



Tourism and Hospitality Talent: Human Capital and Economic Contributions in Metro Detroit

Compiled by the Workforce Intelligence Network for Southeast Michigan on behalf of the Detroit Convention and Visitors Bureau

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Contents

About This Report	3
Key Findings	3
Tourism and Hospitality Industry Overview	3
Tourism and Hospitality Workforce Overview.....	4
Methodology.....	5
Employment.....	6
Worker Demographics and Commuting Patterns.....	6
Wages.....	7
Economic Impact and Wage Effects.....	9
Employer Demand	11
Tourism and Hospitality Workforce Occupation Groups.....	15
Arts and Culture	15
Building and Groundskeeping Maintenance.....	19
Conferences and Events.....	23
Entertainment.....	27
Gaming	31
Hospitality	35
Dining and Shopping	39
Recreation.....	43
Tourism Development and Promotion	47
Travel	51
Appendix A: Occupation Codes by Group.....	55
Appendix B: Keyword and Industry Data Collection Filters	59
Appendix C: Glossary	60

About This Report

The Detroit Metro Convention and Visitors Bureau (DMCVB) commissioned this report from the Workforce Intelligence Network for Southeast Michigan (WIN) to better understand the tourism and hospitality workforce as well as the economic and fiscal contributions made by those workers to the region and the state. Findings from this report will be provided to Michigan legislators and state government officials to help inform and emphasize the importance of tourism and hospitality workers as a major economic contributor in metro Detroit and beyond.

This report contains the following:

- Tourism and hospitality-related occupations classified as related workers
- Workforce demographics and metrics for workers in metro Detroit currently employed in tourism and hospitality-related jobs including:
 - Employment trends
 - Demographics (age, gender, race/ethnicity)
 - Worker commuting patterns
 - Typical wages
 - Required education, training and experience
 - Essential skills
- Economic and fiscal contributions defined as spending, spin-off jobs and taxes paid by tourism and hospitality workers, enhancing the state's economic strength

Key Findings

Report findings include:

1. Employers related to tourism and hospitality contribute 463,840 jobs to the metro Detroit economy.
2. Tourism and hospitality jobs are diverse with workers in fields such as retail, fine dining, air travel, theater and the arts, hotels, event planning, casinos, parks, and recreation. These workers enrich the lives not only of visitors to the region but also residents. The strongest employment is in the categories of Dining and Shopping (265,597 workers), Hospitality (79,473 workers) and Building and Groundskeeping Workers (51,384 workers).
3. Conferences and Events and Tourism Development and Promotions workers make up a much larger share of job postings than relative employment, potentially indicating growing demand for these workers.
4. Tourism Development and Promotion and Travel workers report the greatest earning potential among tourism and hospitality occupations.
5. Low cost of living in metro Detroit means that median wages for tourism and hospitality workers in this region are, in effect, nearly \$2.00 per hour higher than the national average.
6. Since the lowest point in the recession in 2010, more than 60,000 tourism and hospitality-related jobs have been recovered in metro Detroit.
7. While education requirements vary, nearly all posted hospitality and tourism jobs specifying experience needs are open to workers with under three years of experience.
8. Across all tourism and hospitality workers, 12.7% are employed directly in the city of Detroit.
9. 32% of workers in the field both live and work in the city of Detroit.

10. Workers in tourism and hospitality jobs in metro Detroit support approximately 23,000 additional indirect jobs in the State of Michigan.
11. Tourism and hospitality worker spending contributes approximately \$79.1 million to state sales tax collections each year.
12. Only 34% of leisure and hospitality workers nationwide have access to health benefits.

Tourism and Hospitality Industry Overview

The hospitality and tourism industry, including sectors such as accommodation and food service, arts and entertainment, retail shopping, travel, marketing and facilities workers, employ over 300,000 individuals in metro Detroit and contribute over 2.8 billion dollars of earnings to the local economy. Instead of focusing on the traditional industry analysis, this report primarily focuses on key occupation groups (based on SOC codes) within the tourism and hospitality industries in order to provide a more detailed picture of the related workforce.

Tourism and Hospitality Workforce Overview

Increased travel over the past several years in metro Detroit has created greater demand for workers in tourism and hospitality. Employment has grown steadily since the Great Recession and surpassed pre-recession highs in recent years. The ongoing COVID-19 pandemic has devastated the tourism and hospitality industry across the nation and the full impact of the crisis will not be understood for months or possibly years.

Looking forward, the landscape for tourism workers faces both opportunities and challenges related to technology and the adaptive skill-sets needed to use it. Prior to the COVID-19 pandemic, Detroit continued to grow as a travel destination and advancements in technology allowed for more targeted marketing and a wider audience for entertainers, automated service kiosks become more prevalent in customer service, and app-based gig economy services take a greater role in the food, retail, and hospitality industries. This report highlights labor market statistics such as employment, wages and demographics for 123 occupations within 10 occupation groups related to tourism and hospitality. The analysis within serves as a baseline in understanding the workers related to the tourism and hospitality industry and their economic contributions to the region and state prior to the COVID-19 crisis.

Tourism and hospitality occupation groups analyzed in this report include:

- Arts and Culture
- Building and Groundskeeping
Maintenance
- Conference and Events
- Entertainment
- Gaming
- Hospitality
- Dining and Shopping
- Recreation
- Tourism Development and Promotion
- Travel

Methodology

A variety of public and proprietary data sources have been combined to produce this analysis. A brief explanation of the major data sources follows, and information is cited in-text where required throughout the report. Please note that unless otherwise specified, data is collected and included at the occupational level. A full list of industry and occupation codes used in this analysis can be found in Appendix A and B.

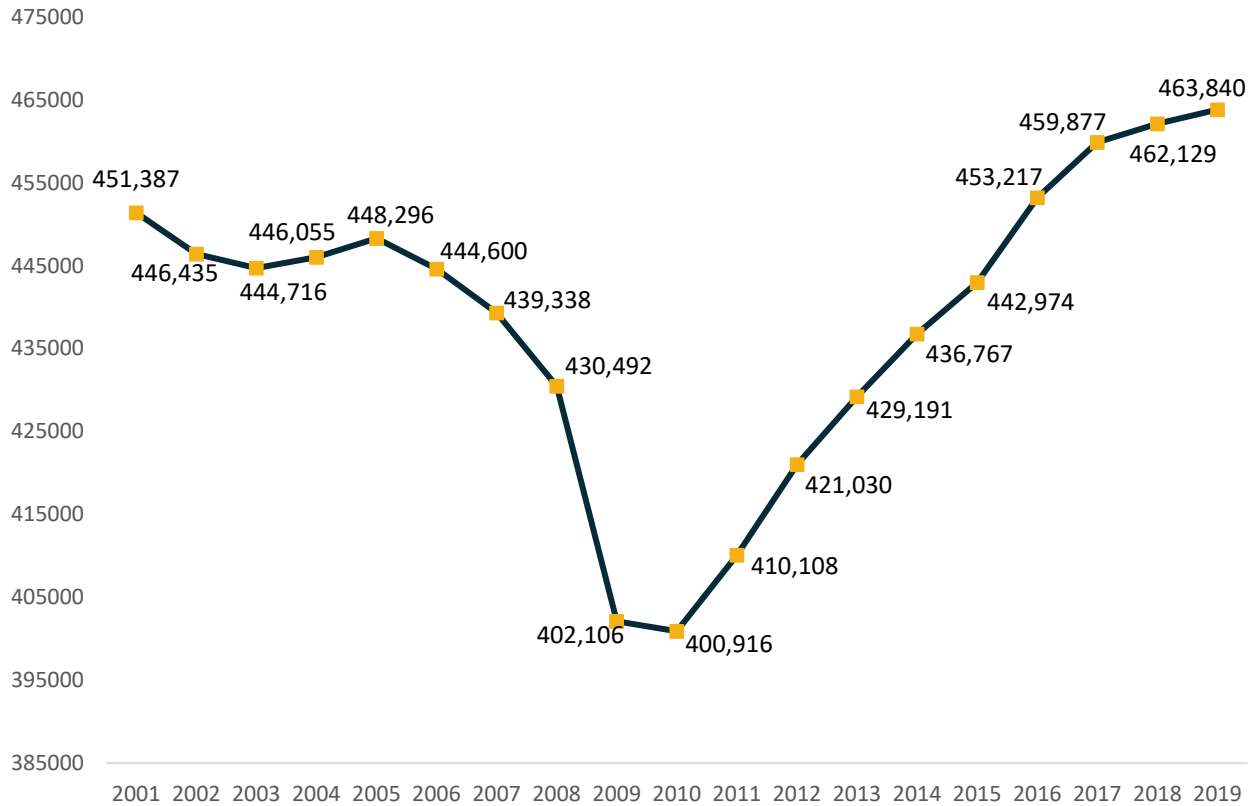
- Bureau of Labor Statistics (BLS): Under the United States Department of Labor, the Bureau of Labor Statistics is the preeminent collector and distributor of labor market and economic data at the federal level
 - Employee Benefits Survey
- US Department of Labor (DOL)
- O*NET
- United States Census Bureau
 - ACS 2018 5-Year Estimates
 - 2017 OnTheMap: all 2017 commuting pattern data
- Economic Modeling Specialists, Intl. (Emsi)
 - Job Postings
 - Estimates based off other traditional sources (automation indices, local wage estimates)
 - Retrieval source for employment, demographics, and other information (except 2017 commuters) provided in the occupation group sections

All data refers to the Detroit Metro area, comprised of Wayne, Oakland, and Macomb counties, unless otherwise specified.

Projection data is not included. Most projections are based on a “steady-state” economy, meaning that the projected employed assumes that the region will have no technological advances or other major economic changes in the future. Because the tourism and hospitality industry fluctuates based on individual spending and travel patterns, it is too closely aligned with economic shifts for projections to be relevant.

Employment

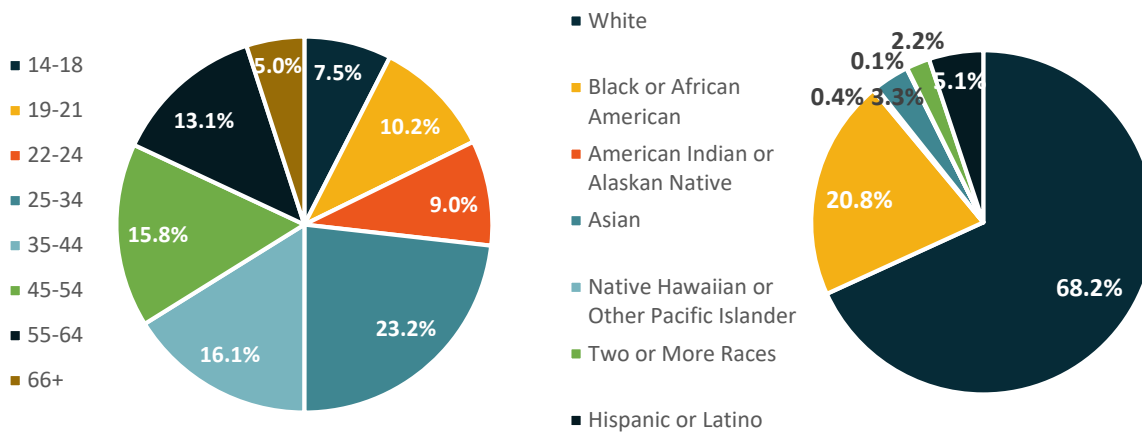
Employment in Tourism and Hospitality Occupations in Metro Detroit (2001 – 2019)



- Over 60,000 jobs have been recovered in tourism and hospitality since the Great Recession, with 2019 employment levels surpassing the most recent 2001 peak by over 10,000 jobs.

Worker Demographics and Commuting Patterns

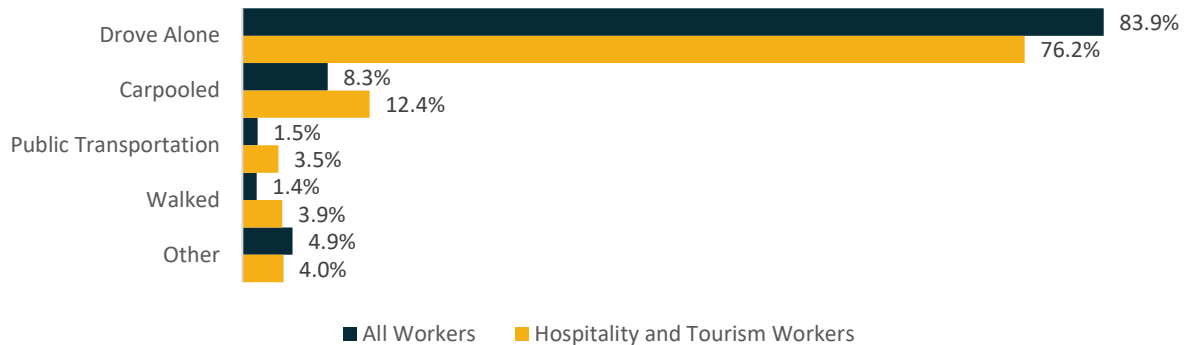
Worker Age and Race/Ethnicity Demographics in Metro Detroit (2019)



Worker Commuting Patterns in Metro Detroit (2017)

- 28,823 Net Commuters in 2019: 5.8%¹ of workers in hospitality occupations commute in from outside of the tri-county area, compared to 19.3%² of the total workforce.
- 76.2% of Arts, entertainment and recreation and accommodation and food services workers drove alone to work in 2018, compared to 83.9% of all workers³.

Means of Transportation to Work in Metro Detroit (2018)



Wages

Wage Distribution by Group in Metro Detroit (2019)

Occupation Group	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
<i>All Occupations in Region</i>	\$15.48	\$19.02	\$24.36	\$31.03	\$39.00
All Hospitality and Tourism Occupations	\$11.02	\$12.71	\$15.42	\$19.07	\$24.52
H&T Occupations: Cost of Living Adjusted	\$11.23	\$12.95	\$17.17	\$19.44	\$24.99
Arts and Culture	\$11.33	\$13.46	\$16.48	\$23.31	\$28.05
Building and Groundskeeping	\$13.66	\$16.67	\$22.00	\$26.40	\$31.89
Conferences and Events	\$12.00	\$16.89	\$26.35	\$37.59	\$52.77
Dining and Shopping	\$9.64	\$10.29	\$11.50	\$13.70	\$17.94
Entertainment	\$11.76	\$14.43	\$19.77	\$29.74	\$41.49
Gaming	\$11.06	\$12.67	\$14.43	\$16.23	\$18.94
Hospitality	\$10.32	\$12.31	\$15.20	\$19.22	\$24.81
Recreation	\$9.71	\$10.33	\$11.62	\$13.97	\$17.87
Tourism Development and Promotion	\$16.87	\$23.12	\$31.19	\$42.49	\$54.49
Travel	\$18.71	\$22.91	\$27.87	\$32.21	\$37.47

¹ 2019 Net Commuter estimate, accessed through Emsi

² 2017 Census OnTheMap

³ 2018 ACS 5-Year Estimate for Oakland, Wayne, and Macomb Counties

Wage Distribution by Group, Including Self-Employed Workers in Metro Detroit (2019)

Occupation Group	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
Hospitality and Tourism Occupations	\$10.42	\$12.32	\$15.42	\$19.51	\$25.50
H&T Occupations: Cost of Living Adjusted	\$10.62	\$12.56	\$17.40	\$19.89	\$25.99
Arts and Culture	\$6.30	\$8.84	\$14.06	\$21.23	\$32.47
Building and Groundskeeping	\$10.67	\$14.33	\$21.22	\$27.57	\$34.49
Conferences and Events	\$11.28	\$16.23	\$25.58	\$36.99	\$52.62
Dining and Shopping	\$9.51	\$10.22	\$11.57	\$13.91	\$18.40
Entertainment	\$9.15	\$12.49	\$18.98	\$30.59	\$45.67
Gaming	\$11.04	\$12.67	\$14.45	\$16.27	\$19.04
Hospitality	\$10.04	\$12.12	\$15.04	\$19.12	\$24.86
Recreation	\$9.28	\$10.23	\$11.60	\$14.08	\$18.46
Tourism Development and Promotion	\$15.37	\$21.84	\$30.33	\$41.93	\$54.33
Travel	\$17.54	\$22.02	\$26.91	\$31.28	\$36.62

- **Benefits and part time workers:**
 - Among all workers nationwide, 70 percent of workers⁴ have access to health care benefits. However, these rates are much lower for the workers included here: among leisure and hospitality workers, only 34 percent have access to health care; 51% of workers at businesses with fewer than 50 employees; 56% in retail trade; 22% of part time workers; and 36% in the lowest quartile of wage earners have access to health care. Participation rates, generally around 70%, mean even fewer workers are actually utilizing those benefits.
 - Nationwide, 11.9%⁵ of all workers are part time for economic reasons, and 5.1% hold multiple jobs.
 - Within the Tri-County region, for selected tourism and hospitality industries, average earnings per job were \$34,909⁶, including \$29,384 in wages and \$5,525 in benefits
 - Median Advertised Salary in job postings is \$34,944; 86.3% of advertised salaries are under \$60,000
 - Median BLS-reported wage is \$32,074
- COL Index for tri-county area is 98.1, meaning the cost of living is about two percent lower than the national average.
- Self-employed workers, Independent Contractors, and the Gig Economy:
 - In Arts and Culture, Entertainment, and Travel, ten-year growth is at least 2 percentage points greater when self-employed workers are included

⁴ 2018 BLS Employee Benefits Survey

⁵ 2018 Census Household Data Annual Averages, United States

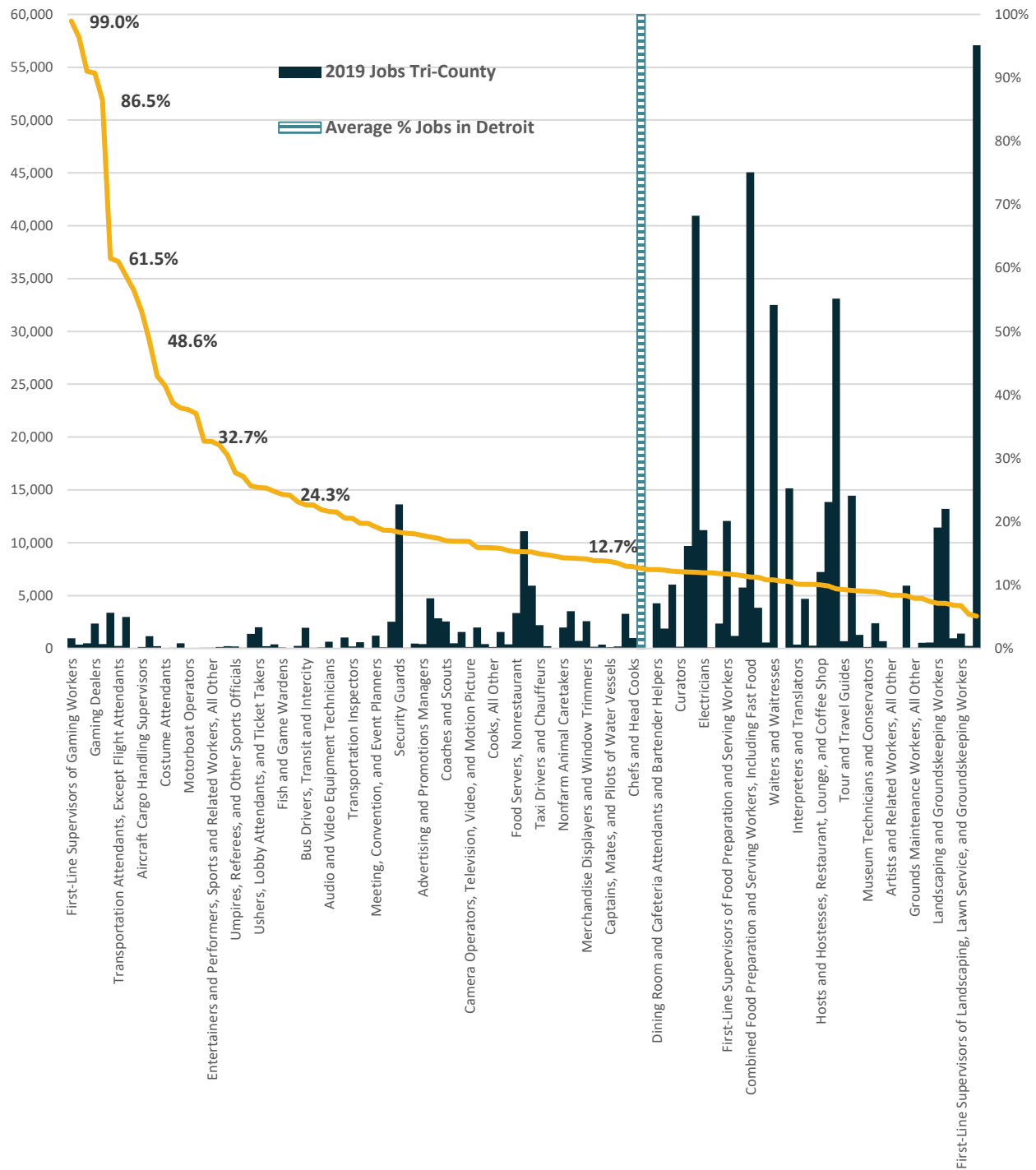
⁶ QCEW Industry Wages

- Self-employed workers show greater wage variation than employees; though starting wages are generally much lower and occasionally below minimum wage, wages for experienced workers tend to be much higher than for employees. The occupation groups in which these differences are most significant are also those experiencing the greatest contrast in growth.
- During 2019, there were 13,405 job postings made for all occupations by common gig economy competitors, including rideshare, food delivery, and home rental services. As cleaning and repair services and other aspects of tourism, hospitality, and personal care services increasingly utilize these platforms, this figure may increase.
- Advertised salaries for gig economy postings had a median of \$45,696 alongside minimal education and experience requirements.

Economic Impact and Wage Effects

- 51,166 workers (11.0%) in the field live in the City of Detroit, and 32.4 percent of service workers in Detroit both live and work in the city.
- 12.7% of workers in Tourism and Hospitality occupations are employed directly in the City of Detroit. This average proportion is noted by the dashed bar in the graph below. While well over half of the occupations here are much more highly concentrated in Detroit, high-employment occupations such as retail salespersons and food preparation workers are spread across all three counties.

Employment Concentration in the City of Detroit as Percent of Metro Detroit (2019)



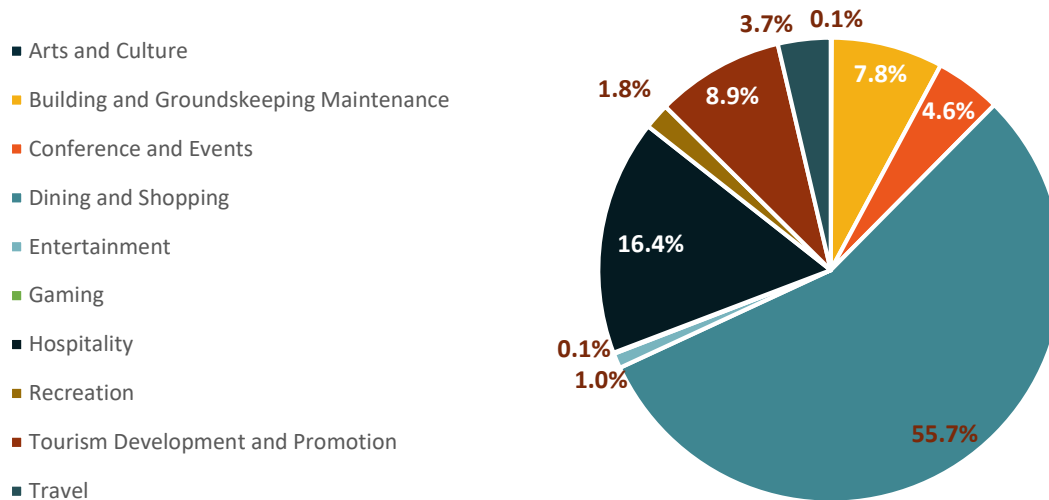
- Roughly 23,000 indirect jobs are created by the retail, hospitality, and transportation industries in the tri-county area
- Workers in Tourism and Hospitality jobs contribute an estimated \$121 million in state of Michigan income taxes annually. Individuals who live and/or work in the City of Detroit contribute approximately \$30.3 million in city income taxes annually.

- Tourism and Hospitality worker spending contributes approximately \$79 million to state sales tax collections each year.
- Workers in the Tourism and Hospitality field pay an estimated \$6.5 million in fuel taxes each year.

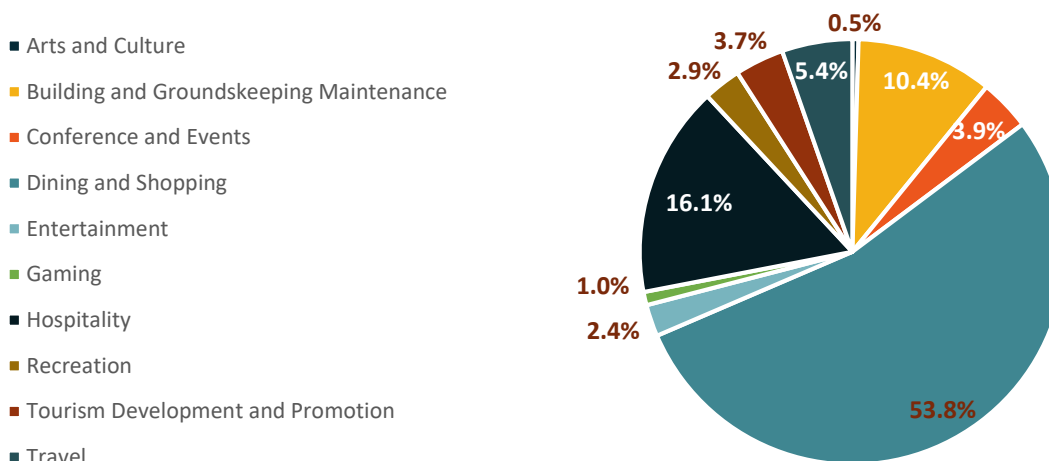
Employer Demand

Comparative Employer Demand by Occupation Group

Job Postings by Group (2019)



Employment by Group (2019)



- Overall posting intensity of 5:1
- Gaming and travel workers are among the highest regionally concentrated occupations, comprising 9 of the top 15 highest location quotients
- Typically, entry level positions such as entertainment and recreation attendants, lifeguards, and hosts and hostesses replace between 20% and 25% of their staff each year

- Many food preparation workers are at high risk of automation, with automation indices over 120. Creative occupations, those focused on managing talent, and air travel workers are at generally low risk of automation.
- In addition to automation, gig economy services may also take the place of some tourism and hospitality occupations. In 2019, there were 13,405 postings made in the region by top app-based food delivery, rideshare, and house renting services.

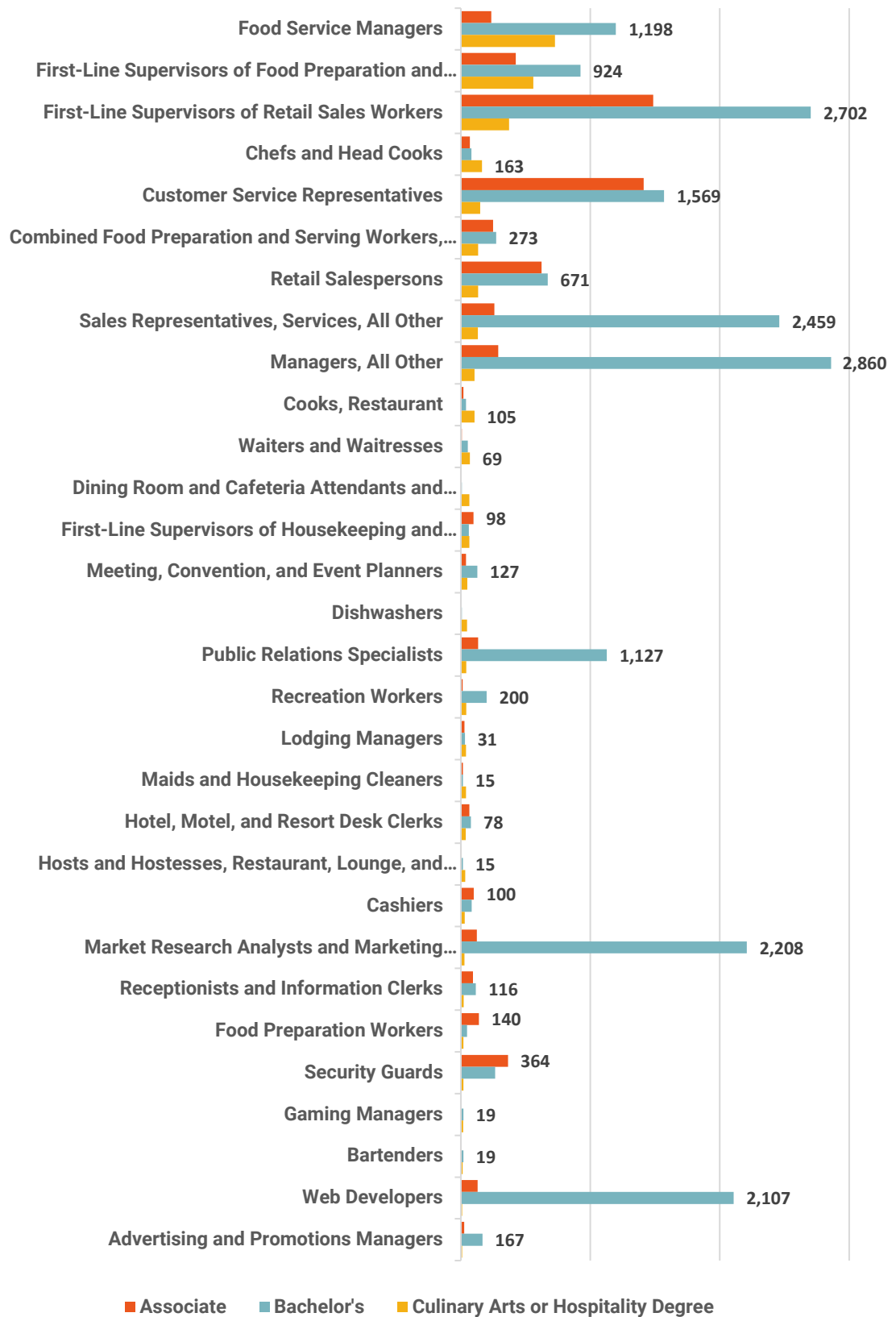
In-Demand Experience and Education (2019)

Education Level	Unique Postings	% of Total
Unspecified	90,362	58.9%
High school or GED	45,943	29.9%
Associate's degree	6,946	4.5%
Bachelor's degree	21,164	13.8%
Master's degree	2,722	1.8%
Ph.D. or professional degree	200	0.1%
Minimum Experience	Unique Postings	% of Total
Unspecified	104,776	68.2%
0 - 1 Years	27,118	17.7%
2 - 3 Years	15,354	10.0%
4 - 6 Years	4,651	3.0%
7 - 9 Years	1,036	0.7%
10+ Years	602	0.4%

Regional Completions

- In some cases, the typical entry education as defined by the BLS and the high-demand job posting education do not line up. For example, "Culinary Arts or Hospitality Degree", below, refers to specific advertised preference for any level of degree in this field. Though indicated by the Bureau of Labor Statistics to require only a high school diploma and experience, up to 28 percent of job advertisements for Food Service Managers require a higher level of education. Additional credentials can provide pathways for workers to gain employment at high-end establishments or enter management roles. Across the state, there were 1,449 completions for hospitality management or culinary arts degrees in 2018.

Job Postings by Degree Type for Hospitality and Foodservice Workers (2019)



In-Demand Skills and Qualifications (2019)

Top Posted Technical Skills

- Merchandising
- Restaurant Operation
- Selling Techniques
- Customer Experience
- Cash Register
- Food Services
- Customer Satisfaction
- Food Safety
- Loss Prevention
- Customer Relationship Management

Top Posted Common Skills

- Customer Service
- Sales
- Management
- Communications
- Operations
- Leadership
- Presentations
- Detail Oriented
- Valid Driver's License
- Cleanliness

Top Posted Qualifications

- ServSafe Certification
- Food Handler's Card
- Food Safety Certification
- Alcohol Certification
- Project Management Professional Certification
- Commercial Driver's License (CDL)
- Cosmetology License
- Pesticide Applicator License
- CDL Class B License
- Certified Forklift Operator
- Registered Dietitian (RD/RDN)
- Certified Dietary Manager (CDM)
- Certified First Responder
- Drone Pilot Certificate
- Personal Trainer Certification
- Water Safety Instructor Certification
- Activity Assistant Certified
- Certified in Production and Inventory Management

Tourism and Hospitality Workforce Occupation Groups

Arts and Culture

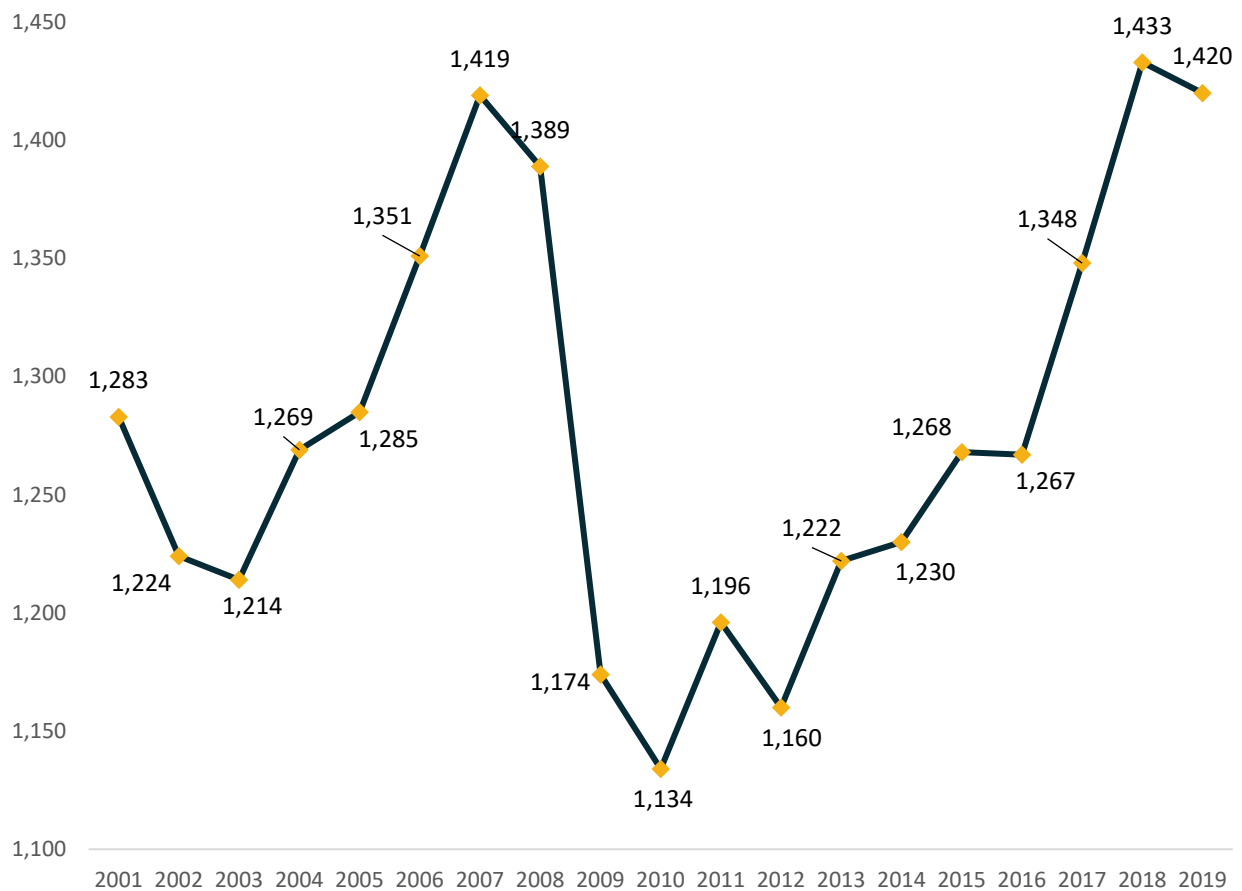
Whether taking in the history of the Motor City at the Detroit Historical Museum or enjoying the murals at the Detroit Institute of Arts, metro Detroit provides a wonderful collection of information and artifacts for visitors looking for the best civilization has to offer.

Workers in arts and culture include:

- Craft Artists
- Tour Guides and Travel Guides
- Audiovisual and Multimedia Collections Specialists
- Curators
- Historians
- Museum Technicians and Conservators
- Set and Exhibit Designers
- Fine Artists

Arts and Culture: Employment

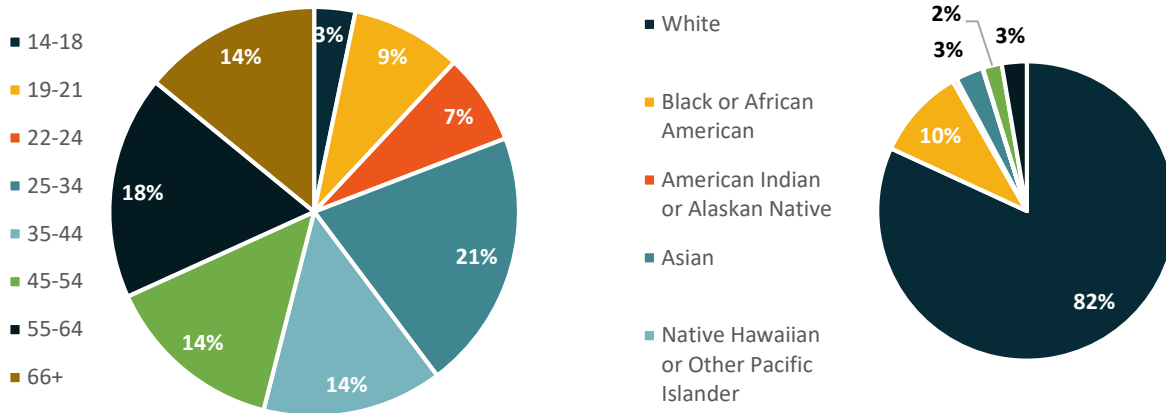
Arts and Culture: Employment Over Time (2001 – 2019)



- Since 2010, employment in arts and culture has increased by 286 workers (from 1,134 to 1,420)
- Employment in arts and culture occupations is expected to remain steady through 2029

Arts and Culture: Worker Demographics and Commuting Patterns

Arts and Culture: Worker Age and Race/Ethnicity Demographics (2019)



- 46% of arts and culture workers are over the age of 45 while less than 20% are 25 years of age or younger

Arts and Culture: Worker Commuting Patterns (2017)

- Only 20 of the 1,420 workers in 2019 were estimated to commute into the region for arts and culture jobs, meaning that the Detroit metro region has enough talent to fill employer demand

Arts and Culture: Wages

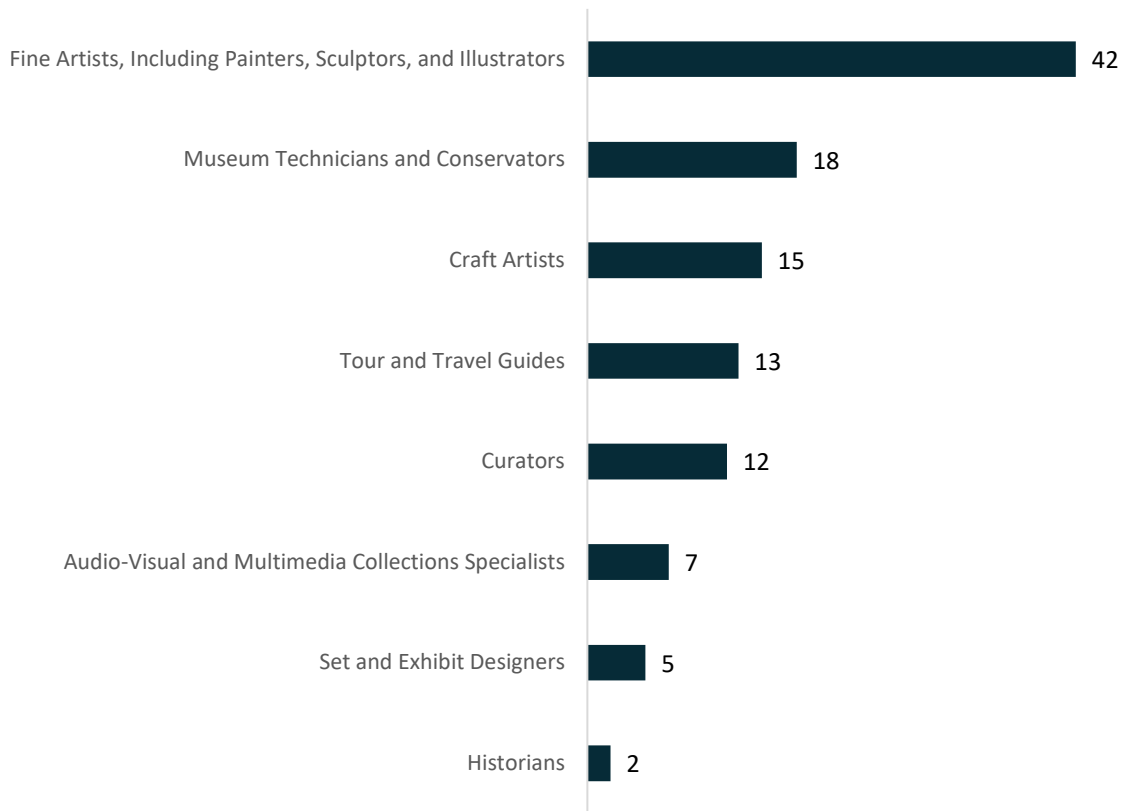
Arts and Culture: Wage Distribution by Occupation (2019)

Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
19-3093	Historians	\$9.37	\$9.85	\$11.88	\$14.50	\$17.73
25-4012	Curators	\$13.55	\$16.56	\$21.80	\$29.43	\$37.35
25-4013	Museum Technicians and Conservators	\$11.02	\$12.97	\$15.54	\$20.90	\$27.19
25-9011	Audio-Visual and Multimedia Collections Specialists	\$11.38	\$18.87	\$25.55	\$34.51	\$37.47
27-1012	Craft Artists	\$12.21	\$20.95	\$24.72	\$32.32	\$46.18
27-1013	Fine Artists, Including Painters, Sculptors, and Illustrators	\$14.12	\$16.93	\$23.00	\$42.65	\$47.84
27-1027	Set and Exhibit Designers	\$14.32	\$24.43	\$30.19	\$41.77	\$48.38
39-7018	Tour and Travel Guides	\$9.60	\$9.83	\$10.69	\$12.29	\$15.55

- Arts and culture occupations offer a wide range of hourly wages depending on experience and education requirements

Arts and Culture: Employer Demand

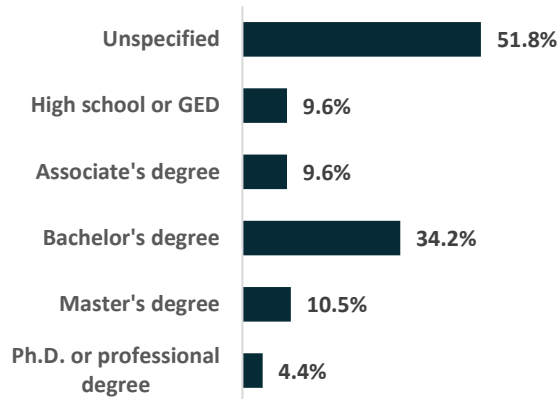
Arts and Culture: Top Postings by Occupation (2019)



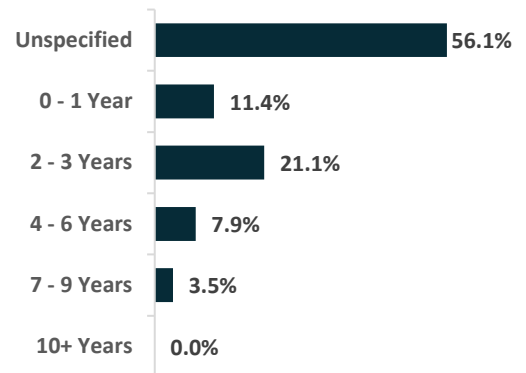
- 114 unique arts and culture jobs were posted in Oakland, Wayne, and Macomb counties in 2019
- Fine Artists, Including Painters, Sculptors, and Illustrators (42 postings) were the highest in-demand arts and culture occupation in 2019 followed by Museum Technicians and Conservators (18 postings) and Craft Artists (15 postings)
- Historians are estimated to have the highest risk of automation with an index of 105.3; however, the automation risk is estimated to be very low overall for arts and culture jobs due to the creative nature of the occupations in this group
- Posting intensity for the arts and culture group is 4:1, meaning there are four job postings for each individual arts and culture position available
- Arts and culture jobs are posted for a median of 36 days indicating employers are experiencing some difficulty filling open positions

Arts and Culture: In-Demand Education and Experience (2019)

Arts and Culture: In-Demand Education



Arts and Culture: In-Demand Experience



- Most arts and culture postings indicate a desire for 2-3 years of work experience and a bachelor’s degree or more which aligns with the minimum requirements to obtain Museum Technicians and Conservators, Curators, and Historians
- Fine Arts and History-related degree completions in the Detroit metro region were sufficient for the number of jobs available in arts and culture in 2018

Arts and Culture: In-Demand Skills and Qualifications (2019)

Top Posted Technical Skills

- Adobe Illustrator
- Adobe Photoshop
- Technical Illustration
- Sculpture
- Curation
- Public Relations
- Loans
- Microsoft SharePoint
- 3D Modeling
- Production Engineering

Top Posted Common Skills

- Research
- Leadership
- Management
- Operations
- Time Management
- Written Communication
- Presentations
- Microsoft Excel
- Customer Service
- Communications

Top Posted Qualifications

- Certified Internet Webmaster

Building and Groundskeeping Maintenance

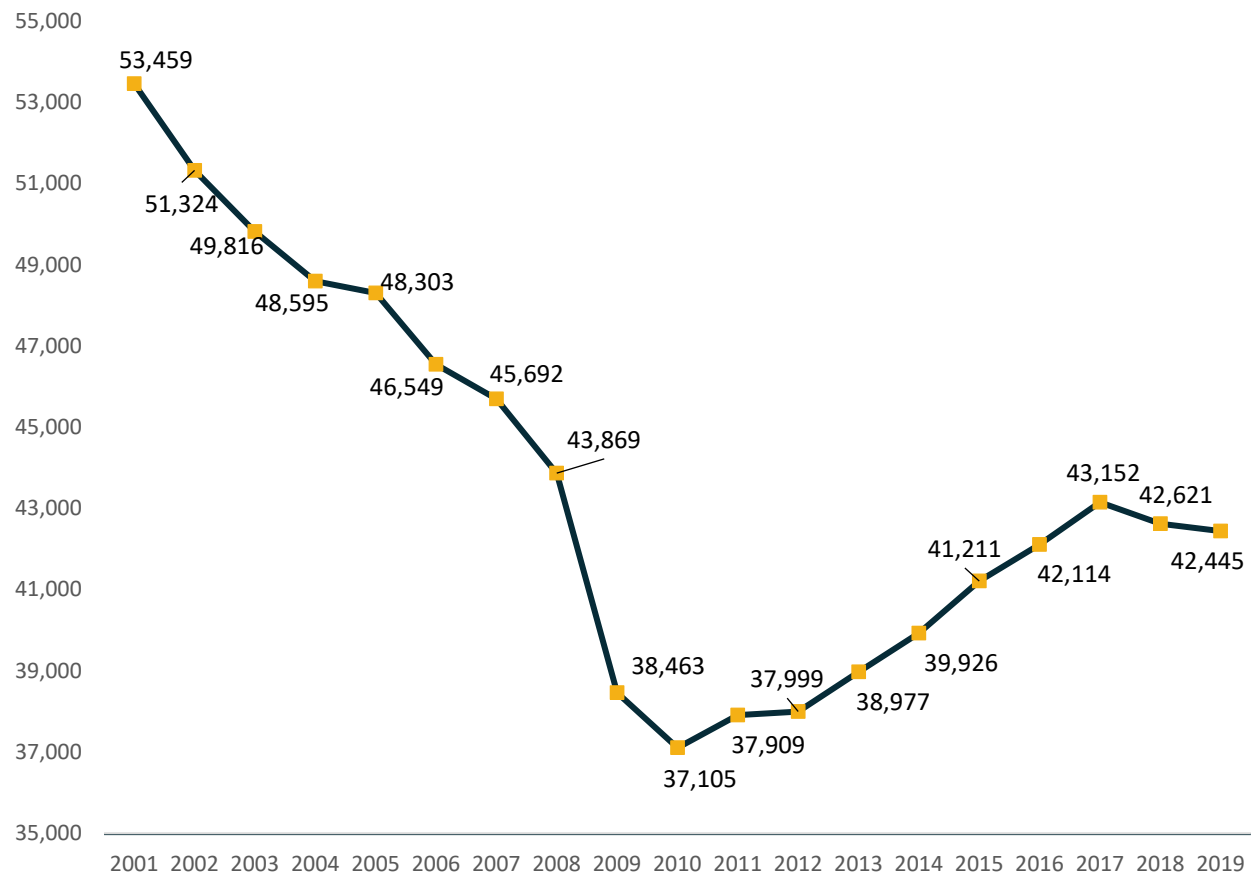
Whether spending a night in one of the 400 hotels in metro Detroit, strolling through the Huron-Clinton Metroparks or enjoying the scenic views on Belle Isle, building and groundskeeping maintenance jobs care for the parks and venues enjoyed by visitors to Detroit. Elevator Installers and Repairers seen a location quotient of 2.78 in 2019.

Workers in building and groundskeeping maintenance include:

- Electricians
- Elevator Installers and Repairers
- First-line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers
- Grounds Maintenance Workers, All Other
- Landscaping and Groundskeeping Workers
- Security Guards
- Security Managers
- Tree Trimmers and Pruners

Building and Groundskeeping Maintenance: Employment

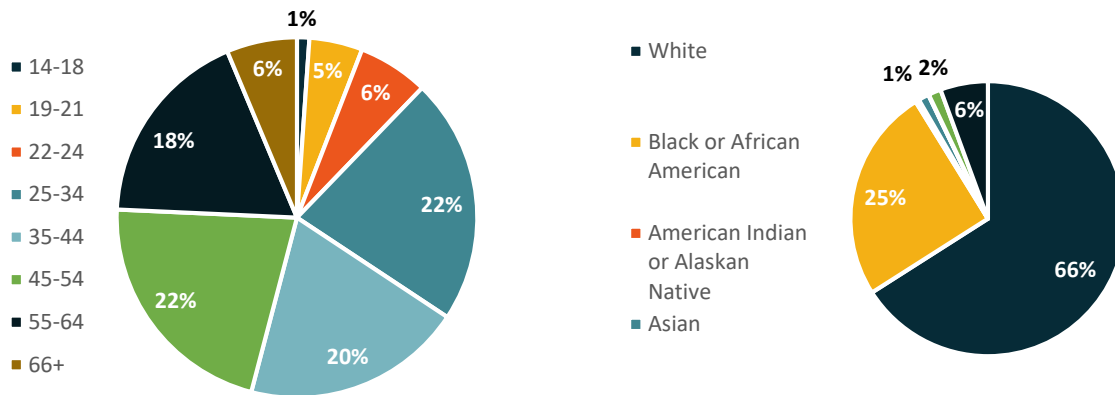
Building and Groundskeeping Maintenance: Employment Over Time (2001 – 2019)



- Since 2010, employment has increased by 5,340 workers (12.6%)

Building and Groundskeeping Maintenance: Worker Demographics and Commuting Patterns

Building and Groundskeeping Maintenance: Worker Age and Race/Ethnicity Demographics (2019)



- 63.5% of the workforce are between the ages of 25-54
- Majority of the workers are either white (66.0%) or black or African American (25.2%), accounting for 91.2%, while 5.6% are Hispanic or Latino

Building and Groundskeeping Maintenance: Worker Commuting Patterns (2017)

- Between 2001 and 2019, the net commuters for almost all occupations have been negative, identifying that there are more workers living in the region than there are jobs available. Grounds Maintenance Workers, All Other and Elevator Installers and Repairers are the only occupations to have a positive increase

Building and Groundskeeping Maintenance: Wages

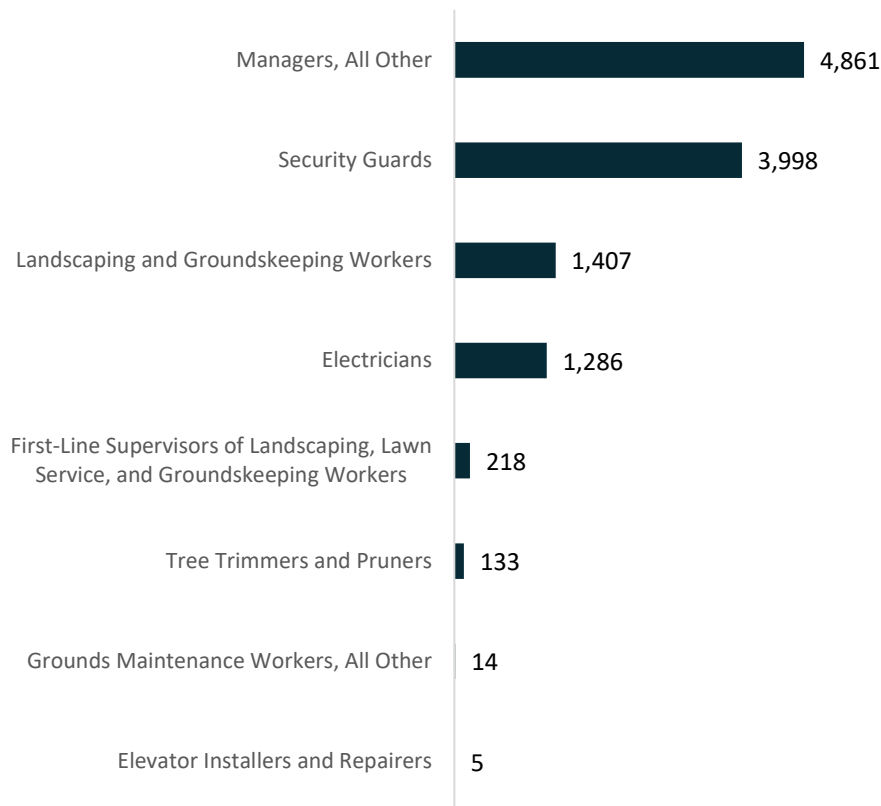
Building and Groundskeeping Maintenance: Wage Distribution by Occupation (2019)

Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
11-9199	Managers, All Other	\$30.87	\$38.75	\$49.94	\$60.50	\$74.95
33-9032	Security Guards	\$9.51	\$10.45	\$11.76	\$14.67	\$19.39
37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	\$15.71	\$18.29	\$22.48	\$28.30	\$33.29
37-3011	Landscaping and Groundskeeping Workers	\$10.45	\$11.81	\$13.94	\$16.44	\$19.66
37-3013	Tree Trimmers and Pruners	\$15.17	\$15.85	\$16.97	\$18.09	\$18.76
37-3019	Grounds Maintenance Workers, All Other	\$23.47	\$25.79	\$30.39	\$32.16	\$36.35
47-2111	Electricians	\$15.64	\$20.93	\$32.28	\$38.03	\$43.88
47-4021	Elevator Installers and Repairers	\$20.84	\$29.59	\$41.33	\$50.01	\$58.58

- Half of the occupations have median wages above \$25.00
- Grounds Maintenance Workers, All Other, Electricians, and Elevator Installers and Repairers have median wages above \$29.00 and require no formal education or a high school diploma coupled with an apprenticeship or short-term on-the-job

Building and Groundskeeping Maintenance: Employer Demand

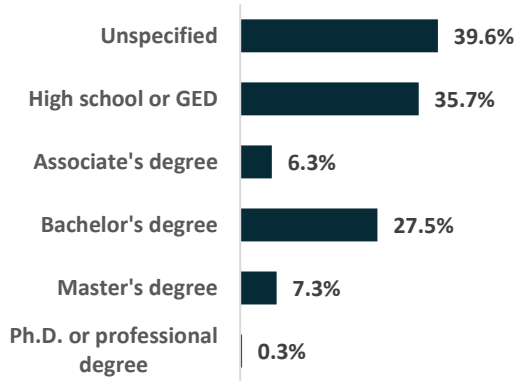
Building and Groundskeeping Maintenance: Top Postings by Occupation (2019)



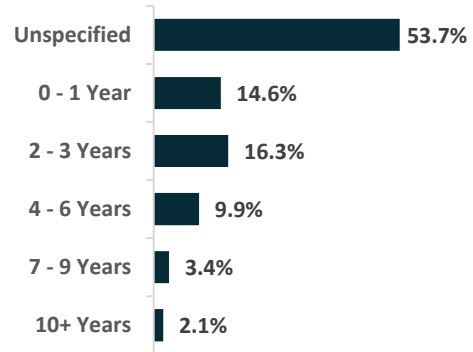
- Occupations found in this group have a higher than average risk of becoming automated with almost all having an automation index of over 100, except Managers, All Other, which has a lower than average risk of with an automation index of 84.5
- Managers, All Other and Security Guards are highly demanded with 4,861 and 3,998 postings respectively for 2019
- The posting intensity of this occupation group is five to one for 2019, with 11,922 unique postings
- Detroit (2,893 postings) and Troy (781 postings) are the top posting cities accounting for 30.8% of postings
- Security Officers (Protective Service) (1,458 postings) and Project Managers (Management) (1,023 postings) are the top posted job titles in 2019
- 7,541 or 63.3% of posting require either a high school diploma or equivalent (4,262 postings or 35.7%) or a bachelor’s degree (3,279 or 27.5%), while 30.9% or 3,687 postings require zero to three years of experience

Building and Groundskeeping Maintenance: In-Demand Education and Experience (2019)

Arts and Culture: In-Demand Education



Arts and Culture: In-Demand Experience



- Regional completions for these occupations are low due to most positions requiring no formal education or a high school diploma or equivalent, although Managers, All Other, requiring a bachelor’s degree, had 2,399 regional completions for 2019

Building and Groundskeeping Maintenance: In-Demand Skills and Qualifications (2019)

Top Posted Technical Skills

- Project Management
- Landscaping
- Mowing
- Electrical Wirings
- Fire-Control Systems
- Budgeting
- Irrigation (Landscaping and Agriculture)
- Trimming
- Customer Satisfaction
- Groundskeeping

Top Posted Common Skills

- Management
- Communications
- Customer Service
- Leadership
- Operations
- Innovation
- Sales
- Detail Oriented
- Interpersonal Skills
- Problem Solving

Top Posted Qualifications

- Project Management Professional Certification
- Commercial Driver's License (CDL)
- Pesticide Applicator License
- Certified in Production and Inventory Management
- Six Sigma Black Belt Certification
- PRINCE2 (Projects in Controlled Environments 2)
- Professional Engineer
- LEED Accredited Professional (AP)

Conferences and Events

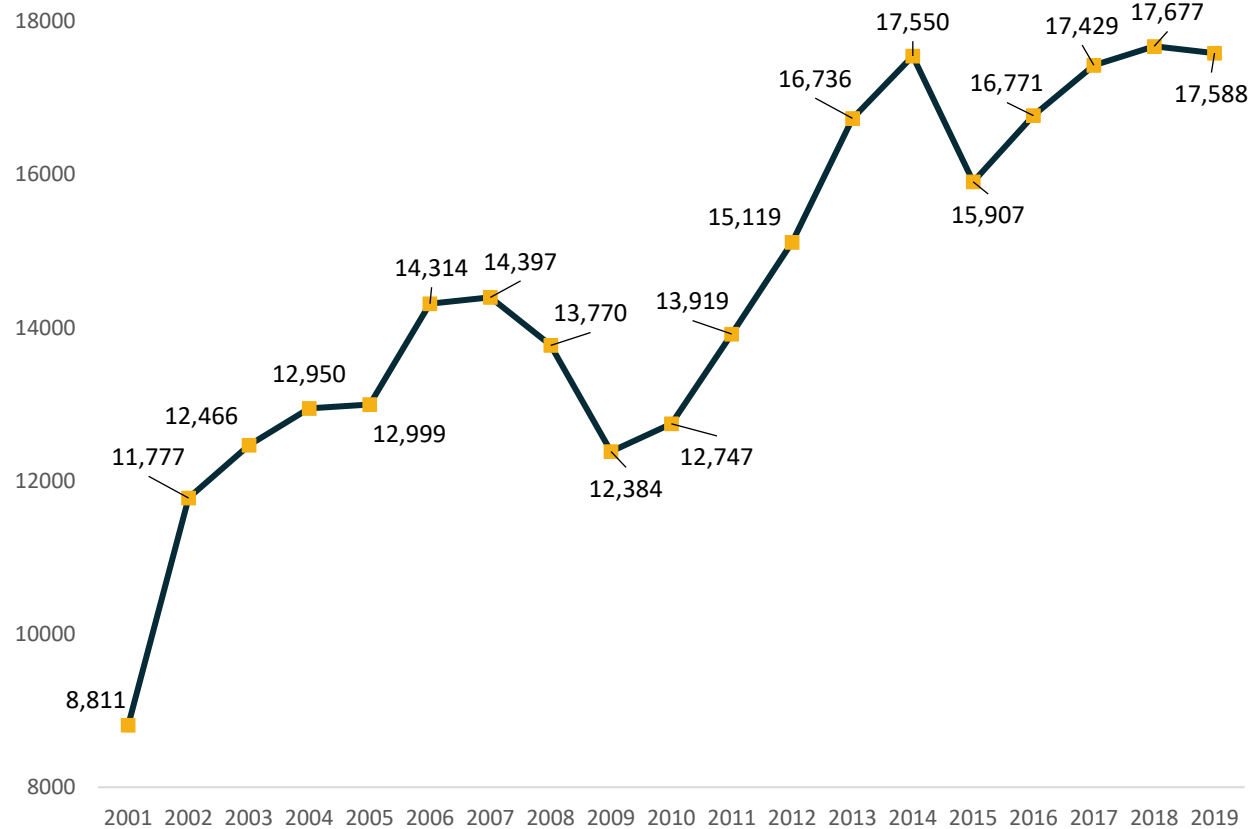
Whether visiting Detroit for a business conference, a concert at DTE Energy Music Theatre or one of the various conventions taking place in the Motor City, conferences and events jobs provide excellent services and venues to visitors in Detroit.

Workers in conferences and events include:

- Meeting, Convention, and Event Planners
- Photographers
- Audio and Video Equipment Technicians
- Floral Designers
- Media and Communication Equipment Workers, All Other
- Sales Representatives, Services, All Other
- Sound Engineering Technicians

Conferences and Events: Employment

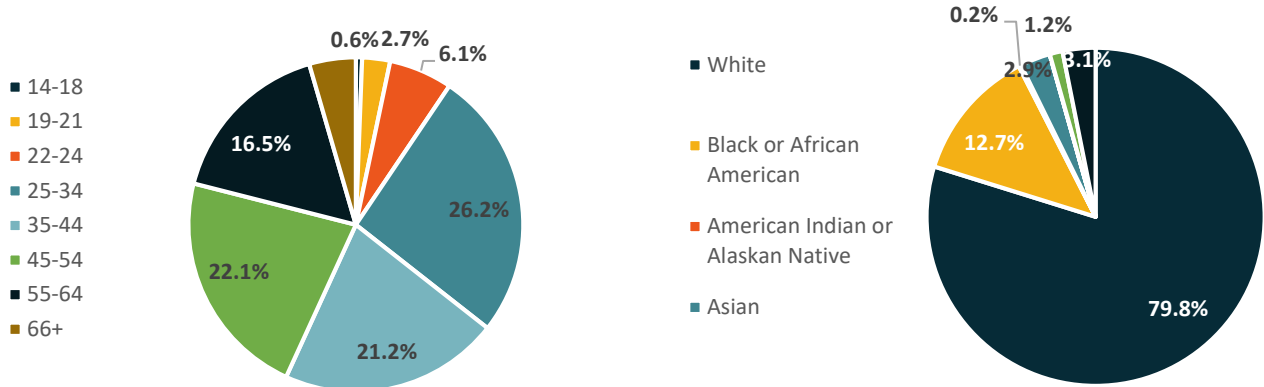
Conferences and Events: Employment Over Time (2001 – 2019)



- 0.9% employment growth predicted by 2029 for all conferences and events workers, but Audio and Video Equipment Technicians predicted to grow by 9.4%
- When self-employed workers are included, Conferences and Events occupations are predicted to grow 1.5% by 2029. This discrepancy is due in part to major shifts in photographers and floral designers to self-employment.

Conferences and Events: Worker Demographics and Commuting Patterns

Conferences and Events: Worker Age and Race/Ethnicity Demographics (2019)



- 40.1% of workers are female, 59.9% are male

Conferences and Events: Commuting Patterns (2017)

- 1,057 net commuters adding to tri-county workforce

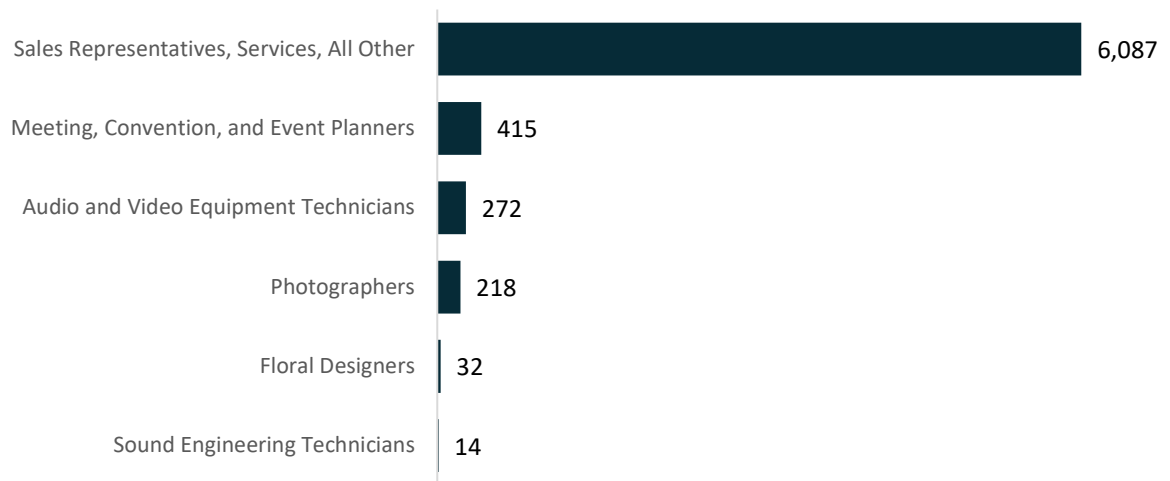
Conferences and Events: Wages

Conferences and Events: Wage Distribution by Occupation (2019)

Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
13-1121	Meeting, Convention, and Event Planners	\$12.82	\$16.52	\$22.63	\$29.21	\$36.51
27-1023	Floral Designers	\$9.48	\$10.46	\$14.39	\$17.10	\$18.68
27-4011	Audio and Video Equipment Technicians	\$10.19	\$13.85	\$18.63	\$25.93	\$30.58
27-4014	Sound Engineering Technicians	\$22.31	\$26.26	\$30.98	\$39.48	\$49.38
27-4021	Photographers	\$9.76	\$12.22	\$18.97	\$25.35	\$37.17
27-4099	Media and Communication Equipment Workers, All Other	\$11.02	\$12.57	\$14.98	\$39.66	\$50.66
41-3099	Sales Representatives, Services, All Other	\$12.15	\$17.47	\$27.80	\$40.02	\$57.02

Conferences and Events: Employer Demand

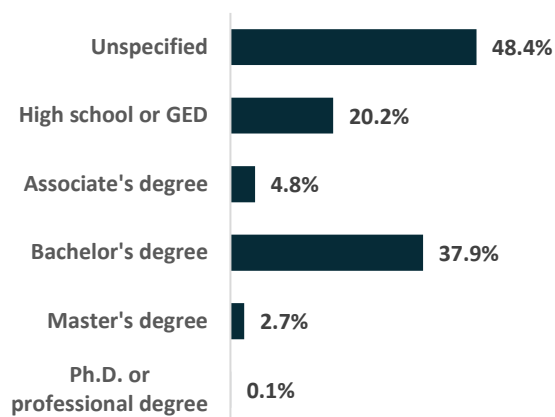
Conferences and Events: Top Postings by Occupation (2019)



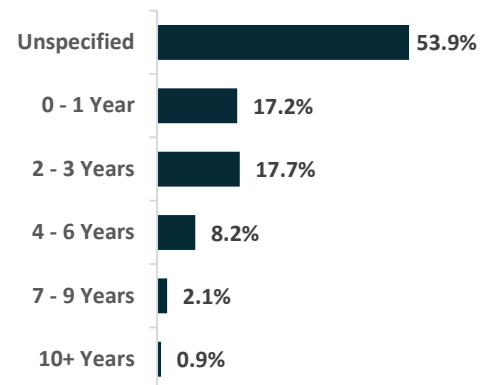
- These occupations have, in general, a relatively low risk of automation; only Sound Engineering Technicians have an automation index over 100, and it is 101.4, due to the creative and communications-heavy roles included in this group.
- Posting intensity, 5:1, is the same as the regional average. Sales Representatives and Audio and Visual Equipment Technician postings are up for a median of 36 days, indicating higher demand and difficulty to fill.
- Approximate 10% replacement rate per year, relatively low among hospitality and tourism occupations

Conferences and Events: In-Demand Education and Experience (2019)

Arts and Culture: In-Demand Education



Arts and Culture: In-Demand Experience



- Growing demand for college degrees: only one occupation has typically required a BA (Meeting and Event Planners, 6.9% of total employment in this group), yet 38% of postings request one

Conferences and Events: In-Demand Skills and Qualifications (2019)

Top Posted Technical Skills

- Selling Techniques
- Cold Calling
- Customer Relationship Management
- Business to Business
- Sales Process
- Business Development
- Lead Generation
- Sales Training
- Forecasting
- Salesforce.Com

Top Posted Common Skills

- Sales
- Customer Service
- Management
- Presentations
- Communications
- Leadership
- Valid Driver's License
- Problem Solving
- Microsoft Excel
- Negotiation

Top Posted Qualifications

- AVIXA Certified Technology Specialist
- Drone Pilot Certificate
- Certified Meeting Professional
- Microsoft Certified Professional
- Certified Forklift Operator
- Certified Internal Auditor
- Certified Professional in Catering and Events
- Certified Sales Executive
- Cisco Certified Network Associate
- NICET Level II Certification

Entertainment

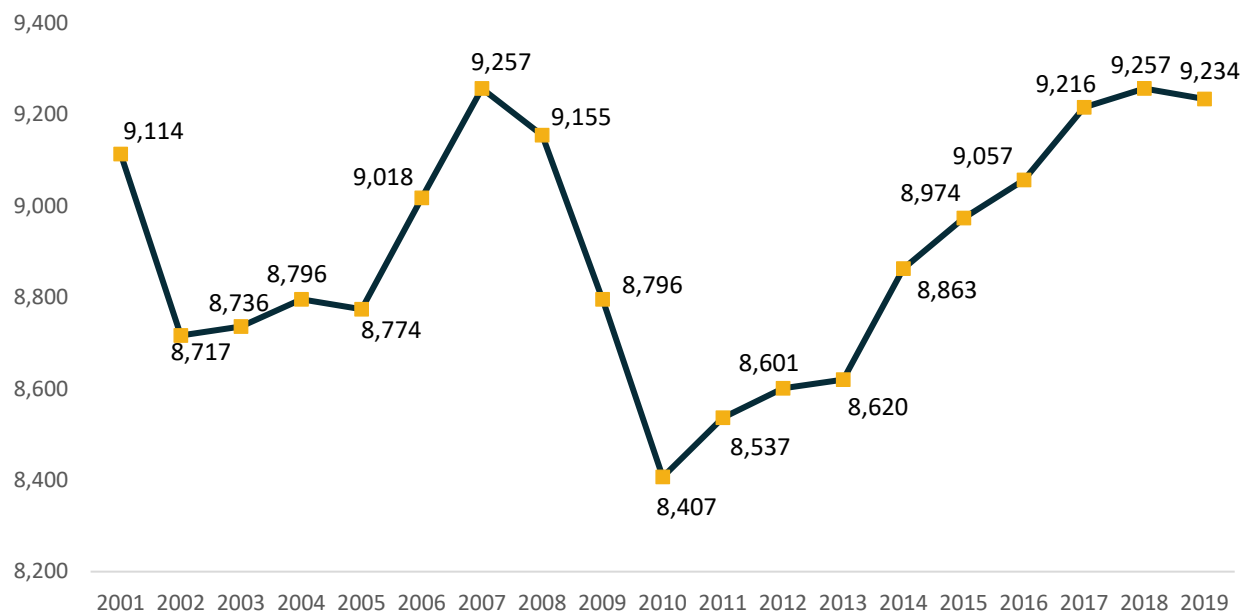
No matter your preference, Detroit offers a wide range of activities for all occasions. From musical and theatrical performances at the Detroit Opera House and the Fox Theatre, to thrilling sports events at Comerica Park and Ford Field, you will always be on the move.

Workers in entertainment include:

- Actors
- Athletes and Sports Competitors
- Dancers
- Entertainers and Performers, Sports and Related Workers, All Other
- Entertainment Attendants and Related Workers, All Other
- Musicians and Singers
- Musicians, Instrumental
- Singers
- Ushers, Lobby Attendants and Ticket Takers
- Agents and Business Managers of Artists, Performers and Athletes
- Art Directors
- Artists and Related Workers, All Other
- Camera Operators, Television, Video and Motion Picture
- Choreographers
- Costume Attendants
- Directors - Stage, Motion Pictures, Television and Radio
- Makeup Artists, Theatrical and Performance
- Music Directors and Composers
- Producers and Directors
- Talent Directors
- Umpires, Referees and Other Sports Officials Coaches and Scouts

Entertainment: Employment

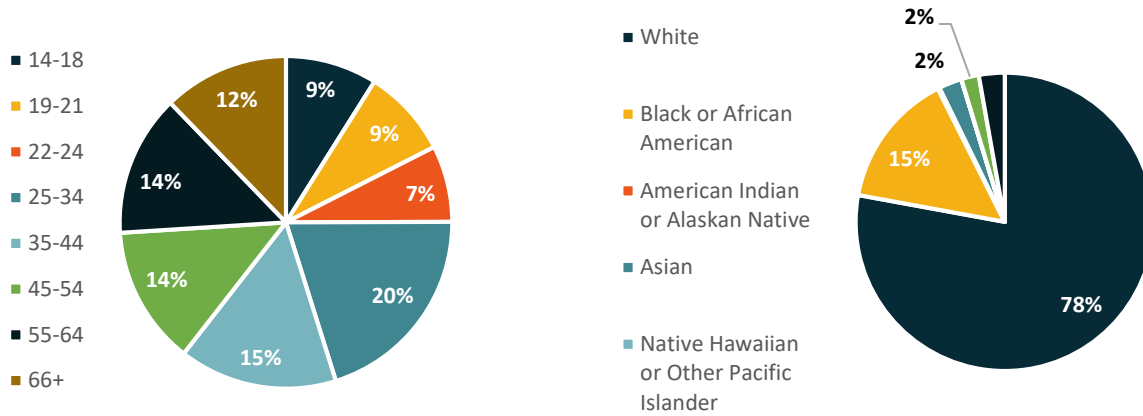
Entertainment: Employment Over Time (2001 – 2019)



- Since 2010, employment has increased by 827 workers (9.0%).

Entertainment: Worker Demographics and Commuting Patterns

Entertainment: Worker Age and Race/Ethnicity Demographics (2019)



- Almost half or 49.0% of the workforce are between the ages of 25-54
- Majority of the workers are either white (77.8%) or black or African American (14.7%), accounting for 92.5%, while 2.8% are Hispanic or Latino

Entertainment: Worker Commuting Patterns (2017)

- Between 2001 and 2019, the net commuters for over half of occupations has been positive, identifying that available jobs are being met by workers living in the region, while Umpires, Referees, and Other Sports Officials and Musicians and Singers has seen the highest decrease

Entertainment: Wages

Entertainment: Wage Distribution by Occupation (2019)

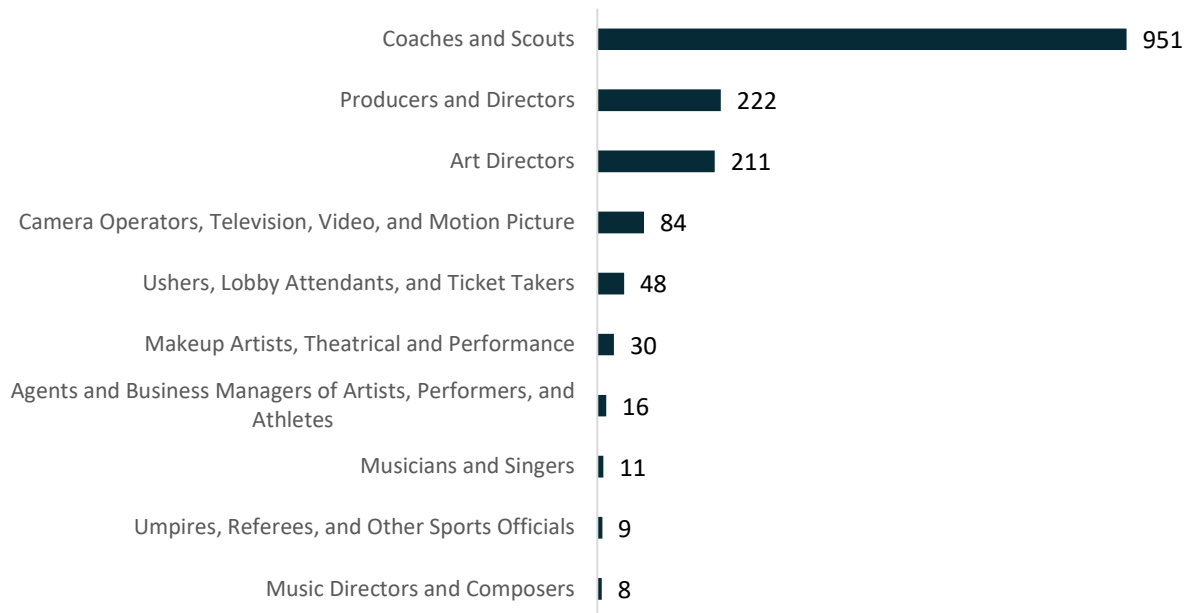
Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
13-1011	Agents and Business Managers of Artists, Performers, and Athletes	\$21.12	\$25.32	\$45.17	\$68.50	\$82.34
27-1011	Art Directors	\$22.37	\$31.58	\$40.65	\$54.25	\$72.49
27-1019	Artists and Related Workers, All Other	\$14.19	\$19.11	\$32.31	\$46.37	\$54.53
27-2011	Actors	\$10.62	\$12.47	\$14.41	\$18.95	\$57.06
27-2012	Producers and Directors	\$17.32	\$21.94	\$29.09	\$42.13	\$58.71
27-2021	Athletes and Sports Competitors	\$10.36	\$12.45	\$26.85	\$33.40	\$39.83
27-2022	Coaches and Scouts	\$9.62	\$10.74	\$16.27	\$26.84	\$40.32
27-2023	Umpires, Referees, and Other Sports Officials	\$9.64	\$10.16	\$13.13	\$26.95	\$42.56
27-2031	Dancers	\$9.28	\$9.67	\$10.59	\$12.49	\$14.90
27-2032	Choreographers	\$9.25	\$10.28	\$11.86	\$15.16	\$18.12
27-2041	Music Directors and Composers	\$9.66	\$13.15	\$21.32	\$30.49	\$38.09
27-2042	Musicians and Singers	\$8.91	\$10.92	\$18.23	\$34.71	\$54.52

Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
27-2099	Entertainers and Performers, Sports and Related Workers, All Other	\$4.57	\$9.36	\$14.97	\$30.87	\$74.50
27-4031	Camera Operators, Television, Video, and Motion Picture	\$9.95	\$16.34	\$27.51	\$40.86	\$51.41
39-3031	Ushers, Lobby Attendants, and Ticket Takers	\$9.39	\$9.59	\$10.04	\$11.20	\$12.04
39-3092	Costume Attendants	\$13.98	\$17.18	\$22.55	\$28.95	\$32.66
39-3099	Entertainment Attendants and Related Workers, All Other	\$9.25	\$10.57	\$12.05	\$16.38	\$24.39
39-5091	Makeup Artists, Theatrical and Performance	\$9.56	\$13.55	\$25.54	\$43.48	\$57.94

- Over half of the occupations have median wages above \$19.00
- Agents and Business Managers of Artists, Performers, and Athletes and Art Directors both have median wages above \$40.00 and requires a bachelor’s degree
- Costume Attendants and Makeup Artists, Theatrical and Performance occupations have median wages above \$22.00 and require a high school diploma or equivalent or postsecondary nondegree coupled with short-term on-the-job training

Entertainment: Employer Demand

Entertainment: Top Postings by Occupation (2019)

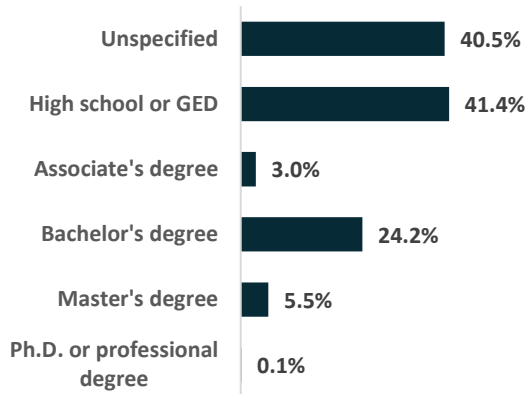


- Occupations found in this group have a below average risk of becoming automated with most having an automation index of under 100, except Actors and Dancers, which have an above average risk with an automation index over 111

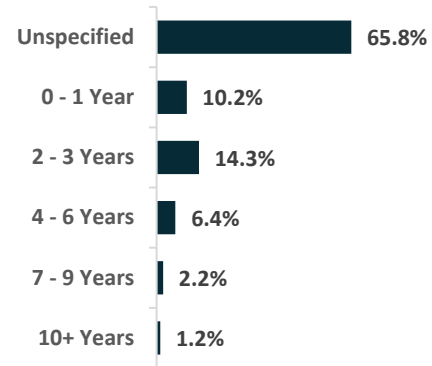
- Coaches and Scouts are highly demanded with 951 postings for 2019
- The posting intensity of this occupation group is three to one for 2019, with 1,603 unique postings
- Detroit (612 postings) is the top posting city accounting for 38.2% of postings
- Coaches and Head Coaches (621 postings) and Art Directors (134 postings) are the top posted job titles in 2019

Entertainment: In-Demand Education and Experience (2019)

Arts and Culture: In-Demand Education



Arts and Culture: In-Demand Experience



- 664 or 41.4% of posting require a high school diploma or equivalent, while 24.5% or 392 postings require zero to three years of experience
- Many occupations require no formal education or a high school diploma or equivalent, although due to the nature of the work, almost all occupations have completions, with an average of 120 completions for the group

Entertainment: In-Demand Skills and Qualifications (2019)

Top Posted Technical Skills

- Cardiopulmonary Resuscitation (CPR)
- Automated External Defibrillator
- Fundraising
- Journalism
- Storytelling
- Photography
- Branding
- Selling Techniques
- Broadcasting
- Communication Strategies

Top Posted Common Skills

- Communications
- Leadership
- Teaching
- Management
- Presentations
- Operations
- First Aid
- Detail Oriented
- Organizational Skills
- Swimming

Top Posted Qualifications

- Certified Strength and Conditioning Specialist
- Personal Trainer Certification
- Cosmetology License

Gaming

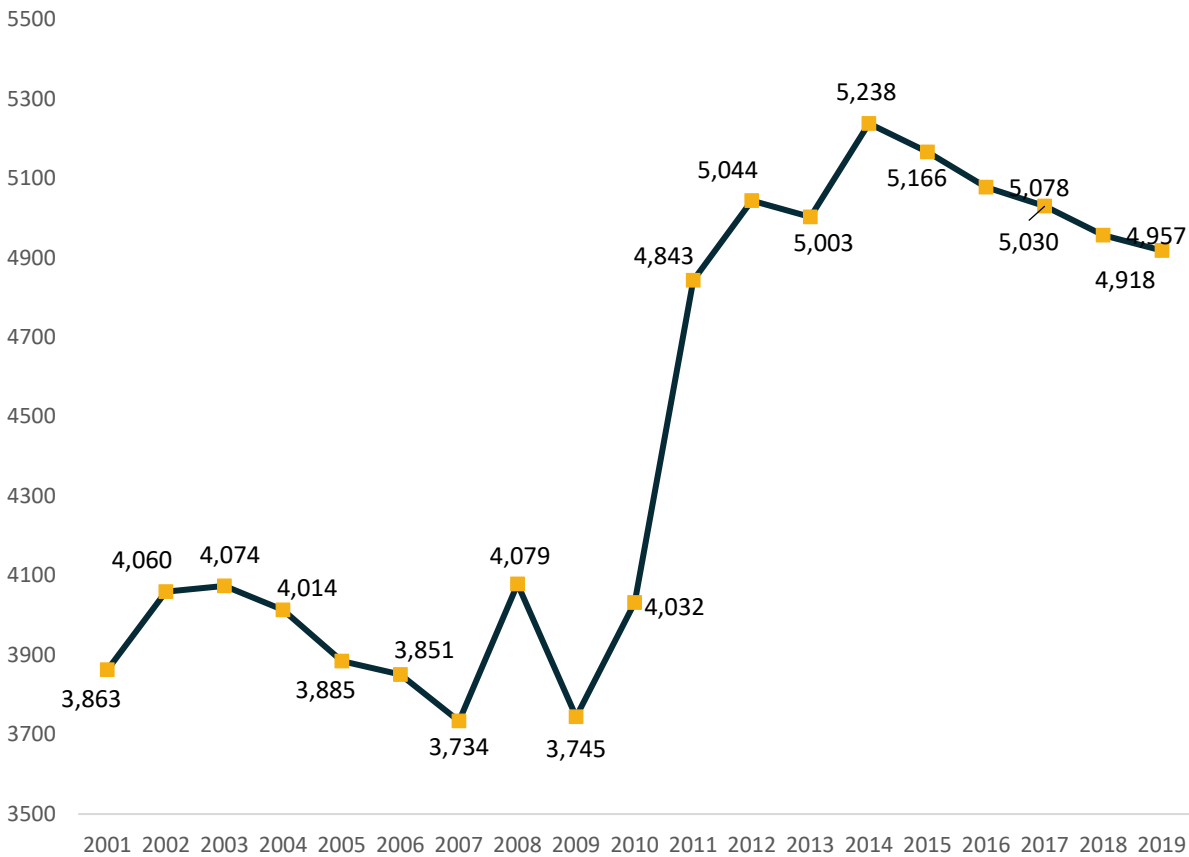
Enjoying a night at the Greektown Casino Hotel or any of the other casinos in Detroit highlight that gaming jobs provide excellent service to visitors in the high-stakes venues around the Detroit area. Most gaming workers are about twice as concentrated in this region than the nation as a whole, with five of the occupations here reporting location quotients above 1.80.

Workers in gaming include:

- Gaming Cage Workers
- Gaming Change Persons and Booth Cashiers
- Gaming Dealers
- Gaming and Sports Book Writers and Runners
- Gaming Managers
- Gaming Service Workers, All Other
- Gaming Supervisors
- Gaming Surveillance Officers and Gaming Investigators
- First Line Supervisors of Gaming Workers

Gaming: Employment

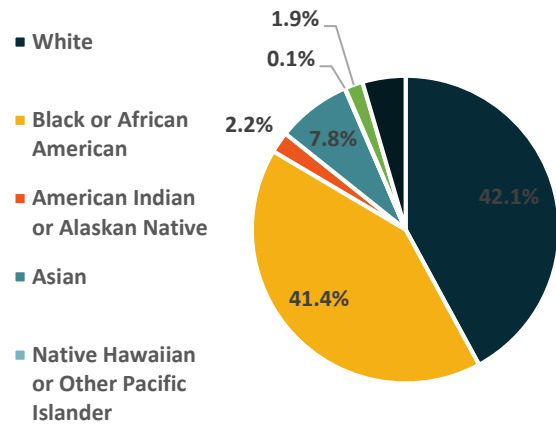
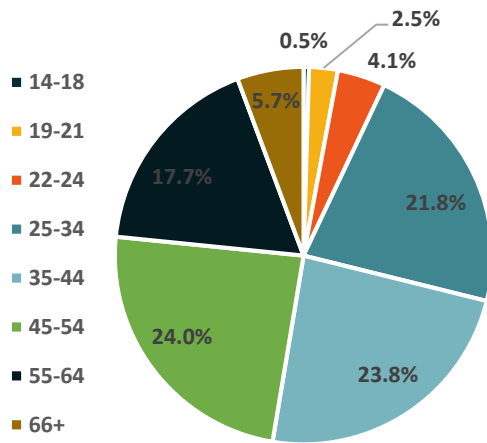
Gaming: Employment Over Time (2001 – 2019)



- Despite decline in recent years, Gaming employment is nearly 1,000 jobs above pre-recession levels

Gaming: Worker Demographics and Commuting Patterns

Gaming: Worker Age and Race/Ethnicity Demographics (2019)



- 56.0% of workforce is female, 44.0% is male

Gaming: Worker Commuting Patterns (2017)

- 266 Net Commuters adding to tri-county workforce

Gaming: Wages

Gaming: Wage Distribution by Occupation (2019)

Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
11-9071	Gaming Managers	\$21.09	\$25.15	\$27.65	\$30.05	\$36.64
33-9031	Gaming Surveillance Officers and Gaming Investigators	\$9.31	\$9.50	\$10.40	\$11.42	\$13.83
39-1018	First-Line Supervisors of Gaming Workers	\$14.73	\$20.90	\$27.02	\$31.78	\$37.30
39-3011	Gaming Dealers	\$9.34	\$9.51	\$9.79	\$10.08	\$11.36
39-3012	Gaming and Sports Book Writers and Runners	\$9.75	\$10.21	\$11.56	\$13.32	\$15.70
39-3019	Gaming Service Workers, All Other	\$19.29	\$21.70	\$26.96	\$33.50	\$37.58
41-2012	Gaming Change Persons and Booth Cashiers	\$9.27	\$9.61	\$10.40	\$11.19	\$11.67
43-3041	Gaming Cage Workers	\$10.13	\$10.87	\$12.12	\$16.56	\$21.04

Gaming: Employer Demand

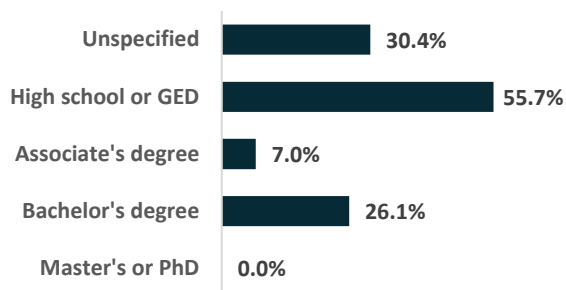
Gaming: Top Postings by Occupation (2019)



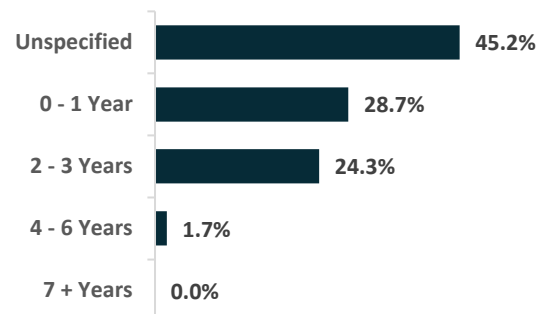
- Only Gaming Managers have a less than average risk of being automated, as many games and payment systems become increasingly virtual or automated; over half of these occupations have automation indices at or over 110
- Posting intensity: 6:1; slightly greater than regional average of 5:1. Many postings up for over a month at the median, suggesting difficulty to fill
- Exceptionally high replacement rate/ turnover, 18.9 percent, for gaming booth cashiers
- More separations than hires as employment fell between 2014 and 2020

Gaming: In-Demand Education and Experience (2019)

Arts and Culture: In-Demand Education



Arts and Culture: In-Demand Experience



- Growing demand for college degrees: no occupations typically require more than a high school diploma, yet 38% of postings request a bachelor's

Gaming: In-Demand Skills and Qualifications (2019)

Top Posted Technical Skills

- Resolve Guest Concerns
- Performance Management
- Policy Enforcement
- Accounting
- Microsoft Access
- Automation
- Guest Relations
- Microsoft Project
- Welfare
- Internal Controls

Top Posted Common Skills

- Detail Oriented
- Management
- Organizational Skills
- Customer Service
- Listening Skills
- Time Constraints
- Hospitality
- Multilingualism
- Operations
- Problem Solving

Top Posted Qualifications

- Alcohol Certification

Hospitality

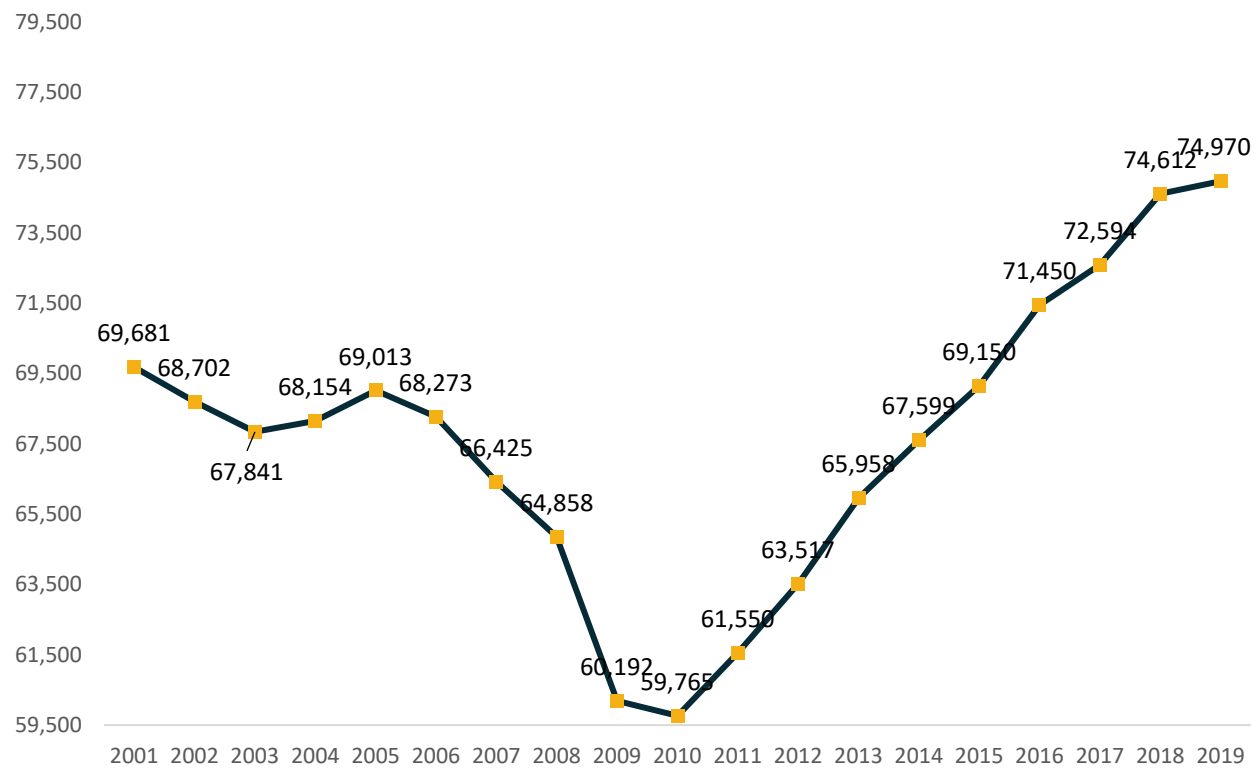
Whether you are planning a family trip, business event or any other kind of visit somewhere other than home, one of the first things you do is book a place to stay. Detroit offers an incredible variety of activities that you can take advantage of during your stay, and because of hospitality occupations and the people in this sector, turning in for the night will feel like coming back to your second home. Despite the majority of hospitality jobs offering low wages, they do offer the ability to enhance other essential on-the-job and off-the-job skills that can be applied to many career paths.

Workers in hospitality include:

- Baggage Porters and Bellhops
- Concierges
- Customer Service Representatives
- Hotel, Motel and Resort Desk Clerks
- Interpreters and Translators
- Locker Room, Coatroom and Dressing Room Attendants
- Personal Care and Service Workers, All Other
- Receptionists and Information Clerks
- First-Line Supervisors of Housekeeping and Janitorial Workers
- First-Line Supervisors of Personal Service Workers
- Lodging Managers
- Maids and Housekeeping Cleaners

Hospitality: Employment

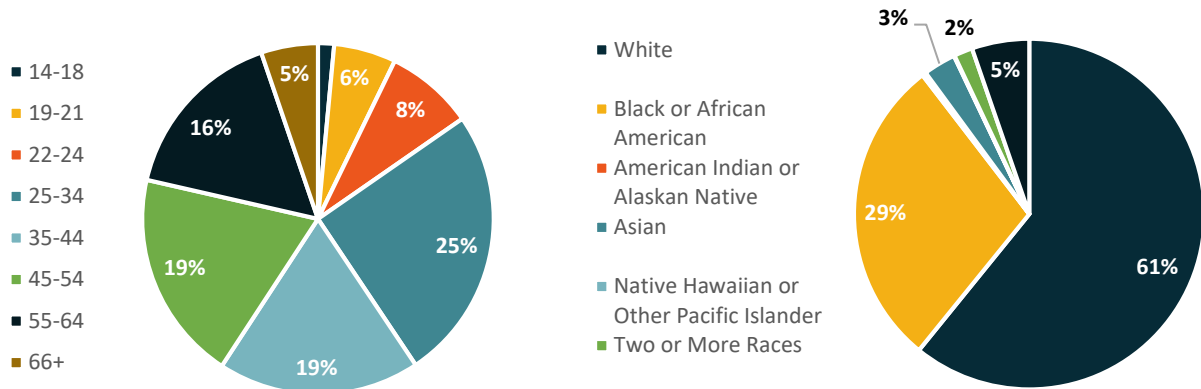
Hospitality: Employment Over Time (2001 – 2019)



- Since 2010, employment in hospitality occupations has increased by 15,205 (from 59,765 to 74,970 in 2019)

Hospitality: Worker Demographics and Commuting Patterns

Hospitality: Worker Age and Race/Ethnicity Demographics (2019)



- Nearly 41% of hospitality workers are over the age of 45 while just over 15% are 25 years of age or younger

Hospitality: Worker Commuting Patterns (2017)

- In 2019, 4,725 (6.3%) of the total 74,970 hospitality workers were estimated to commute into the region to work, meaning that the Detroit metro region is filling the majority of hospitality positions with local talent

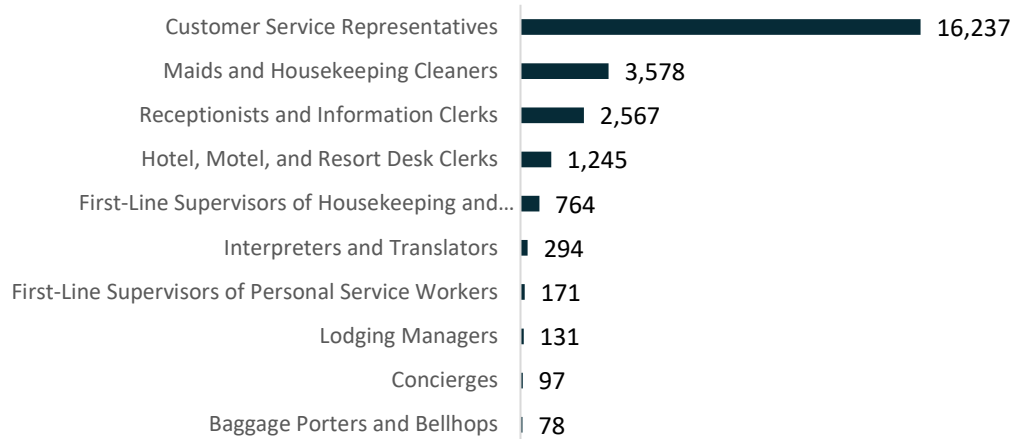
Hospitality: Wages

Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
11-9081	Lodging Managers	\$19.01	\$22.44	\$29.98	\$43.15	\$69.36
27-3091	Interpreters and Translators	\$11.48	\$14.40	\$20.02	\$24.14	\$33.21
37-1011	First-Line Supervisors of Housekeeping and Janitorial Workers	\$11.55	\$13.90	\$17.32	\$21.79	\$27.46
37-2012	Maids and Housekeeping Cleaners	\$9.77	\$10.44	\$11.68	\$13.59	\$15.34
39-1021	First-Line Supervisors of Personal Service Workers	\$11.92	\$13.56	\$16.36	\$22.13	\$30.32
39-3093	Locker Room, Coatroom, and Dressing Room Attendants	\$9.58	\$9.76	\$9.99	\$12.33	\$15.00
39-6011	Baggage Porters and Bellhops	\$9.58	\$10.51	\$12.96	\$18.59	\$24.83
39-6012	Concierges	\$9.63	\$9.97	\$12.32	\$14.44	\$17.18
39-9099	Personal Care and Service Workers, All Other	\$9.69	\$10.39	\$11.63	\$13.46	\$15.73
43-4051	Customer Service Representatives	\$10.41	\$12.96	\$16.49	\$21.37	\$28.80
43-4081	Hotel, Motel, and Resort Desk Clerks	\$9.51	\$10.27	\$11.40	\$13.27	\$15.26
43-4171	Receptionists and Information Clerks	\$9.90	\$11.57	\$14.03	\$16.90	\$19.53

- Most occupations in the hospitality group pay minimum wage at the entry level making the median hourly wages relatively low when compared to other occupations groups

Hospitality: Employer Demand

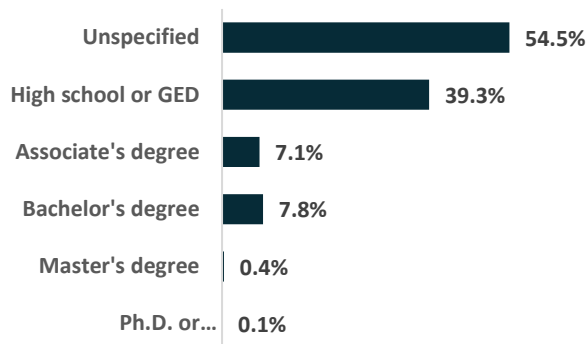
Hospitality: Top Postings by Occupation (2019)



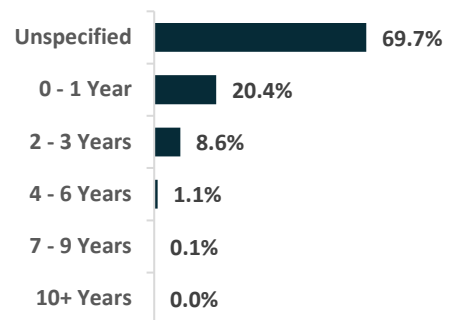
- 25,180 unique hospitality jobs were posted in Oakland, Wayne, and Macomb counties in 2019
- Customer Service Representatives made up nearly 65% of the total hospitality job postings making these front-line workers the most in-demand in 2019
- Of the hospitality occupations in this group, Maids and Housekeeping Cleaners have the highest estimated risk for automation (index of 124.5) followed by Locker Room, Coatroom, and Dressing Room Attendants (index of 119.3)
- Posting intensity for the hospitality group is 5:1, meaning there are five job postings for each individual hospitality position available
- Hospitality jobs are posted for a median of 34 days indicating employers are experiencing some difficulty filling open positions

Hospitality: In-Demand Education and Experience (2019)

In-Demand Education



In-Demand Experience



- A minimum of a high school diploma or GED and little to no experience are the most common education and experience indicators in job postings for occupations within the hospitality group

Hospitality: In-Demand Skills and Qualifications (2019)

Top Posted Technical Skills

- Merchandising
- Call Centers
- Billing
- Customer Experience
- Customer Satisfaction
- Selling Techniques
- Mopping
- Restaurant Operation
- Cash Register
- Linens

Top Posted Common Skills

- Customer Service
- Sales
- Communications
- Management
- Detail Oriented
- Problem Solving
- Operations
- Professionalism
- Computer Literacy
- Cleanliness

Top Posted Qualifications

- Food Handler's Card

Dining and Shopping

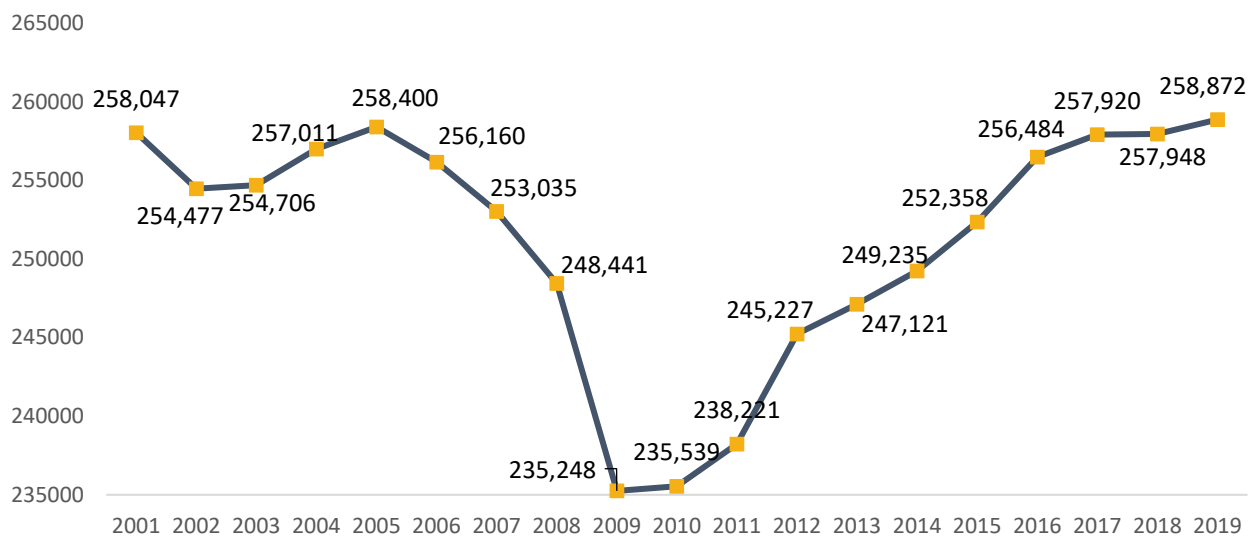
Enjoying a meal in one of Detroit’s hottest new restaurants, holiday shopping at Somerset Collection or strolling through downtown Eastern Market emphasize that dining and shopping workers provide excellent service to visitors in Detroit. While the majority of jobs in this sector offer low wages, they do offer opportunities to gain important on-the-job skills necessary in all lines of work.

Workers in dining and shopping include:

- Baristas
- Bartenders
- Cashiers
- Counter Attendants, Cafeteria, Food Concession and Coffee Shop
- Food Servers, Non-restaurant
- Hosts and Hostesses, Restaurant, Lounge and Coffee Shop
- Retail Salespersons
- Waiters and Waitresses
- Chefs and Head Cooks
- Combined Food Preparation and Serving Workers, Including Fast Food
- Cooks, All Other
- Cooks, Fast Food
- Cooks, Restaurant
- Cooks, Short Order
- Dining Room and Cafeteria Attendants and Bartender Helpers
- Dishwashers
- First-Line Supervisors of Food Preparation and Serving Workers
- First-Line Supervisors of Retail Sales Workers
- Food Preparation and Serving Related Workers, All Other
- Food Preparation Workers
- Food Service Managers
- Merchandise Displayers and Window Trimmers

Dining and Shopping: Employment

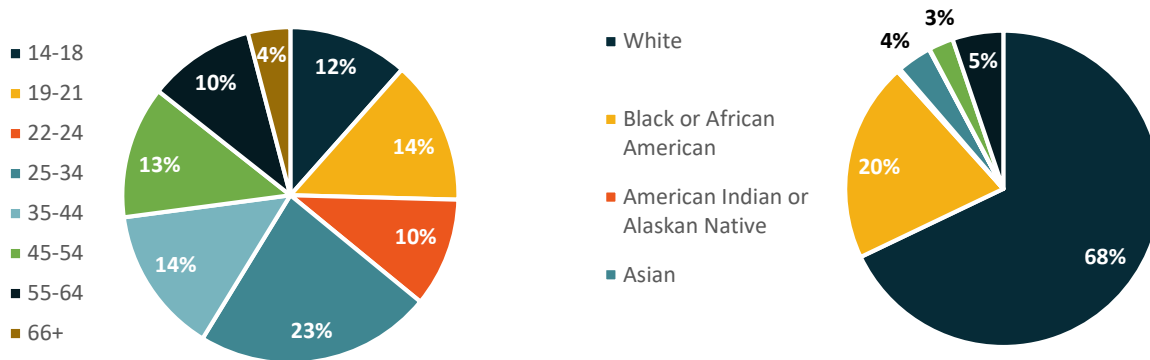
Dining and Shopping: Employment Over Time (2001 – 2019)



- Employment in the dining and shopping occupation group has recovered 23,624 jobs in the past ten years (from 2009 to 2019)

Dining and Shopping: Worker Demographics and Commuting Patterns

Dining and Shopping: Worker Age and Race/Ethnicity Demographics (2019)



- Unlike workers in other occupation groups analyzed in this report, the majority of dining and shopping workers are 34 years of age or younger (nearly 59%) with only 27% of dining and shopping workers age 45 or older

Dining and Shopping: Worker Commuting Patterns (2017)

- In 2019, 15,948 (6.2%) of the total 258,872 dining and shopping workers were estimated to commute into the region to work, meaning that the Detroit metro region is able to fill most dining and shopping positions with local talent

Dining and Shopping: Wages

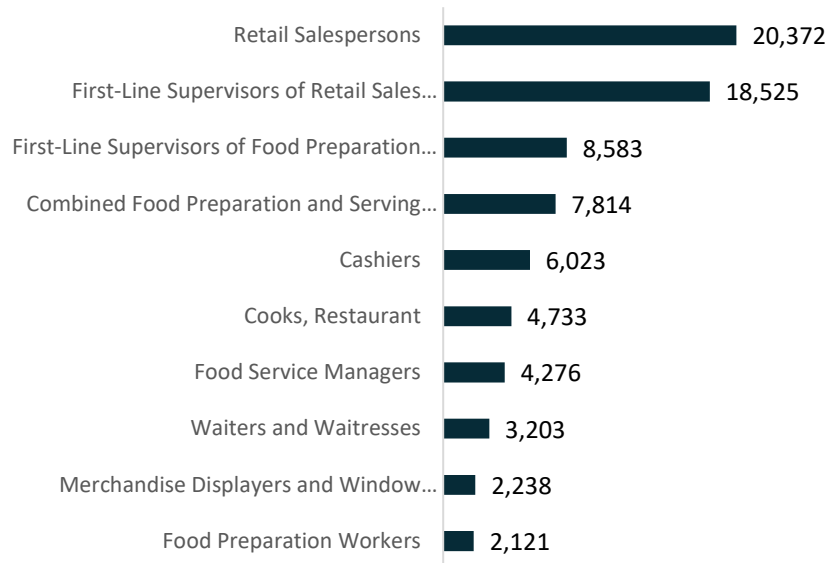
Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
11-9051	Food Service Managers	\$15.30	\$23.06	\$28.95	\$37.81	\$47.27
27-1026	Merchandise Displayers and Window Trimmers	\$9.62	\$10.28	\$11.63	\$15.32	\$18.70
35-1011	Chefs and Head Cooks	\$16.65	\$20.42	\$24.92	\$31.57	\$41.55
35-1012	First-Line Supervisors of Food Preparation and Serving Workers	\$10.68	\$12.65	\$15.73	\$20.44	\$25.59
35-2011	Cooks, Fast Food	\$9.48	\$9.86	\$10.55	\$11.89	\$13.13
35-2014	Cooks, Restaurant	\$9.42	\$10.27	\$11.82	\$14.41	\$17.33
35-2015	Cooks, Short Order	\$9.51	\$9.76	\$10.44	\$13.29	\$15.96
35-2019	Cooks, All Other	\$10.25	\$10.90	\$11.96	\$13.58	\$15.27
35-2021	Food Preparation Workers	\$9.40	\$9.75	\$10.90	\$12.91	\$15.14
35-3011	Bartenders	\$9.48	\$9.66	\$9.87	\$10.51	\$19.42
35-3021	Combined Food Preparation and Serving Workers, Including Fast Food	\$9.32	\$9.55	\$9.86	\$10.94	\$12.28
35-3022	Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	\$9.33	\$9.72	\$10.51	\$11.99	\$14.44
35-3031	Waiters and Waitresses	\$9.28	\$9.45	\$10.02	\$10.67	\$17.00

Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
35-3041	Food Servers, Non-Restaurant	\$9.63	\$10.31	\$11.56	\$13.33	\$14.97
35-9011	Dining Room and Cafeteria Attendants and Bartender Helpers	\$9.30	\$9.59	\$10.07	\$11.94	\$14.56
35-9021	Dishwashers	\$9.28	\$9.54	\$10.03	\$11.09	\$12.83
35-9031	Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	\$9.28	\$9.52	\$10.11	\$10.91	\$12.24
35-9099	Food Preparation and Serving Related Workers, All Other	\$9.73	\$10.59	\$11.98	\$14.64	\$18.65
41-1011	First-Line Supervisors of Retail Sales Workers	\$12.19	\$14.75	\$19.19	\$26.33	\$37.40
41-2011	Cashiers	\$9.39	\$9.70	\$10.58	\$12.06	\$15.19
41-2031	Retail Salespersons	\$9.39	\$10.02	\$11.45	\$14.33	\$19.78

- Most occupations in the dining and shopping group pay minimum wage at the entry level making the median hourly wages relatively low when compared to other occupations groups
- Food Service Managers offer the most earning potential of all the occupations in the dining and shopping group

Dining and Shopping: Employer Demand

Dining and Shopping: Top Postings by Occupation (2019)

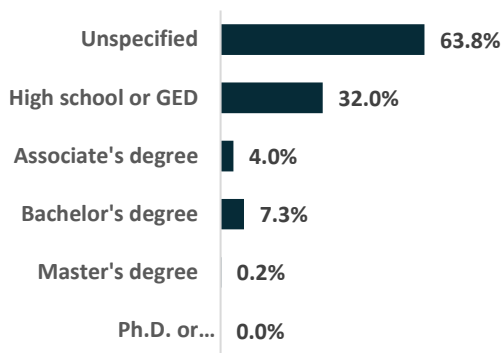


- 85,481 unique dining and shopping jobs were posted in Oakland, Wayne, and Macomb counties in 2019
- Online job ads for Retail Salespersons made up nearly 24% of total dining and shopping job postings in 2019, followed closely by First-Line Supervisors of Retail Sales Workers with nearly 22% of the total dining and shopping job postings

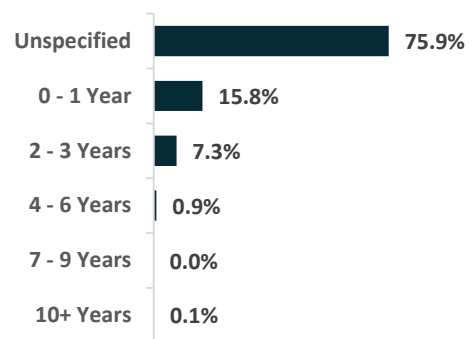
- Of the dining and shopping occupations in this group, cooks, food preparers, dishwashers, servers, and other kitchen-related jobs have the highest estimated automation risk
- Posting intensity for the dining and shopping occupation group is 5:1, meaning there are five job postings for each individual dining and shopping position available
- Dining and shopping jobs are posted for a median of 46 days indicating employers are experiencing a great deal of difficulty filling open positions
- Occupations in the dining and shopping group have the highest turnover rates when compared to other occupation groups in this report

Dining and Shopping: In-Demand Experience and Education (2019)

In-Demand Experience



In-Demand Education



- A minimum of a high school diploma or GED and little to no experience are the most common education and experience indicators in job postings for occupations within the hospitality group

Dining and Shopping: In-Demand Skills and Qualifications (2019)

Top Posted Technical Skills

- Merchandising
- Restaurant Operation
- Selling Techniques
- Cash Register
- Customer Experience
- Food Services
- Food Safety
- Customer Satisfaction
- Loss Prevention
- Food Preparation

Top Posted Common Skills

- Sales
- Customer Service
- Management
- Communications
- Operations
- Leadership
- Presentations
- Cleanliness
- Sanitation
- Retail Sales

Top Posted Qualifications

- ServSafe Certification
- Food Handler's Card
- Food Safety Certification
- Alcohol Certification
- Certified Pharmacy Technician
- Cosmetology License
- Registered Dietitian (RD/RDN)
- Certified Dietary Manager (CDM)
- Certified Forklift Operator

Recreation

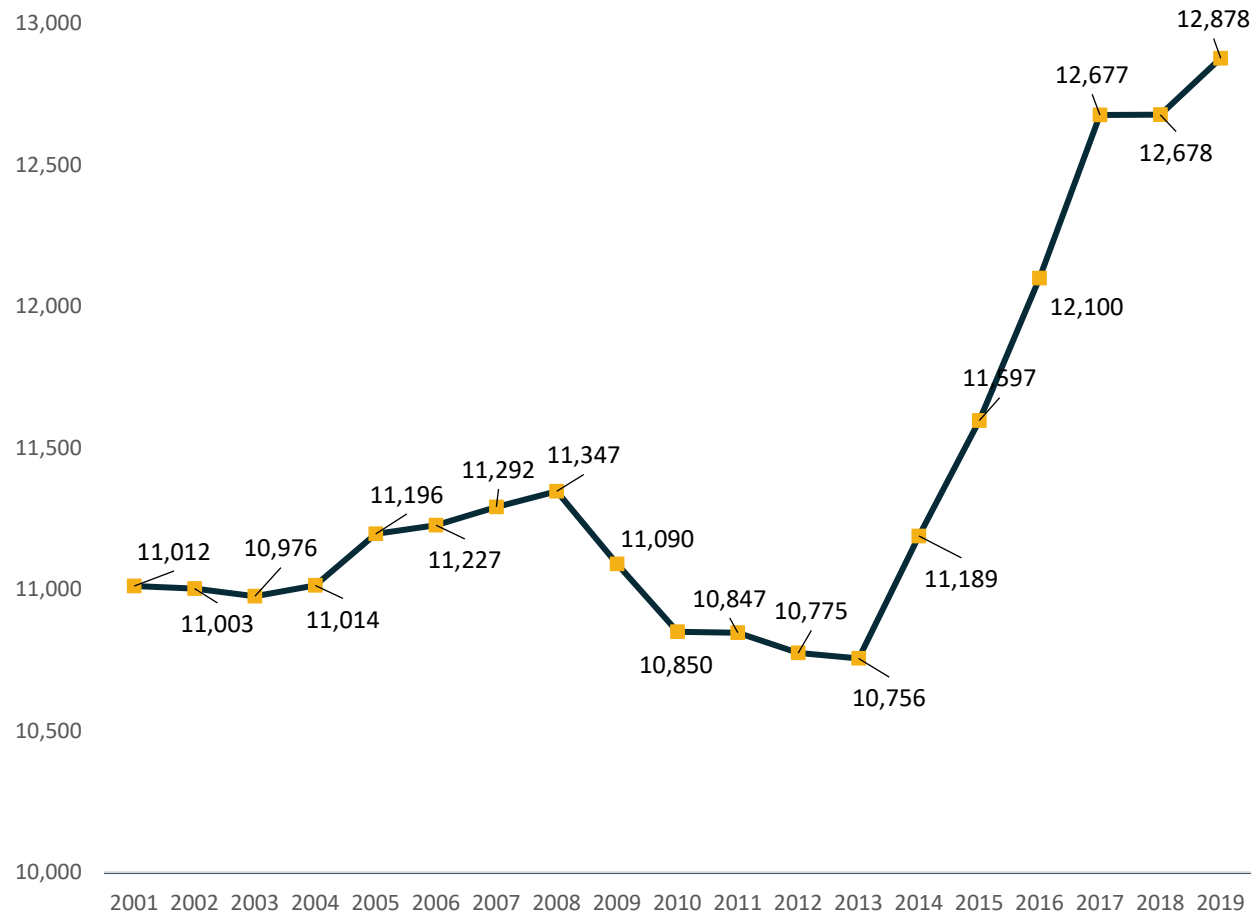
Whether visiting the Detroit Zoo, enjoying a day at Belle Isle Park, or hiking trails in southeast Michigan’s metroparks, recreation jobs ensure that places of amusement and nature are well kept, enjoyable and safe around Detroit. The location quotient for these occupations is relatively low.

Workers in recreation include:

- Amusement and Recreation Attendants
- Fish and Game Wardens
- Lifeguards, Ski Patrol and Other Recreational Protective Service Workers
- Recreation Workers
- Animal Trainers
- Coin, Vending and Amusement Machine Servicers and Repairers
- Nonfarm Animal Caretakers
- Park Naturalists
- Zoologists and Wildlife Biologists

Recreation: Employment

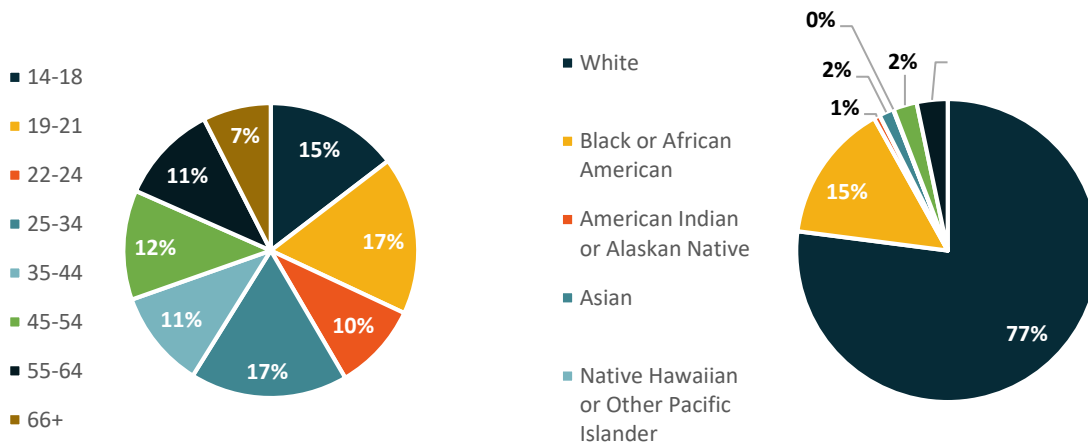
Recreation: Employment Over Time (2001 – 2019)



- Since 2013, employment has increased by 2,122 workers (16.5%)

Recreation: Worker Demographics and Commuting Patterns

Recreation: Worker Age and Race/Ethnicity Demographics (2019)



- 81.6% of the workforce is under the age of 55, with the 14-24 and 25-54 age groups accounting for 41.6% and 40.1% respectively
- Majority of workers are either white (77.0%) or black or African American (14.9%), accounting for 91.9%, while 3.3% are Hispanic or Latino

Recreation: Worker Commuting Patterns (2017)

- Between 2001 and 2019, the net commuters for over half occupations has decreased, identifying that there are more workers living in the region than there are jobs available

Recreation: Wages

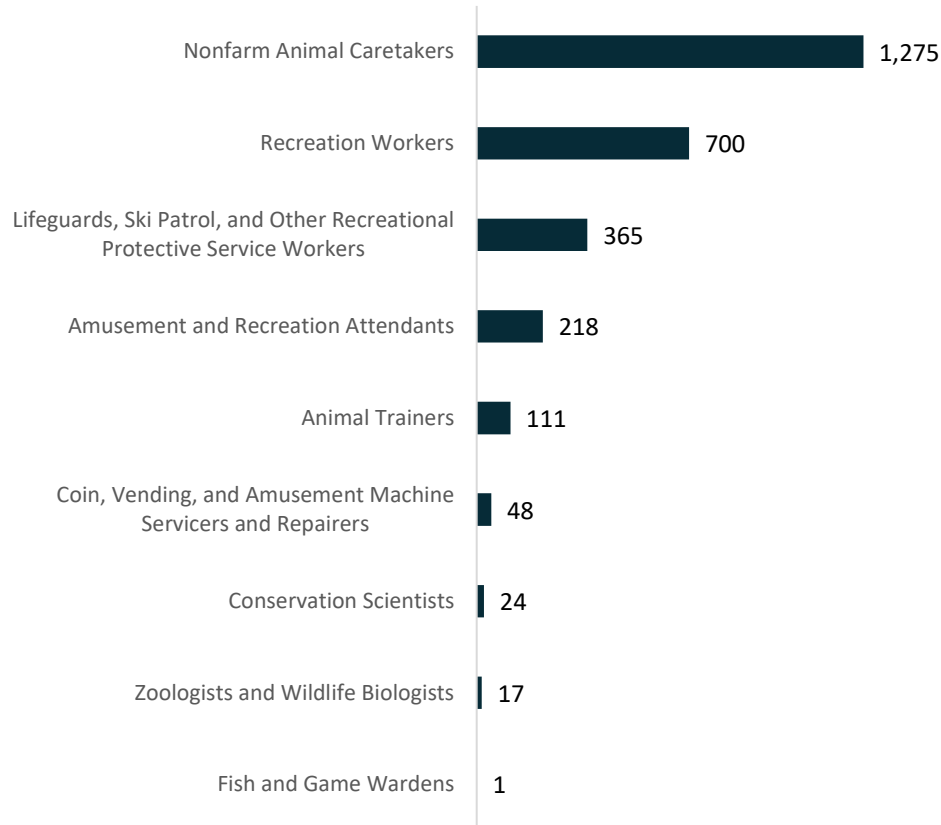
Recreation: Wage Distribution by Occupation (2019)

Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
19-1023	Zoologists and Wildlife Biologists	\$20.11	\$22.01	\$27.17	\$36.76	\$44.14
19-1031	Conservation Scientists	\$19.94	\$21.48	\$24.04	\$30.19	\$37.29
33-3031	Fish and Game Wardens	\$12.30	\$14.77	\$17.91	\$20.68	\$22.62
33-9092	Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers	\$9.28	\$9.97	\$10.93	\$12.60	\$15.23
39-2011	Animal Trainers	\$9.72	\$10.65	\$12.34	\$26.22	\$35.65
39-2021	Nonfarm Animal Caretakers	\$9.32	\$9.90	\$10.74	\$11.80	\$12.98
39-3091	Amusement and Recreation Attendants	\$9.74	\$10.11	\$11.00	\$12.24	\$15.87
39-9032	Recreation Workers	\$9.39	\$9.98	\$11.33	\$14.41	\$19.46
49-9091	Coin, Vending, and Amusement Machine Servicers and Repairers	\$12.49	\$15.11	\$21.81	\$30.60	\$40.28

- Just under half of the occupations have median wages above \$17.00
- Zoologists and Wildlife Biologists and Conservation Scientists have median wages above \$24.00 and requires a bachelor’s degree

Recreation: Employer Demand

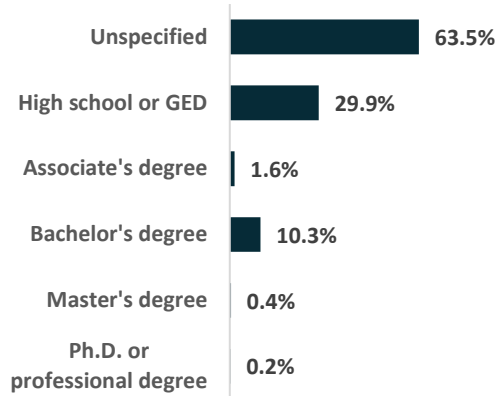
Recreation: Top Postings by Occupation (2019)



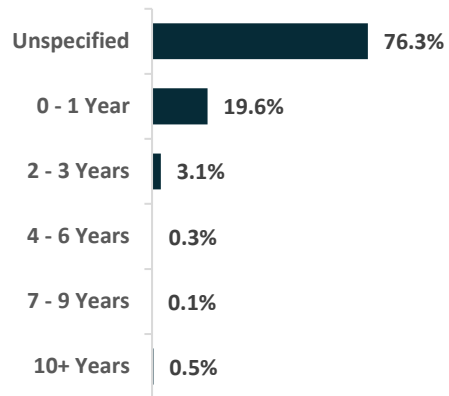
- Occupations found in this group have a below average risk of becoming automated with most having an automation index of under 100, except Amusement and Recreation Attendants, Nonfarm Animal Caretakers, and Coin, Vending, and Amusement Machine Servicers and Repairers which have an above average risk with an automation index over 107
- Nonfarm Animal Caretakers and Recreation Workers are highly demanded with 1,275 and 700 postings respectively for 2019
- The posting intensity of this occupation group is three to one for 2019, with 2,759 unique postings
- Detroit (345 postings) and Troy (188 postings) are the top posting cities accounting for 19.3% of postings
- Pet Sitters and Pet Groomers (690 postings) and Groomers (224 postings) are the top posted job titles in 2019
- 824 or 29.9% of posting require either a high school diploma while 19.6% or 542 postings require zero to one year of experience

Recreation: In-Demand Education and Experience (2019)

Arts and Culture: In-Demand Education



Arts and Culture: In-Demand Experience



- Regional completions for these occupations are low due to most positions requiring no formal education or a high school diploma or equivalent, although due to the nature of the work, Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers saw 88 regional completions for 2019

Recreation: In-Demand Skills and Qualifications (2019)

Top Posted Hard Skills

- Cardiopulmonary Resuscitation (CPR)
- Automated External Defibrillator
- Merchandising
- Mopping
- Adult Cardiopulmonary Resuscitation (CPR)
- Family Support
- Instructing
- Point of Sale
- Restaurant Operation
- Dog Training

Top Posted Common Skills

- Customer Service
- First Aid
- Leadership
- Operations
- Cleanliness
- Communications
- Swimming
- Professionalism
- Teamwork
- Tactfulness

Top Posted Qualifications

- Activity Assistant Certified
- Water Safety Instructor Certification
- Commercial Driver's License (CDL)
- Certified Therapeutic Recreation Specialist
- Group Fitness Instructor Certification
- Professional Wetland Scientist
- Food Handler's Card

Tourism Development and Promotion

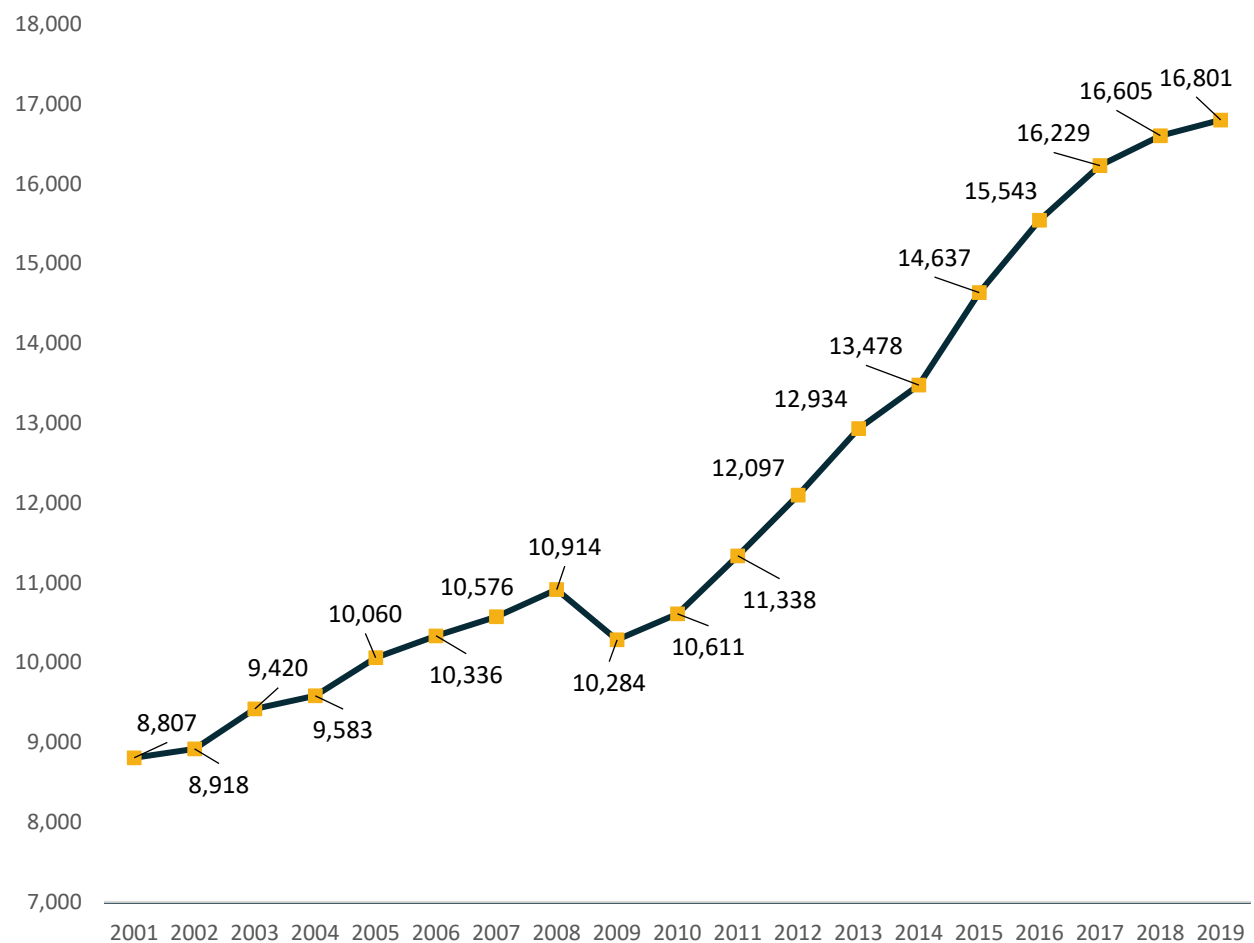
Seeing a beautiful shot of the picturesque Detroit skyline while surfing the web, exploring a website for one of the many museums or music venues in metro Detroit or hearing promotions for a Detroit Red Wings hockey game on the radio are all made possible by tourism development and promotion workers who help stimulate visitor interest in Detroit.

Workers in tourism development and promotion include:

- Public Address System and Other Announcers
- Advertising and Promotions Managers
- Cartographers and Photogrammetrists
- Graphic Designers
- Market Research Analysts and Marketing Specialists
- Media and Communication Workers, All Other
- Public Relations Specialists
- Web Developers

Tourism Development and Promotion: Employment

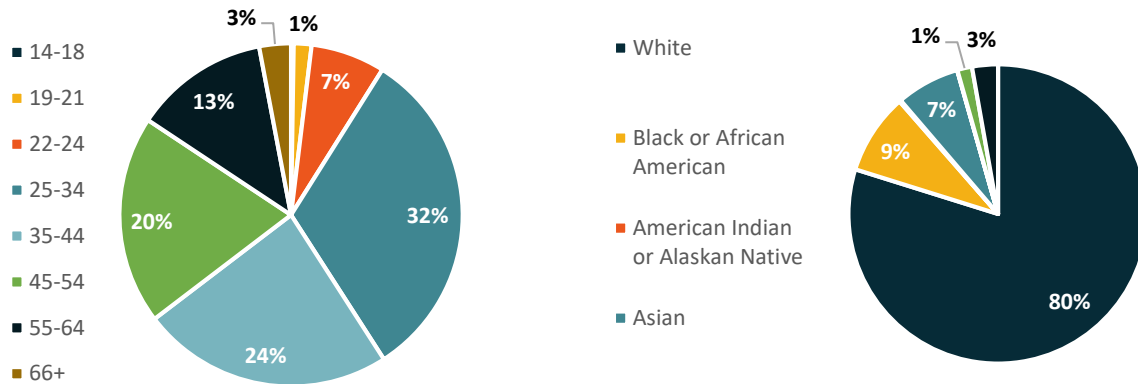
Tourism Development and Promotion: Employment Over Time (2001 – 2019)



- Since 2010, employment has increased by 6,190 workers (36.8%)

Tourism Development and Promotion: Worker Demographics and Commuting Patterns

Tourism Development and Promotion: Worker Age and Race/Ethnicity Demographics (2019)



- 75.4% of the workforce are between the ages of 25-54
- Majority of workers are either white (79.9%) or black or African American (8.7%), accounting for 88.6%, while 2.8% are Hispanic or Latino

Tourism Development and Promotion: Worker Commuting Patterns (2017)

- Between 2001 and 2019, the net commuters for half of occupations have decreased, suggesting employers have become better able to fill job openings with local talent
- Market Research Analysts and Marketing Specialists are the only occupations to have a positive increase of over 300 commuters each.

Tourism Development and Promotion: Wages

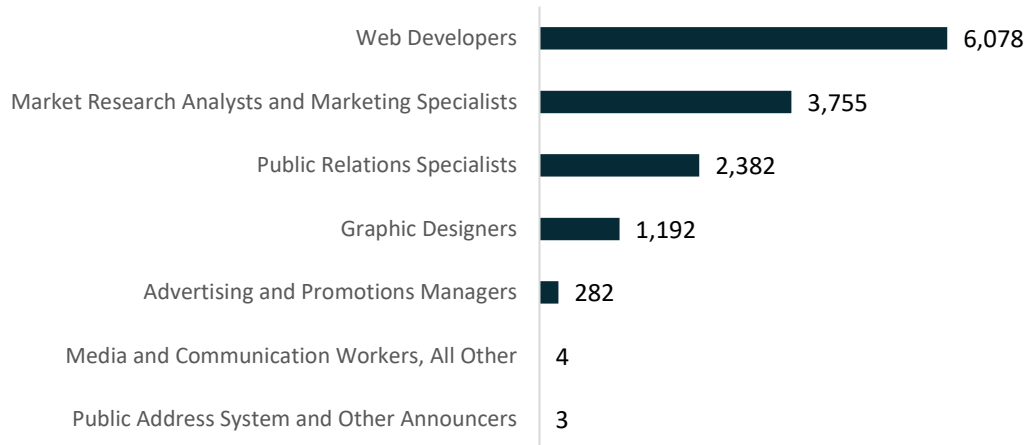
Tourism Development and Promotion: Wage Distribution by Occupation (2019)

Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
11-2011	Advertising and Promotions Managers	\$28.47	\$38.41	\$57.44	\$78.38	\$115.03
13-1161	Market Research Analysts and Marketing Specialists	\$16.82	\$24.16	\$33.01	\$46.35	\$59.48
15-1134	Web Developers	\$19.80	\$26.74	\$34.58	\$43.93	\$50.45
17-1021	Cartographers and Photogrammetrists	\$24.84	\$26.37	\$28.64	\$32.16	\$43.15
27-1024	Graphic Designers	\$14.44	\$17.32	\$22.10	\$29.09	\$37.20
27-3012	Public Address System and Other Announcers	\$9.51	\$9.76	\$14.07	\$24.55	\$38.40
27-3031	Public Relations Specialists	\$15.20	\$20.47	\$27.87	\$36.23	\$46.05
27-3099	Media and Communication Workers, All Other	\$11.87	\$18.46	\$28.30	\$38.26	\$53.53

- Almost all the occupations have median wages above \$22.00
- Advertising and Promotions Managers, Market Research Analysts and Marketing Specialists, and Web Developers have median wages above \$33.00. Most require a bachelor’s degree, while Web Developers require an associate degree.

Tourism Development and Promotion: Employer Demand

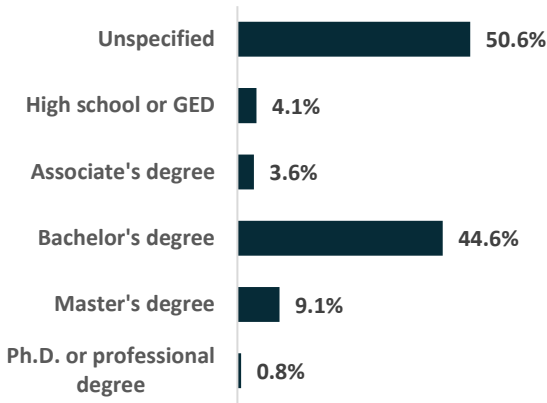
Tourism Development and Promotion: Top Postings by Occupation (2019)



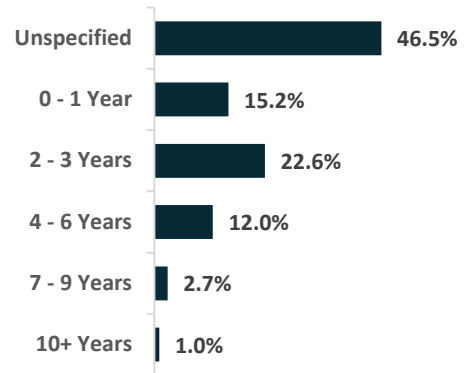
- Occupations found in this group have a lower than average risk of becoming automated with all occupations having an automation index of under 100
- Web Developers are highly demanded with 6,078 postings for 2019
- The posting intensity of this occupation group is five to one for 2019, with 13,696 unique postings
- About 35 percent of postings (4,787 ads) reflect demand for data science, personalized digital marketing, or other targeted search engine optimization skills
- Detroit is the top posting city, accounting for 34% or 4,655 postings
- Java Developers (2,000 postings) and Research Analysts (Life, Physical, and Social Science) (1,058 postings) are the top posted job titles in 2019
- 6,111 or 44.6% of posting require a bachelor’s degree, while 37.8% or 5,178 postings require zero to three years of experience

Tourism Development and Promotion: In-Demand Education and Experience (2019)

Arts and Culture: In-Demand Education



Arts and Culture: In-Demand Experience



- Regional completions for these occupations are high due to most positions requiring a bachelor’s degree, while Web Developers had 1,165 regional completions, the highest for 2019

Tourism Development and Promotion: In-Demand Skills and Qualifications (2019)

Top Posted Technical Skills

- Java
- JavaScript
- Cascading Style Sheets (CSS)
- HyperText Markup Language (HTML)
- Agile Software Development
- SQL
- Angular (Web Framework)
- Web Services
- Spring Framework
- Java Platform Enterprise Edition (J2EE)

Top Posted Common Skills

- Communications
- Management
- Sales
- Presentations
- Research
- Leadership
- Detail Oriented
- Problem Solving
- Microsoft Excel
- Microsoft PowerPoint

Top Posted Qualifications

- Google Analytics Certification
- Certified Professional Coder
- Microsoft Certified Professional
- Project Management Professional Certification
- Salesforce Certification
- Certified Computer Programmer

Travel

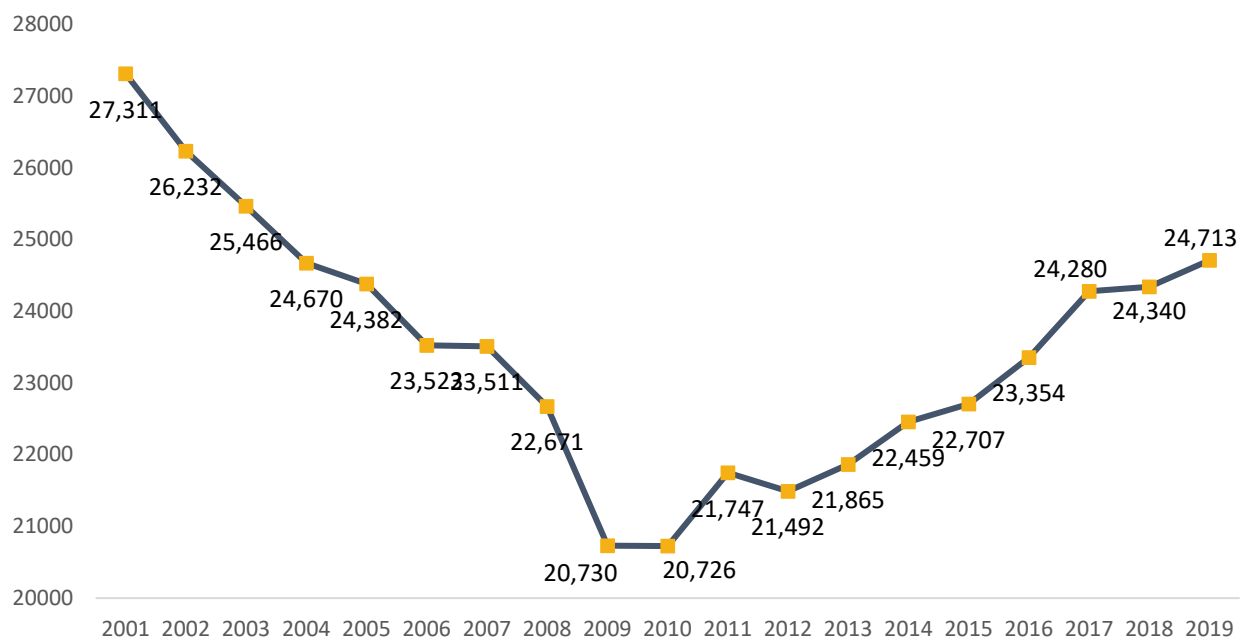
With the 14th most populous metropolitan area, a top 20 North American airport serving more than 35 million passengers each year and a beautiful river flowing between lakes St. Clair and Erie, metro Detroit has thousands of workers in travel to ensure safe and enjoyable transportation for visitors. The diverse jobs in this group provide reliable transportation on a daily basis, whether assisting in arranging travel or operating a vehicle, boat or plane. Workers in travel serve as a critical component to a successful trip to metro Detroit.

Workers in this group include:

- Automotive and Watercraft Service Attendants
- Bus Drivers, Transit and Intercity
- Counter and Rental Clerks
- Flight Attendants
- Parking Lot Attendants
- Reservation and Transportation Ticket Agents and Travel Clerks
- Taxi Drivers and Chauffeurs
- Transportation Attendants, Except Flight Attendants
- Travel Agents
- Air Traffic Controllers
- Aircraft Cargo Handling Supervisors
- Airfield Operations Specialists
- Airline Pilots, Copilots and Flight Engineers
- Aviation Inspectors
- Captains, Mates and Pilots of Water Vessels
- Commercial Pilots
- Motorboat Operators
- Ship and Boat Captains
- Transportation Security Screeners

Travel: Employment

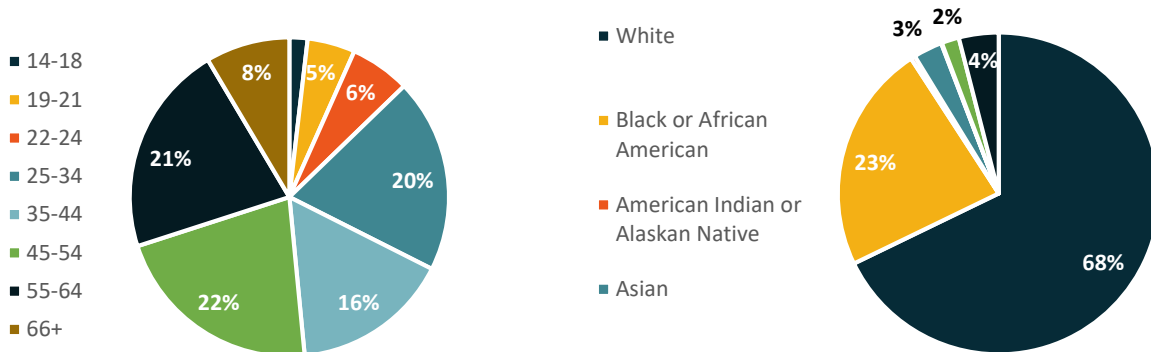
Travel: Employment Over Time (2001 – 2019)



- Employment in occupations in the travel group have increased by 3,987 from 2010 to 2019

Travel: Worker Demographics and Commuting Patterns

Travel: Worker Age and Race/Ethnicity Demographics (2019)



- Just over half (51.5%) of all workers in travel occupations are 45 years of age or older; however, most travel occupations require a great deal of training and experience which poses a barrier to young workers

Travel: Worker Commuting Patterns (2017)

- In 2019, 3,043 (12.31%) of the total 24,713 travel workers were estimated to commute into the region to work, meaning that the Detroit metro region is attracting some talent-related workers from the surrounding areas rather than filling all travel jobs with local talent

Travel: Wages

Travel: Wage Distribution by Occupation (2019)

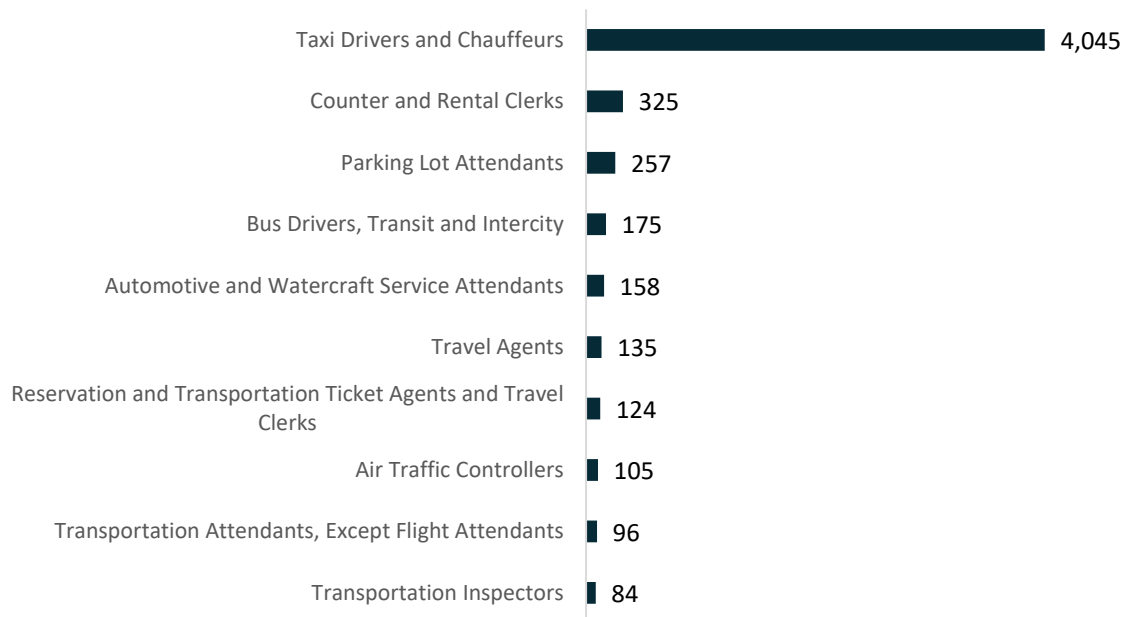
Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
33-9093	Transportation Security Screeners	\$17.12	\$19.65	\$19.97	\$21.48	\$23.16
41-2021	Counter and Rental Clerks	\$9.53	\$10.39	\$12.94	\$15.52	\$21.23
41-3041	Travel Agents	\$12.99	\$15.83	\$20.27	\$28.41	\$38.18
43-4181	Reservation and Transportation Ticket Agents and Travel Clerks	\$9.78	\$14.96	\$21.49	\$23.88	\$25.38
53-1011	Aircraft Cargo Handling Supervisors	\$14.65	\$16.93	\$20.70	\$28.09	\$41.03
53-2011	Airline Pilots, Copilots, and Flight Engineers	\$70.62	\$88.25	\$103.36	\$114.38	\$123.12
53-2012	Commercial Pilots	\$19.20	\$23.43	\$34.44	\$48.87	\$59.34
53-2021	Air Traffic Controllers	\$38.39	\$49.96	\$68.80	\$77.73	\$84.93
53-2022	Airfield Operations Specialists	\$16.23	\$21.23	\$29.56	\$33.80	\$37.13
53-2031	Flight Attendants	\$15.16	\$21.39	\$26.40	\$30.72	\$37.22
53-3021	Bus Drivers, Transit and Intercity	\$11.45	\$13.23	\$16.03	\$19.67	\$24.28
53-3041	Taxi Drivers and Chauffeurs	\$9.57	\$9.94	\$11.24	\$12.87	\$15.23
53-5021	Captains, Mates, and Pilots of Water Vessels	\$11.39	\$28.13	\$74.34	\$84.22	\$91.11
53-5022	Motorboat Operators	\$13.54	\$17.32	\$22.17	\$27.75	\$33.09

Occupation Code	Occupation Name	10th Percentile Wages	25th Percentile Wages	Median Wages	75th Percentile Wages	90th Percentile Wages
53-6021	Parking Lot Attendants	\$9.29	\$9.59	\$10.18	\$12.33	\$14.77
53-6031	Automotive and Watercraft Service Attendants	\$9.39	\$9.96	\$11.05	\$13.29	\$16.49
53-6051	Transportation Inspectors	\$16.35	\$22.56	\$45.82	\$55.18	\$65.13
53-6061	Transportation Attendants, Except Flight Attendants	\$9.26	\$9.95	\$10.85	\$11.90	\$13.69

- Many occupations in the travel group offer a very high earning potential, but also require a high level of skill and expertise

Travel: Employer Demand

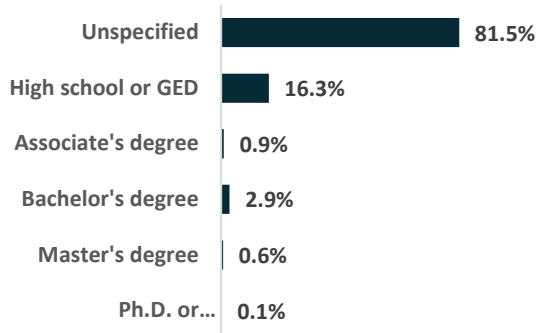
Travel: Top Postings by Occupation (2019)



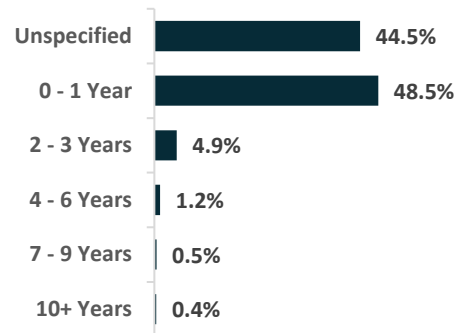
- 5,629 unique postings for travel jobs were posted in Oakland, Wayne, and Macomb counties in 2019
- In 2019, online job ads for Taxi Drivers and Chauffeurs dominated the in-demand travel occupation list, accounting for nearly 72% of all travel postings (4,045 job ads)
- Tasks typically performed by Automotive and Watercraft Service Attendants have the highest estimated risk of being automated (index of 122.9)
- Posting intensity for the travel occupation group is 4:1, meaning there are five job postings for each individual travel position available
- Travel jobs are posted for a median of 12 days indicating employers are easily filling open positions

Travel: In-Demand Experience and Education (2019)

In-Demand Experience



In-Demand Education



- The majority of job postings for occupations in the travel group did not specify a minimum level of education and of those that specified a minimum

Travel: In-Demand Skills and Qualifications (2019)

Top Posted Technical Skills

- Food Services
- Creative Industries
- Food Preparation
- Office Assistant
- Food Delivery
- Selling Techniques
- Vehicle Inspection
- Accounting
- Warehousing
- Customer Satisfaction

Top Posted Common Skills

- Valid Driver's License
- Customer Service
- Good Driving Record
- Management
- Sales
- Android (Operating System)
- Apple iPhone
- Dishwashers
- Communications
- Detail Oriented

Top Posted Qualifications

- Commercial Driver's License (CDL)
- CDL Class B License
- Drone Pilot Certificate
- CDL Class C License
- Certified Professional Coder
- Airline Transport Pilot License

Appendix A: Occupation Codes by Group

Dining and Shopping

SOC	Occupation
11-9051	Food Service Managers
27-1026	Merchandise Displayers and Window Trimmers
35-1011	Chefs and Head Cooks
35-1012	First-Line Supervisors of Food Preparation and Serving Workers
35-2011	Cooks, Fast Food
35-2014	Cooks, Restaurant
35-2015	Cooks, Short Order
35-2019	Cooks, All Other
35-2021	Food Preparation Workers
35-3011	Bartenders
35-3021	Combined Food Preparation and Serving Workers, Including Fast Food
35-3022	Counter Attendants, Cafeteria, Food Concession, and Coffee Shop
35-3031	Waiters and Waitresses
35-3041	Food Servers, Nonrestaurant
35-9011	Dining Room and Cafeteria Attendants and Bartender Helpers
35-9021	Dishwashers
35-9031	Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop
35-9099	Food Preparation and Serving Related Workers, All Other
41-1011	First-Line Supervisors of Retail Sales Workers
41-2011	Cashiers
41-2031	Retail Salespersons

Travel

SOC	Occupation
33-9093	Transportation Security Screeners
41-2021	Counter and Rental Clerks
41-3041	Travel Agents
43-4181	Reservation and Transportation Ticket Agents and Travel Clerks
53-1011	Aircraft Cargo Handling Supervisors
53-2011	Airline Pilots, Copilots, and Flight Engineers
53-2012	Commercial Pilots
53-2021	Air Traffic Controllers
53-2022	Airfield Operations Specialists
53-2031	Flight Attendants
53-3021	Bus Drivers, Transit and Intercity
53-3041	Taxi Drivers and Chauffeurs
53-5021	Captains, Mates, and Pilots of Water Vessels
53-5022	Motorboat Operators

53-6021	Parking Lot Attendants
53-6031	Automotive and Watercraft Service Attendants
53-6051	Aviation Inspectors
53-6061	Transportation Attendants, Except Flight Attendants

Hospitality

SOC	Occupation
11-9081	Lodging Managers
27-3091	Interpreters and Translators
37-1011	First-Line Supervisors of Housekeeping and Janitorial Workers
37-2012	Maids and Housekeeping Cleaners
39-1021	First-Line Supervisors of Personal Service Workers
39-3093	Locker Room, Coatroom, and Dressing Room Attendants
39-6011	Baggage Porters and Bellhops
39-6012	Concierges
39-9099	Personal Care and Service Workers, All Other
43-4051	Customer Service Representatives
43-4081	Hotel, Motel, and Resort Desk Clerks
43-4171	Receptionists and Information Clerks

Entertainment

SOC	Occupation
13-1011	Agents and Business Managers of Artists, Performers, and Athletes
27-1011	Art Directors
27-1019	Artists and Related Workers, All Other
27-2011	Actors
27-2012	Producers and Directors
27-2021	Athletes and Sports Competitors
27-2023	Umpires, Referees, and Other Sports Officials
27-2031	Dancers
27-2032	Choreographers
27-2041	Music Directors and Composers
27-2042	Musicians and Singers
27-2099	Entertainers and Performers, Sports and Related Workers, All Other
27-4031	Camera Operators, Television, Video, and Motion Picture
39-3031	Ushers, Lobby Attendants, and Ticket Takers
39-3092	Costume Attendants
39-3099	Entertainment Attendants and Related Workers, All Other
39-5091	Makeup Artists, Theatrical and Performance
27-2023	Coaches and Scouts

Gaming

SOC	Occupation
11-9071	Gaming Managers
33-9031	Gaming Surveillance Officers and Gaming Investigators
39-1011	Gaming Supervisors
39-3011	Gaming Dealers
39-3012	Gaming and Sports Book Writers and Runners
39-3019	Gaming Service Workers, All Other
41-2012	Gaming Change Persons and Booth Cashiers
43-3041	Gaming Cage Workers
39-1018	First Line Supervisors of Gaming Workers

Arts and Culture

SOC	Occupation
19-3093	Historians
25-4012	Curators
25-4013	Museum Technicians and Conservators
25-9011	Audio-Visual and Multimedia Collections Specialists
27-1012	Craft Artists
27-1027	Set and Exhibit Designers
39-7011	Tour Guides and Escorts
27-1013	Fine Artists

Tourism Development and Promotion

SOC	Occupation
11-2011	Advertising and Promotions Managers
13-1161	Market Research Analysts and Marketing Specialists
15-1134	Web Developers
17-1021	Cartographers and Photogrammetrists
27-1024	Graphic Designers
27-3012	Public Address System and Other Announcers
27-3031	Public Relations Specialists
27-3099	Media and Communication Workers, All Other

Conferences and Events

SOC	Occupation
13-1121	Meeting, Convention, and Event Planners
27-1023	Floral Designers
27-4011	Audio and Video Equipment Technicians
27-4014	Sound Engineering Technicians
27-4021	Photographers

27-4099	Media and Communication Equipment Workers, All Other
41-3099	Sales Representatives, Services, All Other

Building and Groundskeeping Maintenance

SOC	Occupation
11-9199	Security Managers
33-9032	Security Guards
37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers
37-3011	Landscaping and Groundskeeping Workers
37-3013	Tree Trimmers and Pruners
37-3019	Grounds Maintenance Workers, All Other
47-2111	Electricians
47-4021	Elevator Installers and Repairers

Recreation

SOC	Occupation
19-1023	Zoologists and Wildlife Biologists
19-1031	Park Naturalists
33-3031	Fish and Game Wardens
33-9092	Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers
39-2011	Animal Trainers
39-2021	Nonfarm Animal Caretakers
39-3091	Amusement and Recreation Attendants
39-9032	Recreation Workers
49-9091	Coin, Vending, and Amusement Machine Servicers and Repairers

Appendix B: Keyword and Industry Data Collection Filters

3-Digit Industry Filters

NAICS	Description
443	Electronics and Appliance Stores
445	Food and Beverage Stores
446	Health and Personal Care Stores
447	Gasoline Stations
448	Clothing and Clothing Accessories Stores
451	Sporting Goods, Hobby, Musical Instrument, and Book Stores
452	General Merchandise Stores
453	Miscellaneous Store Retailers
454	Nonstore Retailers
481	Air Transportation
482	Rail Transportation
483	Water Transportation
485	Transit and Ground Passenger Transportation
487	Scenic and Sightseeing Transportation
488	Support Activities for Transportation
711	Performing Arts, Spectator Sports, and Related Industries
712	Museums, Historical Sites, and Similar Institutions
713	Amusement, Gambling, and Recreation Industries
721	Accommodation
722	Food Services and Drinking Places

Keyword Filters

- Data in Marketing: "data analysis" OR "data science" OR "big data" OR analytics OR "audience targeting" OR "digital marketing" OR personalized OR psychographics OR SEO OR "Google Ads"
- Culinary Arts/ Hospitality Degree: ("culinary arts" OR "hospitality") AND "degree"

Appendix C: Glossary

Automation Index: Measure for each occupation provided by Emsi:

“The automation index captures an occupation’s risk of being affected by automation using four measures:

- % of time spent on high-risk work
- % of time spent on low-risk work
- Number of high-risk jobs in compatible occupations
- Overall industry automation risk

This methodology starts with the underlying work on task content. We use estimated task time shares, derived from O*NET work activities, and regress them for each occupation based on Frey and Osborne’s published “computerization probabilities” (2013). This helps us identify which tasks are positively and negatively correlated with automation risk. This classification is then linked with the task time shares to identify the share of each occupation’s time spent in high- and low-risk work, from an automation perspective. Then we look at the place of an occupation in the broader context of labor market automation risk. Using occupation compatibility scores, we look at all similar roles (defined as having an O*NET compatibility score over 75) and find the percentage of jobs in those similar roles that are at risk of automation. Finally, using staffing pattern data, we multiply the share of an occupation’s jobs in 3-digit NAICS industries by that industry’s share of at-risk jobs to calculate the overall industry automation risk. We then standardize all these measures and scale the index so that 100 = the “average worker,” defined as the average index across all occupations, weighted by job numbers in 2018. The index has a standard deviation of 15. Note that the share of time spent on low-risk work is a negative contributor to an occupation’s index score (making the index score lower) while the other three measures are positive contributors (making the index score higher).”

Location Quotient: An analytical statistic that measures a region’s industrial specialization relative to a larger geographic unit (usually the nation). An LQ is computed as an industry’s share of a regional total for some economic statistic (earnings, GDP by metropolitan area, employment, etc.) divided by the industry’s share of the national total for the same statistic. For example, an LQ of 1.0 in mining means that the region and the nation are equally specialized in mining; while an LQ of 1.8 means that the region has a higher concentration in mining than the nation.

North American Industry Classification System (NAICS): Adopted in 1997 by the United States Economic Classification Policy Committee (ECPC) and partner departments in Mexico and Canada, the NAICS is a standard system for defining the activities of businesses.

O*NET: Occupational Information Network, maintained by the United States Department of Labor. O*NET catalogs the essential duties, knowledge, and skills required of a certain job, resulting in a set of 8-digit codes delineating distinct occupations. See also: Standard Occupational Classification System (SOC).

Standard Occupational Classification (SOC): Used by the federal government to define worker type, this classification system features a set of 6-digit codes (aligned with O*NET codes) to delineate distinct occupations. See also: O*NET.

Replacement Rate: A BLS-estimated measure approximating the proportion of job openings that are due to workers permanently leaving an occupation, based on methodology that projects the number of separations as well as job openings.