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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public.

This publication includes lecture notes of papers presented at the 2021 GREEN EXPO Turf and Landscape Conference. Publication of these lectures provides a readily available source of information

covering a wide range of topics and includes technical and popular presentations of importance to the turfgrass industry.

This proceedings also includes research papers that contain original research findings and reviews of selected subjects in turfgrass science. These papers are presented primarily to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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Deborah Spinella, Proceedings Layout Editor
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THE NEW JERSEY TURFGRASS INDUSTRY: 2019 ECONOMIC IMPACT, STRUCTURE, AND CHARACTERISTICS

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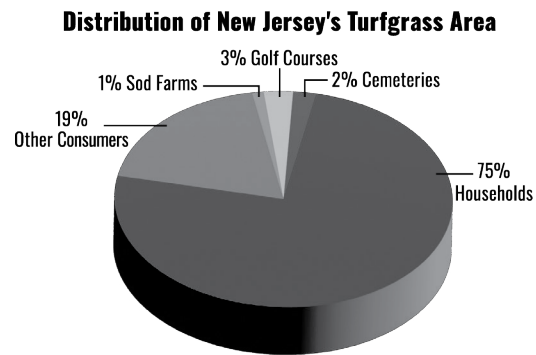
OVERVIEW

The purpose of this study was to evaluate the impact of the New Jersey turfgrass industry on the economy of the State and to characterize the nature of the industry. Much information has been gleaned from this study including quantitative information such as the number of acres of turf maintained, number of workers employed by the turfgrass industry, turf-related expenses, and contribution to the State economy, as well as qualitative information such as species of turfgrass used, product sales, market distribution channels, and maintenance practices.

To accomplish this objective, survey information from each of seven sectors of the New Jersey turfgrass industry were obtained and analyzed. The turfgrass sectors covered in the study included sod producers, manufacturers, service providers, golf courses, cemeteries, homeowners, commercial institutions, and non-profit institutions. The surveys were administered by the National Agricultural Statistics Service (NASS), United States Department of Agriculture. All of the industries and end-users were mailed survey instruments and follow-up surveys (if necessary) between December 2019 and September 2020.

It was estimated that turfgrass covered 953,500 acres in New Jersey in 2019. Figure 1 shows the percentage of turfgrass area by consumer sector. Of that total, New Jersey's turfgrass service providers maintained 353,600 acres of turfgrass. Turfgrass remains a major land cover in New Jersey, accounting for 20% of the State's total land area.

Figure 1. Proportion of New Jersey Turfgrass Area by Consumer Sector



Economic impact analysis was conducted to estimate the overall economic activity in the State generated by New Jersey turfgrass sectors. The analysis showed that the turf industry contributed \$4.9 billion to the New Jersey economy and generated 59,159 jobs in 2019. Table 1 shows the growth in turfgrass area and economic impact by industry sector.

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Table 1. Turfgrass Area and Economic Impact by Turfgrass Sector

Industry/Consumer Sector		2019 Turfgrass Area (acres)	Change from 2001 Study (%)	2019 Economic Impact (\$ Million Output)	Change from 2001 Study (%)
Turfgrass Businesses	Sod Farms	8,300	-7%	\$94.7	43%
	Service Providers	353,600	48%	\$2,296.2	75%
	Total Businesses	361,900	46%	\$2,390.9	73%
Turfgrass Consumers	Golf Courses	30,200	29%	\$1,363.4	39%
	Cemeteries	22,100	0%	\$87.3	43%
	Households	712,600	7%	\$2,768.7	58%
	Other Consumers	180,300	12%	\$630.7	47%
	Total Consumers	945,200	8%	\$4,850.2	51%

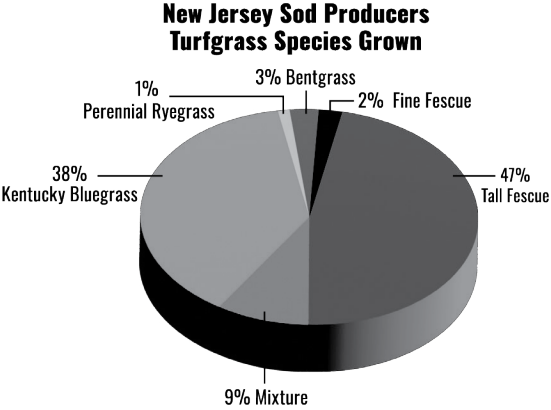
Moreover, it was estimated that the value-added to the State economy from the turfgrass industry was \$3.2 billion and that the turfgrass industry generated \$271.8 million in State tax revenue in 2019.

Previous estimates of New Jersey’s turfgrass economic impact were reported in two studies using data collected in 1983 and 2001, respectively. The current study shows that turfgrass acreage increased by 8% and the total turfgrass economic output increased by 51%, compared to data collected in 2001. The New Jersey turfgrass industry has grown significantly over the past two decades and continues to play a very important role in the State’s economy.

NEW JERSEY SOD PRODUCERS

There are 31 sod producers in New Jersey. The average sod farm surveyed had 59 years of experience in the business. The entire New Jersey sod farm industry managed an estimated 8,300 acres of turfgrass in 2019. As Figure 2 shows, 47% of New Jersey sod grown was tall fescue, 38% was Kentucky bluegrass and 9% was a mixture of other species, followed by bentgrass (3%), fine fescue (2%), and perennial ryegrass (1%). create a real management challenge; for example, sport turfs often exhibit different “field within the field” variations due to concentration of activity/traffic: midfield wear versus non-worn areas. Similarly, there can be “lawn within the lawn” variation due to differences in slope, sun/shade, or adjacent vegetation effects. Soil testing can help to identify what amendments and fertilizer are useful in these situations.

Figure 2. Distribution of Turfgrass Species Grown by New Jersey Sod Producers



Sixty percent of New Jersey sod producer sales were wholesale to landscape contractors, 14% of sales were direct retail to the public, 14% were wholesale to institutions, 9% of sales were wholesale to retailers, 2% were wholesale to other sod producers, and 1% were for in-house use.

New Jersey sod producers billed an estimated \$49.8 million for sod in 2019. The total impact (including indirect impacts) of New Jersey’s sod producers to the State was estimated to be \$94.7 million. Total jobs generated by New Jersey’s sod producers were estimated at 1,051. Economic impact analysis also showed that New Jersey sod producers generated an estimated \$3.8 million in State tax revenue in 2019. This estimate of state tax revenues includes sales and use tax, personal income tax, and corporate business tax.

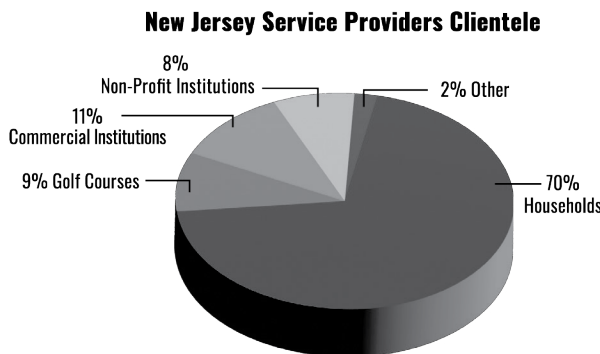
NEW JERSEY SERVICE PROVIDERS

There are an estimated 2,549 turfgrass service providers operating in New Jersey. New Jersey's turfgrass service providers serviced an estimated 353,600 acres of turfgrass in 2019.

New Jersey's turfgrass service providers offer a wide variety of services; the most common services included fertilizer application (74% of respondents), insecticide application (74%), plantings of ornamentals (70%), pruning (70%), herbicide application (70%), overseeding (70%), mowing (65%), aeration (65%), and soil testing (65%). Thirty-five percent of respondents offer natural or organic lawn management services. It is notable that nearly 48% of service providers plow snow during the winter months.

Figure 3 shows the composition of clientele among New Jersey's service providers. On average, 70% of the clients were households, followed by commercial businesses (11%), golf courses (9%), and non-profit organizations (8%).

Figure 3. Percentage Distribution of Clientele

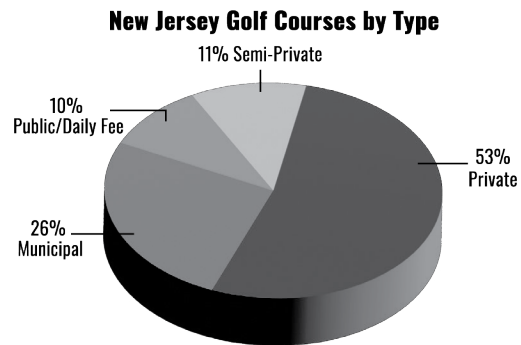


Turfgrass service providers employed 28,726 in 2019. New Jersey turfgrass service providers billed an estimated \$1.2 billion for services provided in 2019. Mowing accounted for the largest share of sales at 51%. The total impact (including indirect impacts) of New Jersey's service providers to the State was estimated to be \$2.3 billion. New Jersey service providers generated an estimated \$127.3 million in State tax revenue in 2019, including sales and use tax, personal income tax, and corporate business tax.

NEW JERSEY GOLF COURSES

There were an estimated 289 golf courses in New Jersey in 2019. Figure 4 shows the distribution of New Jersey golf course by type.

Figure 4. Distribution of Golf Courses in New Jersey by Type



The total land area managed by New Jersey's golf courses was estimated to be 39,700 acres, comprised of 76% turfgrass and natural area and 24% other areas (e.g., buildings, parking lots, etc.). In total, it was estimated that more than 6.2 million 18-hole rounds of golf were played in 2019 in New Jersey, and an additional estimated 3.7 million 9-hole rounds.

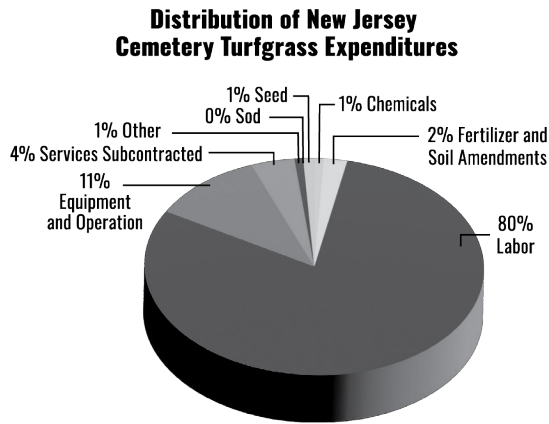
New Jersey golf course revenues generated \$1.4 billion of total economic activity (including indirect impacts) in New Jersey in 2019. The employment impact of New Jersey's golf courses totaled 11,021 jobs. Furthermore, New Jersey golf courses generated an estimated \$78.2 million in State tax revenue in 2019.

NEW JERSEY CEMETERIES

There were an estimated 1,980 cemeteries in New Jersey in 2019. The estimated turfgrass area maintained by New Jersey cemeteries totaled 22,100 acres. New Jersey cemeteries spent an estimated \$52.6 million in turf-related expenses in 2019.

Figure 5 shows the breakdown of cemetery expenditures by type.

Figure 5. Distribution of New Jersey Cemetery Turfgrass Expenditures



Regarding turfgrass-related issues, fifty-six percent of New Jersey cemetery respondents indicated that controlling weeds was a difficult turf-related problem. Other challenging problems included water-related issues (33%), labor availability (28%), and soil-related issues (22%).

The total output impact (including indirect impacts) of New Jersey's cemeteries to the State was estimated to be \$87.3 million. Total jobs generated by New Jersey's cemeteries were estimated at 11,373. In addition, it was estimated that the turfgrass maintenance activities of New Jersey cemeteries generated \$5.1 million in State tax revenue in 2019.

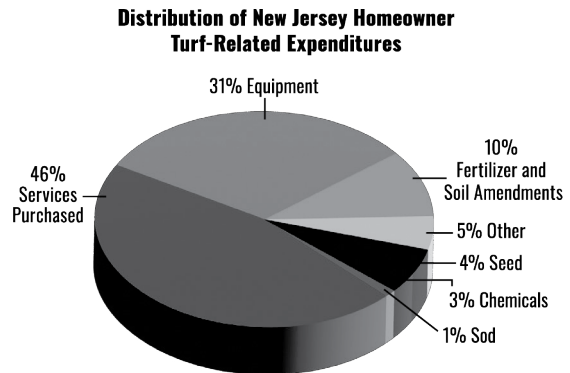
NEW JERSEY HOMEOWNERS

New Jersey's single-family homeowners maintained a total of 712,600 acres of turfgrass in 2019, an increase of approximately 47,000 acres since the last turfgrass economic survey was conducted in 1999. The average lot size for a single-family home was 0.78 acres while the average turfgrass area was 0.36 acres.

The most difficult turfgrass maintenance problem cited by New Jersey homeowners was weeds. Eighty percent of New Jersey homeowners indicated that controlling weeds was a difficult turf-related problem. Other challenging problems included poor soil (26%), shade (26%), and disease (26%).

New Jersey's single-family homeowners spent approximately \$1.47 billion (excluding unpaid labor) on turfgrass maintenance in 2019, an increase of approximately \$0.47 billion since the last survey was conducted in 1999. Figure 6 shows a breakdown of New Jersey homeowner turfgrass expenditures by type.

Figure 6. Distribution of New Jersey Homeowner Turfgrass Expenditures

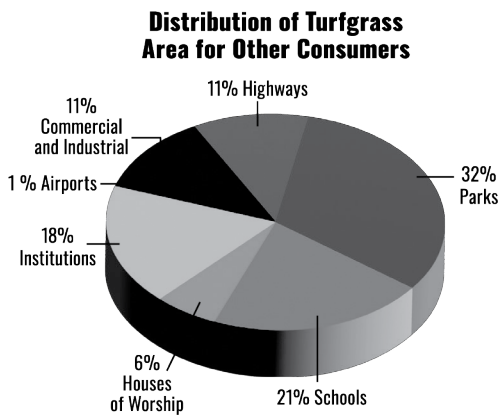


The total output impact (including indirect impacts) of New Jersey's home lawns to the State was estimated to be \$2.8 billion. Total jobs generated by New Jersey's home lawn sector were estimated at 27,503. In addition, it was estimated that the turfgrass maintenance expenditures by New Jersey homeowners generated \$153.5 million in State tax revenue in 2019.

OTHER TURFGRASS CONSUMERS

This group of turfgrass consumers includes parks, schools, houses of worship, institutions, airports, highways/roadsides, and all commercial establishments. The turf area maintained by this sector was 180,300 acres in 2019; Figure 7 shows the distribution of turfgrass area for Other Consumers.

Figure 7. Turfgrass Area for Other New Jersey Turfgrass Consumers



The total annual turf-related maintenance costs for New Jersey’s Other Turfgrass Consumers were \$335.6 million (see Table 2).

Table 2. Turf Statistics for Other New Jersey Turfgrass Consumers

Item	2019 Est.
Total turf area (acres)	180,300
Average maintenance cost per acre (dollars)	\$1,861.6
Total turf maintenance expenditures (million dollars)	\$335.6
Total economic impact w/ induced and indirect impacts (million dollars)	\$630.7

Economic impact analysis showed that turf-related expenditures by other turfgrass consumers generated an estimated \$630.7 million worth of total economic activity in New Jersey. With respect to employment, the turfgrass expenditures of other consumers generated 9,262 jobs in New Jersey. In addition, turfgrass maintenance expenditures by other turfgrass consumers generated \$35.0 million in State tax revenue in 2019.

ACKNOWLEDGMENTS

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To learn more, download the full report: <https://turf.rutgers.edu/docs/2019-Turfgrass-Report.pdf>