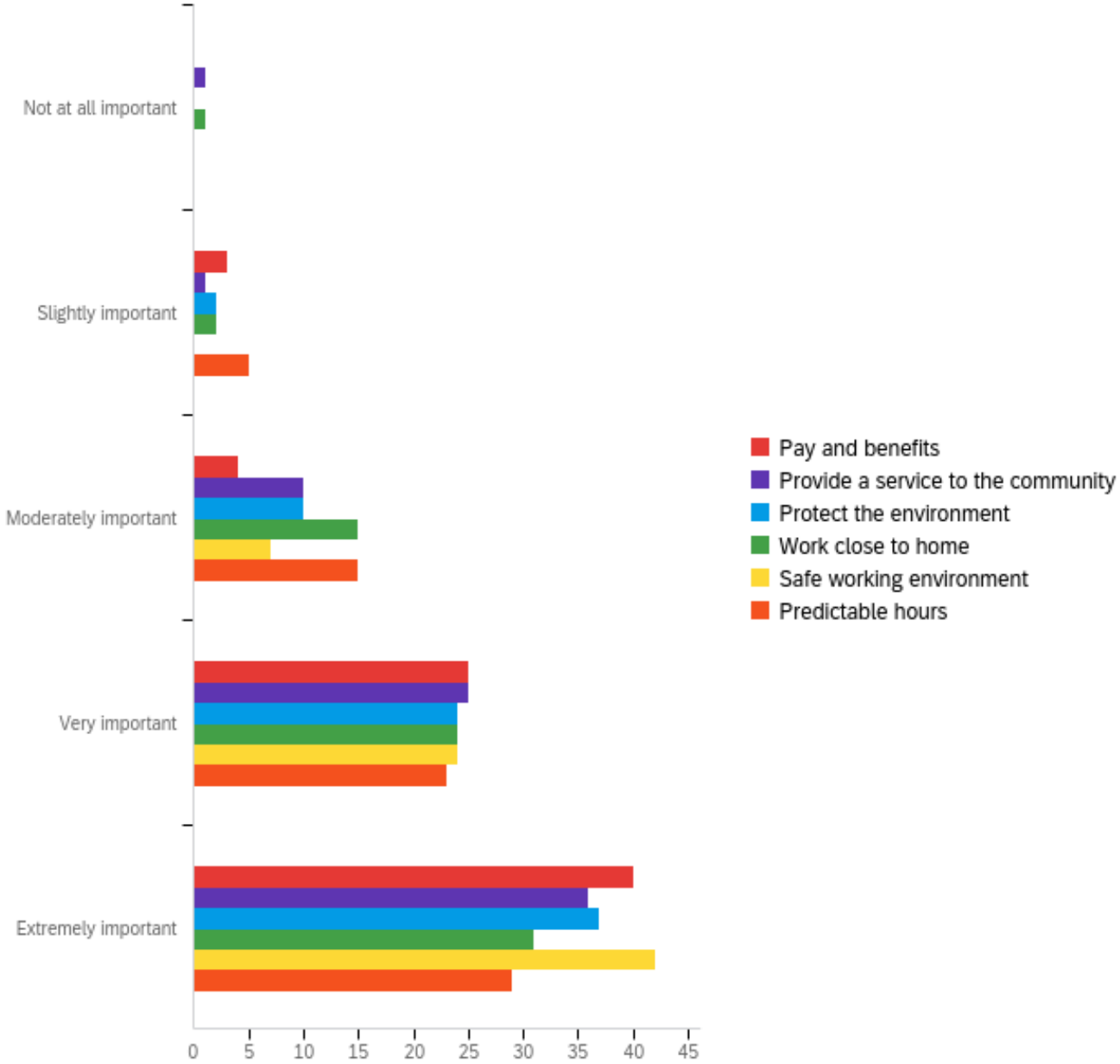
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I am given the equipment and tools I need to do my job effectively.	1.00	5.00	3.63	1.30	1.69	73
2	My utility has the right people and skills to do the	1.00	5.00	3.33	1.21	1.45	73

	work that needs to be done.						
3	Work is distributed evenly at my utility.	1.00	5.00	3.08	1.24	1.53	73
4	I am being paid a fair amount for the work I do.	1.00	5.00	2.86	1.34	1.79	72
5	I am satisfied with the benefits I receive.	1.00	5.00	3.88	1.14	1.30	72
6	I like doing the tasks I do at work.	2.00	5.00	4.08	0.81	0.66	72
7	I am considering leaving the utility where I work.	1.00	5.00	2.50	1.34	1.81	72
8	I am considering leaving the water industry.	1.00	5.00	2.41	1.36	1.86	73

#	Question	Strongly disagree		Somewhat disagree		Neither agree nor disagree		Somewhat agree		Strongly agree		Total
1	I am given the equipment and tools I need to do my job effectively.	5.48%	4	21.92%	16	10.96%	8	27.40%	20	34.25%	25	73
2	My utility has the right people and skills to do the work that needs to be done.	8.22%	6	17.81%	13	26.03%	19	28.77%	21	19.18%	14	73
3	Work is distributed evenly at my utility.	10.96%	8	24.66%	18	24.66%	18	24.66%	18	15.07%	11	73
4	I am being paid a fair amount	16.67%	12	33.33%	24	11.11%	8	25.00%	18	13.89%	10	72

	for the work I do.											
5	I am satisfied with the benefits I receive.	2.78%	2	13.89%	10	13.89%	10	31.94%	23	37.50%	27	72
6	I like doing the tasks I do at work.	0.00%	0	2.78%	2	20.83%	15	41.67%	30	34.72%	25	72
7	I am consideri ng leaving the utility where I work.	33.33%	24	16.67%	12	27.78%	20	11.11%	8	11.11%	8	72
8	I am consideri ng leaving the water industry.	36.99%	27	17.81%	13	23.29%	17	10.96%	8	10.96%	8	73

Q37 - Consider the following and indicate if each factor is an important motivation for you to work in the water industry. Indicate if the factor is not at all important, slightly important, moderately important, very important, or extremely important.



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Pay and benefits	2.00	5.00	4.42	0.78	0.60	72
2	Provide a service to the community	1.00	5.00	4.29	0.85	0.73	73

3	Protect the environment	2.00	5.00	4.32	0.81	0.65	73
4	Work close to home	1.00	5.00	4.12	0.92	0.85	73
5	Safe working environment	3.00	5.00	4.48	0.66	0.44	73
6	Predictable hours	2.00	5.00	4.06	0.94	0.89	72

#	Question	Not at all important		Slightly important		Moderately important		Very important		Extremely important		Total
1	Pay and benefits	0.00%	0	4.17%	3	5.56%	4	34.72%	25	55.56%	40	72
2	Provide a service to the community	1.37%	1	1.37%	1	13.70%	10	34.25%	25	49.32%	36	73
3	Protect the environment	0.00%	0	2.74%	2	13.70%	10	32.88%	24	50.68%	37	73
4	Work close to home	1.37%	1	2.74%	2	20.55%	15	32.88%	24	42.47%	31	73
5	Safe working environment	0.00%	0	0.00%	0	9.59%	7	32.88%	24	57.53%	42	73
6	Predictable hours	0.00%	0	6.94%	5	20.83%	15	31.94%	23	40.28%	29	72

Q38 - The following is a list of things that utilities can do to encourage operators to stay in the water industry. In your opinion, which are the most effective? Rank them from most effective to least effective by dragging and dropping the statements to reorder them. When you click on a statement to move it, you will see the rank you are giving it. For example, if you think that increasing pay is the most effective way utilities can encourage operators to stay in the water industry, you will drag that statement to the top, giving it a rank of 1. Continue ranking the options from the most effective (rank of 1) to the least effective (rank of 8).

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Create incentive programs	1.00	9.00	4.26	2.00	3.99	69
2	Have more certified operators on staff	1.00	9.00	4.71	2.31	5.34	69
3	Increase pay	1.00	4.00	1.20	0.60	0.36	69
4	Offer more training opportunities	3.00	9.00	6.52	1.67	2.80	69
5	Provide better benefits	1.00	9.00	3.57	1.78	3.17	69
6	Provide comp time	3.00	9.00	7.20	1.66	2.77	69
7	Provide new equipment and supplies	1.00	9.00	5.36	1.99	3.94	69
8	Provide overtime pay	2.00	9.00	5.54	2.22	4.94	69
9	Offer more opportunities for professional development and career advancement	2.00	9.00	6.64	2.30	5.30	69

#	Question	1		2		3		4		5		6		7		8		9		Total
1	Create incentive programs	2.90%	2	20.29%	14	20.29%	14	14.49%	10	13.04%	9	14.49%	10	7.25%	5	4.35%	3	2.90%	2	69
2	Have more certified operators on staff	5.80%	4	15.94%	11	14.49%	10	13.04%	9	14.49%	10	10.14%	7	10.14%	7	10.14%	7	5.80%	4	69
3	Increase pay	86.96%	60	8.70%	6	1.45%	1	2.90%	2	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	69
4	Offer more training oppor	0.00%	0	0.00%	0	4.35%	3	13.04%	9	10.14%	7	13.04%	9	27.54%	19	21.74%	15	10.14%	7	69

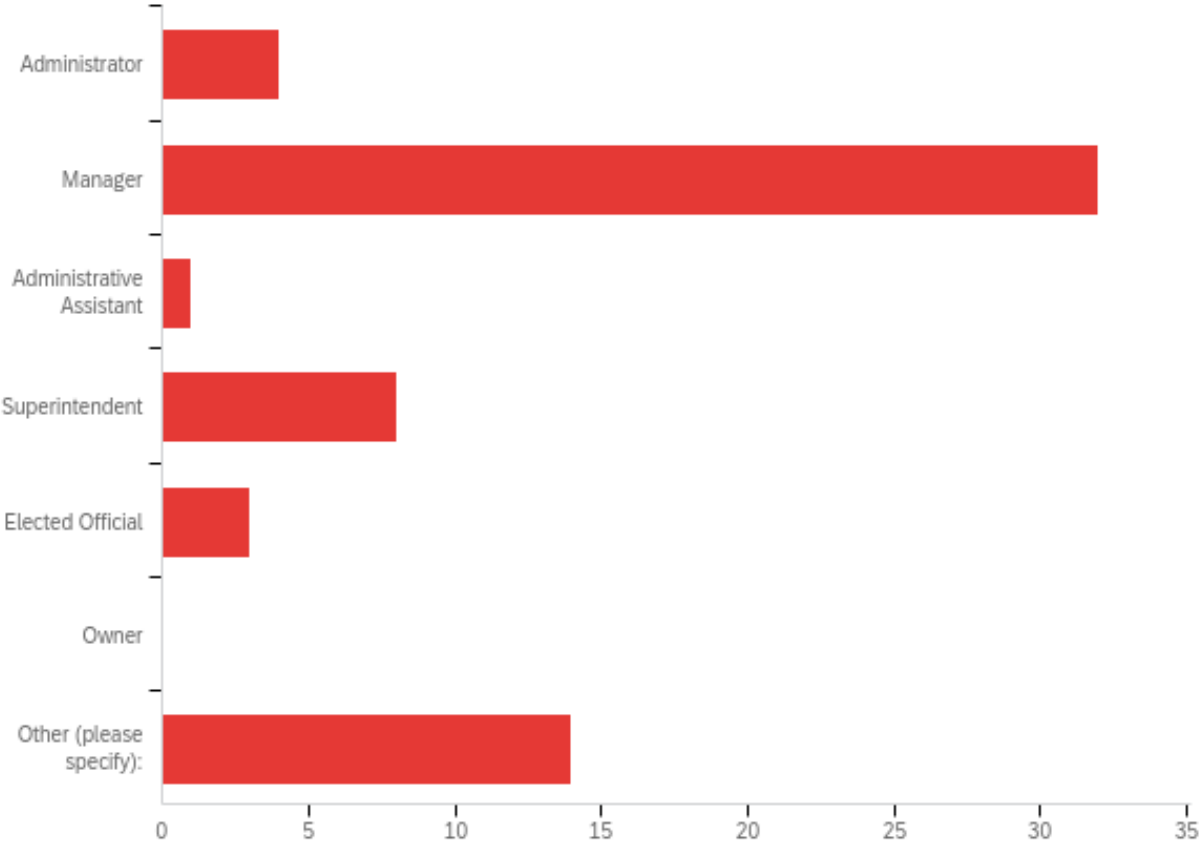
	tunities																		
5	Provide better benefits	1.45%	1	37.68%	26	18.84%	13	13.04%	9	15.94%	11	7.25%	5	1.45%	1	1.45%	1	2.90%	2	69
6	Provide comp time	0.00%	0	0.00%	0	1.45%	1	2.90%	2	13.04%	9	23.19%	16	11.59%	8	11.59%	8	36.23%	25	69
7	Provide new equipment and supplies	2.90%	2	5.80%	4	8.70%	6	23.19%	16	8.70%	6	10.14%	7	28.99%	20	8.70%	6	2.90%	2	69
8	Provide overtime pay	0.00%	0	7.25%	5	21.74%	15	7.25%	5	14.49%	10	8.70%	6	10.14%	7	24.64%	17	5.80%	4	69
9	Offer more opportunities for professional development and career advancement	0.00%	0	4.35%	3	8.70%	6	10.14%	7	10.14%	7	13.04%	9	2.90%	2	17.39%	12	33.33%	23	69

APPENDIX D: MANAGER SURVEY RESULTS

Report

West Virginia Water Workforce Survey - Utility Managers

Q1 - Which of the following best describes your current position at the utility?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Which of the following best describes your current position at the utility? - Selected Choice	1.00	7.00	3.48	2.12	4.48	62

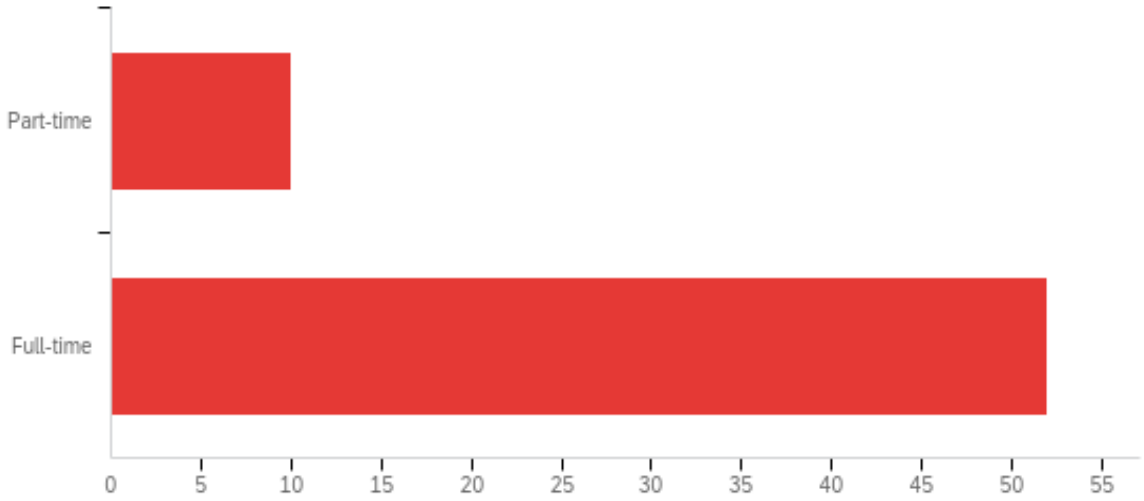
#	Answer	%	Count
1	Administrator	6.45%	4
2	Manager	51.61%	32

3	Administrative Assistant	1.61%	1
4	Superintendent	12.90%	8
5	Elected Official	4.84%	3
6	Owner	0.00%	0
7	Other (please specify):	22.58%	14
	Total	100%	62

Q1_7_TEXT - Other (please specify):

Other (please specify): - Text
semi-retired manager
Assistant Superintendent
Retired Chief Operator
General Manager
Chief Operator
Board Chairman
Contract O&M Provider
Retired
Psd chairman
Supervisor
General Manager & Chief Operator
Senior Supervisor
Chief
Board President Retired

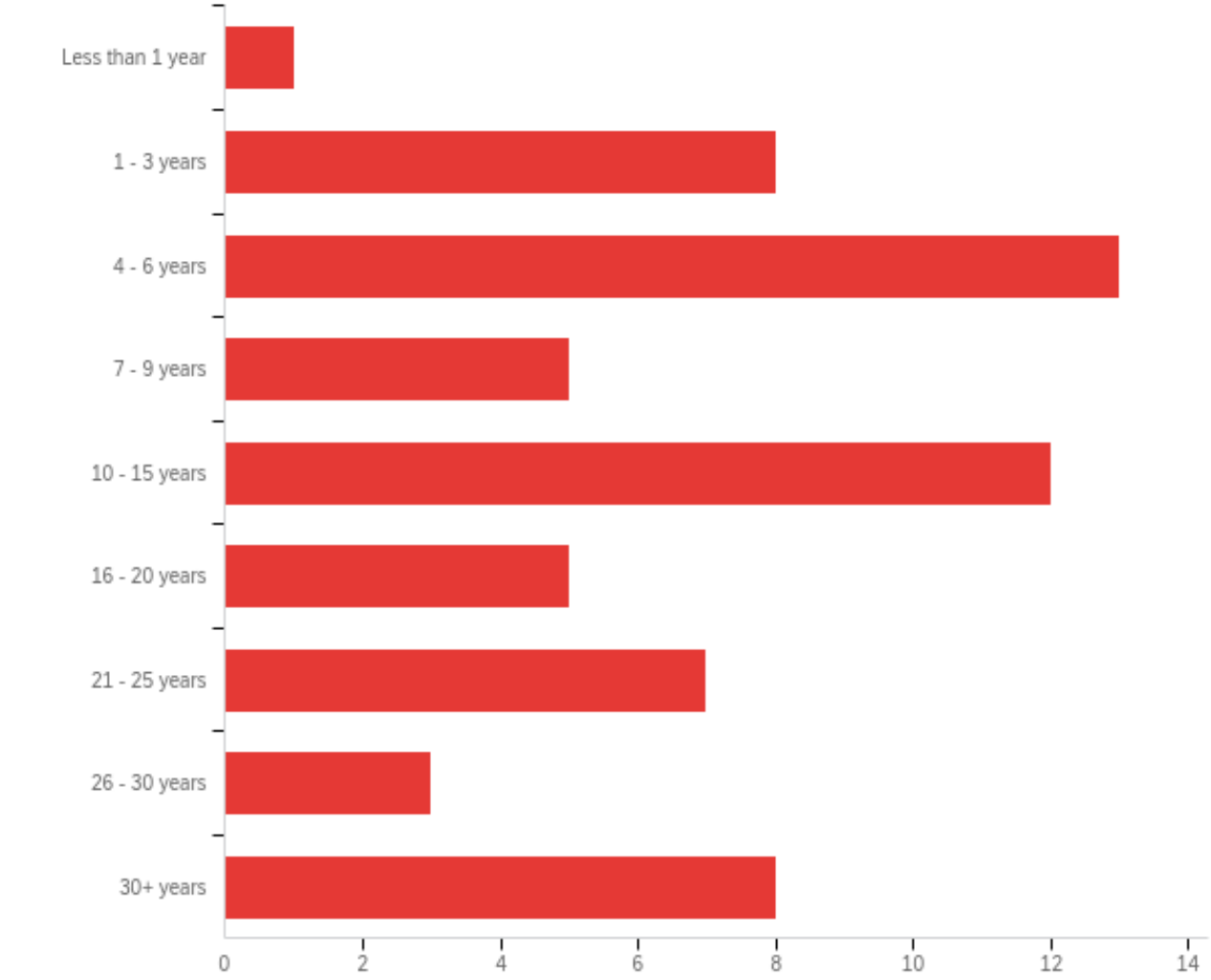
Q2 - Do you work part-time or full-time?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you work part-time or full-time?	1.00	2.00	1.84	0.37	0.14	62

#	Answer	%	Count
1	Part-time	16.13%	10
2	Full-time	83.87%	52
	Total	100%	62

Q3 - How many years have you worked at the utility?

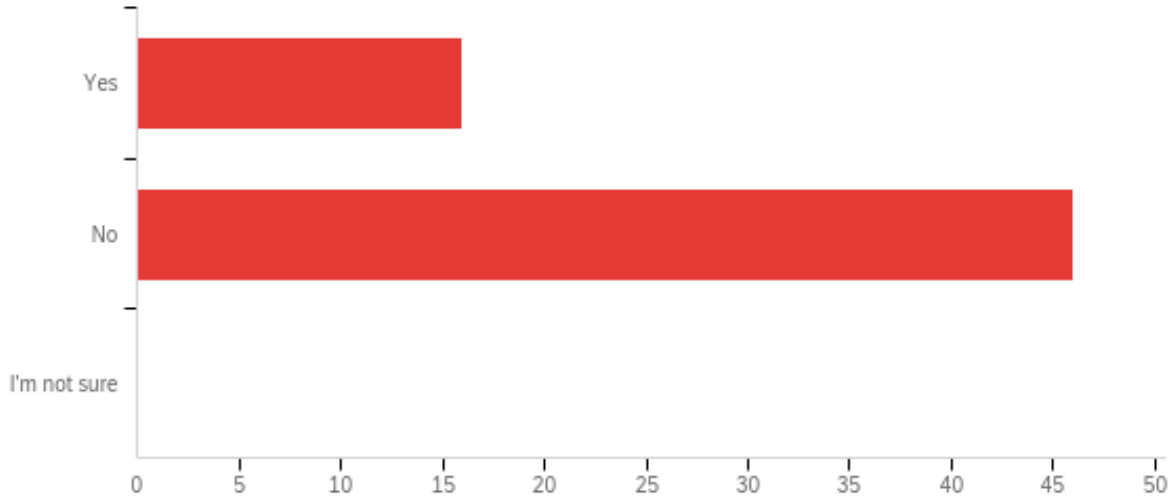


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How many years have you worked at the utility?	1.00	9.00	5.02	2.32	5.37	62

#	Answer	%	Count
1	Less than 1 year	1.61%	1
2	1 - 3 years	12.90%	8
3	4 - 6 years	20.97%	13
4	7 - 9 years	8.06%	5

5	10 - 15 years	19.35%	12
6	16 - 20 years	8.06%	5
7	21 - 25 years	11.29%	7
8	26 - 30 years	4.84%	3
9	30+ years	12.90%	8
	Total	100%	62

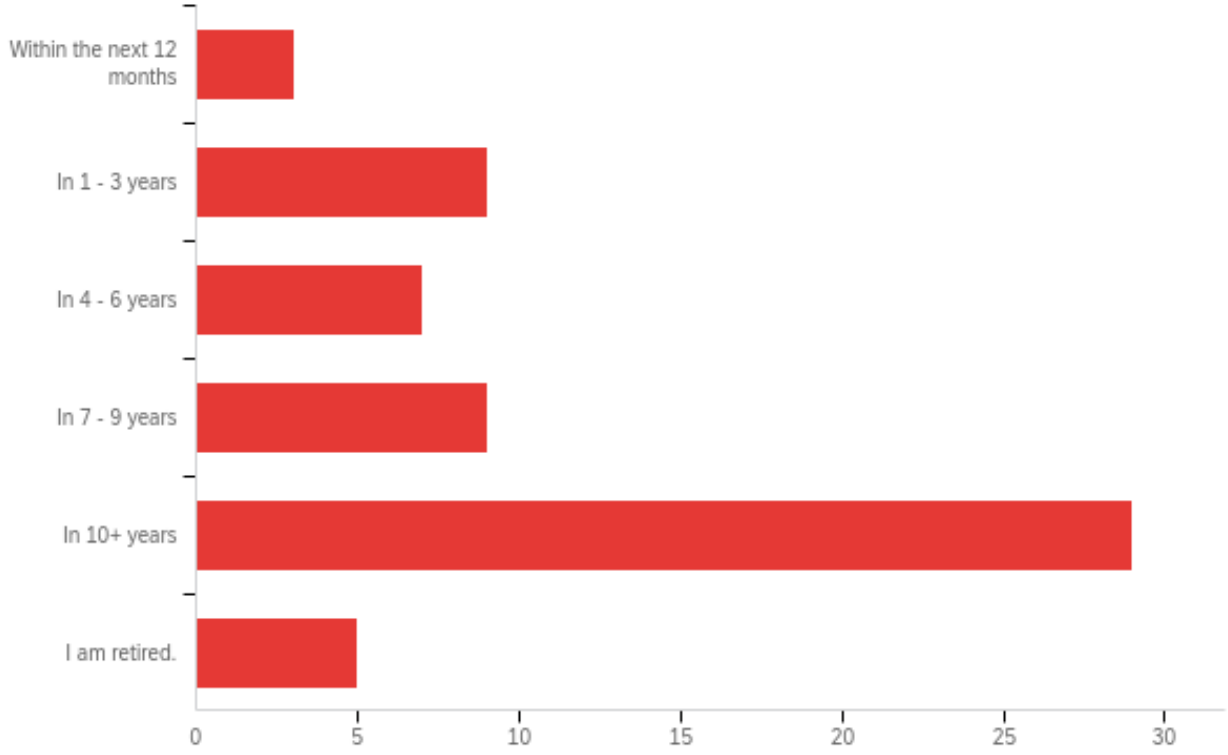
Q4 - Are you currently eligible to retire?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Are you currently eligible to retire?	1.00	2.00	1.74	0.44	0.19	62

#	Answer	%	Count
1	Yes	25.81%	16
2	No	74.19%	46
3	I'm not sure	0.00%	0
	Total	100%	62

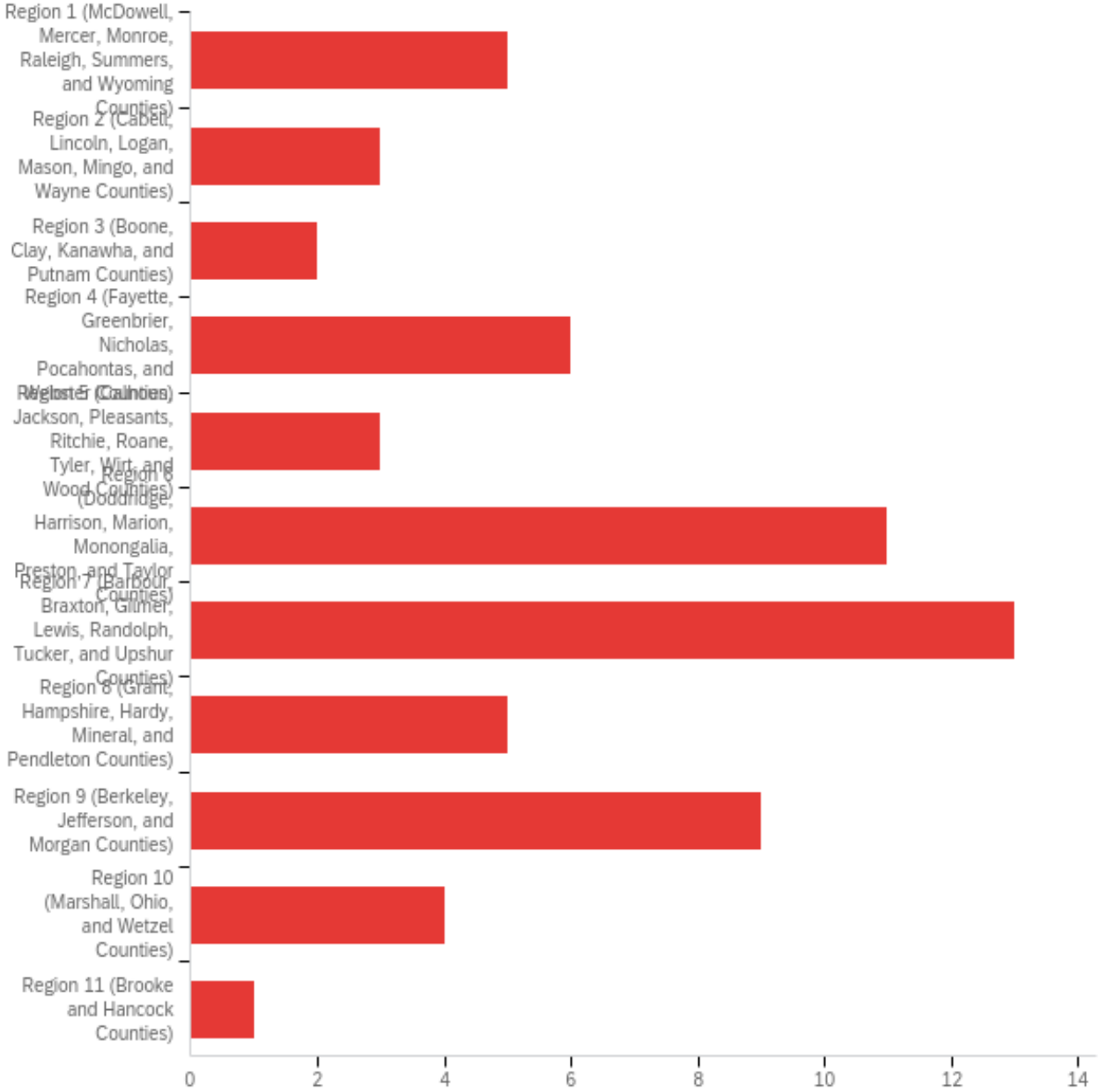
Q5 - When do you plan to retire?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	When do you plan to retire?	1.00	6.00	4.08	1.38	1.91	62

#	Answer	%	Count
1	Within the next 12 months	4.84%	3
2	In 1 - 3 years	14.52%	9
3	In 4 - 6 years	11.29%	7
4	In 7 - 9 years	14.52%	9
5	In 10+ years	46.77%	29
6	I am retired.	8.06%	5
	Total	100%	62

Q6 - What regional planning and development council is your utility in? If your utility is in more than one region, please choose the one where your main office is located. A map of regions is provided below for reference.

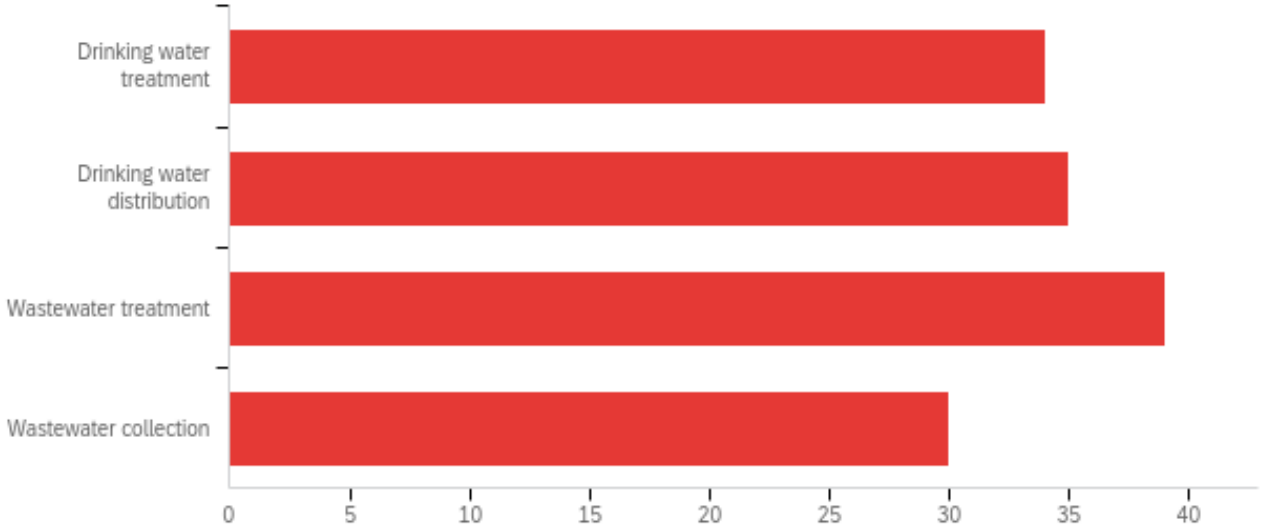


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What regional planning and development council is your utility in? If your utility is in more than one region, please choose the one	1.00	11.00	6.21	2.60	6.75	62

	where your main office is located. A map of regions is provided below for reference.					

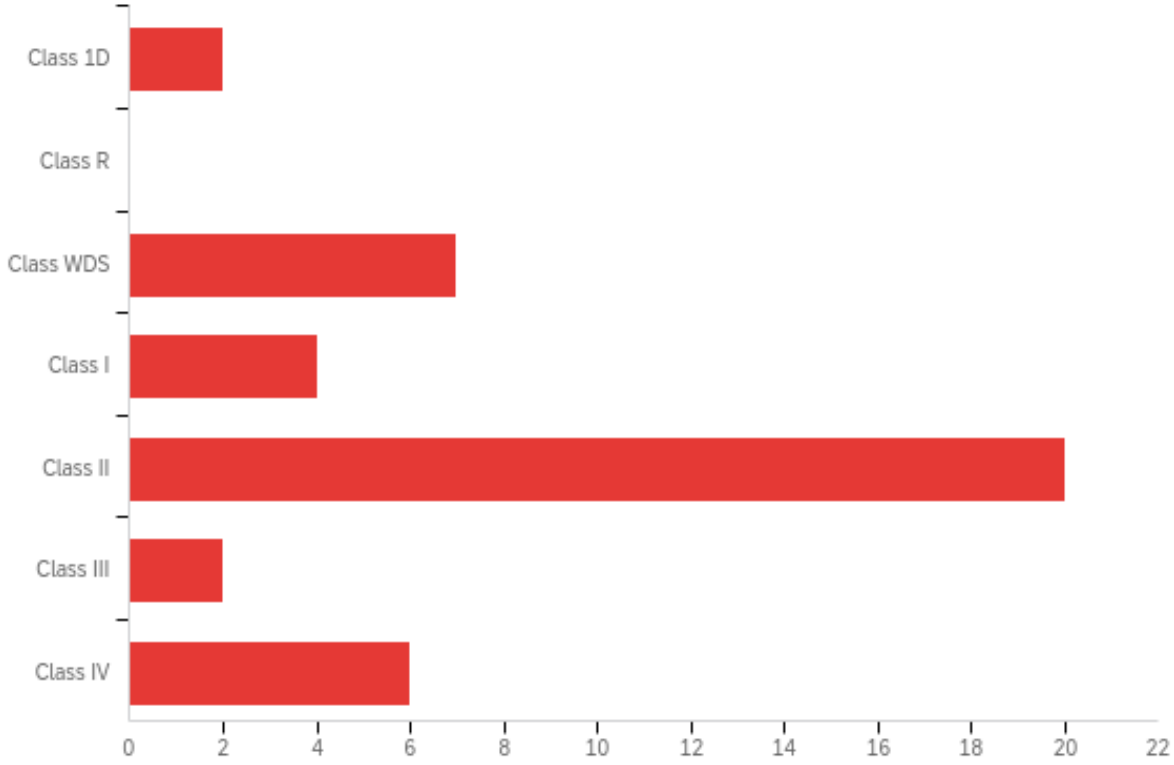
#	Answer	%	Count
1	Region 1 (McDowell, Mercer, Monroe, Raleigh, Summers, and Wyoming Counties)	8.06%	5
2	Region 2 (Cabell, Lincoln, Logan, Mason, Mingo, and Wayne Counties)	4.84%	3
3	Region 3 (Boone, Clay, Kanawha, and Putnam Counties)	3.23%	2
4	Region 4 (Fayette, Greenbrier, Nicholas, Pocahontas, and Webster Counties)	9.68%	6
5	Region 5 (Calhoun, Jackson, Pleasants, Ritchie, Roane, Tyler, Wirt, and Wood Counties)	4.84%	3
6	Region 6 (Doddridge, Harrison, Marion, Monongalia, Preston, and Taylor Counties)	17.74%	11
7	Region 7 (Barbour, Braxton, Gilmer, Lewis, Randolph, Tucker, and Upshur Counties)	20.97%	13
8	Region 8 (Grant, Hampshire, Hardy, Mineral, and Pendleton Counties)	8.06%	5
9	Region 9 (Berkeley, Jefferson, and Morgan Counties)	14.52%	9
10	Region 10 (Marshall, Ohio, and Wetzel Counties)	6.45%	4
11	Region 11 (Brooke and Hancock Counties)	1.61%	1
	Total	100%	62

Q7 - Which of the following describe your utility? (Select all that apply)



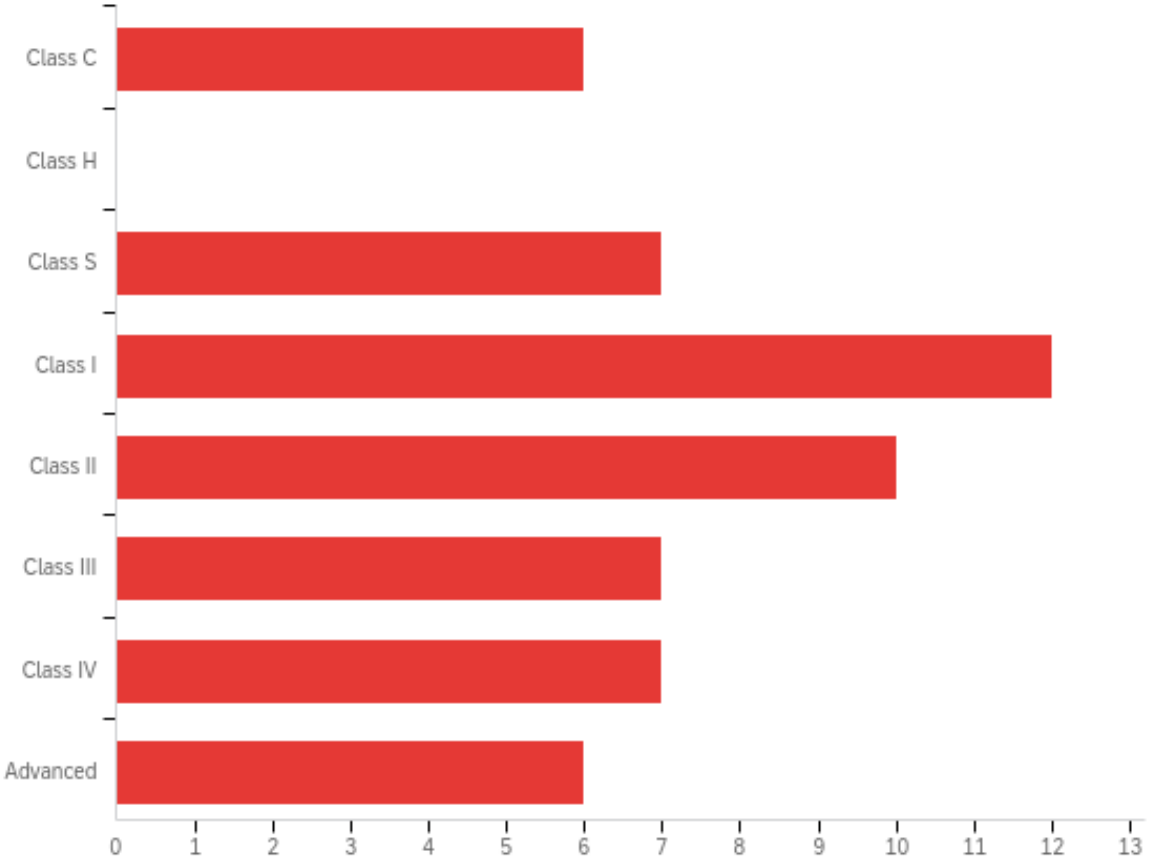
#	Answer	%	Count
1	Drinking water treatment	24.64%	34
2	Drinking water distribution	25.36%	35
3	Wastewater treatment	28.26%	39
4	Wastewater collection	21.74%	30
	Total	100%	138

Q7a - What class is your drinking water treatment or distribution utility?



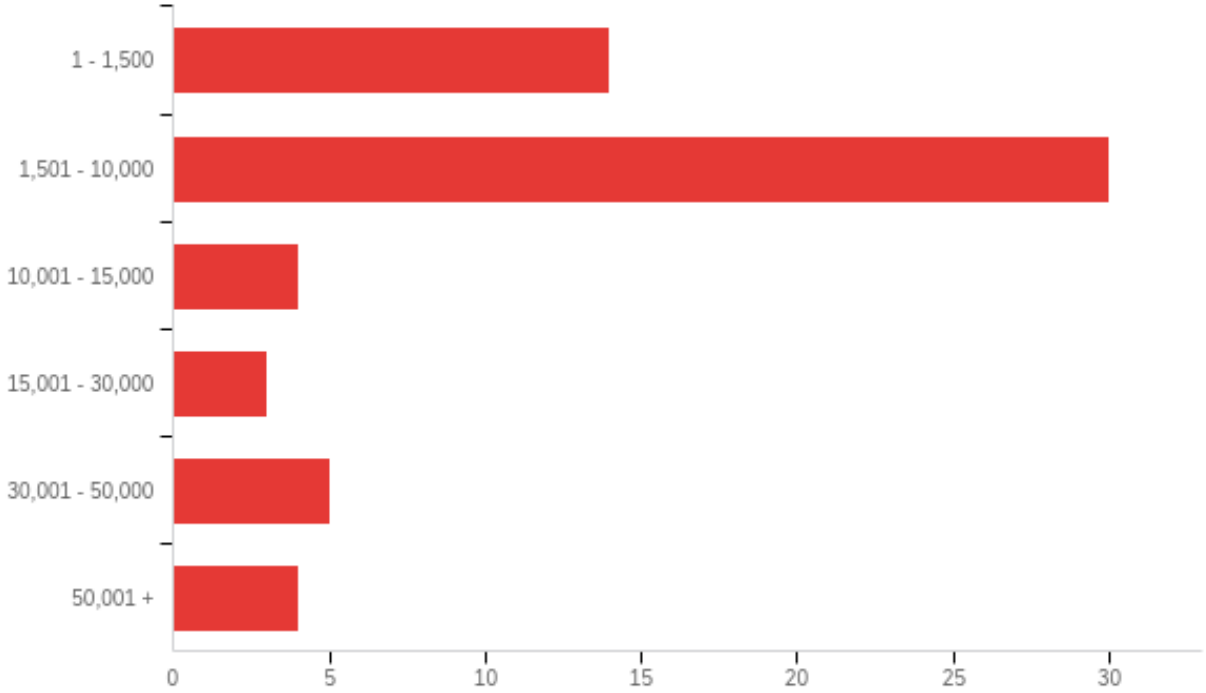
#	Answer	%	Count
1	Class 1D	4.88%	2
2	Class R	0.00%	0
3	Class WDS	17.07%	7
4	Class I	9.76%	4
5	Class II	48.78%	20
6	Class III	4.88%	2
7	Class IV	14.63%	6
	Total	100%	41

Q7b - What class is your wastewater treatment utility?



#	Answer	%	Count
1	Class C	10.91%	6
2	Class H	0.00%	0
3	Class S	12.73%	7
4	Class I	21.82%	12
5	Class II	18.18%	10
6	Class III	12.73%	7
7	Class IV	12.73%	7
8	Advanced	10.91%	6
	Total	100%	55

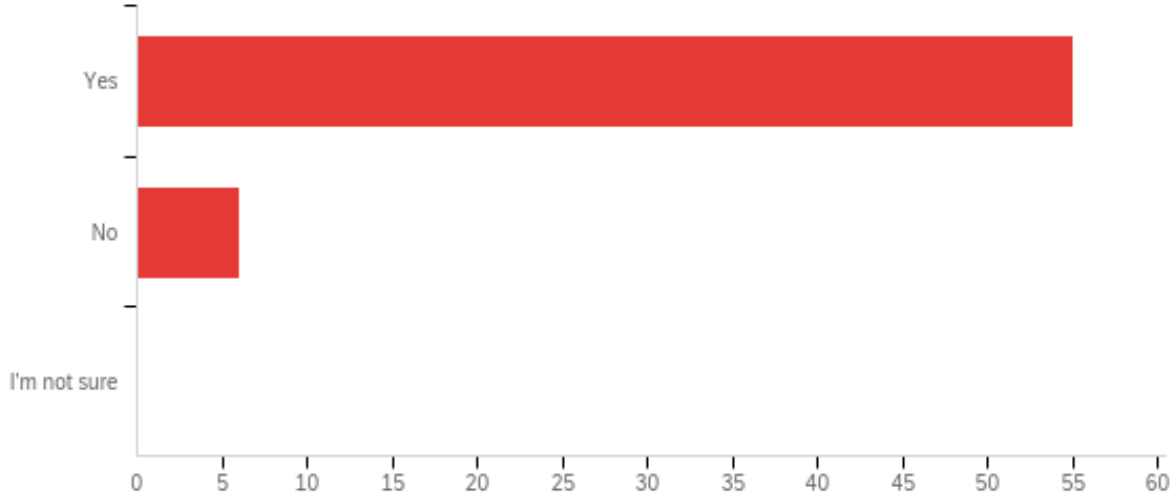
Q8 - How many people does your utility directly serve? Select the highest range for the drinking water or wastewater services provided.



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How many people does your utility directly serve? Select the highest range for the drinking water or wastewater services provided.	1.00	6.00	2.45	1.45	2.11	60

#	Answer	%	Count
1	1 - 1,500	23.33%	14
2	1,501 - 10,000	50.00%	30
3	10,001 - 15,000	6.67%	4
4	15,001 - 30,000	5.00%	3
5	30,001 - 50,000	8.33%	5
6	50,001 +	6.67%	4
	Total	100%	60

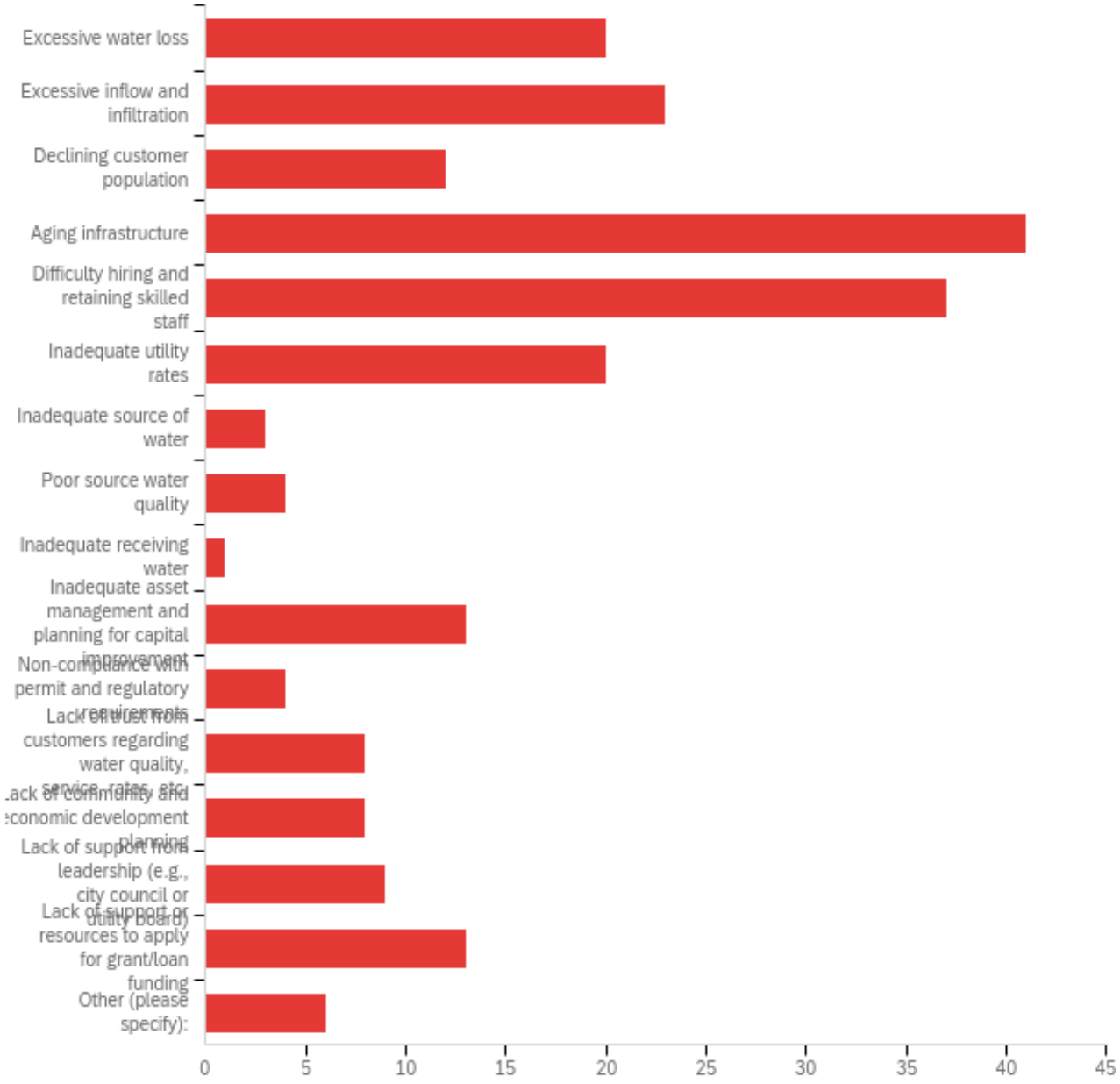
Q9 - Is your utility regulated by West Virginia's Public Service Commission (PSC)?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Is your utility regulated by West Virginia's Public Service Commission (PSC)?	1.00	2.00	1.10	0.30	0.09	61

#	Answer	%	Count
1	Yes	90.16%	55
2	No	9.84%	6
3	I'm not sure	0.00%	0
	Total	100%	61

Q10 - Which of the following operational challenges does your utility face? (Select all that apply)



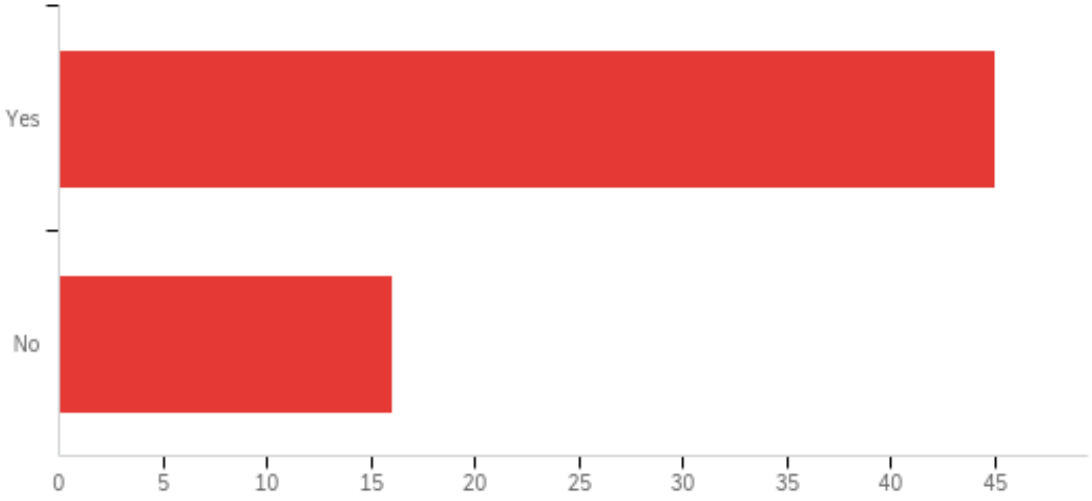
#	Answer	%	Count
1	Excessive water loss	9.01%	20
2	Excessive inflow and infiltration	10.36%	23
3	Declining customer population	5.41%	12
4	Aging infrastructure	18.47%	41

5	Difficulty hiring and retaining skilled staff	16.67%	37
6	Inadequate utility rates	9.01%	20
7	Inadequate source of water	1.35%	3
8	Poor source water quality	1.80%	4
9	Inadequate receiving water	0.45%	1
10	Inadequate asset management and planning for capital improvement	5.86%	13
11	Non-compliance with permit and regulatory requirements	1.80%	4
12	Lack of trust from customers regarding water quality, service, rates, etc.	3.60%	8
13	Lack of community and economic development planning	3.60%	8
14	Lack of support from leadership (e.g., city council or utility board)	4.05%	9
15	Lack of support or resources to apply for grant/loan funding	5.86%	13
16	Other (please specify):	2.70%	6
	Total	100%	222

Q10_16_TEXT - Other (please specify):

Other (please specify): - Text
Difficulty with WVBPH helping water systems maintain compliance
Lack of trainings and seminars in our local area.
issues with data management as it regards drinking water violations
Everybody is dumb and nobody cares
pressure to consolidate from county commission.
Pay

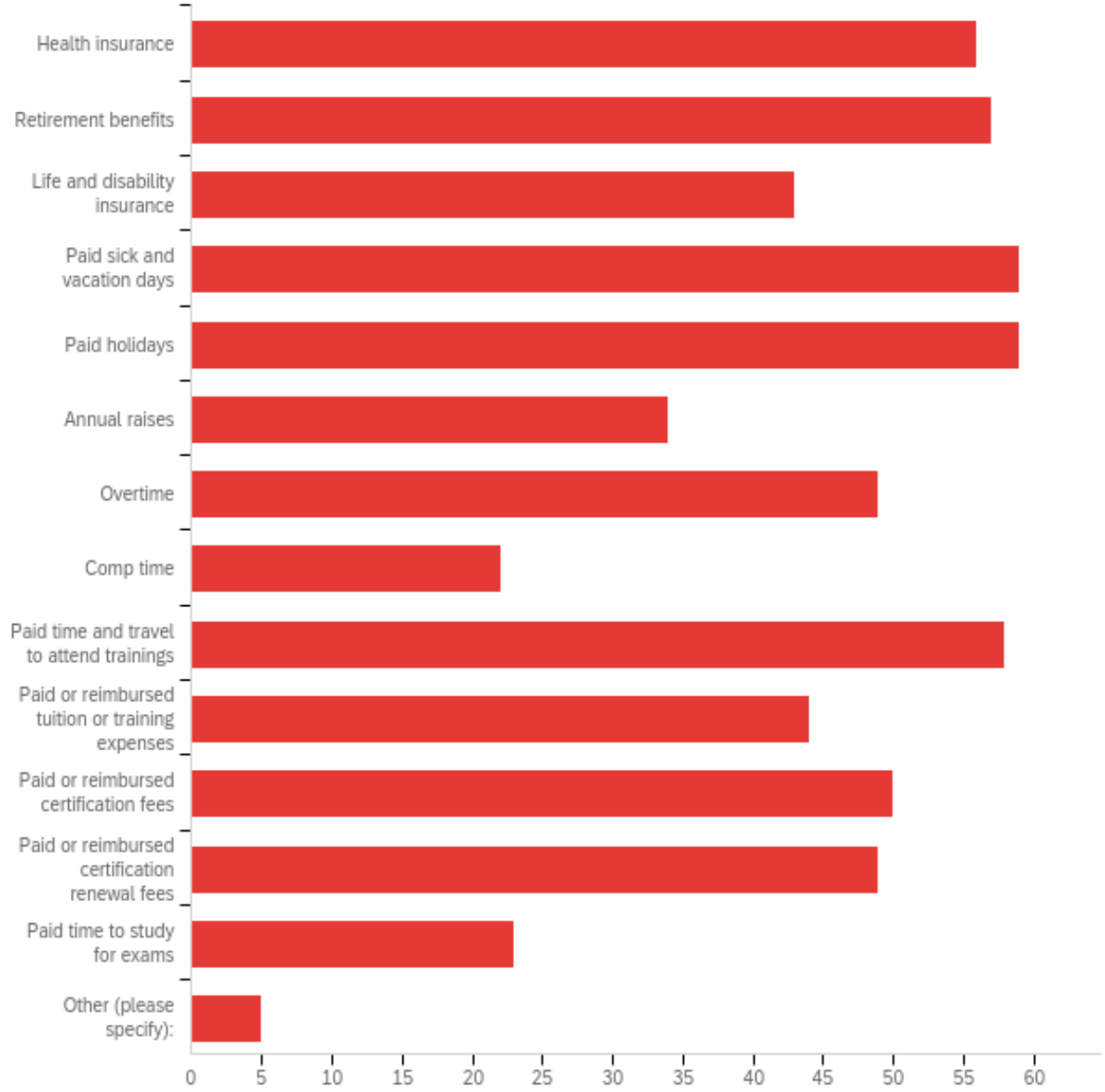
Q11 - Does your utility offer opportunities for promotions and career advancement?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Does your utility offer opportunities for promotions and career advancement?	1.00	2.00	1.26	0.44	0.19	61

#	Answer	%	Count
1	Yes	73.77%	45
2	No	26.23%	16
	Total	100%	61

Q12 - What benefits does your utility provide? (Select all that apply)



#	Answer	%	Count
1	Health insurance	9.21%	56
2	Retirement benefits	9.38%	57
3	Life and disability insurance	7.07%	43
4	Paid sick and vacation days	9.70%	59
5	Paid holidays	9.70%	59

6	Annual raises	5.59%	34
7	Overtime	8.06%	49
8	Comp time	3.62%	22
9	Paid time and travel to attend trainings	9.54%	58
10	Paid or reimbursed tuition or training expenses	7.24%	44
11	Paid or reimbursed certification fees	8.22%	50
12	Paid or reimbursed certification renewal fees	8.06%	49
13	Paid time to study for exams	3.78%	23
14	Other (please specify):	0.82%	5
	Total	100%	608

Q12_14_TEXT - Other (please specify):

Other (please specify): - Text
Flexible scheduling to attend college or higher education classes
Base pay add-ons for additonal trainings and certifications.
COLA
Paid Uniforms, boots and PPE
Overtime Is not a benefit

Q13 - How many operator positions has your utility budgeted for?

Drinking Water Treatment Operators	Drinking Water Distribution Operators	Wastewater Treatment Operators	Wastewater Collection Operators
		3	3
		1	
3			
7	4	4	2
12	6		
1	2	1	2
		11	
8		7	
		13	10
		14	15
		4	
3	2	3	0
	2		
		4	4
.5	.5	.25	.25
0	1	1	0
2.5	3	3	0
	3		
0	0	10	17
4	4	4	4
9	9	6	6
		12	
		13	
		11	13
1`			

2	0	0	0
	2	3	
	3		3
2	2	1	1.5
8	15	4	3
4	4	4	4
2	2		
4	0	0	0
4	1		
13	19	0	0
		4	5
4	2	4	2
		6	6
1		1	
0	3	0	3
		3	
	2		2
8	8		
4	1		
9	8	5	4
3			
	1		
3	1	3	1
0	3	0	0
0	0	2	1
6	1	4	2
5	1	3	1
4			1

Q14 - How many operator positions at your utility are filled?

Drinking Water Treatment Operators	Drinking Water Distribution Operators	Wastewater Treatment Operators	Wastewater Collection Operators
		3	3
2	1		
All	All	All	All
10	6		
1	2	1	2
		10	
7		7	
		13	10
		13	14
		4	
3	2	3	0
	2		
		2	4
.5	.5	.25	.25
0	1	1	0
2.5	2	2	0
	3		
0	0	9	12
4	4	2	2
8	8	5	5
		10	
		13	
		9	13
1			
2	0	0	0

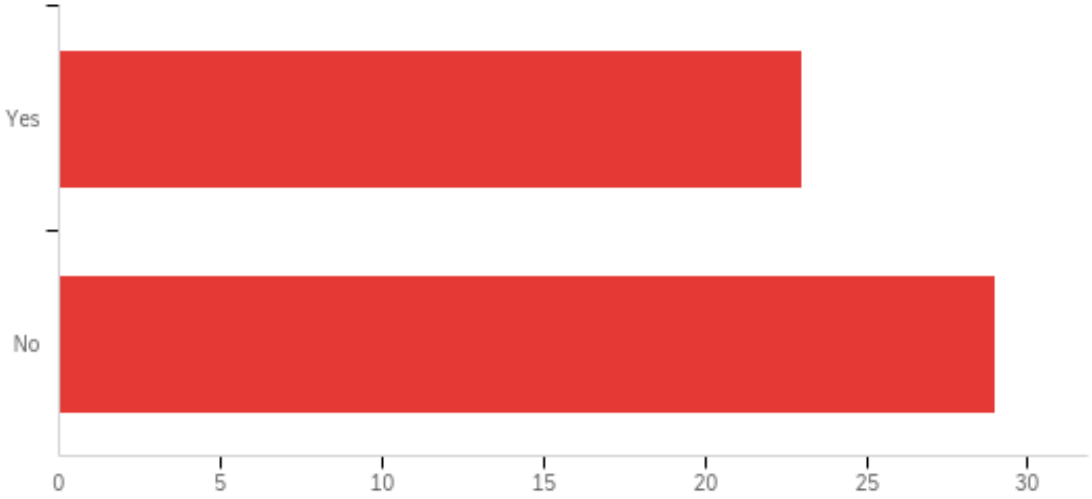
	3	3	
	3		3
2	2	1	1
8	21	4	3
4	4	4	4
2	2		
4	0	0	0
4	1		
11	17	0	0
		4	5
4	2	4	2
		5	5
1		1	
0	2	0	2
		3	
	2		2
8	8		
3	0		
9	8	5	4
2			
	1		
3	1	2	1
0	3	0	0
0	1	2	1
6	1	4	2
5	1	3	1
2			1

Q15 - How many operators have left their positions at your utility in the last 2 years?

Drinking Water Treatment Operators	Drinking Water Distribution Operators	Wastewater Treatment Operators	Wastewater Collection Operators
		1	1
		1	
3	3		
0	0	0	0
2	2		
1	1		
		1	
1		0	
		0	4
		0	
0	0	0	0
	2		
		4	2
0	0	0	0
	1	1	
0	1	0	0
0	0	3	10
0	0	0	0
1	1	1	1
		1	
		1	
		4	5
1			
0	0		
	2		

	0		0
0	0	0	0
2	0	1	0
1	1	1	1
1	1		
1	0	0	0
2			
0	5	0	0
		1	3
4	5	0	5
		5	5
0	1	0	1
	0		0
0	0		
1	2		
0	2	0	1
3			
	0		
1	0	1	0
0	0	0	0
1	0	1	1
0	0	0	0
2	0	1	0
5			0

Q16 - In your opinion, does your utility have enough operators?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	In your opinion, does your utility have enough operators?	1.00	2.00	1.56	0.50	0.25	52

#	Answer	%	Count
1	Yes	44.23%	23
2	No	55.77%	29
	Total	100%	52

Q17 - How many operators are eligible to retire now at your utility?

How many operators are eligible to retire now at your utility?
0
0
2
2
0
1
0
2
2
0
2
None
1
.5
0
2
0
3
0
3
0
0
1
0
1

0
1
2
0
0
0
1
1
0
0
0
None
1
0
1
2
0
3
0
1
0
0
1
1
0
1

Q18 - How many operators are eligible to retire within the next 2-5 years at your utility?

How many operators are eligible to retire within the next 2-5 years at your utility?
0
0
3
6
0
3
2
4
0
0
3
None
2
1
0
4
2
3
0
1
1
1
2
0
1

1

2

1

1

1

1

1

1

2

0

1

1

0

1

2

3

2

1

0

1

0

0

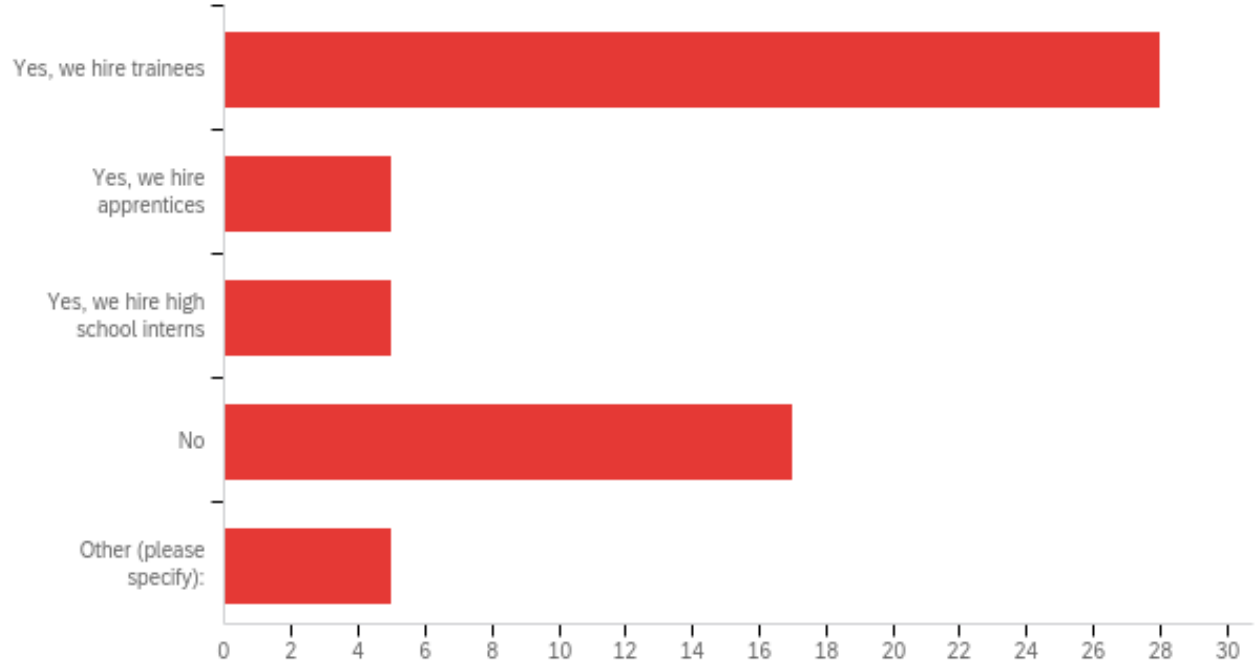
1

0

1

0

Q19 - Does your utility hire trainees, apprentices, or high school interns? Select all that apply.

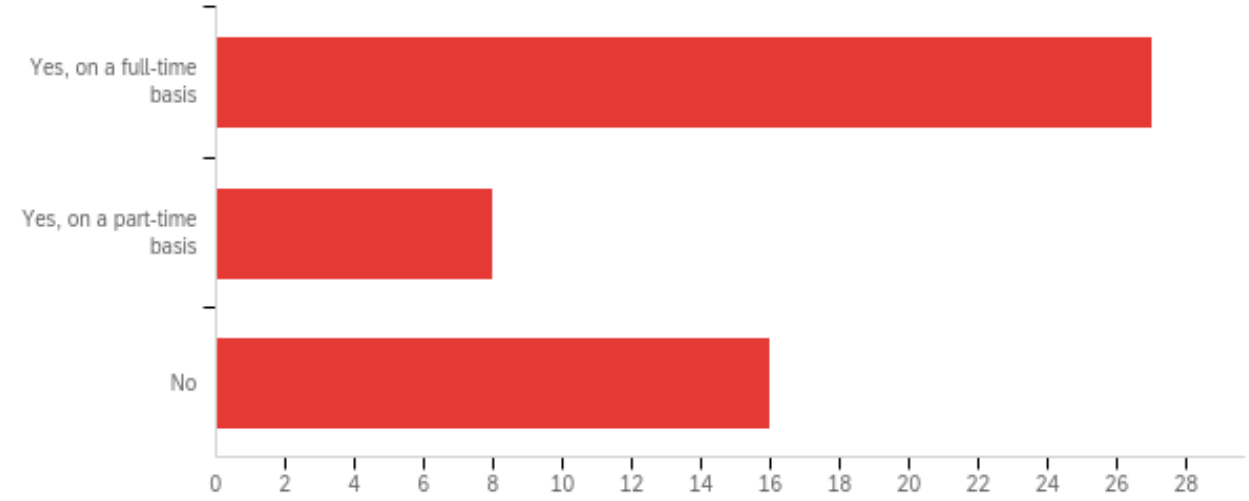


#	Answer	%	Count
1	Yes, we hire trainees	46.67%	28
2	Yes, we hire apprentices	8.33%	5
3	Yes, we hire high school interns	8.33%	5
4	No	28.33%	17
5	Other (please specify):	8.33%	5
	Total	100%	60

Q19_5_TEXT - Other (please specify):

Other (please specify): - Text
have only hired 2 in 15 years rarely have turnover
We would like to have a program, don't have capacity right now to administer
Age 18 and up
Hoping to start an apprentice program in 2023
Yes to all if positions were available and we had staff to train

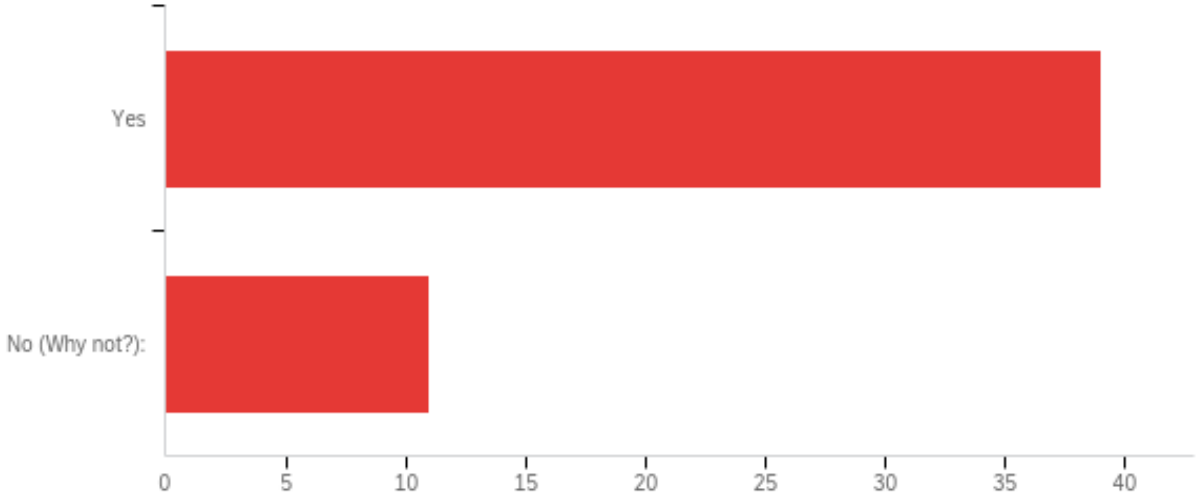
Q20 - Does your utility have a formal trainee program that allows on-site supervision and hands-on training to be provided to operators in training?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Does your utility have a formal trainee program that allows on-site supervision and hands-on training to be provided to operators in training?	1.00	3.00	1.78	0.89	0.80	51

#	Answer	%	Count
1	Yes, on a full-time basis	52.94%	27
2	Yes, on a part-time basis	15.69%	8
3	No	31.37%	16
	Total	100%	51

Q21 - If your utility had the opportunity to participate in hosting a paid high school intern, would you be willing to host an intern?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	If your utility had the opportunity to participate in hosting a paid high school intern, would you be willing to host an intern? - Selected Choice	1.00	2.00	1.22	0.41	0.17	50

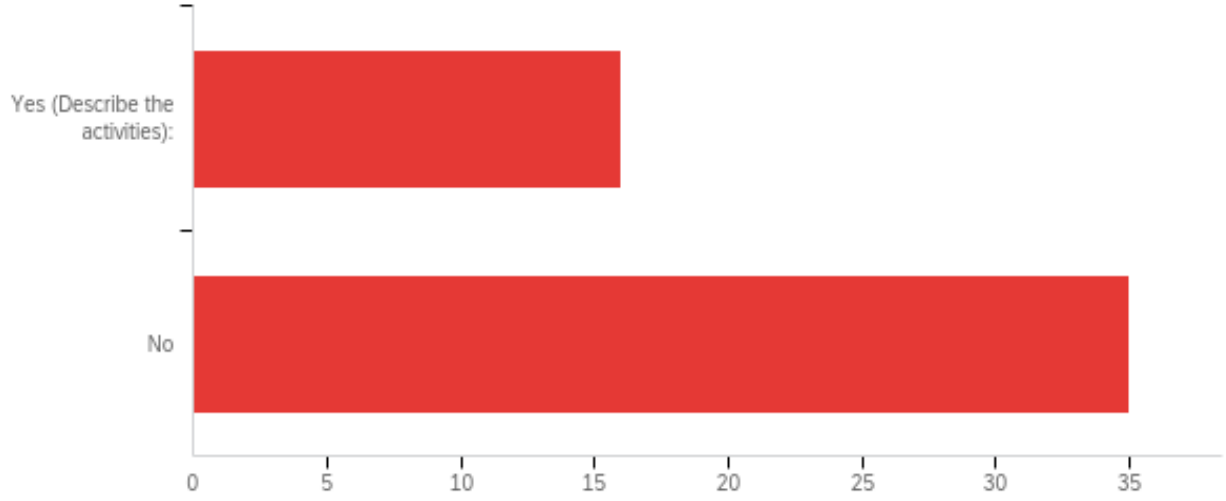
#	Answer	%	Count
1	Yes	78.00%	39
2	No (Why not?):	22.00%	11
	Total	100%	50

Q21_2_TEXT - No (Why not?):

No (Why not?): - Text
$
Insurance liability
I would, Board would NOT

Board decision if PSD would participate
we have never done that
Maybe
Currently fully staffed
not enough staff to train them
Who is paying them?

Q22 - Does your utility participate in youth or community outreach activities, such as facility tours, school visits, youth camps, etc.?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Does your utility participate in youth or community outreach activities, such as facility tours, school visits, youth camps, etc.? - Selected Choice	1.00	2.00	1.69	0.46	0.22	51

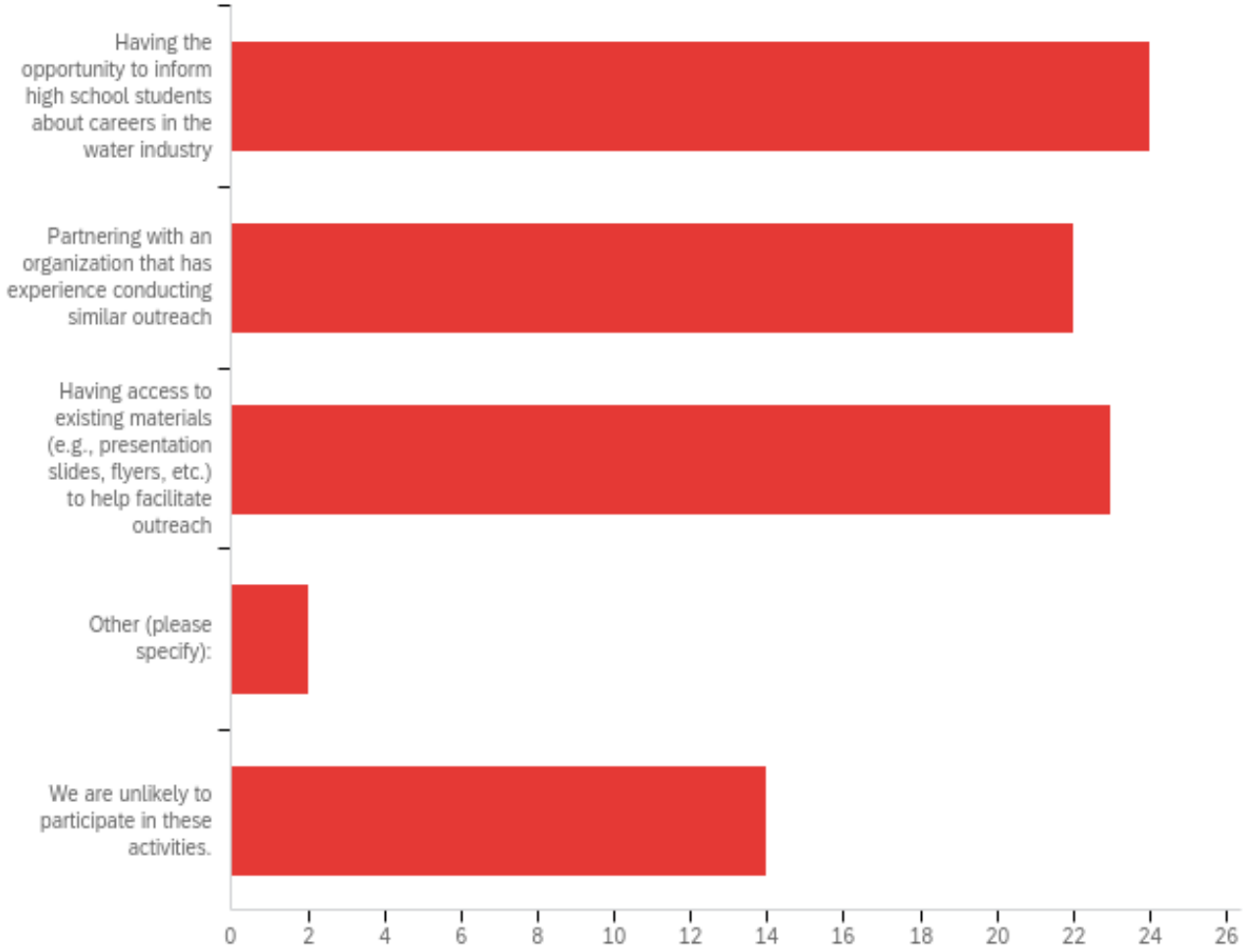
#	Answer	%	Count
1	Yes (Describe the activities):	31.37%	16
2	No	68.63%	35
	Total	100%	51

Q22_1_TEXT - Yes (Describe the activities):

Yes (Describe the activities): - Text
Plant Tours
Facility Tours
school and group tours

Facility tours have been completed in the past. Operations team has participated in local events such as job fairs.
Facility tours, work with WVU Tech, local volunteer watershed group, speak in classrooms, etc.
Some facility tours.
Mostly to younger kids to teach them the importance of pollution control
Facility Tours
coordinate with local audubon chapter that provides watershed program to 4th graders
Facility Tours and School Visits
Tours and Community Outreach
Facility tours and school visits
Career Day at local high schools
Stormwater outreach to the public
tours
Tours

Q23 - What would make your utility more likely to participate in youth or community outreach activities? Select all that apply.



#	Answer	%	Count
1	Having the opportunity to inform high school students about careers in the water industry	28.24%	24
2	Partnering with an organization that has experience conducting similar outreach	25.88%	22
3	Having access to existing materials (e.g., presentation slides, flyers, etc.) to help facilitate outreach	27.06%	23
4	Other (please specify):	2.35%	2
5	We are unlikely to participate in these activities.	16.47%	14
	Total	100%	85

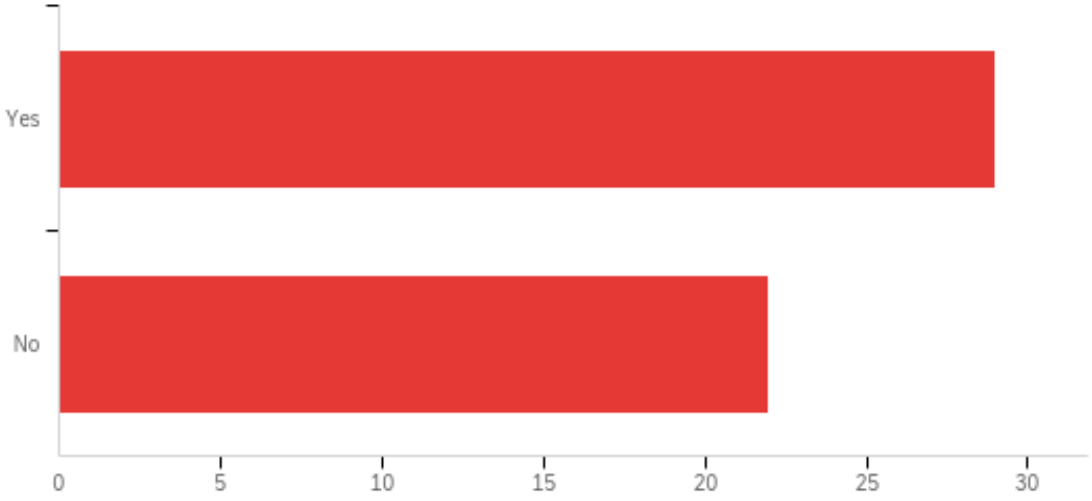
Q23_4_TEXT - Other (please specify):

Other (please specify): - Text

If the people in charge would let me actually do my job the lace would be up to standards to be able to provide tours

Having staff enough to do so.

Q24 - Does your utility have a formal documented pay scale for certified operators?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Does your utility have a formal documented pay scale for certified operators?	1.00	2.00	1.43	0.50	0.25	51

#	Answer	%	Count
1	Yes	56.86%	29
2	No	43.14%	22
	Total	100%	51

Q25a - Using the slider below, please move the bar to the number that corresponds with the starting wage for an entry-level certified drinking water operator at your utility.

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Hourly Wage ($)	8.00	25.00	16.36	4.66	21.69	33

Q26a - Using the slider below, please move the bar to the number that corresponds with the highest hourly wage a certified drinking water operator working at your utility is paid.

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Hourly Wage ($)	13.00	40.00	24.27	6.31	39.77	33

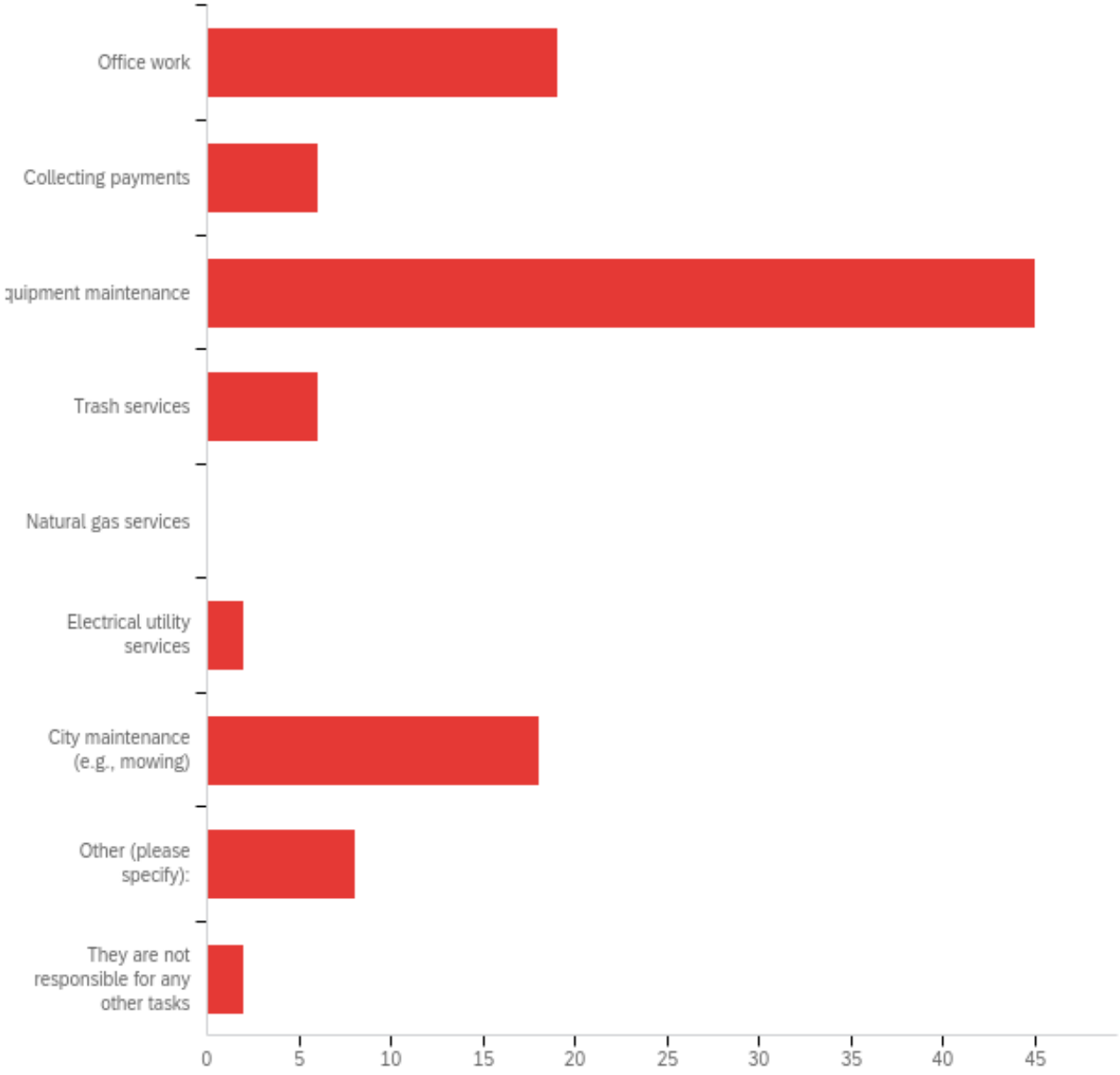
Q25b - Using the slider below, please move the bar to the number that corresponds with the starting wage for an entry-level certified wastewater operator at your utility.

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Hourly Wage ($)	12.00	25.00	15.76	3.65	13.30	34

Q26b - Using the slider below, please move the bar to the number that corresponds with the highest hourly wage a certified wastewater operator working at your utility is paid.

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Hourly Wage	12.00	75.00	25.12	10.18	103.57	34

Q27 - What job duties are operators responsible for at your utility, other than basic system/treatment works? (Select all that apply)



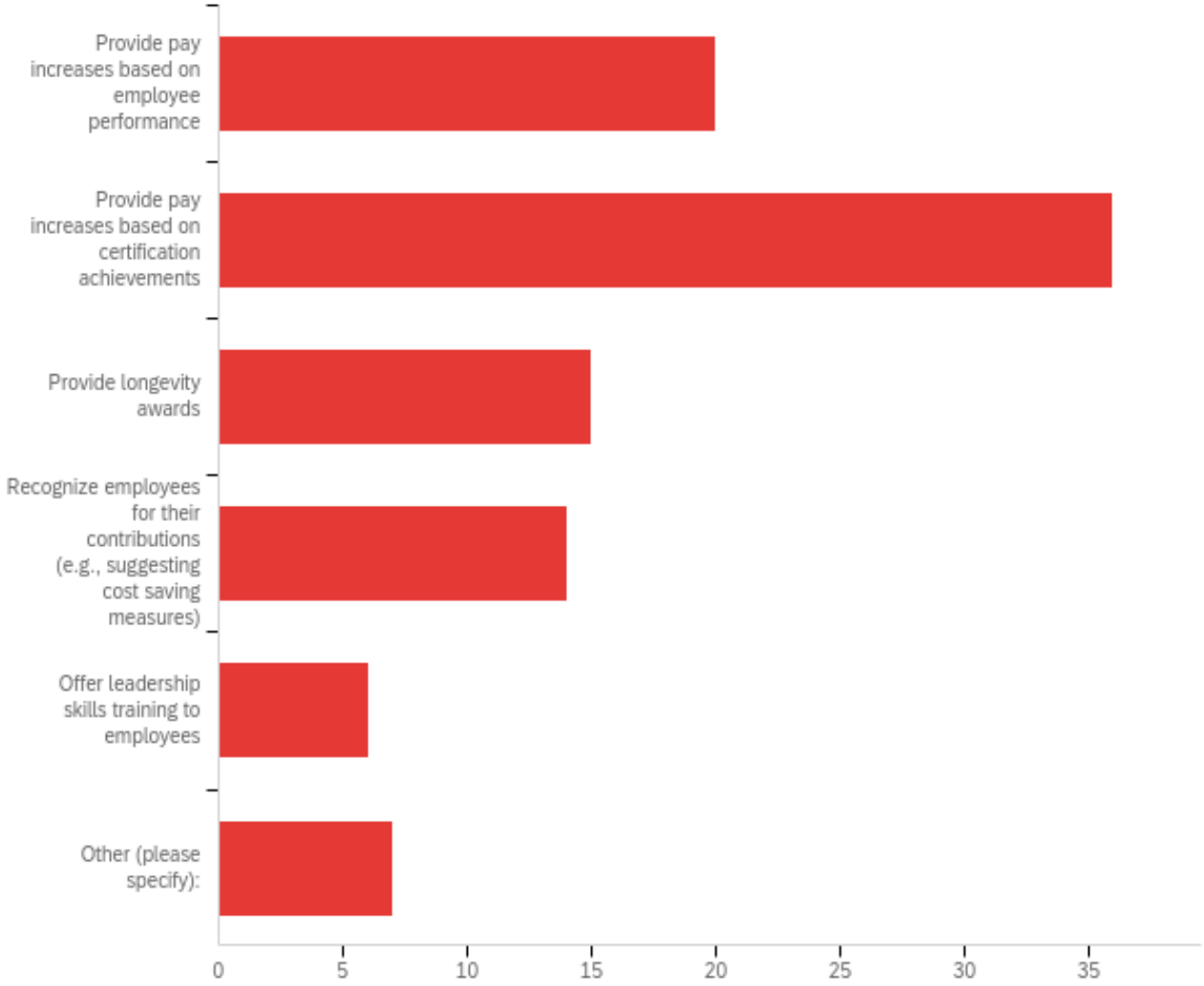
#	Answer	%	Count
1	Office work	17.92%	19
2	Collecting payments	5.66%	6
3	Equipment maintenance	42.45%	45
4	Trash services	5.66%	6

5	Natural gas services	0.00%	0
6	Electrical utility services	1.89%	2
7	City maintenance (e.g., mowing)	16.98%	18
8	Other (please specify):	7.55%	8
9	They are not responsible for any other tasks	1.89%	2
	Total	100%	106

Q27_8_TEXT - Other (please specify):

Other (please specify): - Text
Disposal of bio-solids and pump stations
COLLECTION SYSTEMS
Plant maintenance
basic upkeep of facility such as lawn care, cleaning, etc.
Maintenance & Testing
plow snow if needed
Hydrant testing/flushing, leak repair, meter reading, etc.
building and ground maintenance

Q28 - How does the utility reward and/or show appreciation for its operators? (Select all that apply)

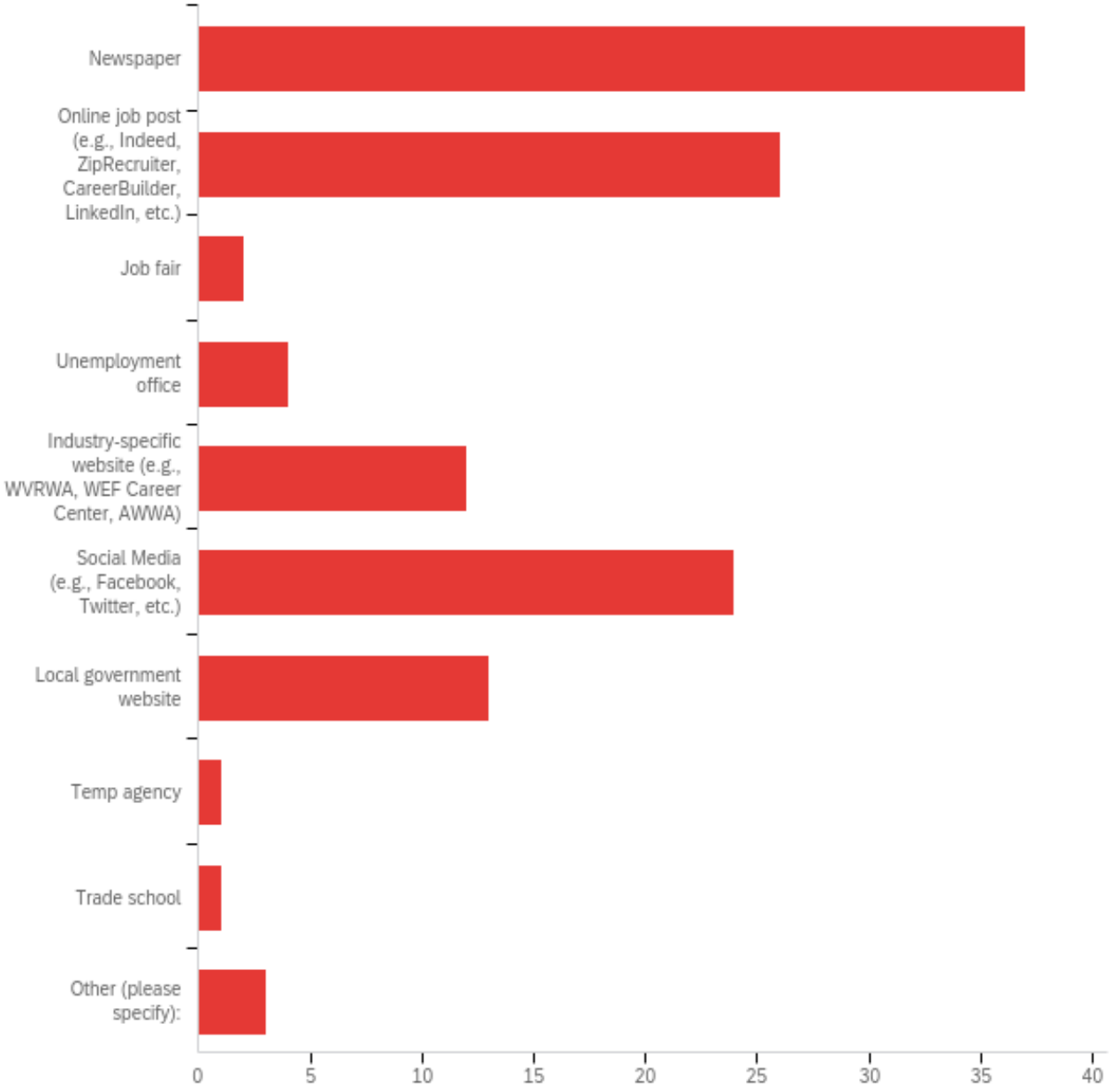


#	Answer	%	Count
1	Provide pay increases based on employee performance	20.41%	20
2	Provide pay increases based on certification achievements	36.73%	36
3	Provide longevity awards	15.31%	15
4	Recognize employees for their contributions (e.g., suggesting cost saving measures)	14.29%	14
5	Offer leadership skills training to employees	6.12%	6
6	Other (please specify):	7.14%	7
	Total	100%	98

Q28_6_TEXT - Other (please specify):

Other (please specify): - Text
Certification Pay
picnic, holiday bonus, luncheons
None
Pay increases annually
It doesn't
Pay increases associated with projects.
none

Q29 - When you have an open position for an operator at your utility, where do you advertise the position? (Select all that apply)



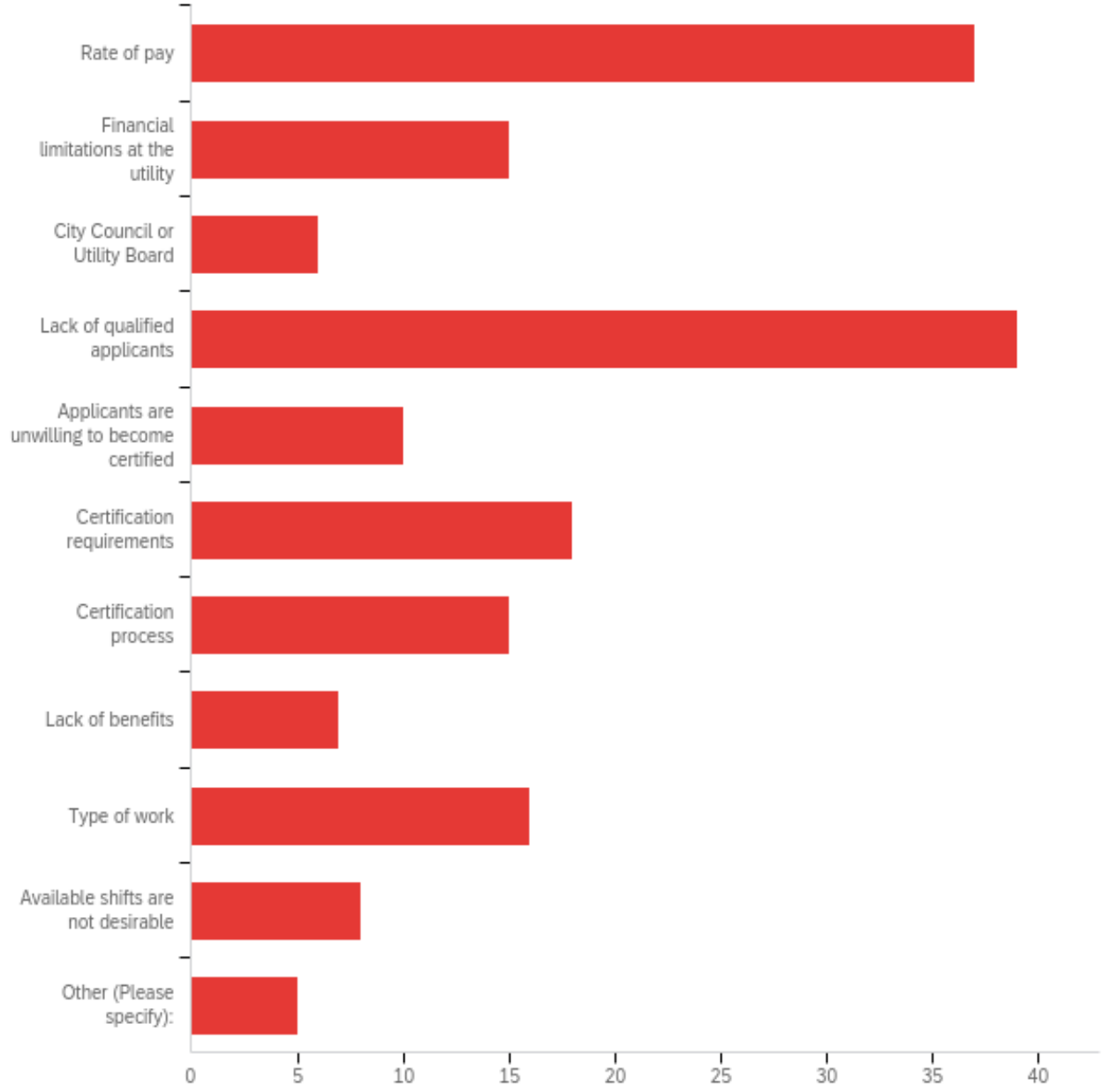
#	Answer	%	Count
1	Newspaper	30.08%	37
2	Online job post (e.g., Indeed, ZipRecruiter, CareerBuilder, LinkedIn, etc.)	21.14%	26
3	Job fair	1.63%	2
4	Unemployment office	3.25%	4

5	Industry-specific website (e.g., WVRWA, WEF Career Center, AWWA)	9.76%	12
6	Social Media (e.g., Facebook, Twitter, etc.)	19.51%	24
7	Local government website	10.57%	13
8	Temp agency	0.81%	1
9	Trade school	0.81%	1
10	Other (please specify):	2.44%	3
	Total	100%	123

Q29_10_TEXT - Other (please specify):

Other (please specify): - Text
have called school for leads
website
word of mouth

Q30 - In your opinion, which of the following are barriers to hiring operators? (Select all that apply)



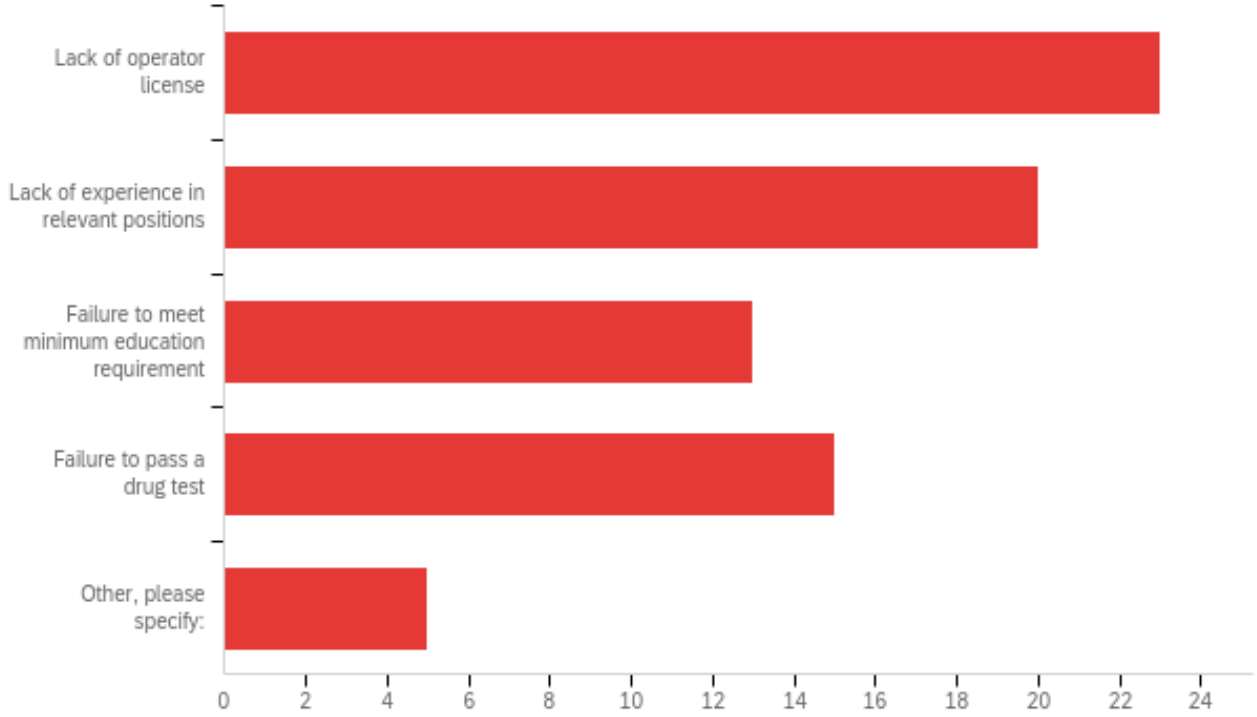
#	Answer	%	Count
1	Rate of pay	21.02%	37
2	Financial limitations at the utility	8.52%	15
3	City Council or Utility Board	3.41%	6
4	Lack of qualified applicants	22.16%	39

5	Applicants are unwilling to become certified	5.68%	10
6	Certification requirements	10.23%	18
7	Certification process	8.52%	15
8	Lack of benefits	3.98%	7
9	Type of work	9.09%	16
10	Available shifts are not desirable	4.55%	8
11	Other (Please specify):	2.84%	5
	Total	100%	176

Q30_11_TEXT - Other (Please specify):

Other (Please specify): - Text
limited opportunity for advancement small utility
Most new hires are inexperienced and not interested in the OIT starting pay of $15.24.
I do not think that public works careers are promoted. They are not well promoted for women.
We have not had anyone to leave
Working in Sewage

Q31 - You indicated that a “lack of qualified applicants” was a barrier to hiring operators. What qualifications have been lacking among potential operator applicants that prevented your utility from hiring them? (Select all that apply)



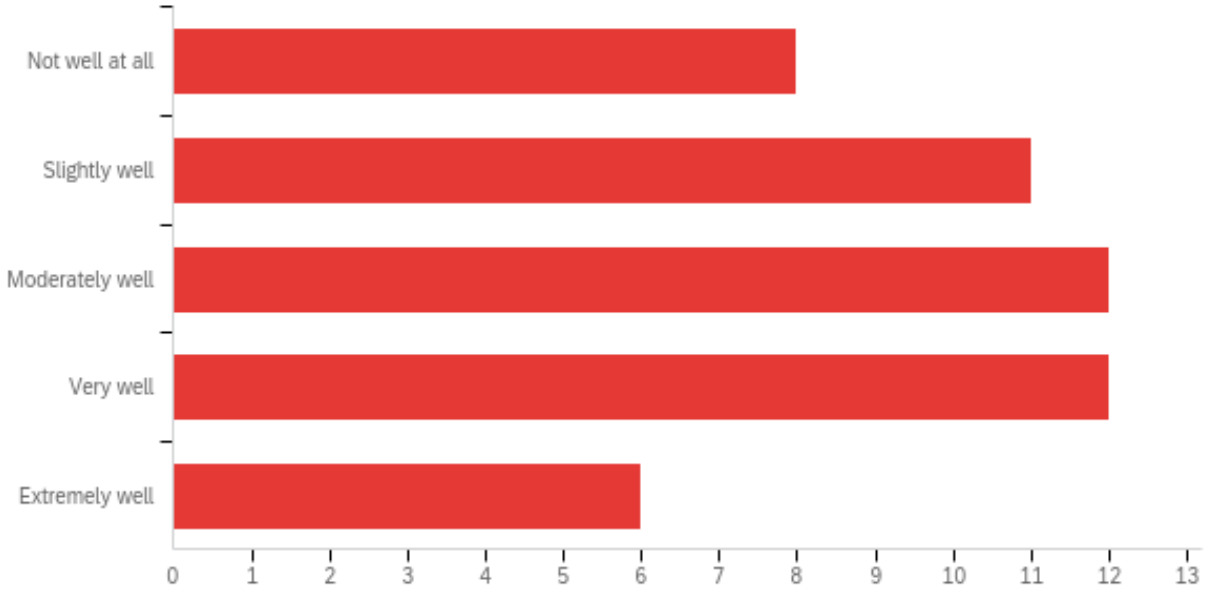
#	Answer	%	Count
1	Lack of operator license	30.26%	23
2	Lack of experience in relevant positions	26.32%	20
3	Failure to meet minimum education requirement	17.11%	13
4	Failure to pass a drug test	19.74%	15
5	Other, please specify:	6.58%	5
	Total	100%	76

Q31_5_TEXT - Other, please specify:

Other, please specify: - Text
people these days are lazy and want everything for nothing
Can not get people to apply

We receive low response/low number of applications, many short listed applicants do not show up for job interviews
Shift work and starting wages
No self starters or motivation to work independently

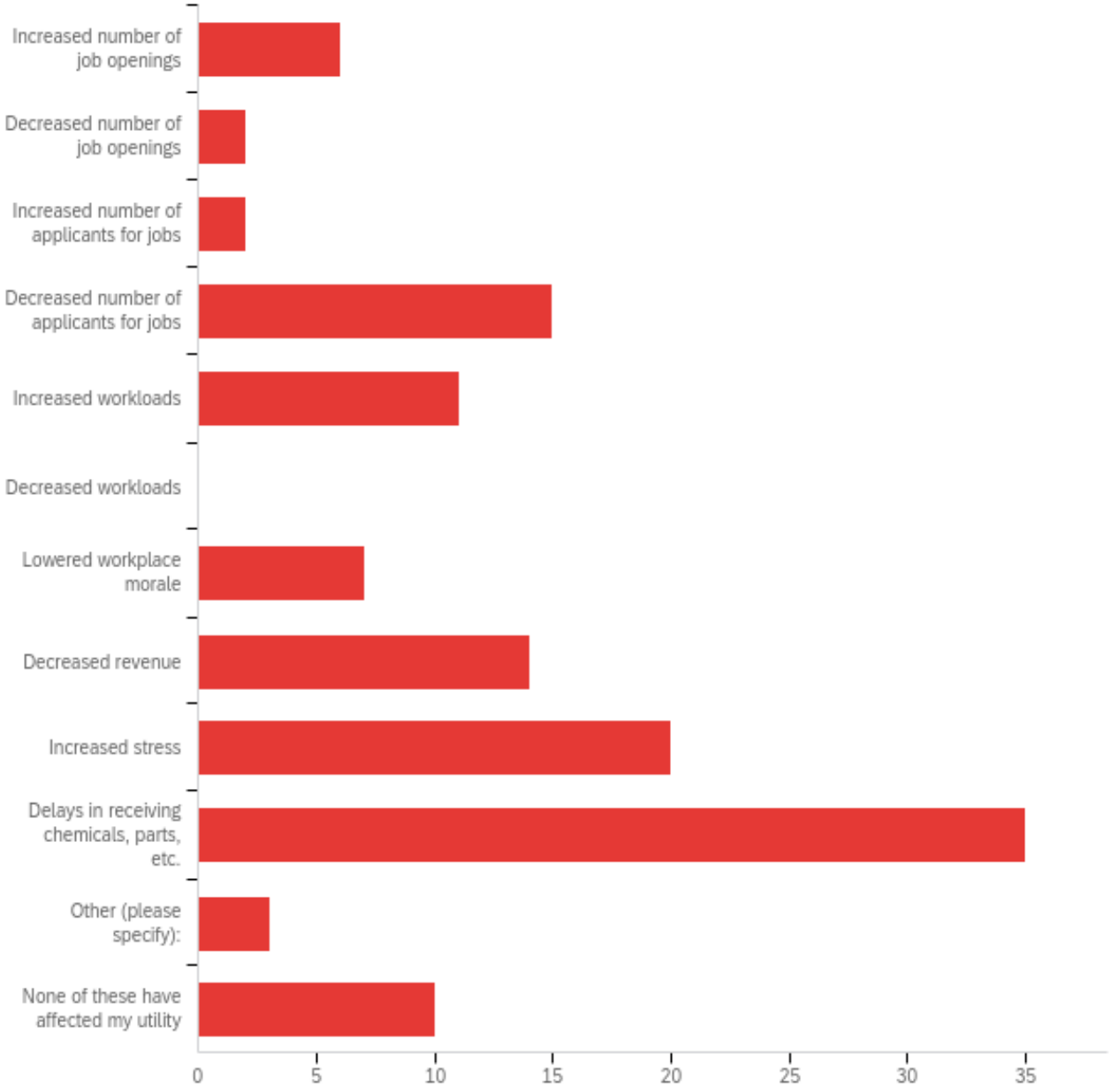
Q32 - How well do your utility's decision-makers (e.g., city council, utility board) understand the challenge of recruiting and retaining operators?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How well do your utility's decision-makers (e.g., city council, utility board) understand the challenge of recruiting and retaining operators?	1.00	5.00	2.94	1.27	1.61	49

#	Answer	%	Count
1	Not well at all	16.33%	8
2	Slightly well	22.45%	11
3	Moderately well	24.49%	12
4	Very well	24.49%	12
5	Extremely well	12.24%	6
	Total	100%	49

Q33 - Since the beginning of the COVID-19 pandemic, has your utility experienced any of the following impacts? (Select all that apply)



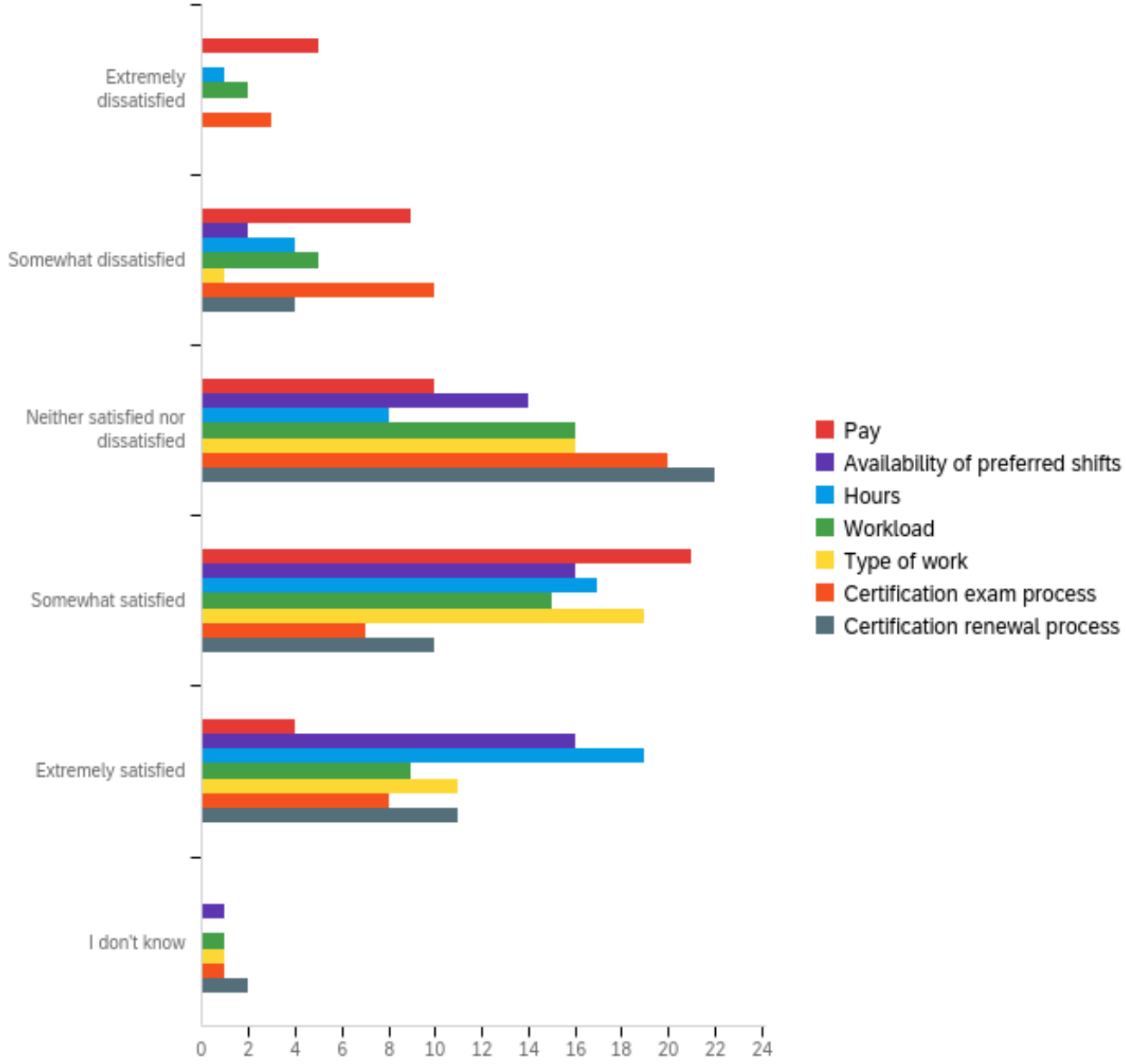
#	Answer	%	Count
1	Increased number of job openings	4.80%	6
2	Decreased number of job openings	1.60%	2
3	Increased number of applicants for jobs	1.60%	2
4	Decreased number of applicants for jobs	12.00%	15

5	Increased workloads	8.80%	11
6	Decreased workloads	0.00%	0
7	Lowered workplace morale	5.60%	7
8	Decreased revenue	11.20%	14
9	Increased stress	16.00%	20
10	Delays in receiving chemicals, parts, etc.	28.00%	35
11	Other (please specify):	2.40%	3
12	None of these have affected my utility	8.00%	10
	Total	100%	125

Q33_11_TEXT - Other (please specify):

Other (please specify): - Text
experienced all of the above before COVID
Aging infrastructure. We are working with 2 large projects.
Cost increase for most everything.

Q34 - As the manager of the utility, you have firsthand knowledge about your operators' job satisfaction. Consider each of the following and indicate whether your operators are extremely dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, or extremely satisfied with that aspect of their job. If you aren't sure, you can mark the answer "I don't know."

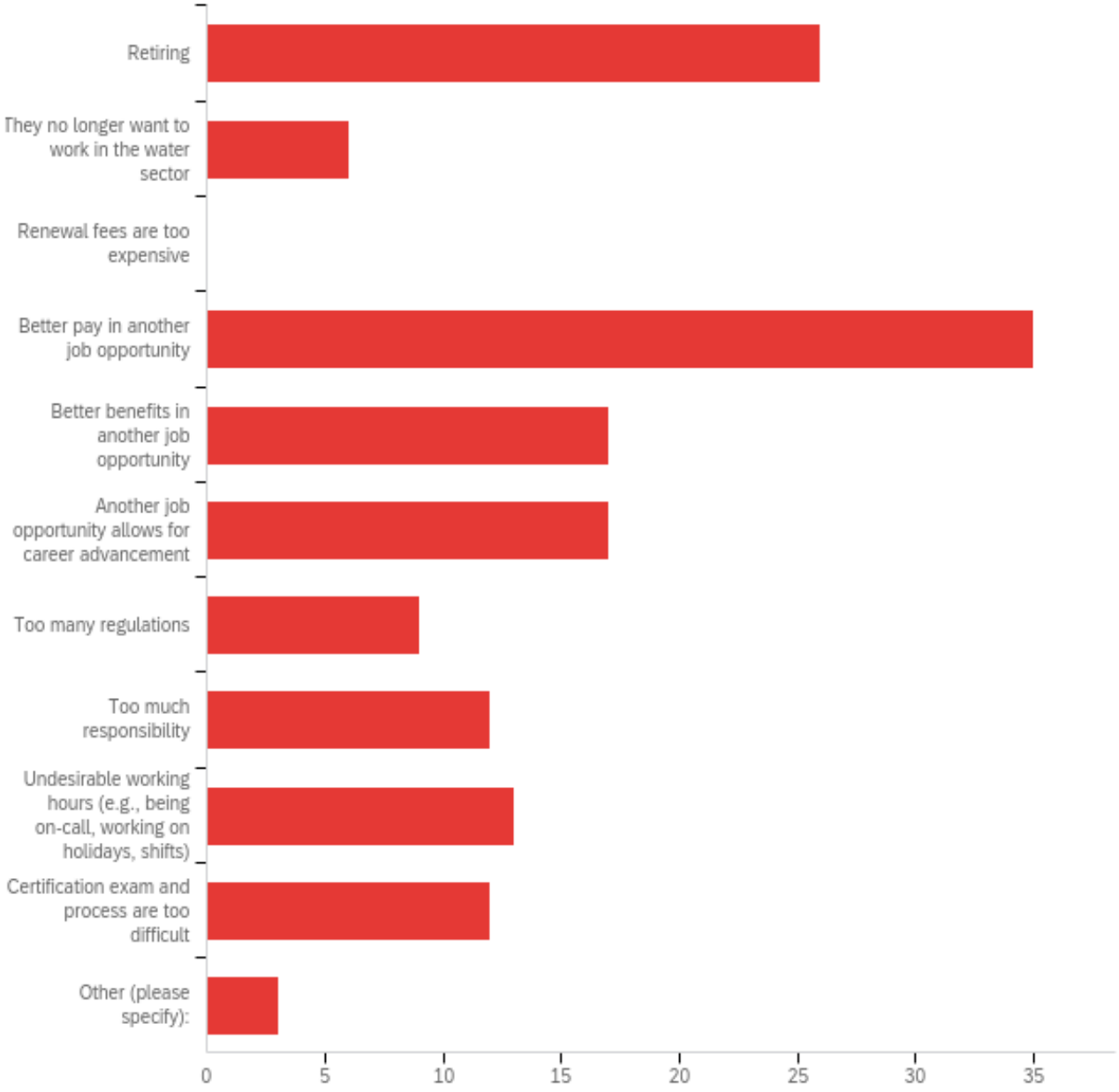


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Pay	1.00	5.00	3.20	1.14	1.31	49

2	Availability of preferred shifts	2.00	6.00	4.00	0.93	0.86	49
3	Hours	1.00	5.00	4.00	1.03	1.06	49
4	Workload	1.00	6.00	3.56	1.10	1.20	48
5	Type of work	2.00	6.00	3.90	0.85	0.72	48
6	Certification exam process	1.00	6.00	3.20	1.18	1.39	49
7	Certification renewal process	2.00	6.00	3.69	1.03	1.07	49

#	Question	Extremely dissatisfied		Somewhat dissatisfied		Neither satisfied nor dissatisfied		Somewhat satisfied		Extremely satisfied		I don't know		Total
1	Pay	10.20%	5	18.37%	9	20.41%	10	42.86%	21	8.16%	4	0.00%	0	49
2	Availability of preferred shifts	0.00%	0	4.08%	2	28.57%	14	32.65%	16	32.65%	16	2.04%	1	49
3	Hours	2.04%	1	8.16%	4	16.33%	8	34.69%	17	38.78%	19	0.00%	0	49
4	Workload	4.17%	2	10.42%	5	33.33%	16	31.25%	15	18.75%	9	2.08%	1	48
5	Type of work	0.00%	0	2.08%	1	33.33%	16	39.58%	19	22.92%	11	2.08%	1	48
6	Certification exam process	6.12%	3	20.41%	10	40.82%	20	14.29%	7	16.33%	8	2.04%	1	49
7	Certification renewal process	0.00%	0	8.16%	4	44.90%	22	20.41%	10	22.45%	11	4.08%	2	49

Q35 - In your experience, what reasons do operators give for leaving the job? (Select all that apply)



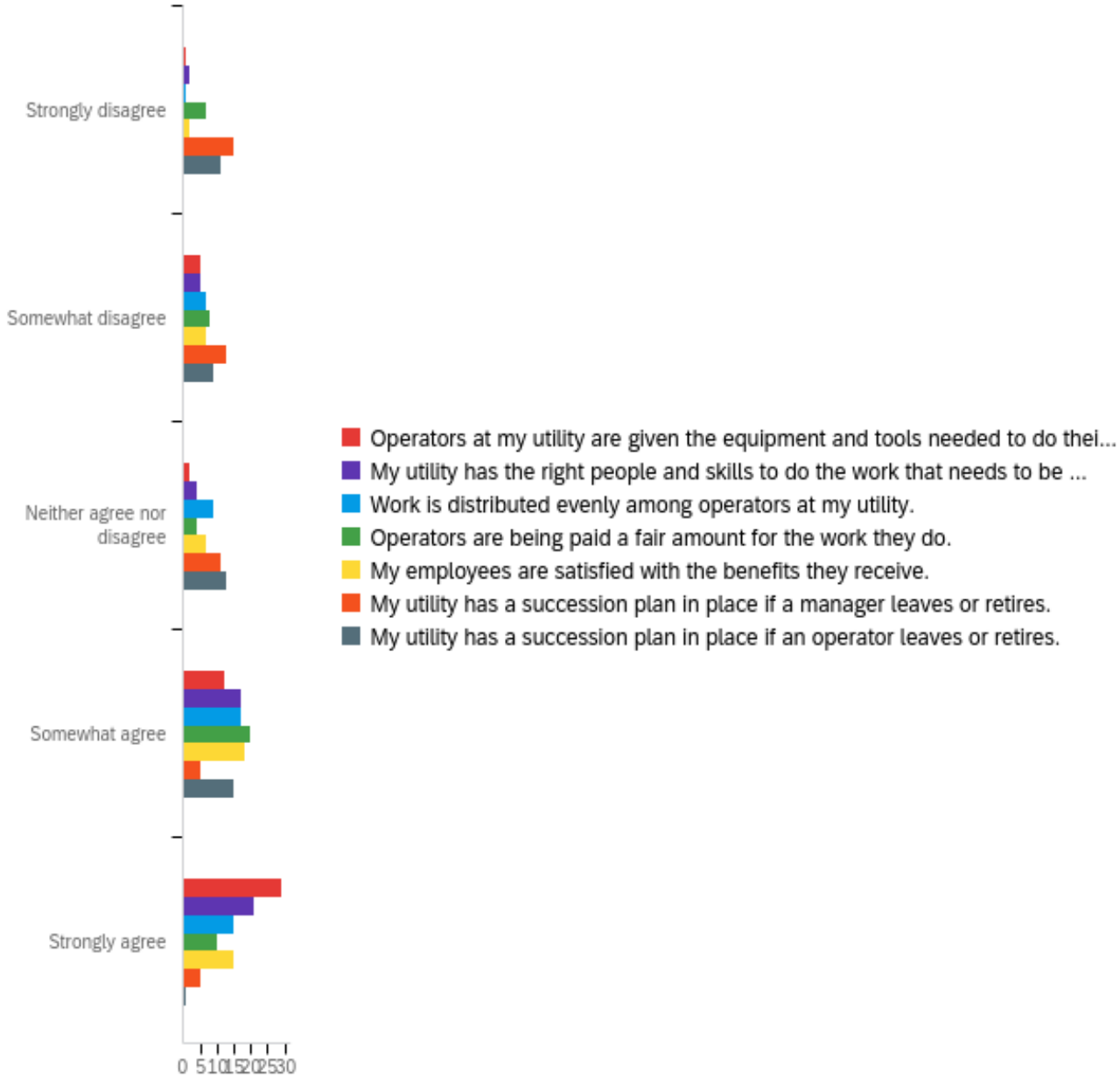
#	Answer	%	Count
1	Retiring	17.33%	26
2	They no longer want to work in the water sector	4.00%	6
3	Renewal fees are too expensive	0.00%	0
4	Better pay in another job opportunity	23.33%	35

5	Better benefits in another job opportunity	11.33%	17
6	Another job opportunity allows for career advancement	11.33%	17
7	Too many regulations	6.00%	9
8	Too much responsibility	8.00%	12
9	Undesirable working hours (e.g., being on-call, working on holidays, shifts)	8.67%	13
10	Certification exam and process are too difficult	8.00%	12
11	Other (please specify):	2.00%	3
	Total	100%	150

Q35_11_TEXT - Other (please specify):

Other (please specify): - Text
Fired for unethical reasons
Upper Management doesn't have a clue what is going on and treats the supervisors that are not yes men unfairly.

Q36 - Consider the following statements and indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each.



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Operators at my utility are given the equipment and tools needed to do their jobs effectively.	1.00	5.00	4.29	1.07	1.14	49
2	My utility has the right people and skills to do the	1.00	5.00	4.02	1.13	1.29	49

	work that needs to be done.						
3	Work is distributed evenly among operators at my utility.	1.00	5.00	3.78	1.09	1.19	49
4	Operators are being paid a fair amount for the work they do.	1.00	5.00	3.37	1.35	1.82	49
5	My employees are satisfied with the benefits they receive.	1.00	5.00	3.76	1.15	1.33	49
6	My utility has a succession plan in place if a manager leaves or retires.	1.00	5.00	2.43	1.29	1.67	49
7	My utility has a succession plan in place if an operator leaves or retires.	1.00	5.00	2.71	1.18	1.39	49

#	Question	Strongly disagree		Somewhat disagree		Neither agree nor disagree		Somewhat agree		Strongly agree		Total
1	Operators at my utility are given the equipment and tools needed to do their jobs effectively.	2.04%	1	10.20%	5	4.08%	2	24.49%	12	59.18%	29	49
2	My utility has the right people and skills to do the work that needs to be done.	4.08%	2	10.20%	5	8.16%	4	34.69%	17	42.86%	21	49
3	Work is distributed evenly among	2.04%	1	14.29%	7	18.37%	9	34.69%	17	30.61%	15	49

	operators at my utility.											
4	Operators are being paid a fair amount for the work they do.	14.29%	7	16.33%	8	8.16%	4	40.82%	20	20.41%	10	49
5	My employees are satisfied with the benefits they receive.	4.08%	2	14.29%	7	14.29%	7	36.73%	18	30.61%	15	49
6	My utility has a succession plan in place if a manager leaves or retires.	30.61%	15	26.53%	13	22.45%	11	10.20%	5	10.20%	5	49
7	My utility has a succession plan in place if an operator leaves or retires.	22.45%	11	18.37%	9	26.53%	13	30.61%	15	2.04%	1	49