

# Labor Market Analysis of Skills Related to Animal Science in Massachusetts

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## Overview and Key Findings

### Programs

Five Chapter 74 programs of study are currently offered within the Agriculture and Natural Resources Cluster:

* Veterinary Science
* Agricultural Mechanics
* Animal Science
* Environmental Science & Technology
* Horticulture

Each of these programs maps to at least one target occupation, and each occupation is employed by multiple industries. This analysis uses labor market data from the Massachusetts Department of Economic Research to provide perspective on both the industries (the employers) and the career paths that are available to our graduates.

### Industries

In public labor market data systems, industries are types of employers defined by their primary output. There is not a direct relationship between industries and occupations, although the United States Bureau of Labor Statistics publishes an employment matrix that estimates the share of a given industry’s workforce that consists of each occupational category.

Industries are organized in general categories under a two-digit code, and the industry category is then subdivided into three-digit codes, then four-digit codes and so on down to six digits. Three distinct industries are profiled in this analysis:

* Veterinary Services (NAICS 54194)
* Animal Production and Aquaculture (NAICS 112)
* Crop Production (NAICS 111)

There are some inherent challenges in using public labor market data sources to profile these industries. The Agriculture industry makes use of a large number of self-employed workers and workers whose compensation is paid in cash and not included in public employment and wage data. Also, Agricultural Mechanics is not classified as an industry in these systems. To provide perspective on the importance and the career potential of these fields, we also use analysis of target occupations for these programs.

Veterinary Services is a component of the two-digit level industry Professional, Scientific, and Technical Services. Animal Production and Crop Production are components of the Agriculture, Forestry, Fishing, and Hunting industry.

#### Veterinary Services Industry (NAICS 54194)

Establishments of licensed veterinary practitioners primarily engaged in the practice of veterinary medicine, dentistry, or surgery for animals; and establishments primarily engaged in providing testing services for licensed veterinary practitioners.

Illustrative Examples:

* Animal hospitals
* Veterinary clinics
* Veterinarians' offices
* Veterinary testing laboratories

#### Animal Production and Aquaculture (NAICS 112)

Industries in the Animal Production and Aquaculture subsector raise or fatten animals for the sale of animals or animal products and/or raise aquatic plants and animals in controlled or selected aquatic environments for the sale of aquatic plants, animals, or their products. The subsector includes establishments, such as ranches, farms, and feedlots, primarily engaged in keeping, grazing, breeding, or feeding animals. These animals are kept for the products they produce or for eventual sale. The animals are generally raised in various environments, from total confinement or captivity to feeding on an open range pasture.

The industries in this subsector are grouped by important factors, such as suitable grazing or pasture land, specialized buildings, type of equipment, and the amount and types of labor required. Establishments are classified in the Animal Production and Aquaculture subsector when animal production (i.e., value of animals for market) accounts for one-half or more of the establishment's total agricultural production.

#### Crop Production (NAICS 111)

Industries in the Crop Production subsector grow crops mainly for food and fiber. The subsector comprises establishments, such as farms, orchards, groves, greenhouses, and nurseries, primarily engaged in growing crops, plants, vines, or trees and their seeds.

The industries in this subsector are grouped by similarity of production activity, including biological and physiological characteristics and economic requirements, the length of growing season, degree of crop rotation, extent of input specialization, labor requirements, and capital demands. The production process is typically completed when the raw product or commodity grown reaches the "farm gate" for market, that is, at the point of first sale or price determination.

Establishments are classified in the Crop Production subsector when crop production (i.e., value of crops for market) accounts for one-half or more of the establishment's total agricultural production.

### Occupations

In public data systems, occupations are sets of tasks regularly performed by one individual on an employer’s payroll. In this analysis, occupations related to these programsare profiled in a career pathway framework as we seek to provide strategic value in the development and administration of Agriculture curriculum and the construction of compelling and instructive narrative that will introduce students to the rapidly evolving world of Agriculture in the 21st Century.

Each program maps to at least one particular occupation and at least one industry-recognized credential. The table that follows identifies each target occupation and the occupation family (from the United States Bureau of Labor Statistics) in which that occupation is found. Also included is the career cluster (from Advance CTE and used as the taxonomy for CTE programs). Within every cluster are from one to eight pathways, and those are included for each occupation, as well.

#### Agriculture and Natural Resources Cluster Programs and Related Occupations and Credentials

* Veterinary Science
	+ Target Occupation: Veterinary Assistant
	+ Occupation Family: Healthcare Practitioners & Technical
	+ Career Cluster: Health Sciences
	+ Career Pathway: Diagnostic Services
	+ Industry-Recognized Credential: Certified Veterinary Technician
* Agricultural Mechanics
	+ Target Occupation: Agricultural Equipment Operators
	+ Occupation Family: Farming, Fishing and Forestry
	+ Career Cluster: Agriculture, Food and Natural Resources
	+ Career Pathway: Power, Structural and Technical Systems
	+ Industry-Recognized Credential: Valid Driver’s License
* Animal Science
	+ Target Occupations
		- Farmworkers and Laborers, Crop, Nursery and Greenhouse
		- Farmworkers, Farm, Ranch and Aquacultural Animals
		- Farmers, Ranchers and Other Agricultural Managers
	+ Occupation Family: Farming, Fishing and Forestry
	+ Career Cluster: Agriculture, Food and Natural Resources
	+ Career Pathway: Agribusiness Systems
	+ Industry-Recognized Credential: Valid Driver’s License
* Environmental Science & Technology
	+ Target Occupation: Biological Technician
	+ Occupation Family: Life, Physical and Social Science
	+ Career Cluster: Agriculture, Food and Natural Resources
	+ Career Pathway: Plant Systems
	+ Industry-Recognized Credential: Technologist In Molecular Biology (MB-ASCP)
* Horticulture
	+ Target Occupation: Agricultural Technician
	+ Occupation Family: Life, Physical and Social Science
	+ Career Cluster: Agriculture, Food and Natural Resources
	+ Career Pathway: Food Products and Processing Systems
	+ Industry-Recognized Credential: Pesticide Applicator

### Key Findings

A detailed analysis of the Programs of study, related industries, and related occupations led to several key conclusions:

1. **The importance of the** **Agriculture, Forestry, Fishing, and Hunting industry to the Massachusetts economy**
2. In labor market data systems, the Agriculture, Forestry, Fishing, and Huntingindustry is further divided into five subcategories, of which four are significant components of the Commonwealth’s economy and labor market. More than 23,000 people are employed by organizations in this industry.
3. **Career Outlooks for the target occupations**

More than 14,000 people in Massachusetts are employed in Agriculture, Fishing, and Forestry occupations. That number is projected to grow by more than 300 in the coming decade.

1. **Trends in the profiled industries**

Both the Agriculture, Forestry, Fishing, and Hunting and the Veterinary Services industries have avoided the employment declines that characterized the regional economy in the aftermath of the COVID-19 pandemic, and Veterinary Services has experienced notable growth.

1. **The importance of a driver’s license**

A valid driver's license is by far the most mentioned qualification for careers in this field, making it not only a value to the individual on a personal level, but also as a career-related asset.

## The Agriculture, Forestry, Fishing, and Hunting Industry in Massachusetts

### The Agriculture, Forestry, Fishing, and Hunting Industry in Labor Market Data Systems

In public labor market data systems, the Agriculture, Forestry, Fishing, and Hunting Industry (NAICS 11) comprises five more detailed industry categories, including Crop Production, Animal Production, and Support Activities for Crop Production. It comprises employers primarily engaged in growing crops, raising animals, harvesting timber, and harvesting fish and other animals from a farm, ranch, or their natural habitats.

The establishments in this sector are often described as farms, ranches, dairies, greenhouses, nurseries, orchards, or hatcheries. A farm may consist of a single tract of land or a number of separate tracts which may be held under different tenures. For example, one tract may be owned by the farm operator and another rented. It may be operated by the operator alone or with the assistance of members of the household or hired employees, or it may be operated by a partnership, corporation, or other type of organization. When a landowner has one or more tenants, renters, croppers, or managers, the land operated is considered a farm.

The sector distinguishes two basic activities: agricultural production and agricultural support activities. Agricultural production includes establishments performing the complete farm or ranch operation, such as farm owner-operators and tenant farm operators. Agricultural support activities include establishments that perform one or more activities associated with farm operation, such as soil preparation, planting, harvesting, and management, on a contract or fee basis.

The category is then further parsed into four-, five-, and ultimately six-digit level categories, and the Massachusetts Department of Economic Research produces employment and wage estimates for each.

### Other Industry Categories

* 11 Agriculture, Forestry, Fishing and Hunting
	+ 111 Crop Production
	+ 112 Animal Production and Aquaculture
	+ 113 Forestry and Logging
		- 1131 Timber Tract Operations
		- 1132 Forest Nurseries and Gathering of Forest Products
		- 1133 Logging
	+ 114 Fishing, Hunting and Trapping
	+ 115 Support Activities for Agriculture and Forestry
		- 1151 Support Activities for Crop Production
			* 115111 Cotton Ginning
			* 115112 Soil Preparation, Planting, and Cultivating
			* 115113 Crop Harvesting, Primarily by Machine
			* 115114 Postharvest Crop Activities (except Cotton Ginning)
			* 115115 Farm Labor Contractors and Crew Leaders
			* 115116 Farm Management Services
		- 1152 Support Activities for Animal Production
		- 1153 Support Activities for Forestry

### Employment Trends

More than 24,000 people are employed at 999 payrolled locations in the Agriculture, Forestry, Fishing, and Hunting Industry (NAICS 11) in Massachusetts. Employment in this sector has declined slightly over the last ten years.

#### Table 1: Average Annual Employment, Auto Repair and Maintenance Industries, 2014-2023

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Jobs** | **Year** | **Jobs** |
| 2014 | 19,768 | 2019 | 21,514 |
| 2015 | 19,552 | 2020 | 22,203 |
| 2016 | 20,301 | 2021 | 24,036 |
| 2017 | 20,192 | 2022 | 24,838 |
| 2018 | 20,869 | 2023 | 24,586 |



When we break down the Commonwealth’s employment within the Agriculture, Forestry, Fishing, and Hunting industry, we find that the largest number of jobs are in the Animal Production and Crop Production industries. Employment in each has been generally consistent over the last decade, with only Animal Production experiencing a measurable decrease (1,668 jobs).

#### Tables 2 and 3: Employment Change, Agriculture, Forestry, Fishing and Hunting, Massachusetts, 2014-2023

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Industry | 2014 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| Animal Production | 3,245 | 3,422 | 3,517 | 3,343 | 3,454 | 3,464 | 3,321 |
| Crop Production | 8,561 | 8,482 | 8,710 | 8,958 | 9,226 | 10,064 | 11,001 |
| Support Activities for Crop Production | 846 | 723 | 701 | 685 | 761 | 648 | 739 |
| Support Activities for Animal Production | 1,043 | 1,012 | 1,090 | 1,172 | 1,236 | 1,137 | 1,211 |

|  |  |  |
| --- | --- | --- |
| Industry | 2014-2023 Change | 2014-2023 % Change |
| Animal Production | 196 | 6.0% |
| Crop Production | 5,050 | 59.0% |
| Support Activities for Crop Production | 150 | 17.7% |
| Support Activities for Animal Production | 285 | 27.3% |

## The Pathways

### Priority Occupations and Pathways

This section looks at the target occupation categories. It will also consider advancement opportunities in related careers that are not directly related to the program of study, but that illustrate opportunities that may be available to workers in these occupations with additional education and experience.

#### Table 3: Target Occupations, Massachusetts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Occupation | 2023 Jobs | Turnover Rate | 2014 - 2023 Change | 2014 - 2023 % Change | Median Annual Earnings |
| Farmworkers and Laborers, Crop, Nursery, and Greenhouse | 4,846 | 94.9% | 1,469 | 43.5% | $33,231 |
| Farmworkers, Farm, Ranch, and Aquacultural Animals | 2,039 | 76.3% | 940 | 85.5% | $34,073 |
| Farmers, Ranchers, and Other Agricultural Managers | 7,884 | 19.8% | 521 | 7.1% | $32,144 |
| Agricultural Equipment Operators | 680 | 91.7% | 371 | 120.2% | $38,839 |
| Agricultural Technician | 407 | 55.2% | 258 | 173.2% | $79,100 |
| Biological Technician | 6,927 | 64.2% | 1,409 | 25.5% | $61,693 |
| Veterinary Assistant | 1,831 | 88.9% | 338 | 22.7% | $44,456 |

While careers in these two occupations are certainly viable in their own rights, they also can serve as entry points to progressively more sophisticated and better-paying roles.

#### Tables 4 and 5: Related Career Pathways

##### Job Zone Two Occupations

|  |  |  |  |
| --- | --- | --- | --- |
| Occupation | 2023 Jobs | Typical Education Requirement | Median Annual Earnings |
| Forest and Conservation Workers | 251 | High school | $38,164 |
| [Animal Breeders](https://www.onetonline.org/link/summary/45-2021.00) | 37 | High school | $40,619 |
| Animal Trainers | 2,793 | High school | $33,906 |
| [Agricultural Inspectors](https://www.onetonline.org/link/summary/45-2011.00) | 215 | Bachelor's | $51,214 |
| Veterinary Assistants and Laboratory Animal Caretakers | 1,831 | High school | $44,456 |
| Biological Technicians | 6,927 | Bachelor's | $61,693 |

##### Job Zone Three Occupations

|  |  |  |  |
| --- | --- | --- | --- |
| Occupation | 2023 Jobs | Typical Education Requirement | Median Annual Earnings |
| First-Line Supervisors of Farming, Fishing, and Forestry Workers | 734 | High school | $47,218 |

## Occupation Profile and Job Postings

### O\*Net Occupation Profile-Farmworkers, Farm, Ranch and Aquacultural Animals

The United States Department of Labor, Employment and Training Administration created and regularly updates more than 800 occupational profiles with characteristics like skills, educational requirements, and daily tasks, based on the inputs of industry experts and people who are employed in the occupations.

#### Description

Attend to live farm, ranch, open range or aquacultural animals that may include cattle, sheep, swine, goats, horses and other equines, poultry, rabbits, finfish, shellfish, and bees. Attend to animals produced for animal products, such as meat, fur, skins, feathers, eggs, milk, and honey. Duties may include feeding, watering, herding, grazing, milking, castrating, branding, de-beaking, weighing, catching, and loading animals. May maintain records on animals; examine animals to detect diseases and injuries; assist in birth deliveries; and administer medications, vaccinations, or insecticides as appropriate. May clean and maintain animal housing areas. Includes workers who shear wool from sheep and collect eggs in hatcheries.

#### Top Skills

* Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.
* Monitoring/assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.
* Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
* Considering the relative costs and benefits of potential actions to choose the most appropriate one.
* Controlling operations of equipment or systems.
* Watching gauges, dials, or other indicators to make sure a machine is working properly.
* Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
* Adjusting actions in relation to others' actions.
* Understanding written sentences and paragraphs in work-related documents.
* Talking to others to convey information effectively.
* Determining causes of operating errors and deciding what to do about it.
* Understanding the implications of new information for both current and future problem-solving and decision-making.
* Determining the kind of tools and equipment needed to do a job.
* Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
* Managing one's own time and the time of others.
* Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
* Repairing machines or systems using the needed tools.

#### Top Daily Tasks

* Care for animals.
* Examine animals to detect illness, injury or other problems.
* Treat animal injuries or illnesses.
* Prepare materials or solutions for animal or plant use.
* Mark agricultural or forestry products for identification.
* Maintain inventories of materials, equipment, or products.
* Perform animal breeding procedures.
* Operate farming equipment.
* Classify organisms based on their characteristics or behavior.
* Maintain forestry, hunting, or agricultural equipment.
* Transport animals, crops, or equipment.
* Maintain operational records.
* Clean equipment or facilities.

#### Additional Information

* American Farm Bureau Federation
* American Paint Horse Association
* American Quarter Horse Association
* American Sheep Industry Association
* Association of Farmworker Opportunity Programs

### Job Postings - Farmworkers, Farm, Ranch, and Aquacultural Animals

P2C uses a third-party system that aggregates data from job postings to provide perspective on the skills and qualifications employers are prioritizing in their advertisements for these occupations.

* After controlling for multiple postings that likely referenced the same single opening, over the last year, we identified 458 unique job postings for Farmworkers, Farm, Ranch, and Aquacultural Animals.
* We identified 128 unique employers who posted openings online.

#### Top Employers Advertising:

* Ianthus Capital Holdings
* Natures Medicine
* Northeast Alternatives
* Pharmacann
* Bountiful Farms
* Viridian Staffing
* Ascend Wellness
* Revolutionary Clinics
* Renew International USA
* Green Thumb
* 4Front Ventures
* Temescal Wellness
* The Human Connection
* The Heirloom Collective
* Sanctuary Medicinals
* Jeeter Systems Corp
* Ezhire Cannabis
* The Botanist

#### Top Job Titles:

* Conservation Technicians
* Scan Technicians
* Harvest Managers
* Activation Associates
* Packaging Technicians
* Processing Technicians
* Stable Hands
* Harvesters

#### Top Qualifications:

* Valid Driver's License