



THE ECONOMIC IMPACT OF RHODE ISLAND PLANT-BASED INDUSTRIES AND AGRICULTURE

An Update to the 2012 Study



CREDITS

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CONTENTS

Green-Related Industry and the Rhode Island Economy	1
Data Sources	3
Methods	5
Results	7
Agriculture	12
Agricultural Support and Related Industries	14
Cemeteries	16
Golf	17
Landscaping Contractors and Services	18
Landscape Related Suppliers	20
Notes	22
Works Cited	23



GREEN-RELATED INDUSTRY & THE RHODE ISLAND ECONOMY

AN UPDATE TO THE 2012 STUDY

Green-related Industry

- Agriculture
- Agricultural Support and Related Industries
- Cemeteries
- Golf
- Landscaping Contractors and Services
- Landscape Related Suppliers

This study provides an update to the groundbreaking *2012 Economic Impact Study of Rhode Island Plant-Based Industries and Agriculture*. The 2012 study was the first to give conclusive evidence of severe underestimation in prevailing economic impact estimates for these sectors.^{1,2} It did so by developing extremely conservative, lower bound estimates of the minimum possible sales and jobs, and these estimates still dramatically exceeded the existing, official numbers.

In contrast, this study attempts to provide the best statistical estimates using all available data. We obtained updated economic data for many businesses, found many more businesses omitted from the 2012 study, and developed new procedures for estimating jobs and sales in these sectors. Our results tell a compelling story: ***plant-based industries and agriculture play a larger role in the Rhode Island economy than has ever been previously documented.***

Herein, we refer to these sectors collectively as “green-related industry,” for consistency with the terminology of recent, similar studies.³ Under this label we include agricultural production of food and nursery products, agricultural support industries, cemeteries, golf, landscaping contractors and services, and landscape related suppliers. These sectors have a prominent history in Rhode Island and exhibit strong economic ties to the present day.^{4,5}

GREEN-RELATED INDUSTRY & THE RHODE ISLAND ECONOMY

PAST ESTIMATION CHALLENGES

Despite the State's small size, estimating the economic impact of the green-related sectors has proved difficult. Green-related industries, as a group, defy standardized industry classification systems such as the North American Industry Classification System (NAICS) because these businesses reside under such disparate categories as construction, entertainment, retail, services and wholesale.

Rhode Island is the smallest U.S. State, but its geographic concentrations of business types may make accurate statistical sampling difficult. For non-agricultural subsectors, including florists and landscaping services, the 2012 study estimated that the Bureau of Economic Analysis 2007 numbers understate jobs by half and the number of firms by almost 40%.⁶

Agricultural estimates may also be lacking for historical reasons. Since USDA took over the five-yearly Agricultural Census in 1997, farm production is valued according to the "market value of agricultural products sold," a measure of primarily wholesale value which does not fully capture value-added (like selling apple pies, or direct to consumer sales at farmers' markets) or farmer-provided services (such as turfgrass installation or equipment repair).⁷ Rhode Island farmers rely heavily on these sources of extra income to overcome tax rates and agricultural land values that are among the highest in the country.

Green-related industries do not fit neatly into standard industry classification systems such as NAICS.

Estimating economic impacts of these businesses has proved difficult, in part due to historical reasons.

DATA SOURCES



SURVEY AND BUSINESS LISTINGS

Individual business observations of gross sales and jobs were compiled from a University of Rhode Island survey and from two industry-standard databases of business information (ReferenceUSA and AtoZ Databases). After dropping 61 firms who went out of business since the 2012 study, our data set includes 229 farms and 1,194 firms in other green-related sectors.⁸

We also collected lists of active, eligible businesses for which economic data are unavailable. The businesses without data are used to estimate the size of their subsector for the statistical model.

Data sources are the State of Rhode Island Directory of Registered Nurseries and Licensed Nursery Stock Dealers and the Corporate Database of the State of Rhode Island Office of the Secretary of State, which includes all active and inactive corporate entities, but does not include sole proprietorships or partnerships. We identified 890 active firms for which economic data needed to be estimated.

In agriculture, listings of firms without economic data were used to confirm classification of businesses and active status, but were not needed for estimating subsector size because that information is found in the USDA Agricultural Census.

This study uses a sample of 229 Rhode Island farms and 1,194 firms in other green-related sectors.

We found listings for 890 additional green-related businesses without economic data.

METHODS

A photograph of a cemetery with rows of gravestones and large trees. The scene is captured from an elevated perspective, showing a long, straight path of headstones receding into the distance. The gravestones are mostly rectangular and light-colored, with some showing signs of age and weathering. Large, mature trees with dense green foliage line the path, casting shadows on the grass. The overall atmosphere is peaceful and well-maintained.

UPDATING THE 2012 ESTIMATES

This study provides a comprehensive look at green-related industries in 2012, the year covered by the most recent Agricultural Census. To achieve this, we adjusted all data to the 2012 reporting year, identified missing firms and estimated their sales and employment figures, compiled estimates at the NAICS and sector levels, and estimated spillover effects in the broader Rhode Island economy.

For missing firms in all sectors, we estimate economic data using a conservative extrapolation procedure. For agriculture, we used statistical methods designed to incorporate the information from our sample into the background knowledge provided by the 2012 Agricultural Census. Such an analysis was not possible for non-agricultural sectors, because the 2012 Economic Census was not yet released at the time of this report.

Details of data cleaning, adjustments, statistical estimates and confidence intervals, and application of economic multipliers to estimate spillover effects are provided in the Technical Appendix to this report.

Estimates for agriculture incorporate the latest data and results from the 2012 USDA Agricultural Census.

Estimates for other sectors rely on business listings to calculate the sector size, pending release of the 2012 Economic Census.

RESULTS



ECONOMIC IMPACTS

We estimate that agriculture and plant-based industries in Rhode Island are responsible for \$2.5 billion of annual sales and 15,826 jobs. Total indirect (spillover) effects are \$1.89 billion and 7,736 jobs. Combining these figures gives a total economic impact of \$4.39 billion and 23,562 jobs.

These are substantial, and expected, increases over the estimates in the 2012 study (\$1.08 billion, 8,708 jobs). The primary drivers of these increases are dramatically increased sample sizes of business data, and the use of statistical methods designed to estimate the true economic impacts, rather than to provide extremely conservative lower bound estimates.

In 2012, agriculture and plant-based industries comprised 4.9% of Rhode Island gross state product (GSP) and 3.9% of total private sector employment in the State. Excluding local, state and federal government spending, green-related sectors directly contributed 5.7% of private sector GSP. As a group, green-related firms form a sector of the RI economy larger than Construction, Education, or Hospitality and Food.

We use economic multipliers to estimate how growth in the green-related sectors spills over to the broader economy. If one sector grows, business owners and employees in this sector then spend the extra money throughout the economy, creating growth and jobs in other sectors.

As a group, green-related industries rank 9th out of 18 major private industry sectors of the RI economy, between Construction (\$2.2 billion) and Information (\$2.7 billion).

If all green-related sectors grew by 5%, the estimated impact to the rest of the Rhode Island economy would be \$94.5 million and 387 jobs.

RESULTS

HIGHLIGHTS

Green-Related Industry Statistics

- 9th largest industry sector
- 4.9% of gross state product
- 3.9% of private employment

“As a group, green-related firms form a sector of the RI economy larger than Construction, Education, or Hospitality and Food.”

Direct Economic Impacts *Output and Jobs*



15,826 jobs



\$2.50 billion

Indirect Economic Impacts *Spillover Effects to Other Sectors*

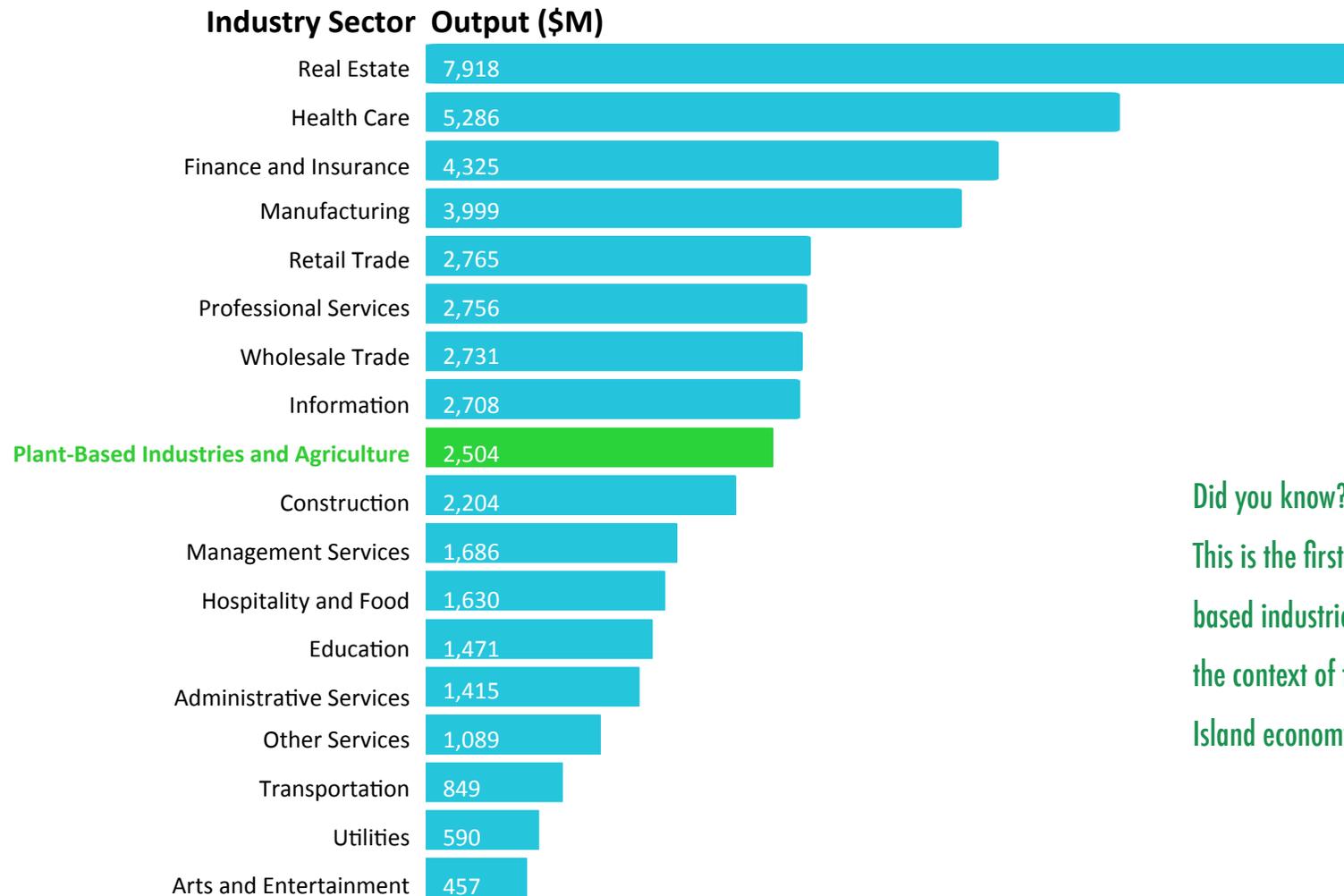


7,736 jobs



\$1.89 billion

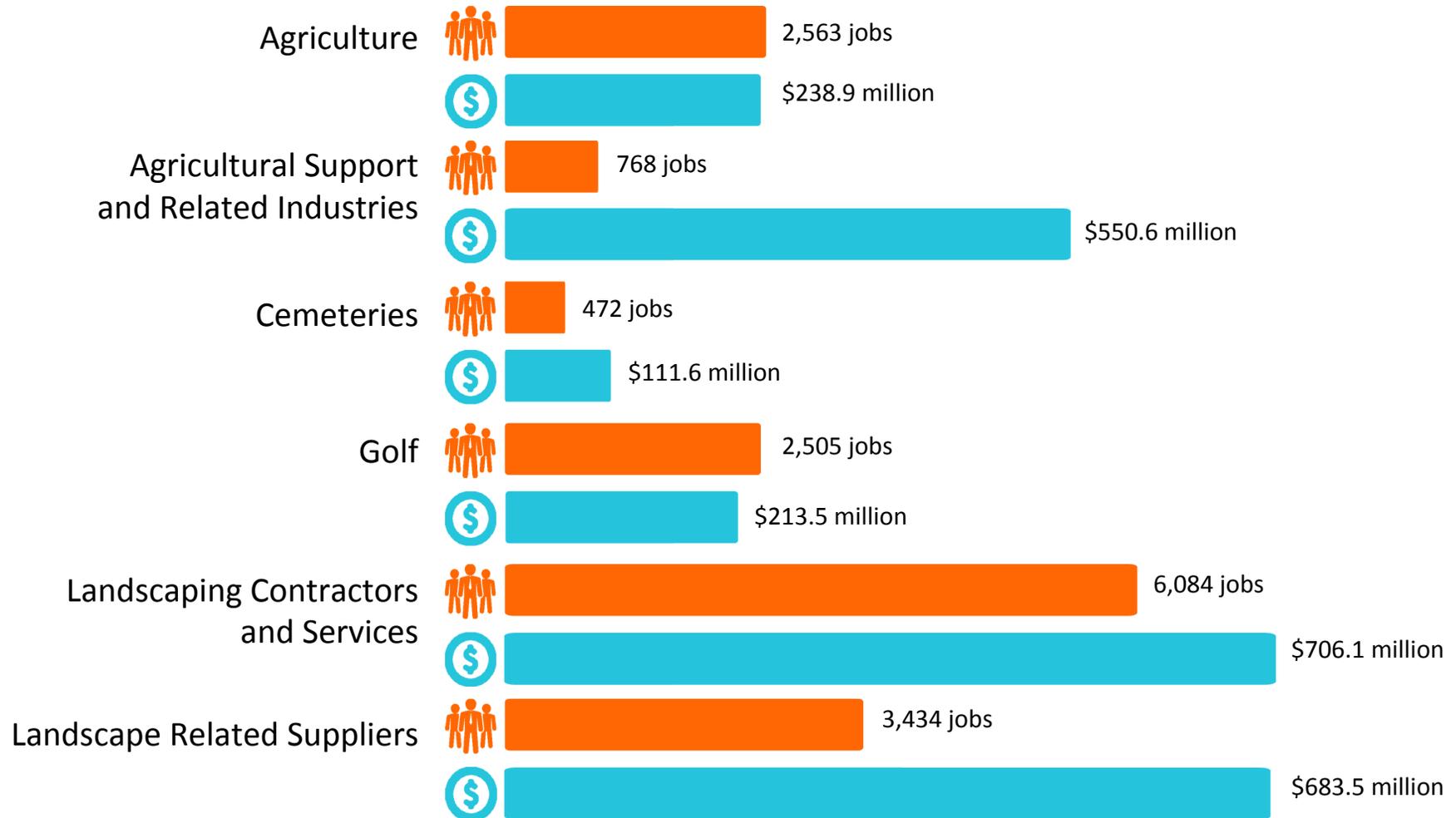
2012 RI INDUSTRY RANKINGS

**Did you know?**

This is the first study to rank plant-based industries and agriculture in the context of the broader Rhode Island economy.

RESULTS

GREEN-RELATED SECTOR SUMMARY





2,563 jobs



\$238.9 million

Subsectors in Agriculture

The following subsector definitions are included in our estimates for agriculture. The details of NAICS classifications for these subsectors can be found in the Technical Appendix to this report.

Animal Production

We estimate all animal agriculture together except for aquaculture. This category includes dairy, ranching and farming of cattle, pigs, sheep or goats, and poultry and egg production. Also included are apiculture (beekeeping), rabbit farming, and breeding operations for horses and pets.

Aquaculture

Includes farming of shellfish, finfish, and hatcheries of both types. Oyster farming operations are the most common type of aquaculture in Rhode Island.

Crop Production

We include all crop farming except for nursery and vineyards, which are estimated separately. This category includes growers of grains, vegetables, melons, fruits, tree nuts and other crops.

Did you know?

Agricultural output (4x) and jobs (1.4x) are dramatically larger than the 2012 Agricultural Census figures.

We estimate gross sales of \$238.9 million and 2,563 jobs, excluding more than 2,000 jobs of farm operators and family members.

RESULTS

AGRICULTURE

Greenhouse, Nursery and Floriculture
Production is the largest subsector of
Agriculture with sales of \$110.1
million and 1,251 jobs.

Subsectors (continued)

Grape Vineyards

Grape vineyards are a distinct economic model from other crop production, because of the production of both grapes and wine on the farm premises.

Greenhouse, Nursery and Floriculture Production

Includes nursery, sod farming, horticulture, floriculture and greenhouse production, as well as Christmas tree farms.

Subsector	Sales (\$M)	Jobs
Animal Production	44.1	366
Aquaculture	3.0	105
Crop Production	63.1	776
Grape Vineyards	18.5	65
Greenhouse, Nursery and Floriculture Production	110.1	1,251
Total	238.9	2,563

AGRICULTURAL SUPPORT & RELATED INDUSTRIES



768 jobs



\$550.6 million

Subsectors in Agricultural Support and Related Industries

The following subsector definitions are included in our estimates for agricultural support and related industries. The details of NAICS classifications for these subsectors can be found in the Technical Appendix to this report.

Farm Machinery and Equipment Wholesalers

Wholesale dealers of heavy tractors, combines, food and grain processing equipment and animal transport equipment.

Farm Management Services

Consulting services related to farming, including managing farm operations.

Produce, Grocery and Related Wholesalers

Wholesale dealers of fresh fruits and vegetables, or of raw or minimally processed food items or farm raw materials.

Did you know?

The green-related sector with the highest worker productivity is Agricultural Support and Related Industries. Output in this sector is over \$700K per worker.

RESULTS

AGRICULTURAL SUPPORT & RELATED INDUSTRIES

Produce, Grocery and Related Wholesalers is the largest subsector of Agricultural Support and Related Industries with sales of \$505.6 million and 661 jobs.

Subsectors (continued)

Support Activities for Animal Production

Includes livestock breeding and facilities services, facilities design and installation, and provision of feed. Does not include veterinary services.

Wineries

These businesses are distinct from vineyards; they are engaged in processing raw grapes, grown by others, into wine.

Subsector	Sales (\$M)	Jobs
Farm Machinery and Equipment Wholesalers	11.4	26
Farm Management Services	0.5	4
Produce, Grocery and Related Wholesalers	505.6	661
Support Activities for Animal Production	16.9	40
Wineries	16.1	37
Total	550.6	768

CEMETERIES



Subsectors in Cemeteries

Cemeteries contains only one subsector under the NAICS system.

Cemeteries and Crematories

Our study includes only cemeteries. We exclude all crematories, funeral homes and chapels, as those firms do not have the same involvement with the landscaping and nursery industries.

Did you know?

Cemeteries are among Rhode Island's oldest organizations. The oldest independent cemetery in our study is Warren South Burial Ground of Warren, RI, founded in 1840.

Subsector	Sales (\$M)	Jobs
Cemeteries and Crematories	111.6	472

RESULTS

GOLF

Did you know?

Rhode Island has 74 businesses in the Golf sector. A single golf course may have separate business entities controlling country club, pro shop, and greens management.



2,505 jobs



\$213.5 million

Subsectors in Golf

Golf contains only one subsector under the NAICS system.

Golf Courses and Country Clubs

Includes practice courses, driving ranges, country clubs, public and private golf courses, and associated grounds keeping, course management and pro-shop operations.

Subsector	Sales (\$M)	Jobs
Golf Courses and Country Clubs	213.5	2,505

LANDSCAPING CONTRACTORS & SERVICES



6,084 jobs



\$706.1 million

Subsectors in Landscaping Contractors and Services

The following subsector definitions are included in our estimates for landscaping contractors and services. The details of NAICS classifications for these subsectors can be found in the Technical Appendix to this report.

Landscape Architectural Services

Includes both landscape architecture and landscape design firms, so long as they are concerned with design and drafting of plans, rather than installation and maintenance.

Landscaping Services

Includes operations such as garden design and installation, maintenance, mow-and-blow, stump grinding, pest control, and tree services.

Masonry Contractors

Includes outdoor tile and stonework, and decorative stone. We exclude chimney, waterproofing, foundation, and interior masonry contractors.

Did you know?

The largest green-related sector is Landscaping Contractors and Services. This sector accounts for almost 20% of green-related jobs in Rhode Island and 28% of sales.

RESULTS

LANDSCAPING CONTRACTORS & SERVICES

Landscaping Services is the largest subsector of Landscaping Contractors and Services with sales of \$455.5 million and 4,485 jobs.

Subsectors (continued)

Other Services to Buildings and Dwellings

Includes power washing operations for patios, decks, hardscape and home exteriors. Sandblasting, painting and other services are excluded.

Other Specialty Trade Contractors

Includes landscape lighting, swimming pool and spa installation and repair, fence contractors and patio, deck and driveway builders.

Site Preparation Contractors

Includes irrigation installation, landscape excavation and grading contractors. These contractors are excluded if they do not do landscape related work.

Subsector	Sales (\$M)	Jobs
Landscape Architectural Services	25.8	194
Landscaping Services	455.5	4,485
Masonry Contractors	64.6	639
Other Services to Buildings and Dwellings	1.0	6
Other Specialty Trade Contractors	125.1	602
Site Preparation Contractors	34.0	158
Total	706.1	6,084

LANDSCAPE RELATED SUPPLIERS



3,434 jobs



\$683.5 million

Subsectors in Landscape Related Suppliers

The following subsector definitions are included in our estimates for landscape related suppliers. The details of NAICS classifications for these subsectors can be found in the Technical Appendix to this report.

Brick/Stone Materials Wholesalers

Sellers of bulk sand, gravel or decorative stone for landscaping. Concrete-only operations are excluded from our study.

Florist and Nursery Supply Wholesalers

Wholesale only dealers of florist supplies and nursery stock.

Florists

Retail flower and gift shops, and floral arrangement services.

Nursery, Garden Center and Farm Supply Stores

Primarily retail operations selling plants, landscaping supplies, tools, and materials. Also includes wholesale mulch suppliers and farm supply stores selling seed and fertilizer.

Did you know?

The most recent Federal government estimates from the 2007 Economic Census counted 81 retail florists in the State, with sales of \$23.8 million and 343 jobs. We counted 153 retail florists with sales of \$90.1 million and 890 jobs.

RESULTS

LANDSCAPE RELATED SUPPLIERS

Nursery, Garden Center and Farm Supply Stores is the largest subsector of Landscape Related Suppliers with estimated annual sales of \$430.9 million and 1,786 jobs.

Subsectors (continued)

Other Building Material Dealers

Includes suppliers of fencing materials, pools and spas, irrigation components and landscape lighting.

Outdoor Power Equipment Stores

Sellers of lawnmowers, lawn tractors, snow blowers, etc., but not heavy farm equipment.

Subsector	Sales (\$M)	Jobs
Brick/Stone Materials Wholesalers	16.6	73
Florist and Nursery Supply Wholesalers	12.3	75
Florists	90.1	890
Nursery, Garden Center and Farm Supply Stores	430.9	1,786
Other Building Material Dealers	99.4	463
Outdoor Power Equipment Stores	34.2	147
Total	683.5	3,434

NOTES

1. Sproul and Elsner (2013).
2. Sproul (2014).
3. Hall et al. (2005) and others have used “green industry” to describe environmental horticulture and related sectors. We use “green-related industry” instead to avoid confusion with the “green” moniker adopted by the clean energy and recycling industries in the early 2000s. The same “green-related industry” terminology is used in Sproul and Elsner (2013).
4. See Bristol (1972, p19) and Wright and Sullivan (1982) for background on the explosion of landscape-related agriculture in Rhode Island in the 1970s and 80s.
5. We do not include forestry, wood products or commercial fishing and processing in our estimates due to data limitations. A recent study estimates that commercial fishing and processing account for \$274 million and 2,900 jobs (Farm Credit East, 2012).
6. Sproul and Elsner (2012).
7. USDA (2014).
8. Aquaculture estimates are not included in these counts. The data are sourced from the RI Coastal Resource Management Council.





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