Protective Services Occupations

in the Los Angeles Basin

JUNE 2020

CENTER FOR A COMPETITIVE WORKFORCE

LAEDC

Protective Services Occupations in the Los Angeles Basin

About
CCW

Center for a Competitive Worforce

The Center for a Competitive Workforce (CCW) was established in 2017 as a Strong Workforce Program regional project of the 19 community colleges in the Los Angeles region, in collaboration with the L.A./O.C. Center of Excellence for Labor Market Research (COE), hosted at Mt. San Antonio College, the Los Angeles County Economic Development Corporation (LAEDC) and its Institute for Applied Economics.

CCW is focused on institutionalizing the regular engagement of and partnerships between our 19 community colleges in the L.A. region and employers from high-growth industry sectors (i.e. those with productive advantages, deep labor concentrations and projected growth of middle skill jobs). It is through the development, institutionalization and activation of these productive partnerships and real-time feedback loops that colleges can adaptively attune their programs, courses and curricula to the workforce needs in a way that this truly responsive, demand-driven and future-forward, while also providing students with the very important real-world experiences that come from work-based learning opportunities such as internships.

CCW has published 15 regional labor market and occupational reports for L.A. and Orange County. These reports analyze labor supply and demand data for middle-skill occupations in high-growth industries to inform and influence the expansion of new or modified career education, and workforce development programs and curricula. CCW supports quarterly convenings with education, workforce, nonprofit, government and industry leaders in three of the L.A. region's most highly concentrated and fastest growing industry sectors—advanced transportation, bioscience and digital media/entertainment— with the co-equal goals to strengthen industry engagement with faculty, and connect students to meaningful work-based learning opportunities. This is one of the best ways to, constructively, prepare them for the 21st century jobs and careers, in the fast-emerging and rapidly-changing knowledge-intensive industries that drive our regional economy.

In partnership with the regional directors for employer engagement, CCW has hosted seven regional program advisory committee meetings to further strengthen regional alignment of, and ongoing connections between, faculty and industry. CCW has developed two online platforms: a Biosciences Industry Portal, and a regional Workforce and Education Partner Portal to increase the speed and richness of industry-college connections. The goal is to seamlessly access and deploy the economic intelligence gleaned through industry engagement, and to rapidly expand and scale the number of work-based learning and employment opportunities for career education students and graduates.

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Executive Summary

The Protective Services Industry in the Los Angeles Basin

The Los Angeles Basin's competitive and rapidly changing economic landscape has given rise to a job market in which highly specialized knowledge and skills often mean the difference between success and failure. To help meet this challenge, the Center for a Competitive Workforce (Center) set out to study the major industries driving growth and pinpoint how education and industry stakeholders can calibrate the region's talent development system to fuel a vibrant economy.

This report is the latest in a series of reports by the Center and the Los Angeles County Economic Development Corporation (LAEDC) and focuses on occupations in the protective services industry in the Los Angeles (LA) Basin (Los Angeles and Orange counties).

IN THIS REPORT, THE CENTER:

- Analyzes the major trends occurring in protective services
- Forecasts regional employment in target occupations
- Identifies the jobs that have the brightest future for community college students in the region

Why Focus on Protective Services?

With 13 million people calling LA and Orange counties home, a top regional priority is the training and development of a large, capable middle-skill workforce in protective services to ensure the well-being and safety of residents. Los Angeles County is home to the largest correctional institution system in the country, and its law enforcement, probation, and correctional institution workforces are critical for maintaining peace and security. Additionally, as Southern California is particularly susceptible to devasting natural disasters such as earthquakes and wildfires, the region relies on firefighters, fire inspectors and related prevention occupations to counter and mitigate these hazards. The protective services industry is an essential component of the regional workforce, ensuring that all other industries are able to operate in a safe and secure environment.

Protective Services

SUPPLY VERSUS DEMAND

In this report, we assess whether community college supply is meeting workforce demand. Based on regional community college completions, a looming workforce shortage appears to exist. More than 9,600 annual openings are projected for the six middle-skill target occupations assayed in this report. However, community college completions only totaled about 4,100 awards in the 2018-19 academic year, potentially creating an annual undersupply of 5,500 workers to fill job openings in the region.

OCCUPATION PROFILES

This report identifies six target middle-skill occupations with promising future job growth prospects and decent pay for community college students. The highest number of net new job openings over the five-year forecasted period

(2017-2022) will be for police and sheriff's patrol officers (740 jobs), firefighters (230 jobs) and transportation security screeners (210 jobs). The individual occupations highlighted in this report employ mostly middle-skill workers, who typically have greater educational attainment than a high school diploma, but less than a bachelor's degree. As these occupations are constantly in demand for employees, students will find new opportunities in protective services annually.

ADDITIONAL TRENDS

There are many developing trends, which we cover in this report, affecting the protective services industry that may impact the composition of the workforce and its capabilities. These include improvements in technology, such as fire detection and tracking advancements driven by advanced sensor networks and real-time data that aid firefighters in controlling the spread of wildfires. In forensic science, gait analysis and advancements in genealogy are assisting forensic technicians in the precision and breadth of their crime scene analysis. And, advanced databases are being harnessed not only to solve recent crimes, but to predict locations of future crimes so that resources can be deployed more effectively.

Technology and other emerging trends could displace portions of the workforce by automating jobs. This is apparent in the experimentation with "smart prisons," which are monitored using artificial intelligence (AI) as the number of correctional officers in the region decreases.

However, for the majority of protective services occupations, technology is improving how jobs are performed. The Global Positioning System (GPS) and smart phone technologies have the potential to replace outdated monitoring systems and transform the dynamic between probation officers and offenders by allowing for closer and more careful monitoring. In law enforcement occupations, body-worn cameras (BWCs) are providing greater transparency for the public and allowing more careful review of field operations. In transportation services, new three-dimensional (3D) security scanners are allowing officers to analyze luggage more thoroughly and efficiently, saving travelers time while ensuring their safety. Even firefighters are benefitting, through telemetry systems that that transmit real-time physiological data to their commanders. With all of these advancements, training a workforce to embrace new technologies while also maintaining the "soft skills" required of their profession, such

as negotiation, relationship-building and critical thinking, is of the utmost importance.

RECOMMENDATIONS

There are several ways in which the protective services industry can adapt to address looming challenges like the workforce gap and automation trends. A primary solution is to invest in programs that connect young workers with technological positions, as college completions have trended towards the knowledge- and analysis-based side of these target occupations. Creating labs, building programs around data analysis and AI, and similar initiatives may be a key to attracting more qualified and "work ready" community college graduates to the industry.

Another takeaway from the demographic composition of protective services is that females are vastly underrepresented in the industry. Focusing on strategies to involve women in firefighting, law enforcement and forensic positions from a young age may be helpful in building a stronger pipeline of qualified entrants to the industry.

Finally, the training of new workers is key. The world is changing and building positive community relationships has never been more important. Training in protective services occupations must place a greater emphasis on soft skills like cultural competency, negotiation, conflict resolution and stress management to ensure that workers are properly equipped to handle the complex and dangerous situations they may face every day.

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Protective Services Occupations

n continuing the success of its industry reports, the Center once again joined forces with the LAEDC's Institute for Applied Economics to identify significant opportunities within the LA Basin for community college students. This report focuses exclusively on high-growth occupations in protective services. This occupational overview and other industry reports are intended to encourage the Center and the region's community colleges to develop partnerships with industry in order to amplify their understanding about the region's labor markets and workforce gaps, as gauged by industry needs and community college completions.

There are 26 community colleges in the Los Angeles Basin offering programs relevant to the target occupations identified in this report, as mapped in Figure 1. Details about individual community colleges and their programs are provided in the supply-side analysis of this report. Additional training programs and academies are offered by local police, the two county (LA and Orange) sheriff departments, and fire departments.

Why Focus on Protective Services?

The Standard Occupation Classification System (SOC) identifies 23 detailed occupations within the protective services occupational group. These range from below middle-skill jobs, that require a high school degree or no formal education,

to high-skill jobs that expect completion of a bachelor's degree or higher. Wages, employment numbers and worker characteristics vary greatly across these detailed occupations.

In each of these occupations, the safety of the community being served is of utmost concern. From crossing guards and lifeguards to police officers and firefighters, students seeking training in these occupations must be prepared for the great responsibility and compassion expected of these jobholders. They must often be prepared to think and react quickly to potentially dangerous situations and maintain excellent relations with those whom they work to serve.

In LA and Orange counties, there are over 70 police departments responsible for addressing the safety concerns of the region's 13 million residents. Law enforcement workers, such as detectives, police officers, transit police and correctional officers, assist these departments in carrying out their shared mission to improve quality of life throughout the region and maintain the safety and security of its residents.

The region's susceptibility to the damaging effects of natural disasters, which are often unforeseen and create great losses, drives demand for further support of workers in firefighting and prevention occupations. Inspectors and investigators, firefighters, and prevention specialists are all needed to protect the region's residents, physical structures and environment from further damage by fires. Many of these occupations also play an important

Protective Services Occupations

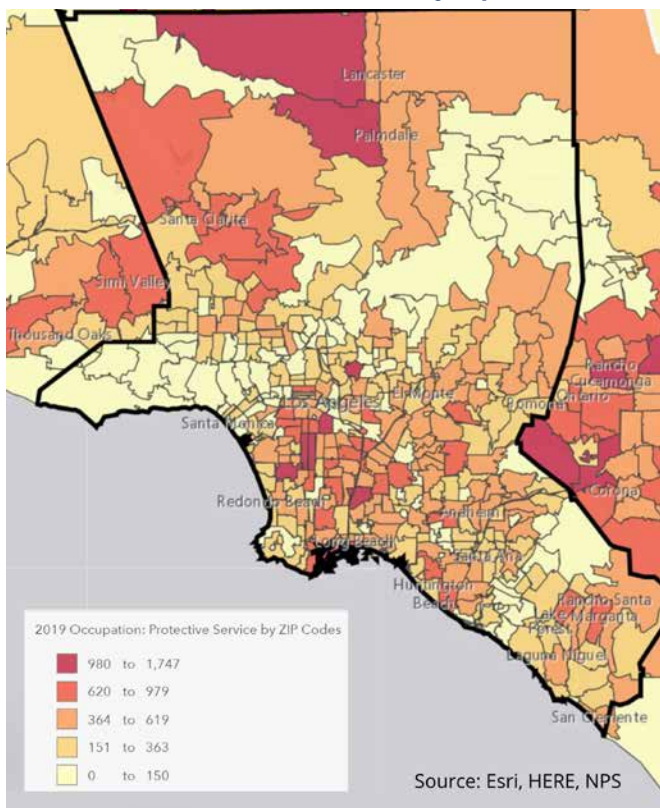FIGURE 1 **Community Colleges Offering Protective Services Programs**

Source: Esri, HERE, NPS; Data by Launchboard

Los Angeles County
Orange County

FIGURE 2 **L.A. Basin Residents Employed Protective Services by Zip Code**

2019 Occupation: Protective Service by ZIP Codes

980 to 1,747	
620 to 979	
364 to 619	
151 to 363	
0 to 150	

Source: Esri, HERE, NPS

role in predicting the impact of earthquakes and providing relief when these natural disaster events occur. Because of the moderate risk of exposure to such disasters in LA and Orange counties, maintaining strong and well-supplied protective service occupations is essential.

While excluded from the SOC's protective services occupational group, many workers in other industries support and enhance the services provided by the occupations identified and assessed in this report. For example, workers employed in several science, legal and social service occupations provide instrumental services to law enforcement and fire prevention workers.

As of 2018, over 140,000 residents of LA County were employed in protective services occupations (SOC 33-000). Figure 2 displays the concentration of these workers throughout the region by zip code. Knowledge about which areas have high demand for protective service workers helps colleges guide students towards areas with high demand.

Protective Services Occupations and the Industries That Employ Them

In 2017, approximately 141,060 workers were employed in protective services occupations in the LA Basin; of these, 36.9 percent are classified by the community colleges as middle-skill occupations (Figure 3), which

FIGURE 3

Skills Classification for the region's Protective Services Occupations

36.9%
63.1%

- Above Middle-Skill
- Middle Skill
- Below Middle-Skill
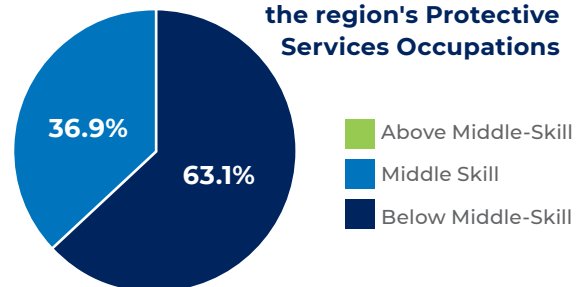
are attainable for workers with an associate degree or postsecondary nondegree award or certification. No protective services occupations are classified as above middle-skill.

Protective services occupations are employed across several industries; however, government is the largest employer. Federal, state and local government agencies (NAICS 92) employ approximately 47 percent of protecti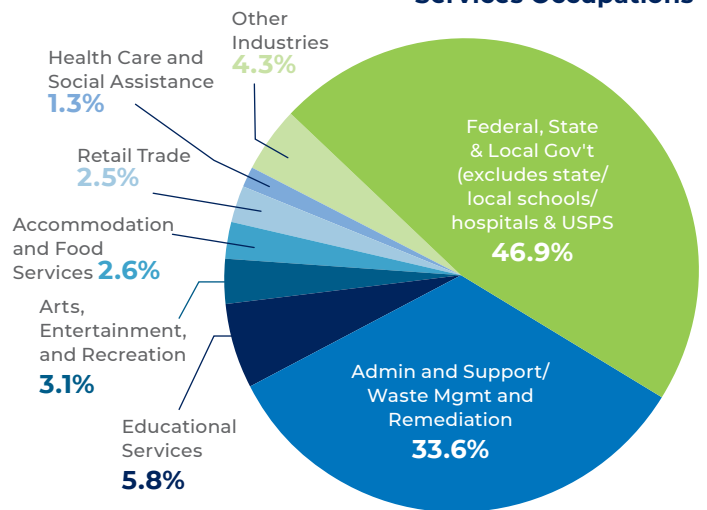ve services occupations (Figure 4). Administrative and support and waste management and remediation services (NAICS 56) ranks second for employing the most protective services occupations, primarily in the investigation and security services industry (NAICS 5616), which includes privately owned investigation, guard, and armored car services.

FIGURE 4

Industries That Employ Protective Services Occupations

Other Industries **4.3%**

Health Care and Social Assistance **1.3%**

Retail Trade **2.5%**

Accommodation and Food Services **2.6%**

Arts, Entertainment, and Recreation **3.1%**

Educational Services **5.8%**

Federal, State & Local Gov't (excludes state/local schools/hospitals & USPS **46.9%**

Admin and Support/Waste Mgmt and Remediation **33.6%**

* Excludes state and local schools and hospitals and the USPS
** Includes securrity services such as guard and patrol and armored car
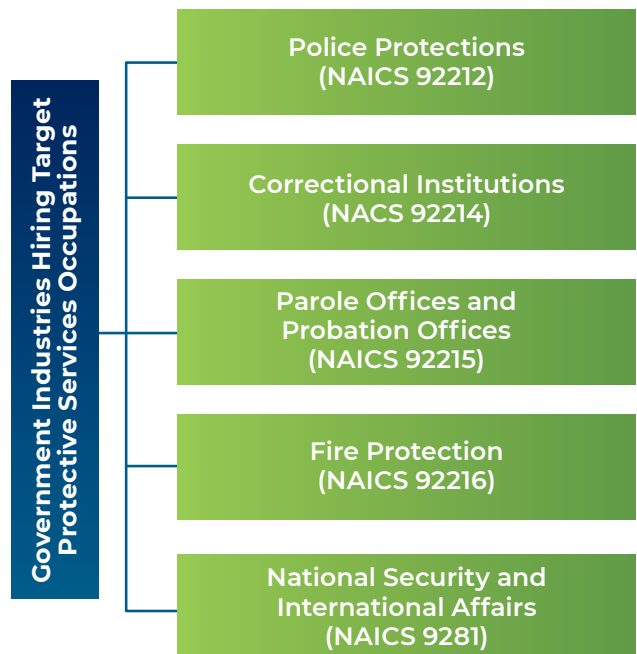
Demand-side Analysis

Outlook and Future Workforce Needs

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Because the protective services industry executes the necessary functions of maintaining safety and public order, workers in this industry are expected to prioritize many soft skills, such as quick reaction times, critical thinking, teamwork and empathy. At the same time, protective service workers are expected to have basic computer skills, which are becoming more and more relevant to the workplace. Reliance on technology for faster and more reliable service is becoming the norm for those employed in this industry. Attention to training both new and incumbent workers should be emphasized in workplaces, as advancements in technology improve and change existing practices.

This report identifies and assesses six target middle-skill occupations attainable for workers with an associate degree or postsecondary nondegree award or certification that often lead to more specialized or advanced roles and that pay more, on average, than the regional average wage. Since these target occupations consist largely of policing and fire prevention, which are employed by the local, state, and/or federal government, we focus on several government industries that predominantly hire the middle-skill occupations highlighted in this report. These industries include: police protection; correctional institutions; parole and probation offices; fire protection; and national security (Figure 5).

Identifying employment and wage trends can provide valuable insights into the industries hiring workers to fill the identified protective services

FIGURE 5 — **Government Industries Hiring Target Protective Services Occupations**

Government Industries Hiring Target Protective Services Occupations

- Police Protections (NAICS 92212)
- Correctional Institutions (NACS 92214)
- Parole Offices and Probation Offices (NAICS 92215)
- Fire Protection (NAICS 92216)
- National Security and International Affairs (NAICS 9281)

middle-skill target occupations. Over the last decade, employment in the government industries of police protection and national security grew by seven percent (7%) and just under nine percent (9%), respectively (Figure 6). Employment in fire protection and correctional institutions declined over the same period.

The change in wages, adjusted for inflation (real wages), in these industries have been mixed. Real wages in fire protection and in police protection
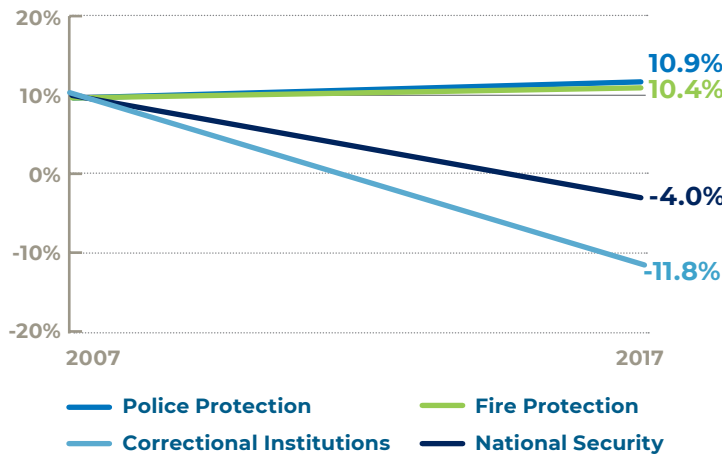
Demand-Side Analysis

FIGURE 6

Change in Payroll Employment from 2007 to 2017

- Police Protection
- Fire Protection
- Correctional Institutions
- National Security

8.9%
7%
-8.4%
-29.1%
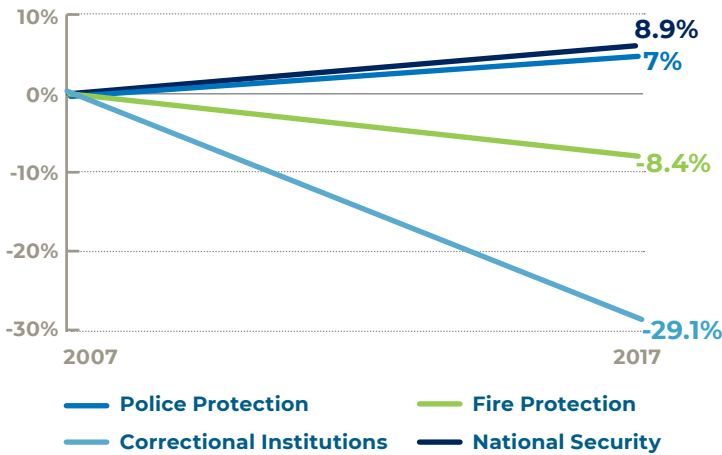
FIGURE 7

Change in Real Wages from 2007 to 2017

- Police Protection
- Fire Protection
- Correctional Institutions
- National Security

10.9%
10.4%
-4.0%
-11.8%

have grown by more than 10 percent over the last decade, while correctional institutions and national security have both experienced a decline over the period (Figure 7).

Figure 8 identifies the employment outlook in these hiring industries from 2017 through 2022.

WORKFORCE AND TECHNOLOGY TRENDS
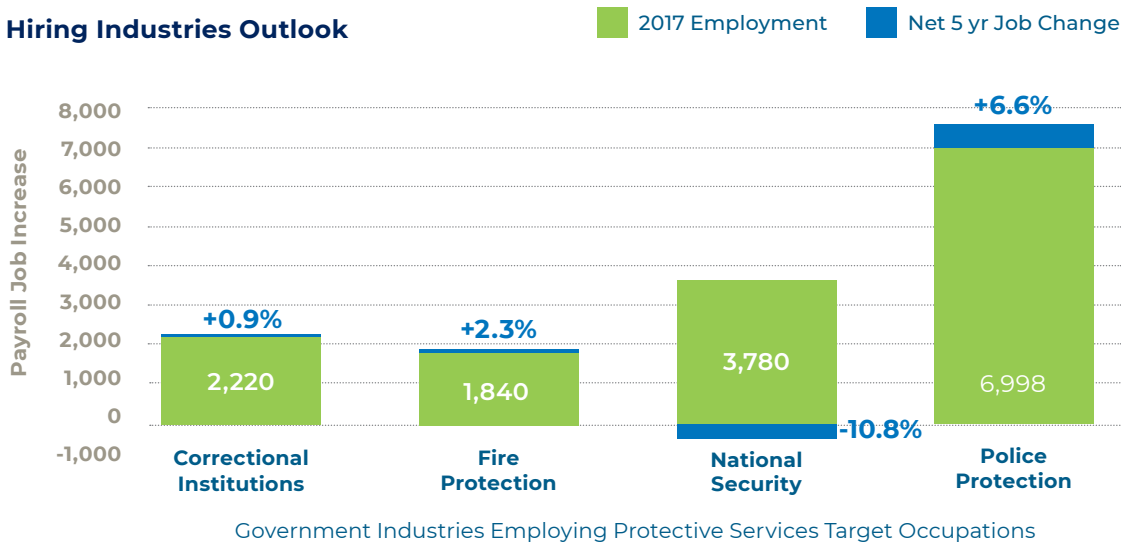
Fire Protection Services

In 2017 and 2018, California experienced the deadliest wildfires in the state's history. In 2019, the state of California reported over 7,800 incidents of wildfires, resulting in more than 259,800 acres burned and 730 structures damaged or destroyed. The loss of personal property due to wildfires has grown increasingly and tragically more widespread amongst Californians as drought and climate change have caused conditions to worsen over the past decade.

Several community colleges in the region offer programs in fire technology and firefighter academies. Projections indicate that the need for these workers will experience stable growth (2.6 percent) over the next three to five years.

The fire protection industry consists of government establishments engaged in fire protection and ambulance or rescue services (NAICS 922160). The industry consists of two main priorities: fire prevention and suppression. Advancing technologies used in prevention and suppression of wildfires are essential for the safety of firefighters and residents. Examples being used across the state include real-time intelligence for tracking and projecting wildfires, advanced detection systems, and improvements in analyzing firefighter's physiological metrics during emergencies.

Access to real-time data allows firefighters to streamline emergency mitigation of wildfires. By accessing real-time traffic analytics, firefighters may find faster and safer routes to arrive on scene, while real-time data of shifting wind and weather patterns may save the lives of firefighters battling wildfires and prove to be an asset in containing the spread of wildfires. Increased emphasis on topography, infrared imagery of wildfires, and shapefile updates of fires are sent as frequent updates to firefighters so that they have knowledge of the exact direction of fires and reliable data to assess evacuation routes on-the-scene.

FIGURE 8

Hiring Industries Outlook

Legend: ■ 2017 Employment ■ Net 5 yr Job Change

Y-axis (Payroll Job Increase): 8,000 / 7,000 / 6,000 / 5,000 / 4,000 / 3,000 / 2,000 / 1,000 / 0 / -1,000

- Correctional Institutions: 2,220 — +0.9%
- Fire Protection: 1,840 — +2.3%
- National Security: 3,780 — -10.8%
- Police Protection: 6,998 — +6.6%

Government Industries Employing Protective Services Target Occupations

Additional projects approved by the state include wildfire detection systems using computer aided sensors in the sky that are programmed to alert dispatch systems when ignition is detected, and real-time data used in predicting the path of a wildfire once ignition has been detected. Minimizing the amount of time it takes to report and track fires will greatly assist fighters in completing their job as quickly and safely as possible.

Telemetry systems are also being expanded in the world of firefighting. These systems are fitted into individual breathing apparatuses in order to report vital physiological data from firefighters to their commanders. Increasing real-time access to these readings while firefighters work on scene will assist dispatchers and commanders in preventing life-threatening situations by providing remote access to air pressure, evacuation signals and man down alarms. In addition to increasing access to these systems, developments in location technology are also needed. Combining physiological data with GPS tracking and building plans will allow controllers and fellow firefighters to track movements and map out action courses, as needed.

Police Protection Services

Technology in the criminal justice system will enhance public safety, improve criminal records and identification systems, and protect and monitor police engagement.

One widely discussed measure, BWCs, has been introduced to police forces across the country to improve interactions between law enforcement and the public. As public demand for access to BWC recordings has increased, so too has the number of technologies that create such recordings. For example, to adhere to county standards, software is being developed to automatically begin recording without the need for officers to turn on and off BWCs. During a foot pursuit, new BWCs are configured with an accelerator that will trigger a video recording when it senses an officer is running. Similarly, vehicle sensors can prompt recordings to initiate when gunshots are heard, when crash sensors are triggered, when a police vehicle begins speeding, or when emergency lights are turned on.

Biometric surveillance technology, such as facial recognition, is another widely talked about technology used by police forces. The idea behind

[1] Kaste, Martin, "How Data Analysis is Driving Policing," NPR. June 25, 2018. https://www.npr.org/2018/06/25/622715984/how-data-analysis-is-driving-policing

Demand-Side Analysis

it is hardly new, as systems implementing this technology began nearly 20 years ago. However, advancements in technology have made these technologies more accurate, but also more controversial since their initiation. While California has barred real-time facial recognition surveillance on BWCs, citing a lack of accuracy and fears over violations of due process, the technology can still be used to match crime suspects to surveillance footage and databases of photos.

Streamlining databases used by police departments are improving efficiencies in police activities ranging from traffic stops to crime mapping. Officers can now use more advanced data search programs to find all the linked information related to an individual or vehicle, and these databases are being used to predict locations of future crimes, allowing police forces to allocate officers on duty to areas that need them most. As bias in the criminal justice system and a trusting relationship between police and the public is of constant concern to many, stringent reviews of all new technologies being introduced to police departments are of great importance in order to ensure that improvements lead to safety and justice for all communities.

Current Degree of Automation

HIGHLY AUTOMATED
- none

MODERATELY AUTOMATED
- Immigration and Customs Inspectors
- Transportation Security Screeners

SLIGHTLY AUTOMATED
- Criminal Investigators and Special Agents
- Forest Fire Inspectors and Prevention Specialists

VERY LITTLE AUTOMATED
- Security Guards
- Crossing Guards

Correctional Institutions

The LA County correctional institution system averages just over 17,000 inmates each day. The number of correctional officers in the LA Basin has fallen since 2012 and further declines are projected through 2022; so, the need for reliable technology in correctional institutions is of utmost importance and is driving the trend of developing "Smart Prisons".

Integrating AI into surveillance of correctional facilities is one solution to understaffed areas. Advancements in technology are enabling AI to analyze video footage without the need for an officer, so that when a disruption is detected (e.g., violent behavior, a large crowd, the arrival of a vehicle, etc.), the surveillance system can automatically alert officers on duty to the scene

of such disruption. Similarly, AI and machine learning software are being coupled with speech recognition and semantic analytics in order to monitor phone calls and detect conversations concerning criminal activities or potential suicides. Once again, the need to have an officer listening into each call or reviewing transcripts has been replaced by more efficient and effective technologies that reduce the amount of time it takes to monitor and identify potentially dangerous behaviors.

Parole and Probation Offices

This industry is inclusive of government establishments engaged in judicially administering probation offices, parole offices and boards, and pardon boards. While parole and

2 Francescani, Chris. "US prisons and jails using AI to mass-monitor millions of inmate calls." ABC News. Oct 24, 2019. https://abcnews.go.com/Technology/us-prisons-jails-ai-mass-monitor-millions-inmate/story?id=66370244

probation officers play a role in assisting police and other law enforcement agencies, they also prioritize rehabilitation and reintegration of those deemed criminally at risk. Some services provided by this industry include risk assessments, monitoring probationers, assisting families, and identifying employment opportunities.

Technology has allowed probation officers to monitor offenders more closely than ever before. Even the proliferation of social media access is helping officers to ensure that recent offenders are not violating any terms of their probation. In some cases, social media profiles have helped officers find the locations of offenders, without the use of advanced tracking systems. Additionally, advancements in the ability to search and monitor computer activities are assisting officers in keeping up with illegal activity taking place online. Some software programs can be stored in flash drives and programmed to search for certain words or content when plugged into a computer.

Electronic monitoring of offenders has been involved in parole services for some time now. Monitoring is dependent on an offender's convictions and their risk to the public. Radio frequency (RF) is one such technology used, allowing parole officers to set curfews or monitor an offender under house arrest. RF requires an in-house monitoring unit to connect with a wrist or ankle bracelet, so that officers may set an appropriate range between the two and receive alerts when an offender wearing a bracelet has moved out of such range. GPS monitoring is also used if a parole officer wishes to track the exact location of an offender wearing a trackable bracelet. As GPS systems become more advanced, officers can use such monitoring to determine if a probationer was in the vicinity of a crime scene. In response to criticisms about GPS monitoring being too strict on probationers, some researchers in criminal justice reform are coming up with methods to make monitoring geared towards assistance, rather than punishment. For example, developing apps that incorporate sleep patterns, movement, and knowledge of content viewed on

a probationers smart phone can help identify substance abuse or mental health problems. The ability to have a working relationship with those being monitored may allow probation officers to identify resources to positively impact behavior and re-integration into society.

Forensic Science

The workforce related to forensic sciences is projected to experience robust growth in the next three to five years. As discussed, law enforcement is being overwhelmed by advancements in technology to improve safety and accuracy. Forensic scientists are responsible for administering tests, interpreting data, examining evidence and reporting on results. As data and testing become a more critical role in policing, the need for analysts and scientists to interpret and improve on technologies will continue to be in high demand.

Subsets of forensic science may include an emphasis on genetics, chemistry, botany, archeology, linguistics, or other specific areas of analysis. Outside of crime labs, the Department of Justice maintains forensic labs at the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), the Drug Enforcement Administration (DEA), and the Federal Bureau of Investigation (FBI). Much emphasis has been put on increasing the capacity of forensic labs so that evidence can be processed quickly. Additionally, federal, state and local governments continue to fund research meant to improve the reliability of analysis and facilitate coordination between forensics and other entities.

Biometric data is a fundamental component of criminal forensic science. It is by no means new in the forensics toolkit; scientists in the United States (U.S.) have been identifying fingerprints at crime scenes to identify suspects for over a century now. However, modern forensic science can now analyze everything from fingerprints to spatiotemporal and kinematic characteristics, also known as gait analysis. Gait analysis is still

developing, with the intent to identify suspects using recognition algorithms from surveillance footage. The use of DNA at crime scenes has long been in use, but developments are allowing scientists to make headway on unknown DNA found at crime scenes. For example, forensic genealogy allows scientists to match DNA against genetic databases, which may result in identifying a suspect or finding relatives of a suspect. Similarly, research is also being conducted around DNA phenotyping, which allows scientists to generate certain attributes of a person's physical appearance using biological materials left at a crime scene.

Transportation Security

In the United States, the Transportation Security Administration (TSA) is responsible for working with law enforcement and the intelligence community to secure U.S. transportation systems. Securing flights, screening passengers and baggage on transportation systems, and improving   counterterrorism measures are the primary functions of the TSA.

Improvements in travel security not only allow passengers to feel safer but will also save time and money if made more effective than current technologies used. For example, 3D technologies are capable of streamlining security measures and saving travelers from excessive wait times. One such example, 3D security scanners, have already begun taking effect in a selection of the nation's airports. These scanners no longer require travelers to take out laptops and liquids, as the 3D technology can digitally rotate an image to examine a suspicious item without the need to open a bag. Similarly, 3D body scanners using millimeter-wave technology are expected to further reduce scan and processing times at airports and reduce false alarms.
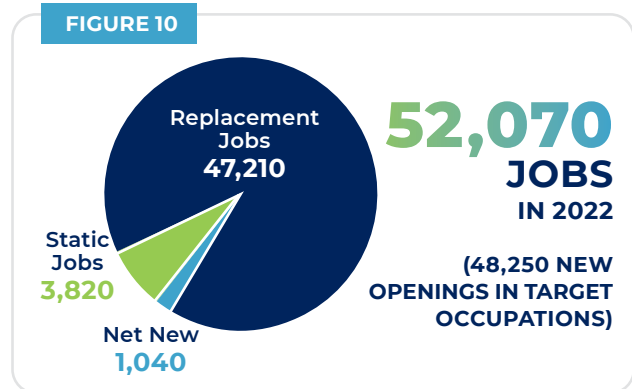

[3] Webster, Katherine. "Smartphones and sensor technology will help promote and reward constructive behaviors to keep probationers on track." CorrectionsOne. November 7, 2017. https://www.correctionsone.com/probation-and-parole/articles/how-next-gen-electronic-monitoring-could-aid-probation-and-parole-officers-m2IbZMsvx1FTAeNz/

Protective Services Target Occupations

As stated, this report has identified six middle-skill target occupations in the Los Angeles Basin that present well-paying, consistent job opportunities for the region's community college students; these target occupations are presented in Figure 9.

In 2017, 51,030 workers in the Los Angeles Basin were employed in the six target occupations identified in this report, accounting for 36 percent of all workers employed in protective services occupations. Police and sheriff's patrol officers account for the greatest number of jobs amongst the targeted occupations and are anticipated to grow 2.4 percent by 2022.

The number of projected new jobs can be combined with job openings from replacements and retirements to provide an overall estimate of employer hiring needs. Overall, employment in the target protective services occupations is forecasted

FIGURE 10

Replacement Jobs 47,210

Static Jobs 3,820

Net New 1,040

52,070 JOBS IN 2022

(48,250 NEW OPENINGS IN TARGET OCCUPATIONS)

to reach 52,070 jobs in 2022, of which 47,210 will be replacement workers (Exhibit 10). Between 2017 and 2022, there will be over 48,250 new openings.

Since the workforce in protective services occupations is employed primarily by the local, state, or federal government, **projections for each of these occupations is susceptible to changes caused by budget cuts or increased spending** by the local, state, and federal governments.

FIGURE 9   **Target Middle-Skill Occupations**

SOC	Occupation	2017 Employ.	2017 to 2022 Across All Industries			Annual Openings	Median Annual Wage
			Net Job Change	Replacement Jobs	Total Openings		
33-3051	Police and Sheriff's Patrol Officers	30,410	740	30,850	31,590	6,320	$103,850
33-2011	Firefighters	8,710	230	9,510	9,740	1,950	$80,630
33-3012	Correctional Officers and Jailers	4,560	-150	3,320	3,170	630	$63,590
33-9093	Transportation Security Screeners	2,400	80	1,580	1,660	330	$38,020
33-3021	Detectives and Criminal Investigators	3,980	80	1,350	1,430	290	$120,490
19-4092	Forensic Science Technicians	970	60	600	660	130	$92,590
Total Employment		51,030	1,040	47,210	48,250	9,650	

Protective Services
Target Occupations

Change in Payroll Employment from 2012 to 2017

- Forensic Science Technicians — **34.7%**
- Firefighters — **21.4%**
- Total, All Industries — **5.7%**
- Police and Sheriff's Patrol Officers — **4.9%**
- Detectives and Criminal Investigators — **3.6%**
- Correctional Officers and Jailers — **-2.8%**
- Transportation Security Screeners — **-12.7%**
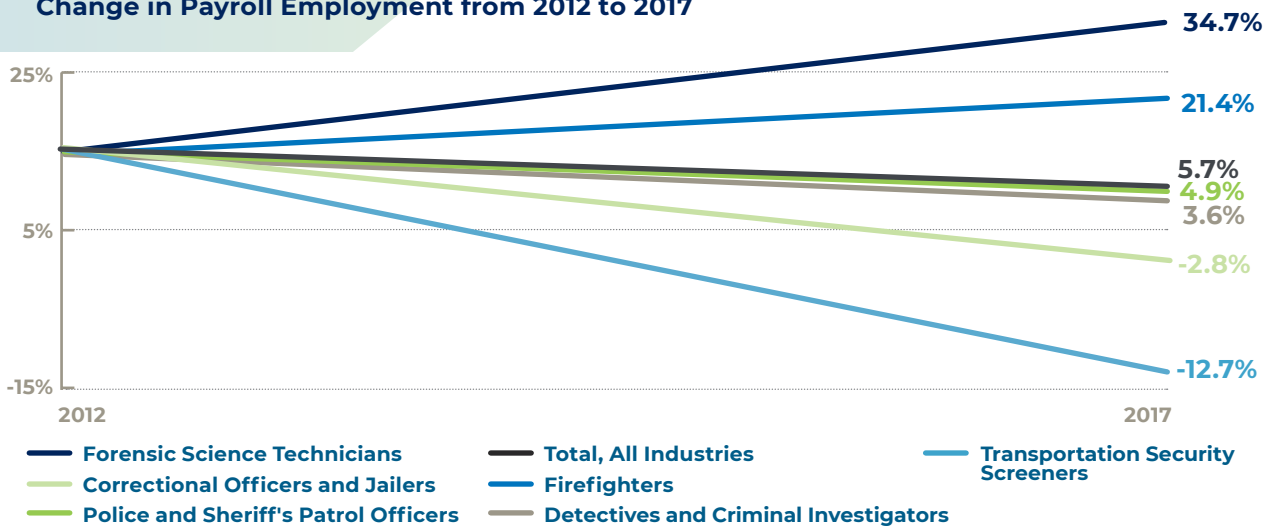
Technology and the risk of automation has also played a critical role in the growth or decline of some of these occupations. As discussed, advancements in surveillance systems have been a major factor driving the decline in correctional officers and jailers. This occupation saw a decline of 2.8 percent from 2012 to 2017 (130 jobs, Figure 11) and is projected to lose another 150 jobs by 2022 (Figure 12). A similar phenomenon has affected transportation security scanners. This occupation, largely created in response to the attacks of 9/11, has since seen major declines, losing 12.7 percent of its workforce in the Los Angeles Basin between 2012 and 2017

(350 jobs) (Exhibit 11). However, projections indicate a brighter outlook for this occupation through 2022, anticipating a growth of 3.2 percent (Figure 12).

While they represent the smallest share of protective services employment in 2017, forensic science technicians are expected to experience the greatest growth of the six middle-skill target occupations, growing 6.4 percent by 2022. Detectives, police, and firefighters are all anticipated to continue being vital occupations in the region, experiencing moderate growth through 2022.

FIGURE 12

Occupational Outlook

Legend: 2017 Employment, Net 5 yr Job Change
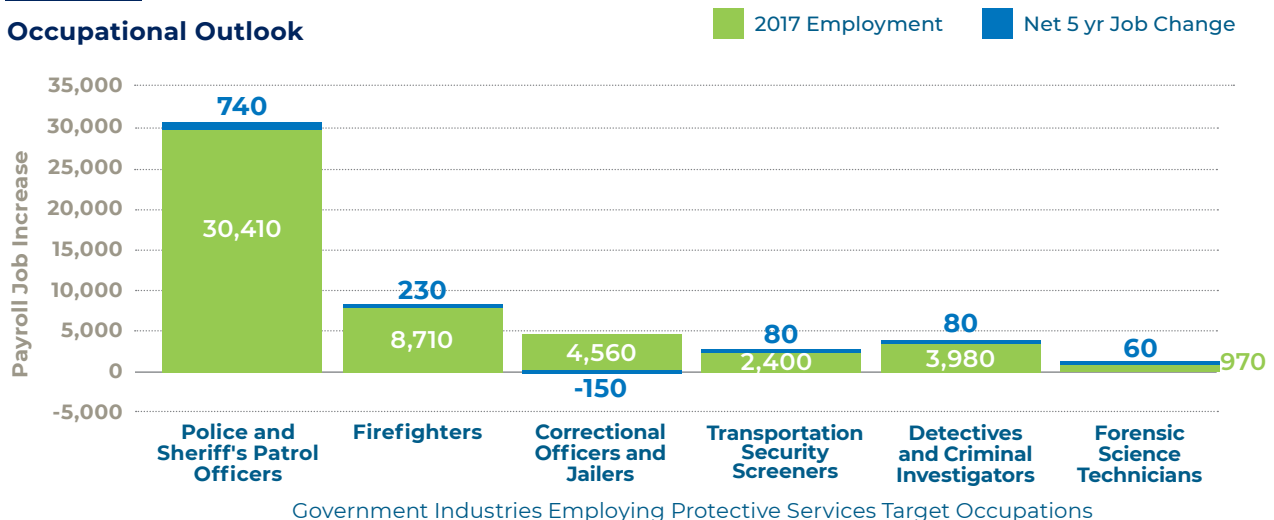
Government Industries Employing Protective Services Target Occupations

Supply-Side Analysis

Community Colleges' Talent Pool

From police to fire protection and from corrections to investigations, there are many different community college programs preparing students to access the diverse array of occupations in protective services, providing a competitive talent pool from which local employers in the LA Basin can draw.

This section details community college program offerings and student completions related to middle-skill protective services occupations. (For a complete list of colleges with related program offerings, see Appendix A.)

Six target middle-skill occupations were selected for closer examination because they offer promising career prospects for community college students. These occupations have positive employment outlooks and pay above the living wage in the region. Nine community college programs prepare students to enter occupations in protective services, conferring nearly 4,200 associate degrees and certificates during the 2018-19 academic year.

Over the next five years, the LA Basin can expect 9,650 job openings annually for the six middle-skill target occupations identified within protective services. However, the region may be facing a workforce shortage in coming years, as there is projected to be an undersupply of nearly 5,500 workers annually to fill job openings in the protective services occupations examined in this report.

According to LaunchBoard data from the 2016-17 academic year, which is the most recent available, there were 64,369 unique students enrolled in one or more public safety (protective services) courses in the LA Basin. Male students predominantly fill relevant courses, accounting for 70 percent of enrolled students. Nearly half of the students enrolled in these programs are Hispanic and nearly a quarter are white. Close to half (48 percent) of students are 29 or younger, with 31 percent of students being 40 and older. The median annual earnings of all students exiting public safety programs was $55,228 in 2016-17, further emphasizing the strong wages associated with protective services jobs.

Over half of the projected employment for all protective services occupations and 65 percent of annual openings for these six protective services occupations are for police and sheriff's patrol officers. These occupations have strong median wages, between $18.28 and $57.93 per hour.

Supply-Side Analysis

FIGURE 13 **Employment, annual openings, and wages for protective services occupations**

SOC	Occupation	Protective Service Industries		Median Hourly Wage
		2017 Employment	Annual Openings	
19-4092	Forensic Science Technicians	970	130	$44.51
33-2011	Firefighters	8,710	1,950	$38.77
33-3012	Correctional Officers and Jailers	4,560	630	$30.58
33-3021	Detectives and Criminal Investigators	3,980	290	$57.93
33-3051	Police and Sheriff's Patrol Officers	30,410	6,320	$49.95
33-9093	Transportation and Security Screeners	2,400	330	$18.28
Total Employment		51,030	9,650	$40.00

The administration of justice program had the most completions out of the nine related training programs, with 2,410 awards conferred in the 2018-19 academic year. Of the nine programs that have historically trained for these six occupations, the wildfire technology program conferred the fewest, and there were no completions for probation and parole. It is also important to note that in addition to the awards listed below (Figure 14), there were 917 non-credit and/or other credit awards issued over the past five academic years in regional administration of justice programs and 413 of these awards were issued in the last year (2018-2019).

FIGURE 14 **Community college awards related to six protective services occupations**

Program	2014-15 Awards	2015-16 Awards	2016-17 Awards	2017-18 Awards	2018-19 Awards
Administration of Justice	1,439	1,716	2,150	2,487	2,410
Corrections	38	56	47	73	48
Probation and Parole	-	-	-	-	-
Industrial and Transportation Security	25	33	136	98	76
Forensics, Evidence, and Investigation	43	27	41	48	56
Police Academy	343	567	545	471	374
Fire Technology	1,039	716	702	6,364	1,136
Wildland Fire Technology	9	4	10	8	22
Fire Academy	20	28	13	28	43
Total	2,956	3,147	3,644	9,577	4,164

Conclusions & Recommendations

Protective services occupations are a vital component of the region's economic and societal well-being. Over the next five years, there will be 48,250 total job openings in the LA Basin for the six middle-skill target occupations identified and assessed by this report. These middle-skill job openings provide both identifiable opportunities for workers to earn a living wage and well-defined "career ladders" to move up the economic opportunity chain.

In 2017, the six protective services target middle-skill occupations employed 51,030 workers in the LA Basin. Stable projections for growth over the next five years and the sizeable amount of current and future job openings in these occupations makes prioritizing this industry for the development of training and educational programs compelling.

Protective services occupations are largely dominated by workers between the ages of 25 and 54. The physical demands of these occupations often lead to an earlier retirement age for those in the field, with most LA firefighters and officers qualifying for pension programs at the age of 50. This requires a consistent pipeline of trained and qualified young adults to maintain a steady workforce.

Forensic sciences employ a younger workforce on average. Opportunities that engage young students in protective services technology could also fill some gaps in this fast-growing area of protective services.

On average, those employed in the target occupations identified in this report earned about $40 per hour, well above the living wage in 2017, with detectives and criminal investigators earning the highest average wages at $57.93 per hour.

The Future Workforce

While the risk of automation replacing jobs is present in future protective services employment, most of the occupations identified in this report are largely shielded from displacement by technology due to their essential role in the community and their employment by local, state, and federal governments. Technology generally augments the job functions of workers in these occupations, which are often in the field and require human decision-making and action.

The aging workforce means that younger workers completing community college are in a key position to get a head start in learning the new technologies that that are now being used

in protective services occupations. A changing occupational landscape will require these potential employees to adapt much faster to new tools, engage more frequently with the public, and rely heavily on interpersonal, physical, and technological skills.

Challenges

IMPENDING WORKER SHORTAGE

When workforce demand is considered, there is some urgency for the creation and expansion of programs targeting protective services occupations. Based on regional community college program completion only, an immediate workforce shortage appears to be posing challenges to filling job openings.

The numbers indicate that there could be an annual undersupply of 5,500 workers. More than 9,600 annual openings are projected for the six target middle-skill occupations studied for this report. But community college completions only totaled about 4,100 awards in the 2018-19 academic year. There appears to be the largest gap between police and sheriff's patrol officers job openings (6,320 annual openings) and awards completions that train for this occupation (2,784 awards).

ADDRESSING AUTOMATION CONCERNS

This report looked not only at where the greatest job growth will be, but also asked the question: "Where won't the jobs be?" It is imperative to take stock of current community college program enrollments to ensure students will be able to obtain employment upon graduation. As community colleges in the region look to develop new programs and update or revise existing programs related to protective services, they should take into consideration whether the occupations they are training for are vulnerable to automation.

As in many other industries, rapid technological change is transforming the role of protective services. AI and varying forms of automation are

disruptive forces, causing some occupations to become obsolete, while increasing opportunities in others. Two of the six target occupations identified are potentially susceptible to displacement by automation. Correctional officers and jailers are expected to lose 3.3 percent of their workforce by 2022 (150 jobs). This occupation has proven the most vulnerable to automation, as surveillance systems fitted with AI have proven to be increasingly effective in correctional institutions. While transportation security screeners have an optimistic outlook through 2022, this occupation has also experienced declines since 2012. Advancements in security technology are reducing staffing needs for these positions. Community colleges must be constantly engaged with industry in order to keep on top of the skills required for protective services workers. Attention should be placed on programs that emphasize analyzing surveillance data and equipping the workforce with the tools to work in conjunction with advancements in technology, rather than being displaced by it.

Recommendations

ADAPT TRADITIONAL PROGRAMS TO MEET MODERN NEEDS

Modern policing has transformed over the years, and educational institutions, along with academies, must incorporate proper training to keep up. Scenario-based training and increased field knowledge that replicate real-life complexities and provide recruits the opportunity to enhance their instincts and problem-solving skills are powerful learning tools. The law enforcement industry requires new recruits to be better emotionally and technically prepared to meet complicated present-day policing challenges, especially with the deployment of BWCs that put officer actions in the public eye. The Los Angeles Police Department (LAPD) has already made changes to enhance engagement between recruits and instructors. Colleges and academies must prepare future officers for the interpersonal relationships and cultural competencies they must build with the residents they are tasked to protect. As an example, for the

LAPD, additional instruction is provided to teach officers Spanish; human relations, such as cultural sensitivity, are strongly emphasized during training as well. In a world of mass media and widespread awareness about social issues, it is more important than ever that protective services workers can act professionally on the job and maintain clarity of mind in stressful situations. Training programs must adapt to provide them the necessary tools to deal with the current cultural, social, and political climate that surrounds their jobs.

ADDRESS DEMOGRAPHIC TRENDS IN WORKFORCE SHORTAGES

As shown by the worker characteristics for each of these occupations, the workforce's gender distribution is skewed away from female workers. Encouraging young women to see these occupations as a rewarding profession is essential to filling the workforce gap. The LA County Fire Department has already been addressing this discrepancy in recruits by working in collaboration with the Women's Fire League to create the Women's Fire Prep Academy. Additionally, the League hosts a Girl's Fire Camp for teenagers to meet and get advice from female firefighters. The protective services industry could fill many vacant job openings by partnering with community colleges and regional partners to create similar programs and encouraging more women to consider careers in protective services.

HARNESS CHANGES IN TECHNOLOGY TO ADVANCE PROGRAMS AND PROTECT STUDENTS FROM AUTOMATION

While some occupations are at risk by new technologies, others stand to benefit, and emerging roles are still developing to address the industry changes. The occupation with the most robust growth, forensic science technicians, is primed with the tools to incorporate new technologies into on-the-job tasks and interpret data for criminal investigations. Similarly,

firefighters represented a large share of community college awards (1,200 in 2018-19). But fire technology represented far more of these completions than fire academy (1,157 and 43 completions, respectively). This is reflective of a larger trend of younger workers eager to develop and expand existing technologies. Investing in labs for forensic scientists, emphasizing data analysis, and introducing students to AI are ways in which community colleges can help students adapt to industry trends.

Occupational Profiles

Employment Numbers & Worker Characteristics

Detailed information has been compiled for the top ten middle-skill occupations in the construction industries. Data from 2017, the most recent available, was used to determine wages and worker characteristics for the charts included within each profile.

Information regarding top industries employing these occupations, current and projected employment, wages and demographics can be used by community colleges to tailor existing programs and to guide outreach to potential students. The occupational analyses that follow may even inspire new program development or new approaches in attracting students to promising career paths.

EACH OCCUPATIONAL PROFILE CONTAINS:

- Hourly wages paid in 2017 for workers in Los Angeles and Orange counties compared to the living wage.

- The distribution of workers across industry sectors in the Los Angeles Basin

- Metrics for the occupation including the number of current jobs and projected openings

- Worker characteristics, such as educational attainment, age distribution, race and ethnicity, and gender

Target Middle-Skill Occupations

1. Firefighters
2. Correctional Officers and Jailers
3. Detectives and Criminal Investigators
4. Police and Sheriff's Patrol Officers
5. Forensic Science Technicians
6. Transportation Security Screeners

Firefighters
(SOC 33-2011)

Control and extinguish fires or respond to emergency situations where life, property, or the environment is at risk. Duties may include fire prevention, emergency medical service, hazardous material response, search and rescue, and disaster management.

Sizing things up

In 2017, 8,710 workers were employed as firefighters in the L.A. Basin. With a regional location quotient of 0.71, this occupation is less competitive compared to the rest of the nation, despite the frequency and increased risk of wildfires in California. This occupation offers decent pay for middle-skill workers, with firefighters earning $38.77 in median hourly wages in 2017.

8,710 JOBS
in Los Angeles & Orange Counties in 2017

9,740 TOTAL OPENINGS (5-YR)

0.71 LOCATION QUOTIENT

1,199 AWARDS (2018-2019)

11 COLLEGES

2017 Hourly Wages in LA Basin

$38.77
Median Hourly Wage

$14.36
OC Living Wage (*1 adult)

$15.85
LA Living Wage (*1 adult)

MIT Living Wage Calculator

Projections indicate that this occupation will experience stable growth, adding about 230 jobs by 2022, a growth rate of 2.6 percent.

The number of projected new jobs, combined with job openings from replacements and retirements, provides an overall estimate of employer hiring needs. Overall, the firefighter occupation is projected to have 9,740 openings, new and replacement, in the Los Angeles Basin between 2017 and 2022.

Occupational Outlook

2017-2022 Job Change
230
+2.6%

Payroll Job Increase

10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0

2017 Payroll Employment
8,710

Firefighters

Worker Characteristics

The composition of the workforce in this occupation in the Los Angeles Basin in 2017 varies according to educational attainment, age, race and ethnicity, and gender.

The largest share of workers in this occupation are between the ages of 25 and 39 years old (41.3 percent), representing a much younger workforce than the regional average, across all occupations. Just over one third of the workforce is between the ages of 40 and 54, while 15 percent are over the age of 55. The physical demands of this occupation and the on-the-job training involved can explain why this occupation has a lower share of workers under 25 or over 55, compared to all other occupations.

Over half of firefighters in the Los Angeles Basin are White (55.8 percent), while just under a third identify as Hispanic (all races) (30.9 percent). Asian and Black workers accounted for 5.7 and 4.6 percent of those employed, respectively. and The majority of workers in this occupation have an associate degree or some college experience (60.1 percent), further emphasizing this occupation as suitable for community college students. The occupation remains largely male dominated, as just under 5 percent of workers in this field are female.
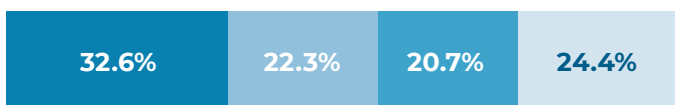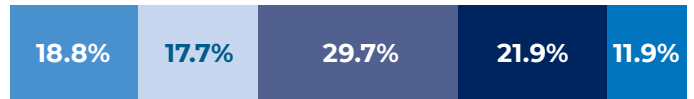
Educational Attainment 2017

TARGET OCCUPATION
1% | 5.4% | 60.1% | 31.7% | 1.8%

TOTAL, ALL INDUSTRIES
18.8% | 17.7% | 29.7% | 21.9% | 11.9%

- Less than High School
- High School
- Master's+
- Associate/ Some College
- Bachelor's

Race & Ethnicity 2017

Target Occupation
30.9% | 55.8% | 5.7% | 4.6% | 2.9%

Total, All Industries
45% | 30% | 15.5% | 6.4% | 3%

- Hispanic
- White
- Asian
- Black
- Other

Gender 2017

Target Occupation
95.3% | 3%

Total, All Industries
49.3% | 50.7%

- Male
- Female

Age Distribution 2017

TARGET OCCUPATION
7.2% | 41.3% | 35.6% | 15.9%

TOTAL, ALL INDUSTRIES
32.6% | 22.3% | 20.7% | 24.4%

- <24 years
- 25-39
- 40-54
- 55+
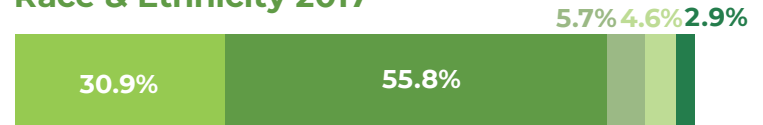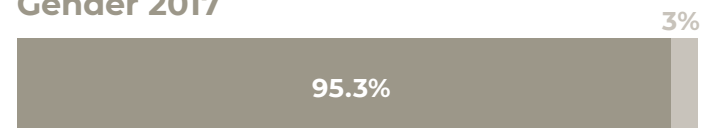
Correctional Officers and Jailers

(SOC 33-3012)

Guard inmates in penal or rehabilitative institution in accordance with established regulations and procedures. May guard prisoners in transit between jail, courtroom, prison, or other point. Include deputy sheriffs and police who spend the majority of their time guarding prisoners in correctional institutions.

Sizing things up

In 2017, correctional officers and jailers employed 4,560 payroll workers in the Los Angeles Basin. With a regional location quotient of 0.26, this occupation is highly non-competitive compared to the rest of the nation. While it represents a small share of regional employment, this occupation offers decent pay for middle-skill workers, paying $30.58 in median hourly wages in 2017.

4,560 JOBS
in Los Angeles & Orange Counties in 2017
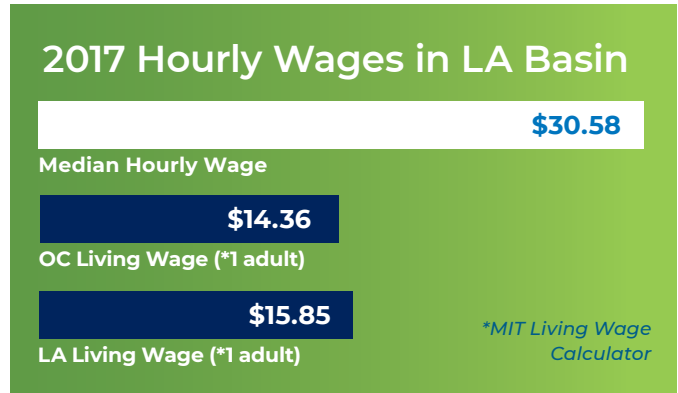
3,170
TOTAL OPENINGS (5-YR)

0.26
LOCATION QUOTIENT

48
AWARDS (2018-2019)

5
COLLEGES

2017 Hourly Wages in LA Basin

Median Hourly Wage	**$30.58**
OC Living Wage (*1 adult)	**$14.36**
LA Living Wage (*1 adult)	**$15.85**

*MIT Living Wage Calculator

Projections indicate that this occupation will anticipate a decrease in employment by 2022 of 3.3 percent (150 jobs).

The number of projected new jobs, combined with job openings from replacements and retirements, provides an overall estimate of employer hiring needs. Overall, the correctional officers and jailers occupation is projected to have 3,170 openings, new and replacement, in the Los Angeles Basin between 2017 and 2022.
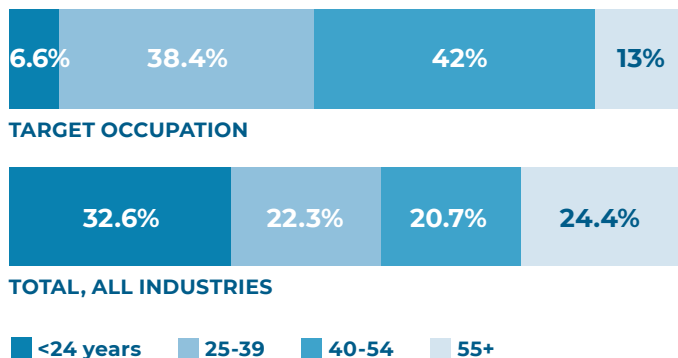
Occupational Outlook

Payroll Job Increase

4,800
4,300
3,800
3,300
2,800
2,300
1,800
1,300
800
300
-200

2017 Payroll Employment 4,560

2017-2022 Job Change
-150

-3.3%

Correctional Officers and Jailers

Worker Characteristics

The composition of the workforce in this occupation in the Los Angeles Basin in 2017 varies according to educational attainment, age, race and ethnicity, and gender.
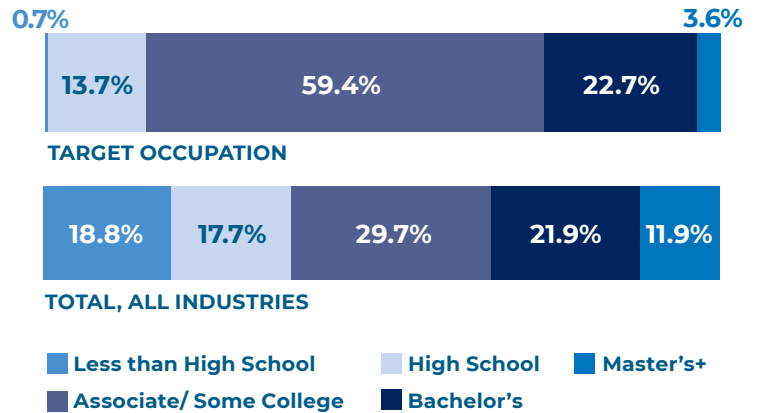
The largest share of workers in this occupation are between the ages of 40 and 54 years old (42.0 percent). Nearly 40 percent are between the ages of 25 and 39, while only 6.6 percent of the workforce was under the age of 25 in 2017, much less than the average across all occupations of 32.6 percent.

The majority of correctional officers and jailers in the Los Angeles Basin are Hispanic (all races), representing 47.7 percent of the workforce in 2017. Over a quarter (27.3 percent) were White, while 17.2 percent of the workforce were Black, representing a much larger share than the regional average of 6.4 percent across all occupations. The share of Asian workers in this profession is much less than the regional average, at 6.4 percent versus 15.5 percent. 59.4 percent of the workforce had some college attainment, while less than a quarter (22.7 percent) held a bachelor's degree. Just over two thirds of employees in this occupation reported their gender as male in 2017 (68.3 percent).

Age Distribution 2017

6.6%	38.4%	42%	13%

TARGET OCCUPATION

32.6%	22.3%	20.7%	24.4%

TOTAL, ALL INDUSTRIES

- <24 years
- 25-39
- 40-54
- 55+

Educational Attainment 2017

0.7% ... 3.6%

13.7%	59.4%	22.7%

TARGET OCCUPATION

18.8%	17.7%	29.7%	21.9%	11.9%

TOTAL, ALL INDUSTRIES

- Less than High School
- High School
- Master's+
- Associate/ Some College
- Bachelor's

Race & Ethnicity 2017

6.4% ... 1.9%

47.3%	27.3%	17.2%

Target Occupation

6.4% 3%

45%	30%	15.5%

Total, All Industries

- Hispanic
- White
- Asian
- Black
- Other

Gender 2017

68.3%	31.7%

Target Occupation

49.3%	50.7%

Total, All Industries

- Male
- Female
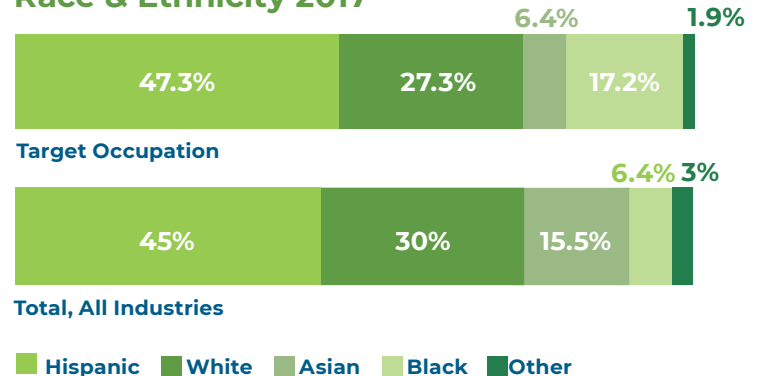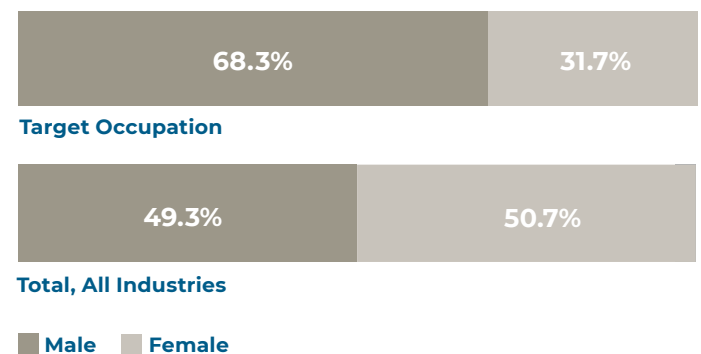
Detectives and Criminal Investigators

(SOC 33-2021)

Conduct investigations related to suspected violations of Federal, State, or local laws to prevent or solve crimes.

Sizing things up

In 2017, 3,980 payroll workers were working as detectives and criminal investigators in the LA Basin. With a regional location quotient of 0.94, this occupation is on par with the rest of the nation in terms of regional competitiveness. This is a well-paying middle-skill job, as workers earned a median hourly wage of $57.93 in 2017.

3,980 JOBS
in Los Angeles & Orange Counties in 2017

1,430
TOTAL OPENINGS (5-YR)

0.94
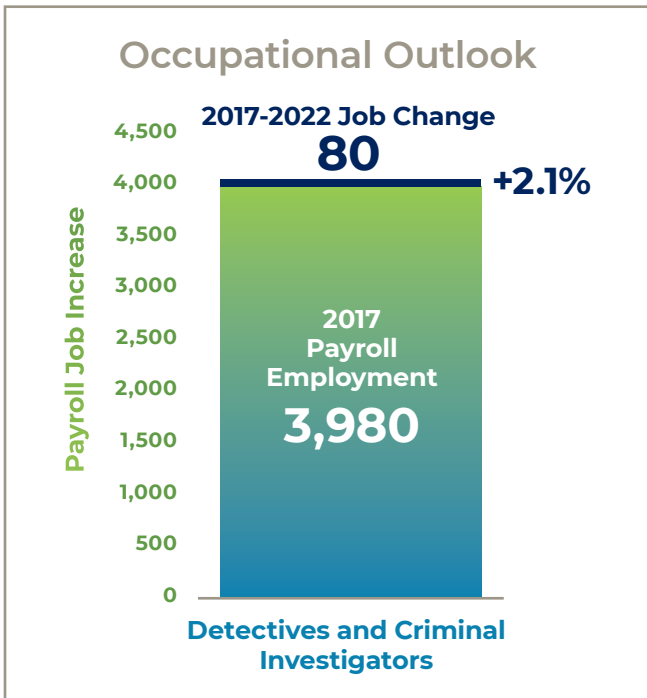**LOCATION QUOTIENT**

374
AWARDS
PoliceAcademy Completions
(2018-2019)

2,410
AWARDS
Administration of Justice Completions
(2018-2019)

25 COLLEGES

2017 Hourly Wages in LA Basin

$57.93	
Median Hourly Wage	
$14.36	
OC Living Wage (*1 adult)	
$15.85	
LA Living Wage (*1 adult)	

MIT Living Wage Calculator

Occupational Outlook

2017-2022 Job Change
80
+2.1%

Payroll Job Increase

4,500	
4,000	
3,500	
3,000	
2,500	**2017 Payroll Employment**
2,000	**3,980**
1,500	
1,000	
500	
0	

Detectives and Criminal Investigators

Projections indicate that this occupation can anticipate roughly 80 additional jobs by 2022, representing a 2.1 percent increase in employment.

The number of projected new jobs, combined with job openings from replacements and retirements, provides an overall estimate of employer hiring needs. Overall, the detectives and criminal investigators occupation is projected to have 1,430 openings, new and replacement, in the Los Angeles Basin between 2017 and 2022.
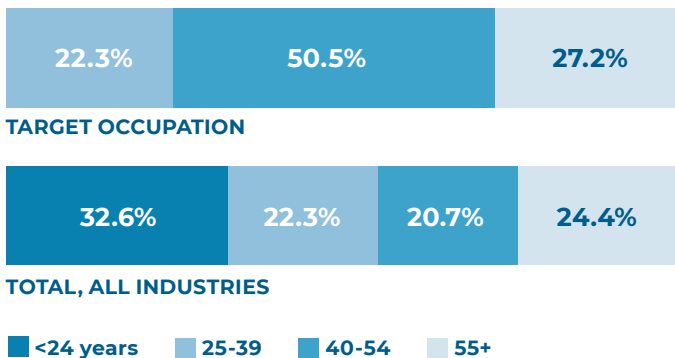
Worker Characteristics

The composition of the workforce in this occupation in the Los Angeles Basin in 2017 varies according to educational attainment, age, race and ethnicity, and gender.
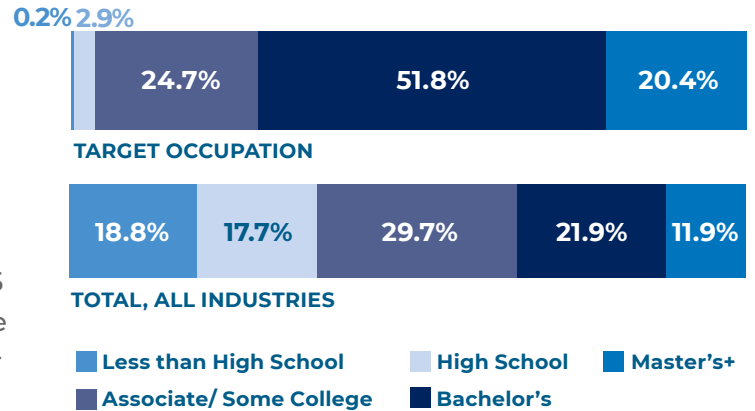
The largest share of workers in this occupation are between the ages of 40 and 54 years old (50.5 percent). Over one quarter of workers are over the age of 55, while 22.3 percent of workers are under the age of 40, which is about half of the regional average for all occupations (54.9 percent across all occupations), thereby indicating a much older workforce in this occupation.

72.2 percent of detectives and criminal investigators hold a bachelor's degree or advanced degree. However, nearly a quarter (24.7 percent) hold an associate degree or have completed some college. Community college students may seek entry-level employment in this occupation and advance after on-the-job training or after attaining additional college experience. In the LA Basin in 2017, over half of workers in this occupation were white (51 percent), while nearly 30 percent identified as Hispanic (all races). Asian and Black workers made up 7.5 and 10.6 percent of this occupation's workforce, respectively. Just over one third of detectives and criminal investigators reported their gender as female in 2017.

Educational Attainment 2017

0.2% 2.9%

24.7%	51.8%	20.4%

TARGET OCCUPATION

18.8%	17.7%	29.7%	21.9%	11.9%

TOTAL, ALL INDUSTRIES

- Less than High School
- High School
- Master's+
- Associate/ Some College
- Bachelor's

Race & Ethnicity 2017

7.5%   1.8%

29.1%	51%	10.6%

Target Occupation

6.4% 3%

45%	30%	15.5%

Total, All Industries

- Hispanic
- White
- Asian
- Black
- Other

Gender 2017

64.5%	35.5%

Target Occupation

49.3%	50.7%

Total, All Industries

- Male
- Female

Age Distribution 2017

22.3%	50.5%	27.2%

TARGET OCCUPATION

32.6%	22.3%	20.7%	24.4%

TOTAL, ALL INDUSTRIES

- <24 years
- 25-39
- 40-54
- 55+

Police and Sheriff's Patrol Officers

(SOC 33-3051)

Maintain order, enforce laws and ordinances, and protect life and property in an assigned patrol district. Perform combination of following duties: patrol a specific area on foot or in a vehicle; direct traffic; issue traffic summonses; investigate accidents; apprehend and arrest suspects, or serve legal processes of courts.

Sizing things up

In 2017, 30,410 workers were employed as police and sheriff's patrol officers in the LA Basin, representing the largest share of employment across the protective services occupations identified in this report. With a regional location quotient of 1.17, the LA Basin has a slightly higher regional competitivess in this occupation compared to the rest of the nation. This occupation

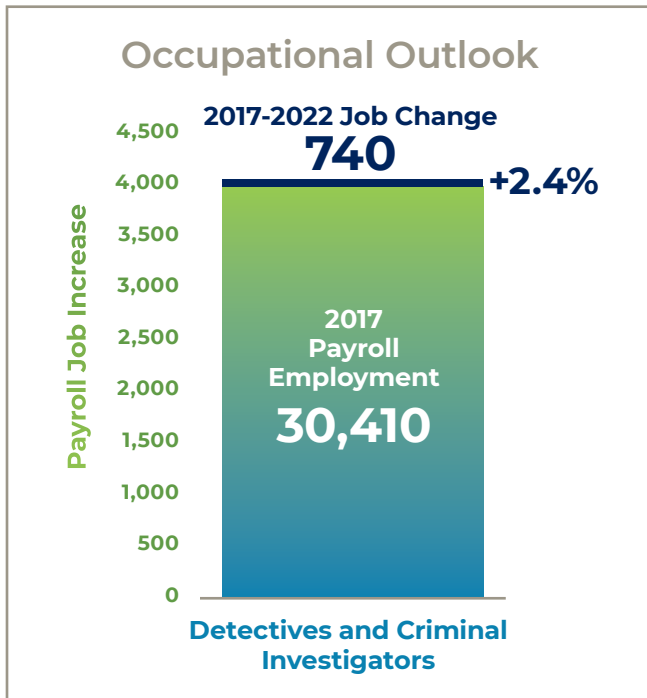**30,410 JOBS**
in Los Angeles &
Orange Counties in 2017

31,590
TOTAL
OPENINGS (5-YR)

1.17
LOCATION
QUOTIENT

374
AWARDS
PoliceAcademy
Completions
(2018-2019)

2,410
AWARDS
Administration
of Justice
Completions
(2018-2019)

25 COLLEGES

Occupational Outlook

2017-2022 Job Change
740
+2.4%

Payroll Job Increase

4,500	
4,000	
3,500	2017
3,000	Payroll
2,500	Employment
2,000	**30,410**
1,500	
1,000	
500	
0	

Detectives and Criminal Investigators

2017 Hourly Wages in LA Basin

$49.95
Median Hourly Wage

$14.36
OC Living Wage (*1 adult)

$15.85
LA Living Wage (*1 adult)

MIT Living Wage Calculator

offers decent wages for middle-skill workers, paying a median hourly wage of $49.95 in 2017.

Projections indicate that this occupation will experience growth of 2.4 percent by 2022, representing an increase of 740 jobs.

The number of projected new jobs, combined with job openings from replacements and retirements, provides an overall estimate of employer hiring needs. Overall, the police and sheriff's patrol officers occupation is projected to have 31,590 openings, new and replacement, in the Los Angeles Basin between 2017 and 2022.
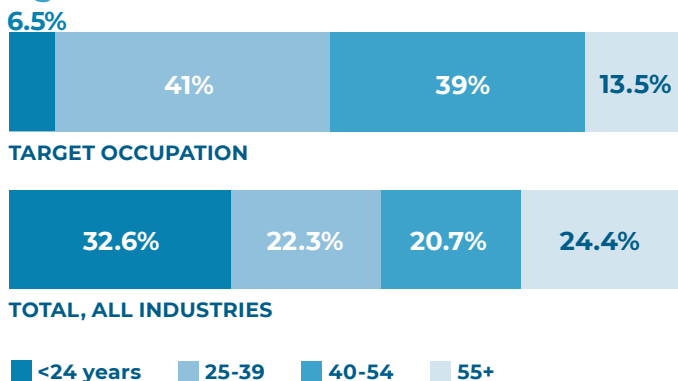
Worker Characteristics

The composition of the workforce in this occupation in the Los Angeles Basin in 2017 varies according to educational attainment, age, race and ethnicity, and gender.
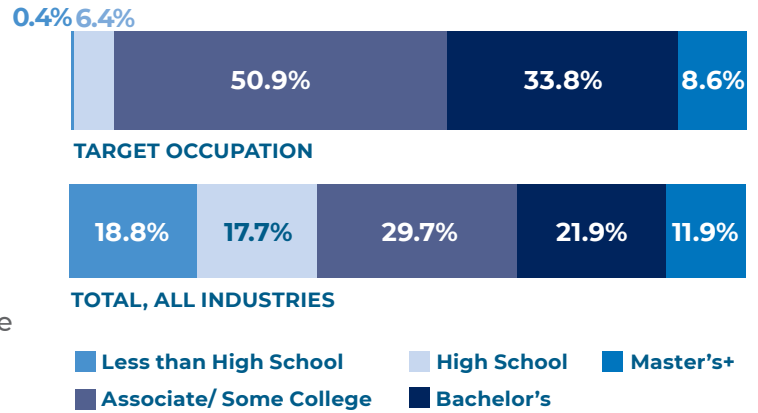
The largest share of workers in this occupation are between the ages of 25 and 39 and 40 and 54 years old (41 and 39 percent, respectively). Like the those employed in firefighting, this occupation is often physically straining and requires significant on-the-job training, which explains the much lower share of the workforce that is under the age of 25 or over the age of 55 (6.5 and 13.5 percent, respectively).

The largest share of police and sheriff's patrol officers in the Los Angeles reported their ethnicity as Hispanic (all races) in 2017, accounting for 41.4 percent of the workforce. Those who identified as white accounted for 37.6 percent of the workforce, while Asian and Black workers made up 9.4 percent and 8 percent of the workforce, respectively. The majority of workers in this occupation hold an associate degree or have had some college experience (50.9 percent), indicating that this is an appropriate target occupation for community college students. Women made up less than 20 percent of this occupation's workforce in 2017 (18.6 percent).

Age Distribution 2017

6.5%

6.5%	41%	39%	13.5%

TARGET OCCUPATION

32.6%	22.3%	20.7%	24.4%

TOTAL, ALL INDUSTRIES

- ■ <24 years
- ■ 25-39
- ■ 40-54
- ■ 55+

Educational Attainment 2017

0.4% 6.4%

50.9%	33.8%	8.6%

TARGET OCCUPATION

18.8%	17.7%	29.7%	21.9%	11.9%

TOTAL, ALL INDUSTRIES

- ■ Less than High School
- ■ High School
- ■ Master's+
- ■ Associate/ Some College
- ■ Bachelor's

Race & Ethnicity 2017

3.5%

41.4%	37.6%	9.4%	8%	3.5%

Target Occupation

6.4% 3%

45%	30%	15.5%	6.4%	3%

Total, All Industries

- ■ Hispanic
- ■ White
- ■ Asian
- ■ Black
- ■ Other

Gender 2017

81.4%	18.6%

Target Occupation

49.3%	50.7%

Total, All Industries

- ■ Male
- ■ Female
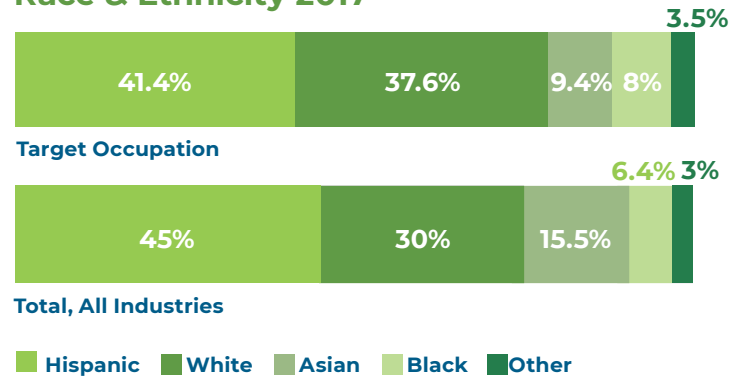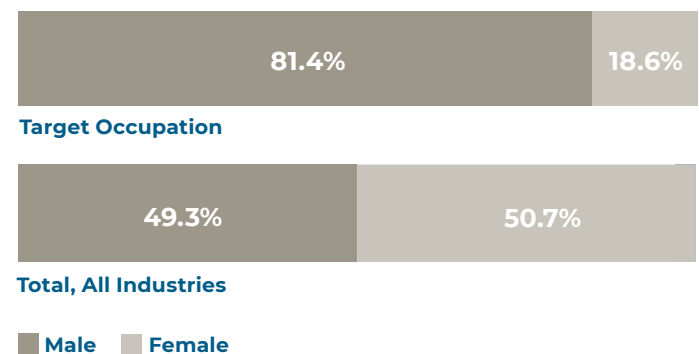
Forensic Science Technicians

(SOC 19-4092)

Collect, identify, classify, and analyze physical evidence related to criminal investigations. Perform tests on weapons or substances, such as fiber, hair, and tissue to determine significance to investigation. May testify as expert witnesses on evidence or crime laboratory techniques. May serve as specialists in area of expertise, such as ballistics, fingerprinting, handwriting, or biochemistry.

Sizing things up

In 2017, just under 1,000 workers were employed as forensic science technicians in the Los Angeles Basin. With a regional location quotient of 1.56, this occupation is highly concentrated in the region compared to the rest of the nation. Forensic science technicians earned a median hourly wage of $44.51 in 2017.
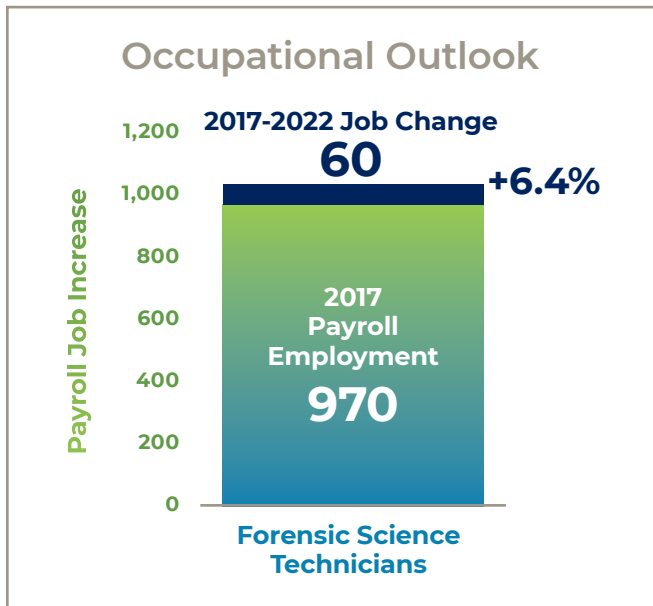
970 JOBS
in Los Angeles &
Orange Counties in 2017

| **660** TOTAL OPENINGS (5-YR) | **1.56** LOCATION QUOTIENT |
| **56** AWARDS (2018-2019) | **3** COLLEGES |

2017 Hourly Wages in LA Basin

$44.51
Median Hourly Wage

$14.36
OC Living Wage (*1 adult)

$15.85
LA Living Wage (*1 adult)

*MIT Living Wage Calculator

Occupational Outlook

2017-2022 Job Change
60
+6.4%

Payroll Job Increase

1,200
1,000
800
600
400
200
0

2017 Payroll Employment **970**

Forensic Science Technicians

Projections indicate that this occupation is anticipated to experience the greatest growth rate of the occupations identified in this report, at 6.4 percent growth by 2022 (60 jobs).

The number of projected new jobs, combined with job openings from replacements and retirements, provides an overall estimate of employer hiring needs. Overall, the forensic science technician occupation is projected to have 660 openings, new and replacement, in the Los Angeles Basin between 2017 and 2022.

Worker Characteristics

The composition of the workforce in this occupation in the Los Angeles Basin in 2017 varies according to educational attainment, age, race and ethnicity, and gender.

The forensic science technician occupation has a younger workforce than many of the other protective service occupations identified in this report. Nearly a third of workers (32 percent) are under the age of 25 and 37.6 percent are between the ages of 25 and 39. An additional 30.4 percent are over the age of 40. Community college programs offering up-to-date technologies and tools in forensics could give younger workers the competitive experience they need to excel in this occupation.

The majority of workers in this occupation hold an associate degree or have some college experience (37.6 percent). However, this occupation also has a large share of workers with a bachelor's or advanced degree (34.6 and 17.6 percent, respectively). This occupation also has the highest share of workers in the protective services who identified as Asian (26.4 percent). Most forensic science technicians in the LA Basin identified as White (38.6 percent), while 24.9 percent were Hispanic (all races), and 6.5 percent were Black. This occupation also has the highest share of females, accounting for 45 percent of the workforce in 2017.

Age Distribution 2017
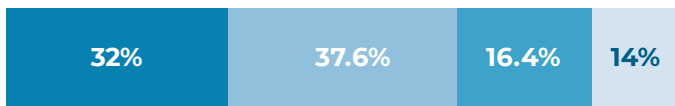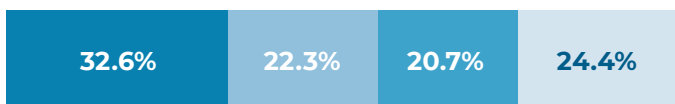
TARGET OCCUPATION

32%	37.6%	16.4%	14%

TOTAL, ALL INDUSTRIES

32.6%	22.3%	20.7%	24.4%

■ <24 years   ■ 25-39   ■ 40-54   ■ 55+

Educational Attainment 2017

1.7%

TARGET OCCUPATION

8.5%	37.6%	34.6%	17.6%

TOTAL, ALL INDUSTRIES

18.8%	17.7%	29.7%	21.9%	11.9%

■ Less than High School   ■ High School   ■ Master's+
■ Associate/ Some College   ■ Bachelor's

Race & Ethnicity 2017

6.5% 3.8%

Target Occupation

24.9%	38.5%	26.4%	

6.4% 3%

Total, All Industries

45%	30%	15.5%	

■ Hispanic   ■ White   ■ Asian   ■ Black   ■ Other

Gender 2017

Target Occupation

55%	45%

Total, All Industries

49.3%	50.7%
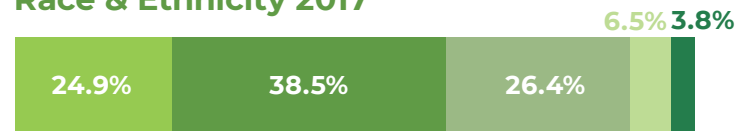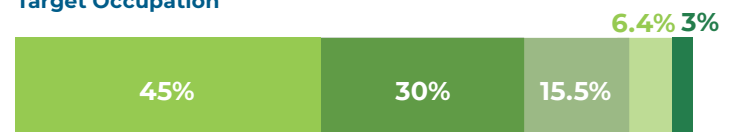
■ Male   ■ Female

Transportation Security Screeners

(SOC 33-9093)

Conduct screening of passengers, baggage, or cargo to ensure compliance with Transportation Security Administration (TSA) regulations. May operate basic security equipment such as x-ray machines and hand wands at screening checkpoints.

Sizing things up

In 2017, 2,400 payroll workers were employed as transportation security screeners in the LA Basin. With a regional location quotient of 1.53, this occupation is highly concentrated in the region compared to the rest of the nation. Transportation security screeners earned $18.28 in median hourly wages in 2017.

2,400 JOBS
in Los Angeles & Orange Counties in 2017

1,660
TOTAL OPENINGS (5-YR)

1.53
LOCATION QUOTIENT

76
AWARDS (2018-2019)

4
COLLEGES

2017 Hourly Wages in LA Basin

$18.28	
Median Hourly Wage	
$14.36	
OC Living Wage (*1 adult)	
$15.85	
LA Living Wage (*1 adult)	*MIT Living Wage Calculator*

Occupational Outlook

2017-2022 Job Change

80 **+3.2%**

Payroll Job Increase

3,000
2,500
2,000
1,500
1,000
500
0

2017 Payroll Employment 2,400

Transportation Security Screeners
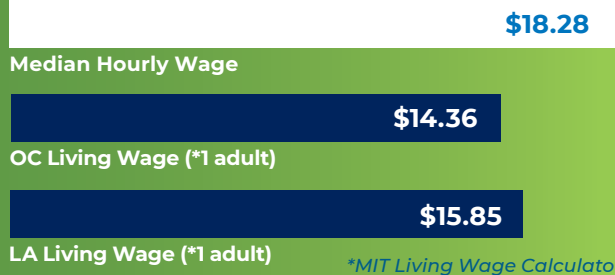
Projections indicate that this occupation can anticipate stable growth between 2017 and 2022, adding 80 additonal jobs (3.2 percent growth).

The number of projected new jobs, combined with job openings from replacements and retirements, provides an overall estimate of employer hiring needs. Overall, the transportation security screener occupation is projected to have 1,660 openings, new and replacement, in the Los Angeles Basin between 2017 and 2022.

Worker Characteristics

The composition of the workforce in this occupation in the Los Angeles Basin in 2017 varies according to educational attainment, age, race and ethnicity, and gender.

The largest share of workers in this occupation are between the ages of 25 and 39 years old (46.8 percent). Roughly 45 percent of workers are over the age of 40, while just 10.3 percent were under the age of 25.
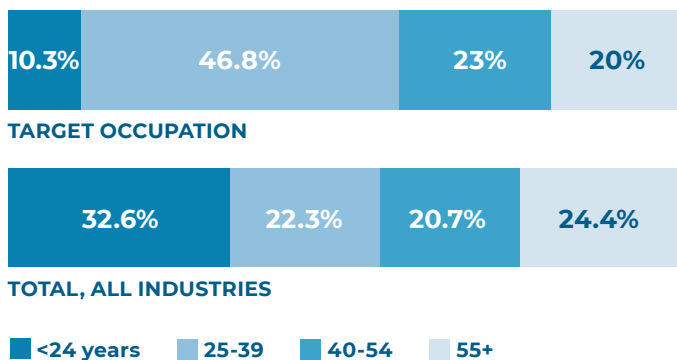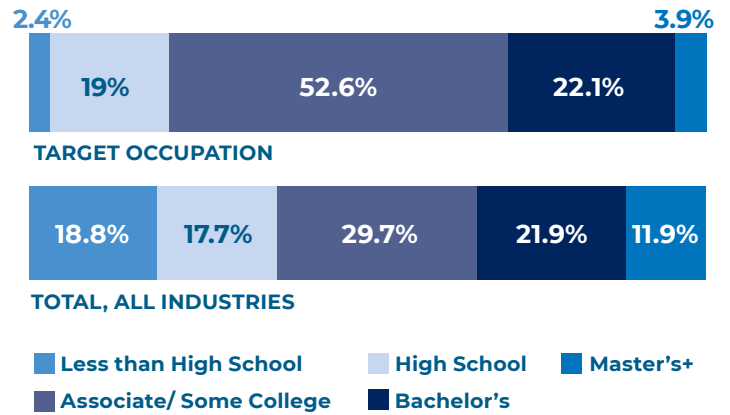
The majority of transportation security screeners have some college experience or an associate degree (52.6 percent), indicating that this is a key occupation for community college students. Over 20 percent of the workforce has no college experience and 22.1 percent have obtained a bachelor's degree. This occupation had the largest share of Black payroll workers, compared to all other protective service occupations (35.7 percent). White workers accounted for 20.1 percent of the workforce while those identifying as Hispanic and Asian represented 31.9 and 7.8 percent of workers, respectively. Just over one third of workers were female (35.7 percent).

Educational Attainment 2017

TARGET OCCUPATION

2.4%	19%	52.6%	22.1%	3.9%

TOTAL, ALL INDUSTRIES

18.8%	17.7%	29.7%	21.9%	11.9%

- ■ Less than High School
- ■ High School
- ■ Master's+
- ■ Associate/ Some College
- ■ Bachelor's

Race & Ethnicity 2017

Target Occupation

31.9%	20.1%	7.8%	35.7%	4.5%

Total, All Industries

45%	30%	15.5%	6.4%	3%

- ■ Hispanic
- ■ White
- ■ Asian
- ■ Black
- ■ Other

Gender 2017

Target Occupation

64.3%	35.7%

Total, All Industries

49.3%	50.7%

- ■ Male
- ■ Female

Age Distribution 2017

TARGET OCCUPATION

10.3%	46.8%	23%	20%

TOTAL, ALL INDUSTRIES

32.6%	22.3%	20.7%	24.4%

- ■ <24 years
- ■ 25-39
- ■ 40-54
- ■ 55+
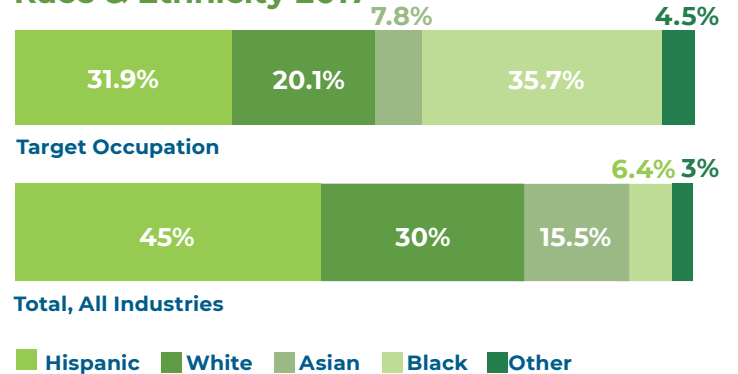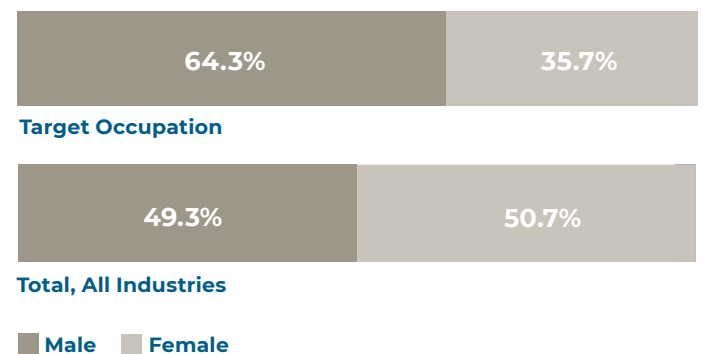
First-Line Supervisors of Correctional Officers

(SOC 33-1011)

Directly supervise and coordinate activities of correctional officers and jailers.

Sizing things up

In 2017, first-line supervisors of correctional officers employed 150 payroll workers in the L.A. Basin. With a regional location quotient of 0.11, this occupation is highly non-competitive compared to the rest of the nation. While it is a small share of regional employment, this occupation offers decent pay for middle-skill workers, at $45.85 in median hourly wages in 2017.

150 JOBS
in Los Angeles & Orange Counties in 2017

35
TOTAL OPENINGS (5-YR)

0.11
LOCATION QUOTIENT

48
AWARDS (2018-2019)

5
COLLEGES

2017 Hourly Wages in LA Basin

$45.85
Median Hourly Wage

$14.36
OC Living Wage (*1 adult)
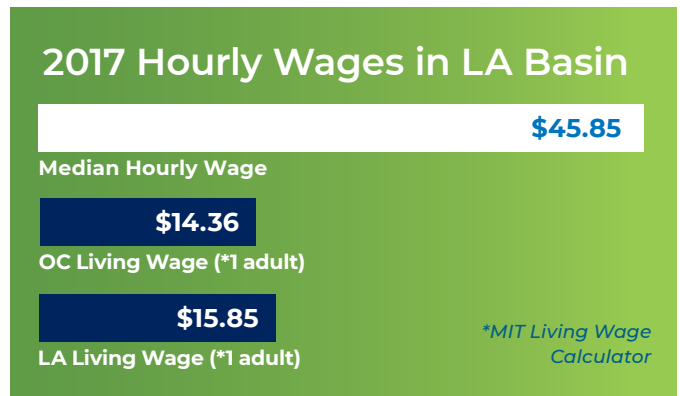
$15.85
LA Living Wage (*1 adult)

*MIT Living Wage Calculator

Projections indicate that this occupation can anticipate a loss of less than a dozen jobs in 2022, representing a 5.2 percent decrease.

The number of projected new jobs, combined with job openings from replacements and retirements, provide an overall estimate of employer hiring needs. Overall, the transportation security screener occupation is projected to have 35 openings, new and replacement, in the Los Angeles Basin between 2017 and 2022.
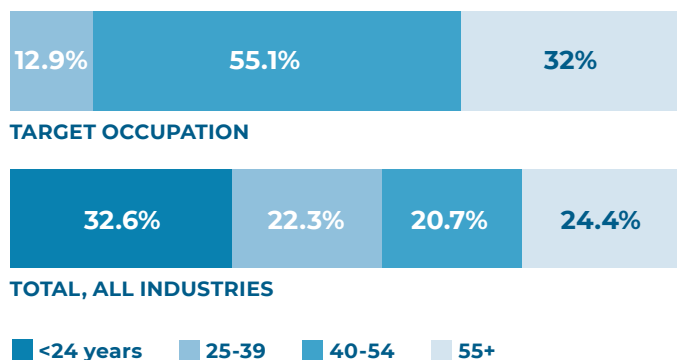
Occupational Outlook

Payroll Job Increase

170
150
130
110
90
70
50
30
10
-10

2017 Payroll Employment 150

-5.2%

2017-2022 Job Change -10

First-Line Supervisors of Correctional Officers

Worker Characteristics

The composition of the workforce in this occupation in the Los Angeles Basin in 2017 varies according to educational attainment, age, race and ethnicity, and gender.
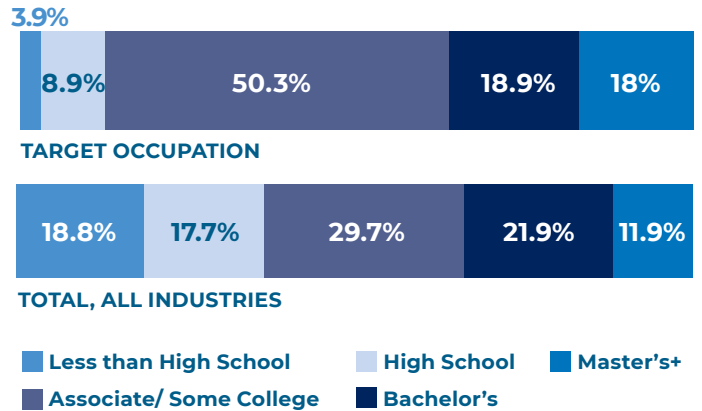
Over half of workers in this occupation are between the ages of 40 and 54 years old (55.1 percent). Nearly one third of workers are over the age of 55, while just 12.9 percent were between 25 and 39 years old and zero workers were under 25.

First-line supervisors of correctional officers identified predominantly as Hispanic (all races) in 2017 (45.6 percent). 21.2 percent of the workforce was White, while Asian and Black workers accounted for 3.2 and 28.1 percent, respectively. Roughly half of those employed in this occupation have an associate degree or some college attainment. Those with a high school diploma or less represent 12.8 percent of workers. Just a quarter of first-line supervisors of correctional officers were female in 2017 (25.8 percent).

Educational Attainment 2017

TARGET OCCUPATION
| 3.9% | 8.9% | 50.3% | 18.9% | 18% |

TOTAL, ALL INDUSTRIES
| 18.8% | 17.7% | 29.7% | 21.9% | 11.9% |

- ■ Less than High School
- ■ High School
- ■ Master's+
- ■ Associate/ Some College
- ■ Bachelor's

Race & Ethnicity 2017

Target Occupation
| 45.6% | 21.2% | 3.2% | 28.1% | 1.8% |

Total, All Industries
| 45% | 30% | 15.5% | 6.4% | 3% |

- ■ Hispanic
- ■ White
- ■ Asian
- ■ Black
- ■ Other

Gender 2017

Target Occupation
| 74.2% | 25.8% |

Total, All Industries
| 49.3% | 50.7% |

- ■ Male
- ■ Female

Age Distribution 2017

TARGET OCCUPATION
| 12.9% | 55.1% | 32% |

TOTAL, ALL INDUSTRIES
| 32.6% | 22.3% | 20.7% | 24.4% |

- ■ <24 years
- ■ 25-39
- ■ 40-54
- ■ 55+
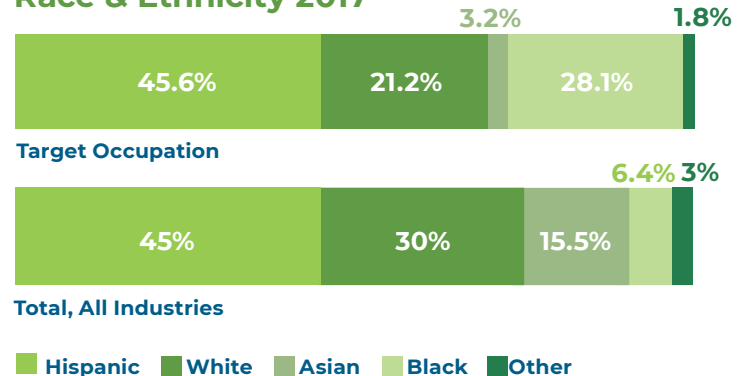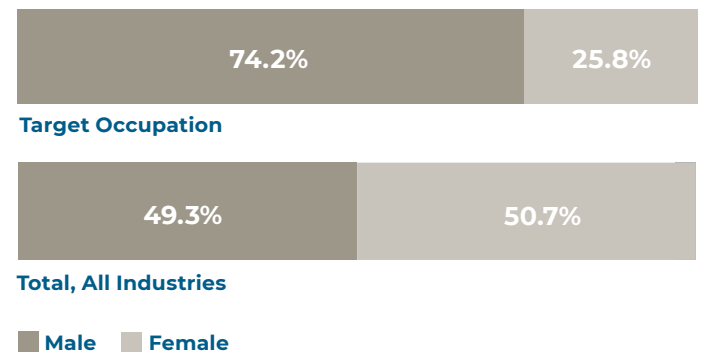
First-Line Supervisors of Fire Fighting and Prevention Workers

(SOC 33-1021)

Directly supervise and coordinate activities of workers engaged in fire fighting and fire prevention and control.

Sizing things up

In 2017, first-line supervisors of fire fighters employed 310 payroll workers in the L.A. Basin. With a regional location quotient of 0.17, this is not a competitive occupational group compared to the rest of the nation. However, those employed in this occupation earn significantly higher median hourly wages than any other of the protective services ocupations this report identified.

310 JOBS
in Los Angeles & Orange Counties in 2017

105 TOTAL OPENINGS (5-YR)	**0.17** LOCATION QUOTIENT
1,199 AWARDS (2018-2019)	**11** COLLEGES

2017 Hourly Wages in LA Basin

$75.16
Median Hourly Wage

$14.36
OC Living Wage (*1 adult)

$15.85
LA Living Wage (*1 adult)

*MIT Living Wage Calculator

Occupational Outlook

2017-2022 Job Change
-10

+2.3%

Payroll Job Increase

350
300
250
200
150
100
50
0

2017 Payroll Employment 310

First-Line Supervisors of Correctional Officers

Projections indicate that this occupation is expected to add less than a dozen additional jobs by 2022, representing a growth rate of 2.3 percent.

The number of projected new jobs, combined with job openings from replacements and retirements, provide an overall estimate of employer hiring needs. Overall, the first-line supervisors of fire fighters occupation is projected to have 105 openings, new and replacement, in the Los Angeles Basin between 2017 and 2022.
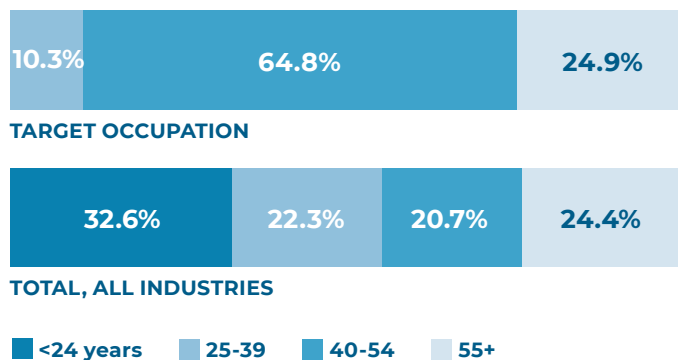
Worker Characteristics

The composition of the workforce in this occupation in the Los Angeles Basin in 2017 varies according to educational attainment, age, race and ethnicity, and gender.
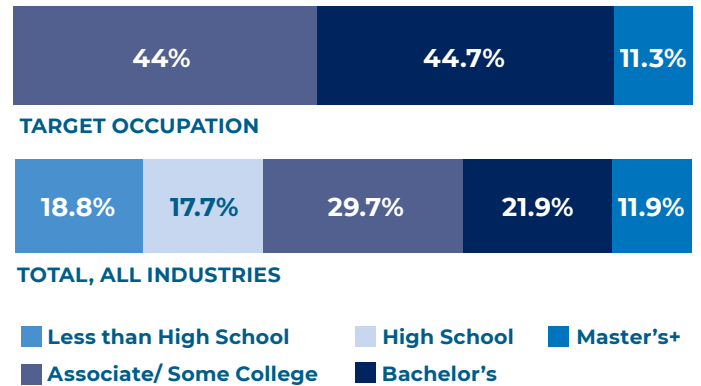
The largest share of workers in this occupation are between the ages of 40 and 54 years old (64.8 percent). Roughly one quarter of workers are over the age of 55, while just 10 percent were under the age of 40, which is much less than the regional average for all occupations (54.9 percent across all occupations).

First-line supervisors of fire fighters are also predominantly White (81.2 percent), and male (98.1 percent). The majority of workers in this occupation have either an associate or bachelor's degree (44 percent and 44.7 percent, respectively), indicating that this is an appropriate target occupation for community college students. Zero workers in this occupation reported having less than some college attainment. Nearly 100 percent of the workforce in this occupation identified as male in 2017 (98.1 percent), double the average male workforce across all other occupations in the region (49.3 percent).

Age Distribution 2017

10.3%	64.8%	24.9%

TARGET OCCUPATION

32.6%	22.3%	20.7%	24.4%

TOTAL, ALL INDUSTRIES

■ <24 years ■ 25-39 ■ 40-54 ■ 55+

Educational Attainment 2017

44%	44.7%	11.3%

TARGET OCCUPATION

18.8%	17.7%	29.7%	21.9%	11.9%

TOTAL, ALL INDUSTRIES

■ Less than High School   ■ High School   ■ Master's+
■ Associate/ Some College   ■ Bachelor's

Race & Ethnicity 2017

0.8% 1.7%

9.3%	81.2%	7%	

Target Occupation

6.4% 3%

45%	30%	15.5%	

Total, All Industries

■ Hispanic   ■ White   ■ Asian   ■ Black   ■ Other

Gender 2017

1.9%

98.1%	

Target Occupation

49.3%	50.7%

Total, All Industries

■ Male   ■ Female
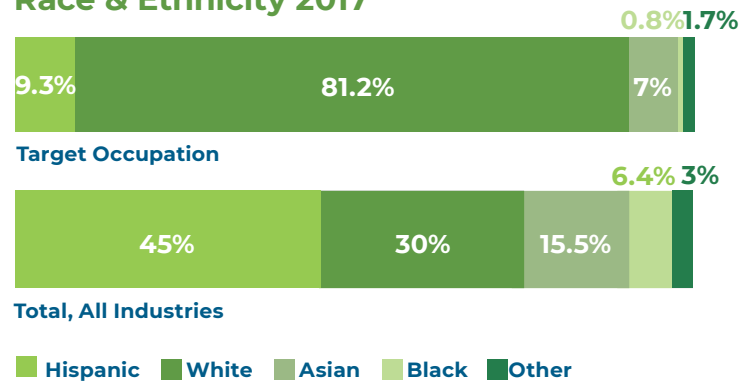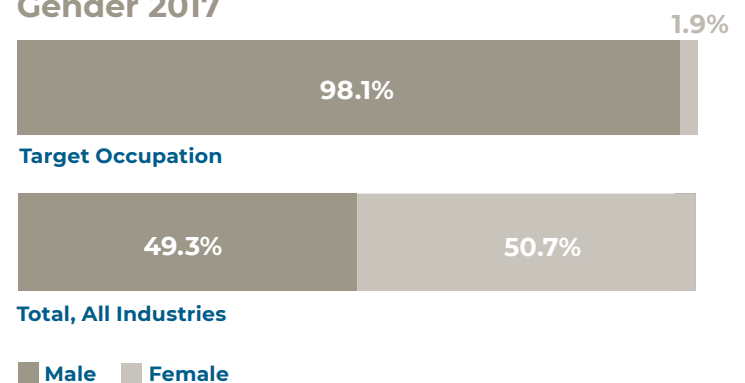
Probation Officers and Correctional Treatment Specialists

(SOC 21-1092)

Provide social services to assist in rehabilitation of law offenders in custody or on probation or parole. Make recommendations for actions involving formulation of rehabilitation plan and treatment of offender, including conditional release and education and employment stipulations.

Sizing things up

In 2017, probation officers and correctional treatment specialists employed 3,760 payroll workers in the L.A. Basin. While this is not one of the six target occupations identified as high-growth for community college students, it is a

3,760 JOBS
in Los Angeles & Orange Counties in 2017

6,250
TOTAL OPENINGS (5-YR)

1.01
LOCATION QUOTIENT

0
AWARDS (2018-2019)

0
COLLEGES

2017 Hourly Wages in LA Basin

$42.15
Median Hourly Wage

$14.36
OC Living Wage (*1 adult)

$15.85
LA Living Wage (*1 adult)

*MIT Living Wage Calculator

Occupational Outlook

2017-2022 Job Change
60
+1.5%

2017 Payroll Employment
3,760

Payroll Job Increase

4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0

Firefighters

supportive occupation of the protective services and may be of interest to those in community college interested in a high-skill occupation related to criminal justice.

With a regional location quotient of 1.01, this is occupation is equally as competitive as the regional average. However, as mentioned, Los Angeles has the largest correctional institution system in the country and therefore, projections indicate that further growth is anticipated for this occupation. By 2022, the occupation is expected to add 60 jobs (1.5 percent growth). Workers employed as probation officers and correctional treatment specialists earned $42.15 in median hourly earnings in 2017.
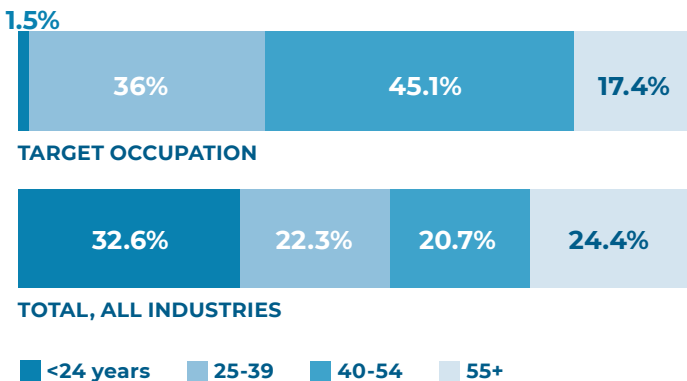
The number of projected new jobs, combined with job openings from replacements and retirements, provide an overall estimate of employer hiring needs. Overall, the probation officers and correctional treatment specialists occupation is projected to have 6,250 openings, new and replacement, in the Los Angeles Basin between 2017 and 2022.
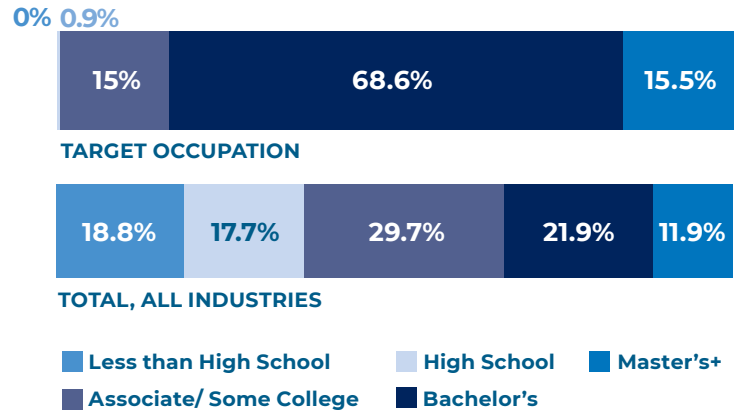
Worker Characteristics

The composition of the workforce in this occupation in the Los Angeles Basin in 2017 varies according to educational attainment, age, race and ethnicity, and gender.

The largest share of workers in this occupation are between the ages of 40 and 54 years old (45.1 percent) and over one third (36 percent) are between the ages of 25 and 39 years of age. While the majority of workers in this occupation have a bachelor's degree (68.6 percent), an additional 15 percent have been employed with some college attainment. Nearly 40 percent of this workforce identified as Hispanic (all races) and 30.9 percent identified as Black. White and Asian workers accounted for 19.9 percent and 8.4 percent of the probation officers in the L.A. Basin, respectively. This occupation had much more equal representation between male and female workers, with females accounting for 48 percent of the workforce.

Age Distribution 2017

TARGET OCCUPATION
1.5% | 36% | 45.1% | 17.4%

TOTAL, ALL INDUSTRIES
32.6% | 22.3% | 20.7% | 24.4%

■ <24 years ■ 25-39 ■ 40-54 ■ 55+

Educational Attainment 2017

TARGET OCCUPATION
0% 0.9% | 15% | 68.6% | 15.5%

TOTAL, ALL INDUSTRIES
18.8% | 17.7% | 29.7% | 21.9% | 11.9%

■ Less than High School   ■ High School   ■ Master's+
■ Associate/ Some College   ■ Bachelor's

Race & Ethnicity 2017

Target Occupation
39.4% | 19.9% | 8.4% | 30.9% | 1.3%

Total, All Industries
45% | 30% | 15.5% | 6.4% | 3%

■ Hispanic ■ White ■ Asian ■ Black ■ Other

Gender 2017

Target Occupation
52% | 48%

Total, All Industries
49.3% | 50.7%

■ Male ■ Female
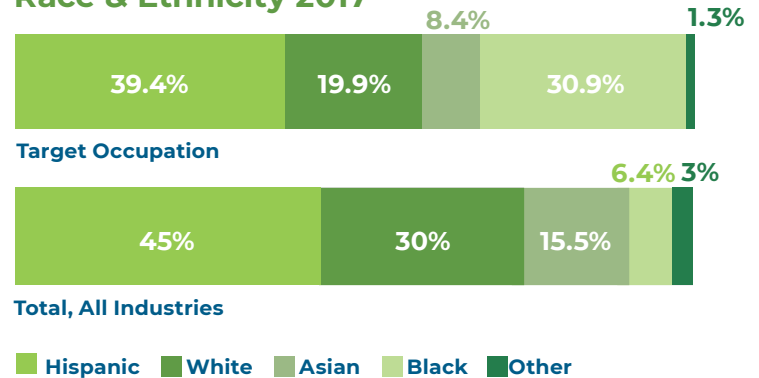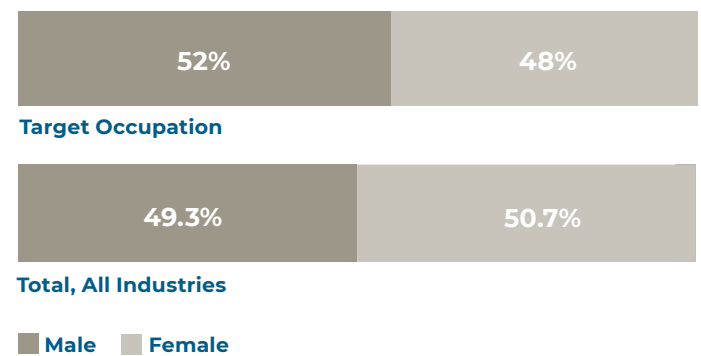
Appendix

Appendix A: Regional Community College Completions (associate degrees and certificates) by Program (2018-19)

ADMINISTRATION OF JUSTICE-2105.00 Program has historically trained for detectives and criminal investigators; and police and sheriff's patrol officers.			
College	# of Associate Degrees, 2018-19	# of Certificates, 2018-19	Total Awards
Cerritos	115	-	115
Citrus	150	49	199
Coastline	32	-	32
Compton	22	-	22
Cypress	13	1	14
East LA	301	252	553
El Camino	110	6	116
Fullerton	123	-	123
Glendale	33	5	38
Golden West	90	49	139
Irvine	46	12	58
LA City	37	1	38
LA Harbor	55	5	60
LA Mission	42	2	44
LA Pierce	117	-	117

ADMINISTRATION OF JUSTICE-2105.00
Program has historically trained for detectives and criminal investigators; and police and sheriff's patrol officers.

College	# of Associate Degrees, 2018-19	# of Certificates, 2018-19	Total Awards
LA Southwest	28	8	36
LA Trade-Tech	13	-	13
LA Valley	30	7	37
Long Beach	120	9	129
Mt San Antonio	87	9	96
Pasadena	113	7	120
Rio Hondo	127	-	127
Santa Ana	104	-	104
Santa Monica	14	-	14
West LA	66	-	66
Total	**1,988**	**422**	**2,410**

CORRECTIONS-2105.10
Program has historically trained for correctional officers and jailers.

College	# of Associate Degrees, 2018-19	# of Certificates, 2018-19	Total Awards
Citrus	3	2	5
East LA	-	35	35
Golden West	2	-	2
Saddleback	-	1	1
Santa Ana	-	5	5
Total	**5**	**43**	**48**

PROBATION AND PAROLE-2105.20
Program has historically trained for corrections officers and jailers.

College	# of Associate Degrees, 2018-19	# of Certificates, 2018-19	Total Awards
No Current Awards	-	-	-

INDUSTRIAL AND TRANSPORTATION SECURITY-2105.30
Program has historically trained for transportation security screeners.

College	# of Associate Degrees, 2018-19	# of Certificates, 2018-19	Total Awards
Citrus	4	2	6
Coastline	4	2	6
Cypress	-	3	3
East LA	-	61	61
Total	8	68	76

INDUSTRIAL AND TRANSPORTATION SECURITY-2105.30
Program has historically trained for transportation security screeners.

College	# of Associate Degrees, 2018-19	# of Certificates, 2018-19	Total Awards
East LA	-	35	35
El Camino	-	6	6
Long Beach	-	15	15
Total	8	56	56

POLICE ACADEMY-2105.50
Program has historically trained for detectives and criminal investigators; and police and sheriff's patrol officers.

College	# of Associate Degrees, 2018-19	# of Certificates, 2018-19	Total Awards
East LA	-	370	370
Golden West	4	-	4
Total	**4**	**370**	**374**

FIRE TECHNOLOGY-2133.00
Program has historically trained for firefighters.

College	# of Associate Degrees, 2018-19	# of Certificates, 2018-19	Total Awards
East LA	24	138	162
El Camino	25	14	39
Glendale	4	30	34
LA Harbor	2	-	2
LA Valley	15	6	21
Long Beach	50	8	58
Mt San Antonio	82	36	118
Pasadena	4	4	8
Rio Hondo	79	89	168
Santa Ana	119	405	524
West LA	1	1	2
Total	**405**	**731**	**1,136**

WILDLAND FIRE TECHNOLOGY-2133.10
Program has historically trained for firefighters.

College	# of Associate Degrees, 2018-19	# of Certificates, 2018-19	Total Awards
East LA	5	17	22
Total	5	17	22

FIRE ACADEMY-2133.50
Program has historically trained for firefighters.

College	# of Associate Degrees, 2018-19	# of Certificates, 2018-19	Total Awards
Compton	-	1	1
East LA	-	7	7
El Camino	-	35	35
Total	4	43	43

Appendix B:
Methodology

Uncertainties of COVID-19 Pandemic

Industry forecasts and occupational projections included in this CCW report were developed prior to the COVID-19 pandemic. It is likely that growth in these industries/occupations will be impacted by the measures taken to mitigate the spread of the virus, including lingering effects of mandated closures, new guidelines for doing business, federal monetary and fiscal policies, local and state relief measures, and changes in consumer behavior, but that over the longer-term (beyond our forecasts and projections for 2022), employment is expected to return to pre-COVID-19 levels. Due to rapidly changing conditions in the LA Basin economy, the dearth of real-time economic information and data, and the uncertainty that exists for many economic factors used to determine our forecasts/projections, we have not yet made revisions.

Industry Forecast

An economic forecast is created to project employment by industry over the next five years using statistical analysis of historical data paired with the most recent qualitative information impacting a set of 151 industries in the Los Angeles Basin. The industries configured for this forecast are defined through the North American Industry Classification System (NAICS) and comprise industries denoted with 2-digit, 3-digit and 4-digit codes through the NAICS hierarchical classification system. A key input for the regional forecast is projected population growth in Los Angeles and Orange counties, provided by the California Department of Finance. State and national trends concerning production methods, consumer behavior, construction and property values that correspond to each industry are a few of the inputs used for the economic forecast model.

Occupations and Projections

Occupations are commonly classified using the Standard Occupational Classification (SOC) System, developed by the Bureau of Labor Statistics. This system classifies workers into 840 detailed occupations that share similar job duties, skills, education and training. These occupations are not industry-specific but are common to many industries. For example, retail salespersons are employed in a full spectrum of industries, from department and discount stores to computer systems design.

The economic forecast for employment by industry is used to guide a projection of net new jobs for each occupation, calculated by applying the industry occupational composition to the detailed industry employment forecast; occupational forecasts are aggre-gated across industries.

The United States Census Bureau estimates replacement needs by industry and occupation through detailed surveys of employers and households. These take into account industry changes, the age of the current workforce within each industry and occupation, and the nature of the career path. These estimates are an important component of occupational job openings and workforce develop¬ment needs, since the retirement and promotion of individuals leave openings for new entrants and those moving up the career ladder.

Total openings are the sum of projected five-year replacement needs and positive net new jobs forecast over the period.

Target Industries and Occupations

Target occupations are selected in a two-step process. First, all occupations identified as middle-skill (jobs that require education and training beyond a high school diploma but less than a bachelor's degree) are isolated from each target industry. Then, a variety of metrics are used to select target occupations: 2017 employment; projected net job change; replace¬ment rate; number of projected replacement jobs from 2017 to 2022; number of projected total job openings from 2017 to 2022; and annual median wages.

Supply

Community colleges and other two-year educational institutions provide education and training relevant to middle-skill occupations. Comparing occupations with related training programs provides information for supply-and-demand analysis. The number of awards conferred by community colleges reflects the most recent data available from the 2018-19 academic year. Award data for other two-year education institutions is from the 2018-19 academic year. Due to data and timing limitations, training gap forecasts approximate unmet labor demand and do not represent an absolute oversupply or undersupply of available talent. In addition, a one-to-one relationship between program completions and occupational demand does not exist because some programs train for multiple occupations. Consequently, awards for some education and training programs overlap with multiple occupations.

Data Sources

All data were obtained from the Bureau of Labor Statistics and the Census Bureau. Annual employment and payroll data are from the Quarterly Census of Employment and Wages series. Estimates for non-disclosed employment and payroll data were produced using proportional shares of the prior year's data or using midpoint estimates from the Census Bureau's County Business Patterns dataset. Occupational data are from the Occupational Employment Statistics program. Unless noted otherwise, all data are for the 2017 calendar year.

Supply Chain & Output Analysis

All data was obtained from the Bureau of Labor Statistics and the Census Bureau. Annual employment and payroll data are from the Quarterly Census of Employment and Wages series. Estimates for non-disclosed employment and payroll data were produced using proportional shares of the prior year's data or using midpoint estimates from the Census Bureau's County Business Patterns dataset. Occupational data are from the Occupational Employment Statistics program. Unless noted otherwise, all data is for the 2017 calendar year.

Appendix c:
Additional Occupational Profiles

Additional occupational profiles for the following protective services and related occupations follow:

- **First-Line Supervisors of Correctional Officers (SOC 33-1011)**
- **First-Line Supervisors of Fire Fighting and Prevention Workers (SOC 33-1021)**
- **Probation Officers and Correctional Treatment Specialists (SOC 21-1092)**

FOR MORE INFORMATION

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