The Economic Contribution of Colorado's Green Industry:

Revenue and Employment Trends

By

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Supported by a grant from GreenCo, the Green Industries of Colorado.

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December 2003

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Executive Summary:

The Economic Contributions of Colorado's Green Industry

- A recent US study estimates that consumers spent nearly $40.7 billion on garden-related products in 2001, up 12.1% from $36.3 billion in 2000, with the average U.S. household spending $444 on lawn and garden goods in 2001 (Danziger).
- Colorado expenditures on garden-related products, landscape and lawn service and other related green industries (irrigation, botanical gardens, outdoor equipment) have followed a similar trajectory, averaging 10% growth per year since 1993, for a total of $1.67 billion in 2002.
- Based on multipliers generated through the IMPLAN input/output model, total economic contributions of Colorado's green industry totals:
    - $2.1 billion (using a Type I multiplier that includes indirect activity with other local businesses), to
    - $3.3 billion dollars (using a type II multiplier that includes indirect activity and expenditures from wage payments to households), to
    - $5 billion (using a SAM multiplier that includes indirect activity and wages and factor payments made to broader economic agents).
- Total green industry employment was almost 34,000 jobs. For every million dollars in green industry output, the industry generates between 24 and 43 jobs, depending on which multiplier is used.
- Assuming total direct green industry output of $1.67 billion, 27% of industry spending goes to intermediate inputs and 73% is value added (payments to capital and labor), which creates a high multiplier to statewide economic activity.

- In 2002, the green industry in Colorado experienced a decline in economic activity, but still accounted for $1.668 billion directly, or $1.953 billion when its impact on broader economic activity in the Colorado economy is considered.
    - There was a significant decrease in revenues from 2001 of over $60 million, which corresponds to about a 4% drop in revenues.
    - The decrease in revenue might have been more substantial if not for sustained consumer demand (for plant materials and new irrigation/garden equipment) and new business strategies, such as a willingness to provide snow removal by landscape companies and more year-round activity (Christmas trees) by nursery and garden centers.
    - When considering previous growth patterns, drought restrictions and the economic downturn had a more compounded effect (the drop in revenues plus the forgone growth of about 10% per year).
- The green industry provides almost 34,000 jobs, an increase of 11,000 jobs since 1994 (6% growth per year), with $825 million in payroll (up $450 million from 1994 or 18% annual growth).
    - These increases are indicative of the demand for green services and the ability to hire workers on a more year-round basis.
    - There was also a drop in workers between 2001 and 2003 (350, then 1550 workers) but payroll increased in 2002 ($40 million) before a decline of $20 million in 2003.

- The green industry generates 30% of its revenue from exports (domestic and foreign), giving it many features of a strong base industry that brings new dollars to Colorado's economy.
- This study includes the production, wholesale and retail sales for floriculture, nursery, and trees; the value of inputs, including garden supplies, irrigation equipment and outdoor equipment; and, the development and care of landscapes including golf courses, landscape design/construction, landscape maintenance (for homes, businesses, public gardens and cemeteries).
- A Texas study that found mass merchants and retail stores added about 42% in additional green industry sales. The USDA suggests this trend leads to under-reporting for the retail nursery sector by almost 40%. As a conservative estimate, this study assumed that 35% of retail sales were lost to mass retailers, a figure used to adjust some sales to account for out-of-sector activity.
- An Illinois study found that out-of-sector end-user payrolls suggest a 17% undercounting of economic contributions from the green industry. In this study, we assume that 20% of relevant end-user values are not reported for several sectors, and adjust landscaping activity upwards accordingly.
- Most green sectors show growth for the years 1993 to 2001, except floriculture production, which was significantly affected by competition from international trade.
    - The highest growth sectors during the 1990's were landscape design and maintenance, public and private golf courses, and nursery/garden centers.

- Florists and nursery and tree production were important sectors but reported flatter revenue trends.
- A few sectors actually showed modest growth from 2001 to 2002 but appear to have lost sales in 2003 including landscaping architectural services, golf courses, flower and nursery stock wholesale, nursery and tree production, nursery and garden centers, and golf courses.

The Economic Contributions of Colorado's Green Industry

I. Introduction

The ornamental horticulture sectors of the agricultural and service industries are of growing interest because of their high growth during the past several decades. One recent study of the entire U.S. industry estimates that consumers spent nearly $40.7 billion on garden-related products in 2001, up 12.1% from $36.3 billion in 2000, with the average U.S. household spending $444 on lawn and garden goods in 2001 (Danziger). The acceleration in green industry activities is fueled by tremendous growth in the demand for ornamental plant materials, landscapes and maintenance services among both homes and businesses, as well as the rapid growth in landscape ordinances by local communities.

The importance, growth and economic role of the sector is of increasing interest because of urban agriculture's competitive position relative to traditional food crop agriculture and other industries due to increasing land, water and labor competition in some high-growth regions. As evidence of the industry's increasing importance, professionals in the landscape and building services industry will begin to receive business census surveys in 2002 and 2003. Also, the new North American Industry Classification System (NAICS) implemented in the early 2000s includes a broader array of business activity specifically designated to ornamental horticulture categories, including landscape architecture, construction and maintenance, and nonfarm outdoor equipment sales and repair.

Still, there are some significant challenges to measuring the size and economic impact of green industries, including insufficient historical data, increasing involvement

in retail sales by large retailers (Walmart and Home Depot) and the fact that many of the industry's services are part of companies' general facilities management or part of public agencies' parks, recreation, transportation and amenity budgets (both of which limit data availability for analysis). In assessing Colorado's green industry, we will review other states' approaches to analyzing the industry, and present revenue and employment findings for Colorado's industry, along with an economic impact analysis of green industries in Colorado. These results also include an overview of some of the complicating factors related to the change in data categorization by government units, as well as the increasing complexity of green industry market structure.

II. Literature Review

As a starting point for the most recent Colorado green industry analysis, a review of studies conducted in other states was completed. Table 1 summarizes findings from that review of the literature. These studies provide several valuable pieces of information. First, the size of other states' green industries provide a baseline number with which to compare Colorado's industry, especially when numbers are standardized on a per capita basis or as a share of the state's total Gross Domestic product (GDP). For marked variations, it is important to note differences in source data, the variety of subsectors included and whether numbers were based on direct sales and payroll or figures that integrate more indirect effects through regional impact multipliers. Finally, several other states have done more in-depth analysis that allows us to make assumptions about potential biases in results in our direct data sources. For instance, the share of sales lost to large mass retailers (not included in our sample) or some end-users that are major

factors in the green industry's economic impact (municipal park districts or company-owned grounds maintenance units) can be assessed only by reference to other students.

II. a. Past Studies

The previous study of the economic contribution of Colorado's green industry was published in 1997 and used 1993 data for analysis. The study was conducted by the Colorado State University Department of Agricultural and Resource Economics and the USDA Forest Service, with cooperation and funding from the GreenCo Foundation. The report analyzed sales, employment, and earnings figures from the Colorado Department of Revenue, Department of Labor, Business Census, Retail sales tax, and IMPLAN data. The 1993 sales of the green industry in Colorado were valued at $1.37 billion and the industry employed 25,500 people with a total payroll of $555 million. Retail nurseries comprised the largest sector of the green industry and accounted for 34% of the total sales revenue. The other subsectors of the green industry, lawn and garden centers, landscaping and horticultural services, golf courses, green houses and nurseries, and florists, accounted for the remaining 27%, 21%, 9%, 7%, and 2%, respectively. The previous study provides a baseline to compare the updated revenue and employment estimates and data adjustments in this study.

Illinois conducted a very thorough study of the state's green industry in 1999, including the collection of primary data. The green industry was defined to be "any business, organization, or individual, and associated property that produces, maintains, uses, or sells plant materials to enhance human environments." Following this broad definition, the industry is divided into three sectors: product, service, and end user. The product sector includes growers, wholesalers, and retailers of horticultural and landscape

goods. The service sector is comprised of landscape designers, builders, and maintainers, as well as lawn, tree, and garden maintenance. The end user sector includes the final consumers of the products and services and include golf courses, commercial properties, schools, and municipalities, many of which have there own in-house horticultural employees. Illinois found the total value of the state's green industry to be $3.95 billion. This number includes service receipts (42%), product sales (41%), and end-user payrolls (17%). The three sectors generated a total of 160 thousand jobs, of which the end-user workforce comprised 53%, the product workforce comprised 25% and the service workforce comprised 22% of the total. End-user payrolls made up 35% of the total industry payroll (over $1.7 billion) with the service and product sector payrolls making up 35% and 27%, respectively. The industry also paid $600 million in taxes in 1999. A majority of the product and service sector firms in the state's green industry were single-location and family-owned businesses and the firms averaged 24.5 years in business for product sector firms and 19.6 years for service sector firms.

Texas conducted an extensive survey of the state's green industry in 2000. The total sales of the green industry firms amounted to $7.98 billion and other firms in related sectors contributed another $1.78 billion for a total economic contribution of $9.76 billion. Of the $9.76 billion in total value, $1.33 billion was contributed by the nursery sector, $1.93 billion from retail garden centers, $4.09 billion from home centers and mass merchants, and $2.40 billion from landscaping firms. The state's industry employed 222 thousand people, one-third of which were employed at garden centers at large mass merchants (such as Walmart) and home centers (such as Home Depot). The economic values added by the green industry totaled $6.46 billion, including $437 million in

exports. The industry has been growing and two-thirds of retailers surveyed expected to increase their retail square footage by as much as 79% in subsequent years.

In 1998, Connecticut found the total sales contribution of the state's green industry to be $855 million, and accounted for 26 thousand jobs with a payroll of $423 million. In addition to this, the industry paid $81 million in taxes. The Connecticut study was part of a larger study of the economic contribution of the New England Environmental Horticulture Industry. Again, this study relied heavily on surveying of green industry related businesses.

Arizona conducted a similar study in 1999. It utilized surveys of green industry related businesses and found a total sales impact of around $950 million, a workforce of 21 thousand jobs with a total payroll of $307 million. This study, however, may have underestimated the total contribution of the green industry by only reporting figures for the landscaping and nursery sectors. Many sectors, such as floriculture, equipment, municipal horticulture, equipment suppliers, turf and golf courses were not assessed in that state's study.

The state of Washington conducted a study in 1997 that surveyed all large wholesalers and retail stores, as well as sampling the state's holders of professional nursery licenses, but the study did not look at professional grounds maintenance workers. The survey found the total value of the green industry to be $1.1 billion with the landscaping and nursery sector accounting for about 80% of the total sales and 20% of sales attributed to wholesalers. Washington's green industry generated 55 thousand jobs at its summer peak, and had total revenues of $232 million. Finally, the green industry firms paid $66.5 million in taxes.

Louisiana conducted a study in 1995 to estimate the value of the green industry to the state's economy. It used an IMPLAN generated input-output model coupled with surveys of green industry producers. The overall sales impact of the green industry to the state of Louisiana was $1.3 billion. The green industry also generated 26 thousand jobs with a total payroll of $486,000.

Florida has conducted two surveys of the state's environmental horticulture industry with support from the University of Florida Institute of Food and Agricultural sciences. The first study was conducted in 1997 and surveyed wholesale nurseries, horticultural retailers, and landscape service providers, as well as residential and commercial consumers of horticultural products. The study estimated the value of the environmental horticulture industry to be $5.9 billion with a payroll of almost $3 billion dollars and a workforce of over 120,500 people. The latest study was conducted in 2001 and utilized surveys of 1,500 commercial firms and 500 household consumers. The study was designed to encompass growers of woody ornamentals, tropical foliage, bedding plants, retailers, garden centers, contract landscapers, and landscape maintenance professionals. The survey also attempted to address the effect of the ongoing drought on the green industry. The study found that in the year 2000, firms had total sales of $8.5 billion and generated $320 million in taxes. It was also estimated that the industry generated 193 thousand jobs with a payroll of $2.9 billion. The net income to individuals and firms, the best way to account for returns above the costs of resources used in an industry, was estimated to be $4.4 billion. It was found that 80% of the green industry firms surveyed experienced a reduction in sales due to the drought, with nurseries and landscaping firms suffering a net decrease in sales of $245 million (or about 3%).

Idaho conducted a study of the state's green industry by surveying for data. Of the 1,000 surveys mailed to eligible firms, over 50% of the surveys were completed and returned. Based on the data from these surveys, the total economic value of Idaho's green industry was estimated to be $660 million with $6.8 million paid in taxes. The industry generated 13 thousand jobs with a payroll of $70 million.

Tennessee's green industry generated $6.37 billion in economic output, $4.5 billion of which was considered value added, and accounted for 14% of the state's agricultural economy in 2000. This study looked at both direct effects and indirect effects, which include impacts that result from economic activity of other sectors that supply goods and services to the green industry. So, the direct value of the state's green industry was around $3.2 billion with the remainder of the impact through indirect effects in other industries. The state's green industry employed almost 73,500 people with another 40,000 people employed in sectors related to the green industry.

Ohio conducted a survey of nursery retailers and producers in the green industry in 1996. Firms recognized as part of the green industry were wholesale producers, landscape installation, landscape maintenance, retail garden centers, and mail order retailers. The study used questionnaires mailed to a random representative sample of the green industry firms. The response rate for the questionnaires was 14% for dealers and 34% for producers. The industry totals were then determined from the survey data. The total value of the green industry to the state was estimated to be almost $2 billion. The industry employed 93 thousand people with a total payroll of $660 million. The green industry grew at an average annual rate of 5.6% for a compounded 56.7% growth rate between the years of 1988 and 1996.

II.b. Lessons from Other States

In short, the comparative nature of these studies is limited by the diverse scope and methods used by different groups of researchers. Moreover, it is clear that the service end of this industry is substantial and growing, which may make measurement by any state or region more challenging. This is especially true when one considers that services may be managed "in-house" by large businesses, government institutions and educational districts with campuses, includes public parks, cemeteries and roadways and these have an intrinsic value, even if not privately traded in the market. Finally, the increasing role of mass retailers and home improvement stores (whose data is aggregated in broad retail sales sectors) with respect to retail sales within the green industry would suggest that analyzing the performance of the industry will be more complex than simply assessing the narrow business lines that focus on ornamental horticulture activities.

Among the most pertinent information gleaned from these previous studies are the findings on the impacts of mass retailer stores and the contributions of end-user payrolls to the total economic contributions of the green industry. Texas' study that found mass merchants and retail stores added about 42% in additional green industry sales that were not otherwise accounted for in direct surveys or revenue statements of horticultural firms. Based on this, and similar estimates from the USDA, it can be assumed that other states may be under reporting the retail nursery sector by almost 40%. As a conservative estimate, this study will assume that 35% of retail sales in several sectors are made through broader retail firms that are not included in the sector-specific data series.

The end-user payrolls are also not generally accounted for in most states' assessments of the green industry. Most every company, business, and organization has

some landscaped grounds that they manage. If the maintenance of those grounds is contracted out to a landscape maintenance company, then the revenues from that would be accounted for in the economic assessment. However, if the grounds are maintained internally, then the maintenance of that property will not be accounted for in revenue and payroll estimates from the green industry-specific sectors. To remedy this, Illinois studied the end-user payrolls and found that 17% of the entire economic contributions of the state's green industry was accounted for by the payrolls of end-users in other economic sectors that were employing workers for ornamental horticulture positions. In this study, we assume that 20% of relevant end-user values are not reported for several of the allied green industry sectors' data series.

III. Revenue and Employment Findings for Colorado

In the first step of the Colorado research project, data from clearly defined NAICS codes were the focus, on orientation developed through discussions with allied green industry leaders and built on sectors included in the earlier CSU study. Then, a time series was developed by translating the NAICS data to the previous Standard Industrial Classification (SIC) system. We determined share of the previous, broadly defined SIC sector was related to green industry activities, and combined sectors when the current NAICS code represents more than one SIC classification. Figure 1 presents the aggregated green industry revenue, economic activity, employment and payroll trends for two points in time, 1994 and 2002. A more complete illustration of the industry's aggregate retail sales trends are presented in Figure 2 and Table 2, while the relative sizes and revenue trends for the individual sectors in the green industry are presented in

Figures 3 and 4. Table 2 and 3 present some of the adjusted numbers for retail and wholesale activity (explanations of these adjustments follow in the data issues section). Employment trends and shares follow similar patterns. Aggregate employment and payroll are presented in Table 4 and Figure 5, while sector-specific shares and trends for worker numbers and payroll are presented in Table 5 and illustrated in Figures 6 and 7.

III.a. Aggregate Revenues

In 2002, the green industry in Colorado directly accounted for $832 million, which we estimate represents $1.667 billion dollars after wholesale, retail and end-user adjustments. There was a decrease from the previous year (2001) when total contributions were estimated between $893 million (direct) and $1.732 billion (after adjustments). This corresponds to about a 7% drop in revenues between 2001 and 2002.

III..b. Aggregate Employment

The allied industry sectors employed 28,527 workers in 2002, or 33,937 when we account for end-users and mass retailers. Payrolls totaled $705.6 million, or $825.5 million when adjusted. A smaller decline was seen for aggregate worker numbers between 2001 and 2002 (down 225 workers out of a total of 28,500 (less than 1%), but payrolls actually increased by over $35 million or 5%. So, we conclude that the industry experienced a slight decline in 2002, most likely due to a combination of the economic downturn (and the effects of the drought). Still, it is important to understand some of the assumptions that were made to arrive at this estimate, and how data was adjusted-- details outlined in the methodology section.

Although we are confident enough to conclude there was a decline in sales and employment levels in 2002, the exact magnitude is difficult to assess because of a switch

in data regime during the same time as major economic and climatic shocks (discussed in more detail below). Even with our estimates, we would conclude that Colorado experienced a 5-10% decrease in revenues and payroll for the allied green industry sector, far less than we expected to find.

III.c. Specific Green Industry Sector Trends

Tables 2 and 3 present some of the revenue and wholesale trends for more narrowly defined green industry sectors between 1993 and 2003, while Figure 4 illustrates those revenue trends by sector. These sector-specific results are interesting for several reasons. First, it is important to understand how various economic and climatic forces are influencing different sectors of the industry. Plus, the differentiation allows us to more closely examine how some data adjustments influenced the aggregate revenue estimates, and more conceptually, how the industry was defined. Finally, it is also important to note how the definition and adjustment of each sector impacts the comparative value of this study to the previous Colorado study (when only SIC was available and less broad categories were integrated).

Most sectors show some growth for the years 1993 to 2003, but the highest growth sectors are landscape architecture/design and maintenance, public and private golf courses, water supply and irrigation systems, and nursery production and wholesale. Floriculture production has declined due to more competitive pressure and international imports of flowers. For 2002, the economic downturn and drought conditions appear to have hurt the landscaping sectors (including cemeteries) the hardest, followed by florists. A few sectors actually showed modest growth from 2001 to 2002, including golf courses and garden centers, but these sectors are forecast to experience declines in 2003. Overall,

the green industries have remained resilient during a time of negative market and natural forces.

When examining employment and payroll numbers (Tables 4 and 5), similar trends exist, but with some important differences. Payrolls have grown faster than revenues, partially due to the higher-than-average growth in labor-intensive service industries, such as landscaping care. For example, landscape care went from one-third of the total green industry payroll to almost one-half, while the labor bill for more capital-intensive sectors (tree production, equipment sales and wholesale nursery and flower sales) remain almost unchanged. Worker numbers have also increased, but at a slower rate than payroll, suggesting two positive trends: more annual pay per worker (growth from $15,700 per worker to $24,700 per worker), and quite likely, less seasonal work, and thus, less employee turnover.

At first, all SIC sectors included in the new green industry NAICS codes were included in the time series calculations of sales. However, the significant decrease in sales (39%) after the switch to the new data classifications led us to realize that some of the former SIC sectors were overly broad, including activities that are not closely aligned with the green industry (farm equipment, design consulting other than landscapes). Subsequently, another trend line was estimated based on the share of any one sector's activity that was allied with the green industry. The true levels lie somewhere between those two lines, but data limitations restrict further refinement. The employment series, while shorter, is a better representation since labor data has been collected under new classifications since 2001, before drought impacts would have significantly influenced economic activity.

Another potentially important sector of the green industry that was not accounted for was the green industry activities of parks and recreation municipal divisions, the Colorado Department of Transportation, schools, and other public sectors that maintain large areas of grass and landscaping. Typically these institutions have in-house personnel who are responsible for the upkeep of the grounds and landscape. Because this labor is not contracted out to a company that is directly affiliated with the green industry, and because public sector agencies do not generate revenues that would be accounted for in the data used in this study, the contributions of such resources, activities and workers are not directly addressed in this study. However, these activities were included by adjusting the service sectors of the green industry following findings from the Illinois study, assuming a 20% shortfall in end-user payrolls to the green industry. Some primary data gathering can be used to support this assumption. Based on spending for parks and landscaping, municipalities are estimated to spend on average $33 per person on parks and park maintenance. Using current population estimates, this corresponds to an additional $150 million, or, an additional 17% in total value, to green industry spending from parks and recreation budgets statewide. Each of these adjustments is included in the data entered into the economic model, but wholesale adjustments will not be included since this activity would represent double counting once indirect and imputed activity is accounted for.

IV. Economic Contribution of the Green Industry to Colorado

In 2002, Colorado's green industry accounted for $1.67 billion dollars in direct revenues, but as is the case with any industry, the impacts of the industry reach farther

than the direct activity measured by sales and employment. Table 6 presents a summary of several indicators of economic contribution for the green industry and several other major sectors. In addition to the variety of channels that benefit from these direct impacts, the green industry also has indirect and induced economic impacts on the state. A full description of the IMPLAN model is presented in the methodology section, but to assist interpretation, a brief summary of multiplier concepts is presented in this discussion of findings. IMPLAN is a commonly used input/output modeling system that gives direct, indirect, and induced economic impacts of given industries on a regional economy. Direct impacts come from employment, payroll and industry output data. Indirect and induced effects are determined through the calculation of economic multipliers. Multipliers are affected by the regional absorption coefficients, the size of which represent where an industry spends the money it receives from sales. Also, multipliers are related to the types of industries from which a given sector buys inputs. This spending represents the recycling of money through the economy and is used to determine the industry's multiplier. There are two main types of multipliers that will be used in this study, employment multipliers and output multipliers. The levels used for these multipliers are presented in Table 7.

Indirect effects are those that result from the interaction of industries, since an industry may purchase inputs from one industry and may provide inputs to another industry and impacts are therefore felt by all other industries that are input or output suppliers. Thus, several industries are interdependent, and increases or decreases in activity in an industry affect other sectors. An example of this might be fertilizer suppliers, sod farms, and landscapers. The fertilizer suppliers are dependent on sod

farmers for their economic activity. The sod farmers and landscapers are at least partially interdependent as sod farms sell inputs to landscapers. The linkages that sod farming displays on other industries are an example of an indirect effect.

Induced effects are incorporated by introducing households as demand for goods and services and a supplier of labor. Employees receive a wage that is then used to purchase goods and services for the household. A given industry then has an economic impact that exceeds its own output and effects on other industries in the region. It also has an effect on regional household spending, which then cycles through the economy and impacts industries that may be unrelated, such as grocery stores and hardware stores. The full impact that an industry has on the regional economy, then, includes its direct output and employment, the indirect effect on other related industries, and the induced impacts from household spending based on employee payrolls.

When looking at only direct (actual revenue generated) and indirect (the green industry's effect on other industries through local purchases) effects of the green industry, IMPLAN shows that the sector generates almost $2 billion dollars in total revenue. This number is based on the direct sales figure derived from primary data and a type I multiplier of 1.26. This means that for every dollar directly generated by the green industry, the green industry generates an additional $.26 in indirect revenues to other industries.

When taking into account direct, indirect, and induced effects (the green industry's impact on the economy due to employee payrolls), IMPLAN estimates the green industry has an economic multiplier of 1.99 and generates $3 billion in revenues. Moreover, if impacts from government institutions, proprietors incomes, and export

revenues are taken into account, then the green industry has an economic multiplier of 3.04 and contributes over $5 billion in total economic impacts.

The green industry also has demands for inputs from other sectors. Of every dollar of green industry output, a certain amount is paid for inputs from other sectors. Every dollar of green industry output can be broken into input cost and value above the costs of the inputs, which is value-added. In the green industry, a total of 27% of each dollar is accounted for as inputs from other sectors. The remaining 73% is value added, which goes to employee compensation, proprietary income, and other incomes not accounted for in the cost of the inputs. According to Table 8, which presents output from the IMPLAN model, the largest suppliers of green industry inputs are the service sector, which receives 8.0% of every dollar of green industry revenue, finance, insurance, and real estate firms (FIRE) (4.2% of every dollar of green industry revenue), and other green industry firms (4.0% of every dollar of green industry revenue).

Of the 73% of the revenues generated that are above the costs of inputs, the majority, 54%, is paid as employee compensation. This indicates that the green industry is quite labor intensive and generates a great deal of employment per dollar of output. By comparison, employee compensation in agriculture only accounts for 7% of total revenue, while and employee compensation in retail and wholesale trade (another sector considered to be highly labor driven) accounts for 42% of total industry output. Employee compensation in services accounts for 46% of the total industry output.

Another important finding is that the green industry purchases a majority of its inputs locally. Over 74% of inputs that are purchased for green industry production are obtained within the state, as evidenced by the regional purchase coefficient (RPC), which

is the percentage of inputs that the green industry purchases from firms within the state of Colorado (by sector). The green industry's RPC ranges from 100% for the construction sector (common for most industries) to 52% for the manufacturing sector. The industry as a whole has an RPC of 74%, which is quite high and suggests green industry firms contribute to the health of several Colorado sectors.

Demand for green industry products and services is driven by private demand (Table 9), as over 40% of total green industry output is accounted for by private buyers. The second largest demand component is intermediate outputs; for example, wholesale nursery products are used as an intermediate input into other products (landscapes). This is followed by domestic exports, which account for 29% of the total industry output demand. The fact that the green industry generates 30% of its revenue from exports (domestic and foreign) indicates that it has many features of a strong base industry, and that it brings new dollars to the Colorado economy.

V. Methodology

There were two important methodological issues that guided our work on this study: the use of IMPLAN, but with specific data collected to more accurately represent this state's green industry; and, modification of available data sources to account for imperfect data sources prior to 2002. In this section, we detail the methods used and how this may influence the interpretation of the results.

V.a. IMPLAN

When a business expands or contracts, there is a well-known ripple effect through the economy from the altered purchases of inputs by the firm and changes in payments to

laborers and owners of capital. Thus, when a green industry firm, such as a nursery, expands, they buy more tree stock and fertilizer and they hire more workers. They may also increase the size of their facilities. All of this new economic activity generates activity in related businesses who sell to the nursery, and who, in turn, buy more inputs and hire more labor. The total impact of a change by one industry therefore is multiplied through the economy through various linkages to other businesses and payments to workers.

To capture this effect, it is necessary to use an economic model that contains these linkages, but it is virtually impossible to fully determine linkages through an entire economy by means of surveys and individual projects. Thus, economists usually use a general framework called IMPLAN that has these linkages calculated, and they adapt it as necessary to improve the standard database used.

The IMPLAN database and related simulations provide a variety of results. First, the *direct* effects of industry activity are given, which are the actual sales or changes in sales of the nursery firms (which are usually determined outside the model). In addition, *indirect* effects are calculated, which are the impacts that related businesses create from new business. Finally, there are impacts due to the expenditures that workers make from their added wages. These are called *induced* effects. These three dimensions of an industry's activity also affect levels of employment in various industries and the industry's earnings and tax revenues. IMPLAN gives estimates of all of these economic characteristics of an industry.

The economic outcomes of an IMPLAN simulation are based on two important features in the model, *multipliers* and *regional purchase coefficients (RPCs).* The

multipliers describe the size of the indirect and induced effects that expansion in a certain industry yields. By definition, the direct multiplier is 1. That is, an expansion of the nursery industry of one dollar leads to increased sales of just that amount. The indirect and induced contributions are then added on top of that effect. An indirect multiplier of 0.42 would imply that the increased output of related businesses adds 42 cents to the direct effect. An induced multiplier of 0.55 would suggest that expenditures from wages add a further 55 cents of sales to the economy from the effect of a dollar expansion in the nursery industry. (It is usual that the induced effect is larger than the indirect effects (See IMPLAN manual)). The total impact on sales would then be 1.97, so that just about an additional dollar in sales is generated from an expansion of the nursery industry. There are similar multipliers developed for employment and tax revenues as well.

The sizes of the indirect and induced multipliers are affected by the economic activity that spills out of the study area, which is the state of Colorado in our analysis. The leakages from the study area come from purchases that are made for imports, which do not multiply through the local economy, as purchases from businesses inside the study area do. The amount of this leakage is shown in the Regional Purchase Coefficient for an industry, which tells the proportion of purchases made by an industry locally. Thus if the RPC is 0.78, then 78% of the purchases of an industry come from within the study area.

IMPLAN uses a variety of national, state and local data to construct the linkages and multipliers described above. The national data is the most extensive but is often not exactly correct for a local industry. For example, to derive output, or sales, relations for the model, national sales per worker are used and then converted state values by multiplying that coefficient by the employment in a certain SIC code. Thus going

directly to estimates of sales for each sector from the Colorado Department of Revenue, as we have done, is more precise and gives a better starting point for the analysis. There are, however, still other types of relations that require values directly from IMPLAN.

V.b. Data Issues

A switch in data collection regimes during a period when major shocks are affecting an industry makes assessing the industry's economic impact a difficult task. For example, many of the NAICS codes that are now narrowly defined for ornamental horticulture once included broader industry activities (such as farm supplies and equipment or general design services). In addition, several sectors (irrigation, cemeteries, outdoor equipment sales and maintenance) were added to account for some backward and forward linkages to the industry. These new inclusions are partially based on the ability to assess industry sectors more accurately under the NAICS classification system. Also, we collected primary information on what share of selected sectors (cemeteries) relates to landscape maintenance.

Colorado's government agencies have adopted the new NAICS codes during different years, with the Department of Workforce adopting new codes in 2001 and the Department of Revenue adopting new codes in 2002. From the data, it also appears that some firms were switched across codes in 1997, the earliest that NAICS codes were available. This may have been a response by agencies that preemptively attempted to properly classify some business lines that had been misdirected in earlier years. Using the shifts in 1997 and coordinated time series of labor and sales data (that switched data at different points in time), this study attempts to control for some of the data

organization and reclassification issues to make the best possible estimates of sector and industry size.

Another important limitation is the fact that more and more retail sales of ornamental horticulture products, and gardening services, will not show up in the NAICS codes dedicated to those activities. This is due to the fact that large, diverse retailers now sell these products (groceries with flowers or Walmart and Home Depot with nursery products and garden inputs and equipment). Also, many large private and public institutions with large campuses or outdoor spaces (Universities, cemeteries, parks and highways) manage those services in-house, so that no data specific to the green industry is reported. Finally, even though these issues would all lead one to assume that the industry will be undervalued in terms of missed revenues, there are also cases where the green industry may get credit for less horticultural-oriented activities, such as golf course revenues that will also include food and services related to golfing.

Each of these limitations represents an issue that has motivated different states to survey and collect primary data, rather than using secondary data, but that may just trade one bias for another. In this case, we tried to thoughtfully apply estimates from other states' studies to approximate the missed revenue and employment impacts.

The final totals for the economic impacts of Colorado's green industry relied on four main assumptions. The first estimate, referred to as the "direct total", was obtained by including the entire share of SIC and NAICS codes with any relationship to the green industry. Because this categorization includes some businesses that are not aligned with the green industry, the direct total may significantly overestimate the true economic contributions of Colorado's green industry (and is one reason that our early 1990's

estimates are lower than the past CSU study). The "adjusted total" attempts to correct the direct total by only including the portion of the code that is directly related to the green industry. This total should be considered the baseline estimate of the true economic contribution of the state's green industry. The "retail and end-user expanded" estimate increases the adjusted total by including the economic contributions of mass merchandisers, home improvement centers, and grocery stores to the green industry, as well as adding in end-user provided services allied with the green industry. The final adjustment is the "multiplier adjustment" which attempts to incorporate secondary impacts of indirect economic activity related to allied green industries. A multiplier of 1.4 was used in this estimate. This is a conservative estimate based on the findings from the Illinois survey of the state's green industry where a multiplier effect of 2.7 was used, but may be more appropriate since such a broad set of sectors was already included in this study's estimations. The application of IMPLAN modeling makes these adjustments less important as well, since they were meant to serve as baselines for IMPLAN and to allow for the construction of longer time series.

VI. Conclusions

The US and Colorado green industries both experienced significant growth in demand and economic activity during the 1990's, but economic concerns, and in some areas, climatic shocks, have presented challenges to future growth. While Colorado's green sectors averaged 10% growth per year over the past decade, 2002 saw a slight decline in revenues and payroll (5% and 1%, respectively) and markedly slower growth in payroll. Still, there are several reasons to remain optimistic about the economic

future of the industry, and findings that would suggest strong support for these sectors among those concerned about local economic development.

Based on multipliers generated through the IMPLAN input/output model, total economic contributions of Colorado's green industry totals between $2 to $5 billion, depending on whether credit is given for just direct revenues, or if the broader contributions of purchases, employment and derived demand by the sector are considered. In addition, total green industry employment was almost 34,000 jobs and for every million dollars in green industry output, the industry generates between 24 and 43 jobs, depending on the level of activity for which the sector is given credit. The industry's strong value-added contribution and share of purchases made from local firms also suggest these are important sectors to community economies, even though it also brings in a significant amount of other states' demand (domestic exports to Colorado). In short, the green industry has credible evidence that any regulations or other limitations to its growth will be farther reaching than industry-specific firms, as would any encouragement for the sector to expand.

Table 1: Review of Green Industry Studies from other US States

State	Year	Total Sales (billions)	Number of jobs (thousands)	Payroll (millions)	Value added (billions)	Taxes paid (millions)	Total population (2000)	GDP (millions)	Median Income (1998)	Share of GDP	Sales per capita
Arizona	1998	$0.95	21	$300	$0.30	$18.80	5,130,600	$144,400	$37,100	0.66%	$185.16
Colorado	1993	$1.40	25.5	$555			4,301,300	$167,918	$46,600	0.83%	$325.48
Connecticut	1998	$0.86	26	$423		$81.00	4,323,000	$142,700	$46,500	0.60%	$197.78
Florida	2000	$8.50	193	$2,900	$4.40	$320.00	15,982,400	$472,100	$34,900	1.80%	$531.84
Idaho	1999	$0.66	13	$70		$6.80	1,294,000	$34,100	$36,680	1.94%	$510.05
Illinois	1999	$3.28	160	$1,740		$600.00	12,419,000	$442,300	$43,180	0.74%	$264.11
Louisiana	1995	$1.30	26.2	$486			4,469,000	$128,000	$31,735	1.02%	$290.89
Ohio	1996	$2.00	93	$660			11,353,000	$326,500	$38,900	0.61%	$176.16
Pennsylvania	2000	$3.10	73	$1,000		$151.00	12,281,000	$404,000	$39,000	0.77%	$252.42
Tennessee	2000	$6.37	73		$4.50		5,689,300	$178,400	$34,100	3.57%	$1,119.65
Texas	2000	$7.98	222		$6.46		20,852,000	$742,270	$35,800	1.08%	$382.70
Utah	2000	$0.80	15	$350		$70.00	2,233,170	$68,500	$44,300	1.17%	$358.24
Washington	1997	$1.10	55	$232		$66.50	5,894,000	$175,200	$47,400	0.63%	$186.63

Table 2: Retail-based Revenues for Green Industry Sectors, 1993-2003* (in millions)

Sector	1993	1994	1995	1996	1997	1998	1999	2000	2001	20022003 (proj).	
Wholesale Flower/Nursery	$1.52	$5.39	$6.94	$8.26	$7.75	$13.07	$12.83	$17.85	$17.21	$26.06	$20.27
Nursery & Tree Prod.	$16.98	$15.49	$16.10	$17.61	$24.73	$33.88	$38.11	$39.78	$42.29	$44.36	$35.86
Landscape Arch.	$5.82	$12.12	$14.09	$14.26	$13.80	$19.38	$26.56	$41.75	$37.78	$27.65	$44.53
Floriculture Production	$26.74	$22.67	$23.03	$25.14	$12.34	$16.63	$18.34	$18.75	$19.89	$4.49	$4.07
Landscape Care	$50.88	$53.98	$64.90	$73.35	$70.55	$96.96	$118.98	$153.76	$150.69	$158.49	$162.77
Golf & Country Clubs	$66.91	$78.05	$78.62	$101.35	$65.40	$104.08	$129.62	$157.91	$159.66	$172.90	$166.99
Florists	$92.95	$101.93	$102.03	$108.35	$99.26	$98.92	$111.54	$151.31	$159.24	$133.39	$117.60
Equipment Maint.	$1.80	$2.10	$2.14	$2.13	$3.84	$3.32	$4.39	$4.94	$4.31	$6.15	$7.42
Equipment Sales	$6.11	$6.79	$6.37	$6.26	$11.47	$12.97	$15.37	$18.40	$18.73	$6.66	$14.89
Nursery & Garden Centers	$195.52	$211.97	$198.56	$199.12	$211.44	$256.70	$197.58	$200.17	$201.54	$223.65	$214.53
Irrigation	$0.62	$2.71	$1.63	$0.56	$0.84	$1.24	$2.95	$5.91	$4.06	$8.88	$9.50
Botanical Gardens	$0.53	$0.00	$0.36	$0.62	$0.31	$0.00	$0.00	$0.35	$1.23	$1.46	$1.45
Cemeteries	$49.40	$68.36	$78.49	$82.45	$74.80	$80.64	$71.83	$80.54	$76.11	$18.31	$11.42
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
***Adjusted Total**	**$515.77**	**$581.56**	**$593.26**	**$639.45**	**$596.52**	**$737.78**	**$748.09**	**$891.43**	**$892.73**	**$832.44**	**$811.30**
****Expanded by Retail & End-Users**	**$665.67**	**$734.95**	**$737.31**	**$788.70**	**$751.74**	**$927.60**	**$927.66**	**$1,103.47**	**$1,112.17**	**$1,085.08**	**$1,057.22**
*****Multiplier Adjusted**	**$1,198.21**	**$1,322.91**	**$1,327.15**	**$1,419.66**	**$1,353.13**	**$1,669.69**	**$1,669.78**	**$1,986.24**	**$2,001.91**	**$1,953.14**	**$1,903.00**

* projected

Assumptions: Landscape was only 1/3 of total design services prior to 2002, home equipment maintenance was 3% of total equipment maintenance, and home equipment was 5% of total sales prior to 2001.
We assume irrigation is 50% green industry, 50% traditional agriculture and cemeteries are 1/3 greens maintenance prior to 2001.
Retail Product sales increased by 35% based on findings from "The Changing Floriculture Industry: A Statistical Overview by the SAF and a Texas Green Industry study.
End User impacts increase the product and service levels by 20% based on estimates from an Illinois green industry study.

Table 3: Retail and Wholesale-based Revenues for Green Industry Sectors, 1993-2003* (in millions)

Sector	1993	1994	1995	1996	1997	1998	1999	2000	2001	20022003 (proj).	
Wholesale Flower/Nursery	$9.14	$32.35	$41.62	$41.30	$38.73	$52.30	$51.34	$71.41	$68.85	$78.17	$60.82
Nursery & Tree Prod.	$42.07	$38.39	$39.91	$43.63	$61.29	$83.96	$94.43	$98.57	$104.79	$109.92	$88.85
Landscape Arch.	$5.82	$12.12	$14.09	$14.26	$13.80	$19.38	$26.56	$41.75	$37.78	$27.65	$44.53
Floriculture Production	$115.94	$98.26	$99.82	$108.97	$53.48	$72.08	$79.52	$81.30	$86.24	$19.46	$17.63
Landscape Care	$152.64	$161.93	$194.70	$220.06	$211.66	$290.87	$356.94	$461.28	$452.08	$475.47	$488.32
Golf & Country Clubs	$66.91	$78.05	$78.62	$101.35	$65.40	$104.08	$129.62	$157.91	$159.66	$172.90	$166.99
Florists	$92.95	$101.93	$102.03	$108.35	$99.26	$98.92	$111.54	$151.31	$159.24	$133.39	$117.60
Equipment Maint.	$1.80	$2.10	$2.14	$2.13	$3.84	$3.32	$4.39	$4.94	$4.31	$6.15	$7.42
Equipment Sales	$6.11	$6.79	$6.37	$6.26	$11.47	$12.97	$15.37	$18.40	$18.73	$6.66	$14.89
Nursery & Garden Centers	$195.52	$211.97	$198.56	$199.12	$211.44	$256.70	$197.58	$200.17	$201.54	$223.65	$214.53
Irrigation	$2.48	$5.43	$3.26	$1.12	$1.67	$2.48	$5.89	$11.81	$8.11	$17.76	$19.00
Botanical Gardens	$0.53	$0.00	$0.36	$0.62	$0.31	$0.00	$0.00	$0.35	$1.23	$1.46	$1.45
Cemeteries	$49.40	$68.36	$78.49	$82.45	$74.80	$80.64	$71.83	$80.54	$76.11	$18.31	$11.42
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
***Adjusted Wholesale Total**	**$741.29**	**$817.68**	**$859.97**	**$929.62**	**$847.14**	**$1,077.69**	**$1,145.00**	**$1,379.75**	**$1,378.65**	**$1,290.94**	**$1,253.44**
****Wholesale with Retail & End-Users**	**$948.61**	**$1,036.18**	**$1,079.67**	**$1,160.58**	**$1,073.43**	**$1,363.03**	**$1,433.06**	**$1,725.62**	**$1,731.93**	**$1,667.68**	**$1,615.66**

Assumptions: Landscape was only 1/3 of total design services prior to 2002, home equipment maintenance was 3% of total equipment maintenance, and home equipment was 5% of total sales prior to 2001.

We assume irrigation is 50% green industry, 50% traditional agriculture and cemeteries are 1/3 greens maintenance prior to 2001.

Retail Product sales increased by 35% based on findings from "The Changing Floriculture Industry: A Statistical Overview by the SAF and a Texas Green Industry study.

End User impacts increase the product and service levels by 20% based on estimates from an Illinois green industry study.

Nursery and tree production wholesale revenues were 147.8% of retail revenues, floriculture was 333.5% , wholesale was 500% and landscape was 200%. Other factors were unadjusted for wholesale activity.

Table 4: Average Workers in Aggregate Green Industry and Sectors, 1994-2003*

Sector Name	NAICS Code	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003 (proj.)
Wholesale Flower/Nursery	**422930**	782	830	816	883	861	994	1,045	967	909	804
Nursery & Tree Prod.	**111421**	1,587	1,685	1,739	1,547	1,628	1,650	1,632	1,611	1,504	1,266
Landscape Arch.	**541320**	691	745	801	886	969	1,102	1,206	1,363	1,329	1,257
Floriculture Prod.	**111422**	923	964	1,040	1,039	1,054	1,048	1,082	1,062	1,144	1,076
Landscape Care	**561730**	6,648	7,165	7,708	8,517	9,317	10,600	11,599	13,109	12,904	12,591
Golf & Country Clubs	**713910**	3,705	3,915	4,160	4,203	4,240	4,420	4,594	4,747	5,003	5,306
Florists	**453110**	1,844	1,835	1,919	1,902	1,968	2,059	2,180	2,124	1,993	1,845
Equipment Maint.	**811411**	73	77	82	85	89	92	94	94	117	115
Equipment Sales	**444210**	165	164	163	170	178	180	185	176	158	155
Nursery & Garden Center	**444220**	1,647	1,808	1,834	1,897	1,877	1,809	2,032	2,024	2,063	1,618
Irrigation	**221310**	792	803	813	802	796	864	854	881	797	786
Botanical Gardens	**712130**	170	191	217	266	362	388	405	405	407	375
Cemeteries	**812220**	179	175	198	212	200	193	190	189	200	183
	Total	**19,204**	**20,357**	**21,490**	**22,407**	**23,538**	**25,399**	**27,100**	**28,752**	**28,527**	**27,377**
	Adjusted Total	**22,746**	**24,110**	**25,438**	**26,582**	**27,938**	**30,131**	**32,268**	**34,262**	**33,937**	**32,390**

*projected

a) Adjusted before 2001 by share of SIC now included in NAICS specific codes (estimated from 2001)

b) Adjusted upward assuming 65% of sales in wholesale/retail sectors reported (others by mass merchants) and 80% of services in private sector (remaineder through integrated end-users).

c) Assumes 50% of irrigation, all botanical gardens and 1/3 cemetery employment is related to green industry.

Table 5: Annual Payroll in Aggregate Green Industry and Sectors, 1994-2003* (in millions)

Sector Name	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003 (proj.)
Wholesale Flower/Nursery	$16.59	$18.31	$18.84	$20.24	$21.97	$25.03	$28.38	$28.10	$25.73	$23.44
Nursery & Tree Prod.	$27.56	$30.40	$34.19	$34.09	$37.16	$38.68	$41.66	$43.42	$40.29	$34.73
Landscape Arch.	$19.54	$22.02	$25.48	$29.23	$34.32	$41.63	$48.54	$57.46	$58.30	$61.12
Floriculture Prod.	$14.55	$16.17	$18.45	$19.46	$20.98	$21.73	$23.63	$24.58	$25.83	$25.22
Landscape Care	$108.99	$122.82	$142.10	$163.00	$191.42	$232.17	$270.70	$320.46	$322.18	$323.86
Golf & Country Clubs	$55.57	$61.68	$67.97	$73.00	$77.81	$83.17	$92.03	$97.65	$106.53	$108.59
Florists	$19.03	$19.67	$21.29	$21.67	$23.84	$26.98	$29.40	$29.14	$28.27	$25.85
Equipment Maint.	$1.23	$1.39	$1.57	$1.71	$1.94	$2.11	$2.27	$2.32	$2.98	$3.36
Equipment Sales	$3.38	$3.45	$3.45	$3.83	$4.22	$4.47	$4.80	$4.71	$3.89	$4.32
Nursery & Garden Center	$23.91	$26.41	$27.92	$29.57	$30.75	$29.78	$35.00	$36.11	$44.89	$34.05
Irrigation	$5.65	$5.78	$6.16	$6.31	$6.39	$7.40	$7.56	$8.12	$31.37	$32.78
Botanical Gardens	$3.14	$3.85	$4.57	$6.33	$8.99	$10.75	$11.37	$11.37	$10.61	$10.42
Cemeteries	$2.92	$3.32	$3.57	$3.84	$3.45	$3.56	$3.97	$4.10	$4.74	$4.35
Total	**$302.07**	**$335.29**	**$375.55**	**$412.28**	**$463.24**	**$527.45**	**$599.30**	**$667.54**	**$705.60**	**$692.09**
Adjusted Total	**$352.44**	**$390.81**	**$437.57**	**$480.62**	**$540.50**	**$616.05**	**$701.66**	**$782.79**	**$825.54**	**$805.31**

* projected

a) Adjusted before 2001 by share of SIC now included in NAICS specific codes (estimated from 2001)

b) Adjusted upward assuming 65% of sales in wholesale/retail sectors reported (others by mass merchants) and 80% of services in private sector (remaineder through integrated end-users).

c) Assumes 50% of irrigation, all botanical gardens and 1/3 cemetery employment is related to green industry.

Table 6-Green Company Industry's Contribution to the Colorado Economy with Other Major Sectors

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
Agriculture	4,892.34	49,821	354.28	323.076	371.623	153.306	1,202.28
Green Industry	**1,670.70**	**34,969**	**899.691**	**88.754**	**143.878**	**82.276**	**1,214.60**
Mining	7,705.71	22,670	983.158	534.031	1,737.27	433.412	3,687.87
Construction	32,883.25	262,699	8,684.75	2,474.57	1,278.98	249.113	12,687.41
Manufacturing	47,777.72	216,885	11,593.69	337.235	4,398.82	908.032	17,237.78
TCPU[a]	38,611.18	148,763	8,556.41	2,303.00	9,159.71	2,350.83	22,369.95
Trade	37,329.40	592,044	15,543.82	895.699	4,911.89	5,019.15	26,370.55
FIRE[b]	52,092.44	282,215	8,455.33	2,046.77	20,374.23	4,587.31	35,463.63
Services	63,669.98	933,127	29,511.56	4,768.94	4,577.58	1,247.86	40,105.93
Government	22,146.20	397,906	16,691.42	0	3,450.34	0	20,141.76
Other	80.765	16,680	182.012	0	-101.247	0	80.765
Total	**308,859.67**	**2,957,778**	**101,456.11**	**13,772.08**	**50,303.07**	**15,031.28**	**180,562.53**

*millions of dollars.
[a]Finance, Insurance and Real Estate.

Table 7- Output and employment multipliers for Colorado's green industry

	Direct effects	Indirect effects	Induced effects	Total	Type I multiplier	Type II multiplier	Type SAM multiplier
Output multiplier	1.0	0.264	0.730	1.994	1.264	1.994	3.04
Employment multiplier	20.93	2.83	7.72	31.48	1.135	1.504	2.04

Table 8- Regional Purchase Coefficients by Industry and Value-Added by Green Industry

Commodity Demand	Gross Coeff.	Gross Inputs*	RPC	Regional Coeff.	Regional Inputs*
1 Agriculture	0.008230	13.750	0.703598	0.005791	9.670
23 Green Industry	0.039715	66.350	0.544128	0.021610	36.100
28 Mining	0.000129	0.220	0.720148	0.000093	0.160
48 Construction	0.009763	16.310	1.000000	0.009763	16.310
58 Manufacturing	0.034306	57.310	0.521602	0.017894	29.900
433 TCPU	0.034489	57.620	0.668599	0.023059	38.530
447 Trade	0.020714	34.610	0.961131	0.019909	33.260
456 FIRE	0.041708	69.680	0.687015	0.028654	47.870
463 Services	0.080222	134.03	0.834845	0.066973	111.890
510 Government	0.003344	5.590	0.982872	0.003287	5.490
516 Other	0.000380	0.630	0.205208	0.000078	0.130
Total Commodity Demand	**0.272999**	**456.100**		**0.197110**	**329.310**

Value Added	Coefficients	Value Added*
Employee Compensation	0.538512	899.691
Proprietary Income	0.053124	88.754
Other Property Income	0.086118	143.878
Indirect Business Taxes	0.049246	82.276
Total Value Added	**0.727000**	**1,214.600**

Table 9-Demand by Source for Green Industry Output

Local private demand	Federal government demand	State & local government demand	Capital	Inventory	Domestic exports	Foreign exports	Intermediate outputs	Total
668.4	.45	25.9	21.3	0	470.3	2.2	482.2	1,670.7

Figure 1

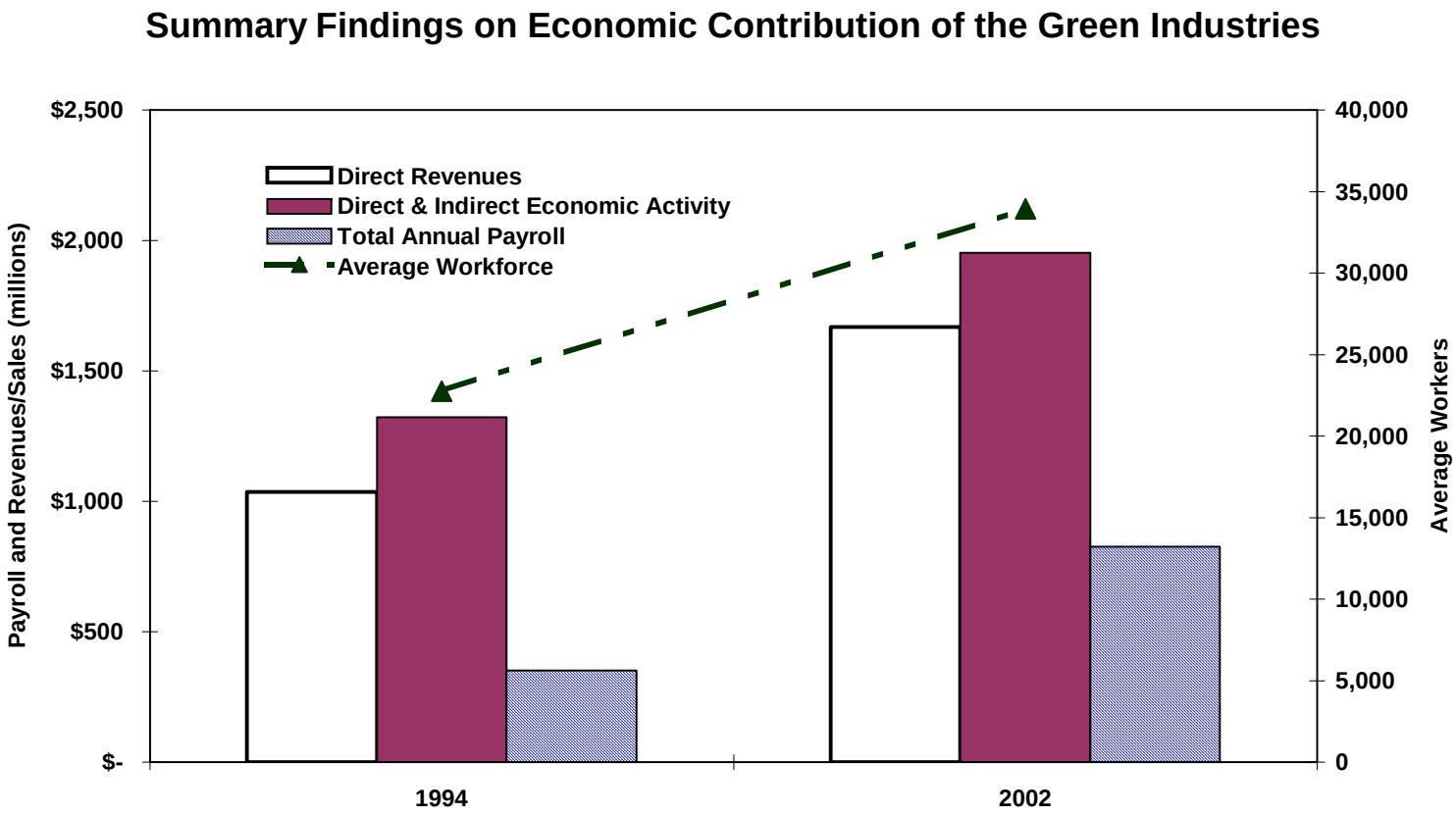
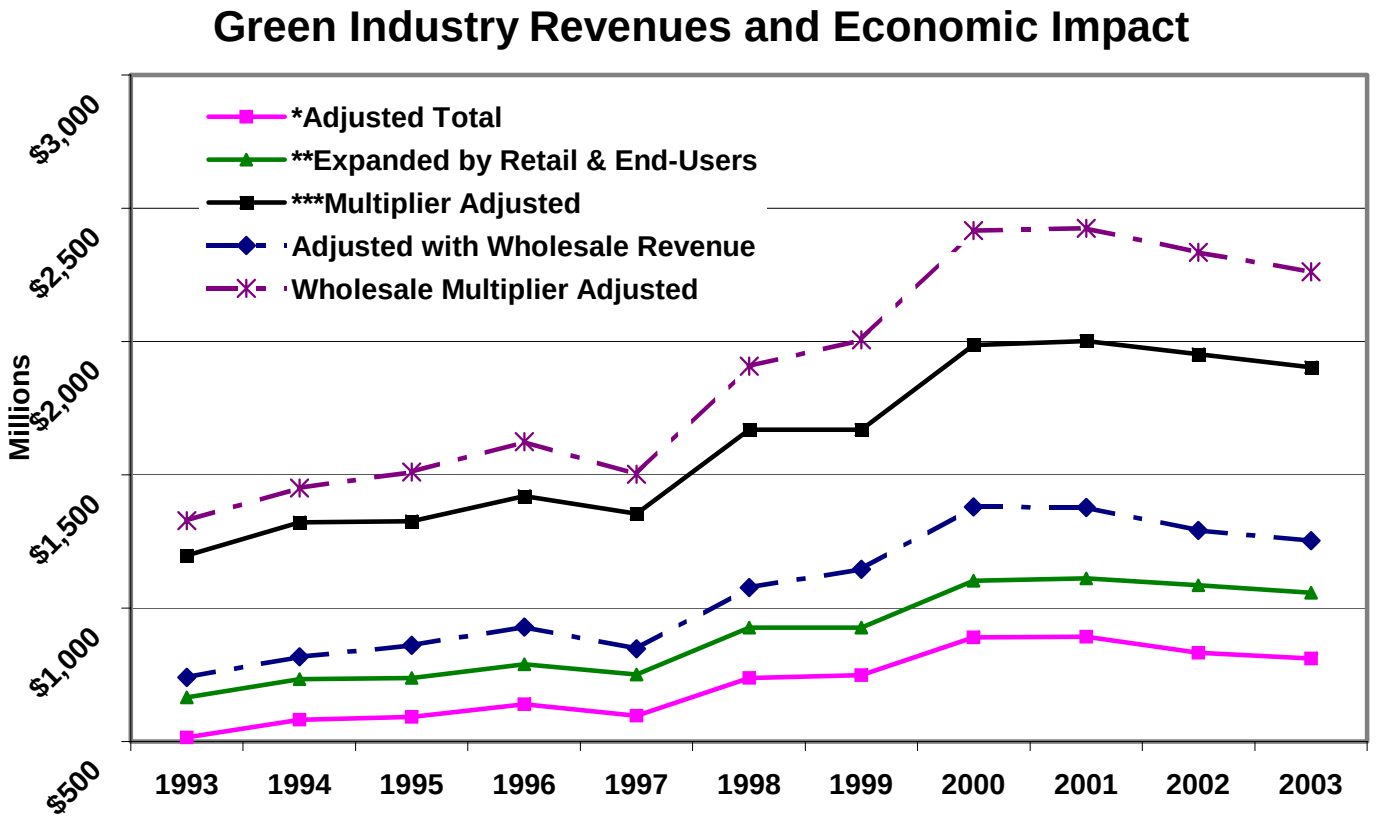

Summary Findings on Economic Contribution of the Green Industries
Payroll and Revenues/Sales (millions)
$2,500
$2,000
$1,500
$1,000
$500
$-
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Average Workers
Direct Revenues
Direct & Indirect Economic Activity
Total Annual Payroll
Average Workforce
1994
2002

Figure 2: Allied Green Industry Revenues: Trends with Varying Data Assumptions



*Direct Total was Adjusted to account for estimated shares in certain industry codes (irrigation, outdoor equipment, design).
**The Expanded estimates account for retail sales made through mass merchandisers, home improvement stores and groceries, as well end-user provided services allied
***The Multiplier impact includes direct revenues attributable to the industry as well as indirect economic activity fueled by the direct impact.

Figure 3

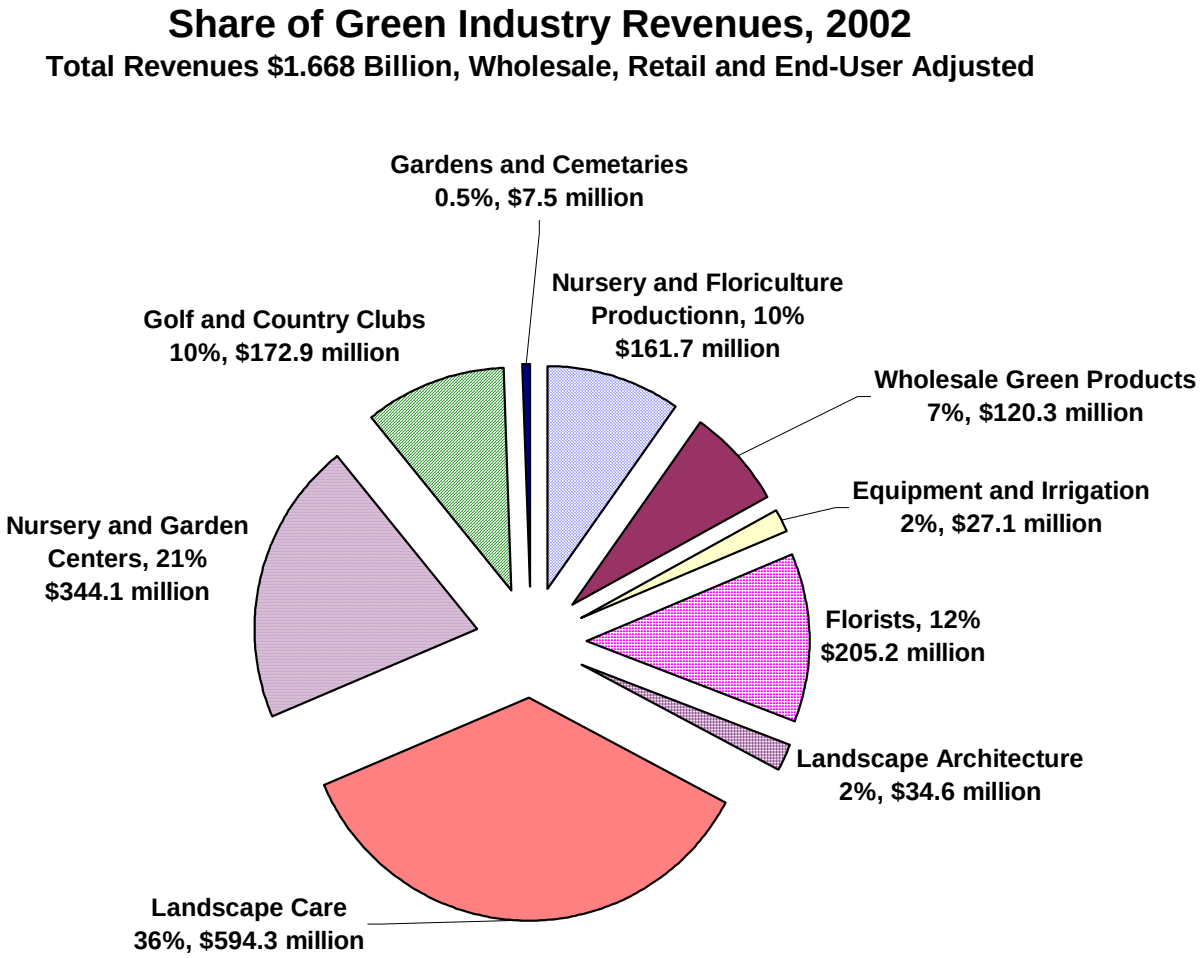

Share of Green Industry Revenues, 2002
Total Revenues $1.668 Billion, Wholesale, Retail and End-User Adjusted
Gardens and Cemetaries
0.5%, $7.5 million
Nursery and Floriculture
Productionn, 10%
$161.7 million
Golf and Country Clubs
10%, $172.9 million
Wholesale Green Products
7%, $120.3 million
Equipment and Irrigation
2%, $27.1 million
Nursery and Garden
Centers, 21%
$344.1 million
Florists, 12%
$205.2 million
Landscape Architecture
2%, $34.6 million
Landscape Care
36%, $594.3 million

Figure 4

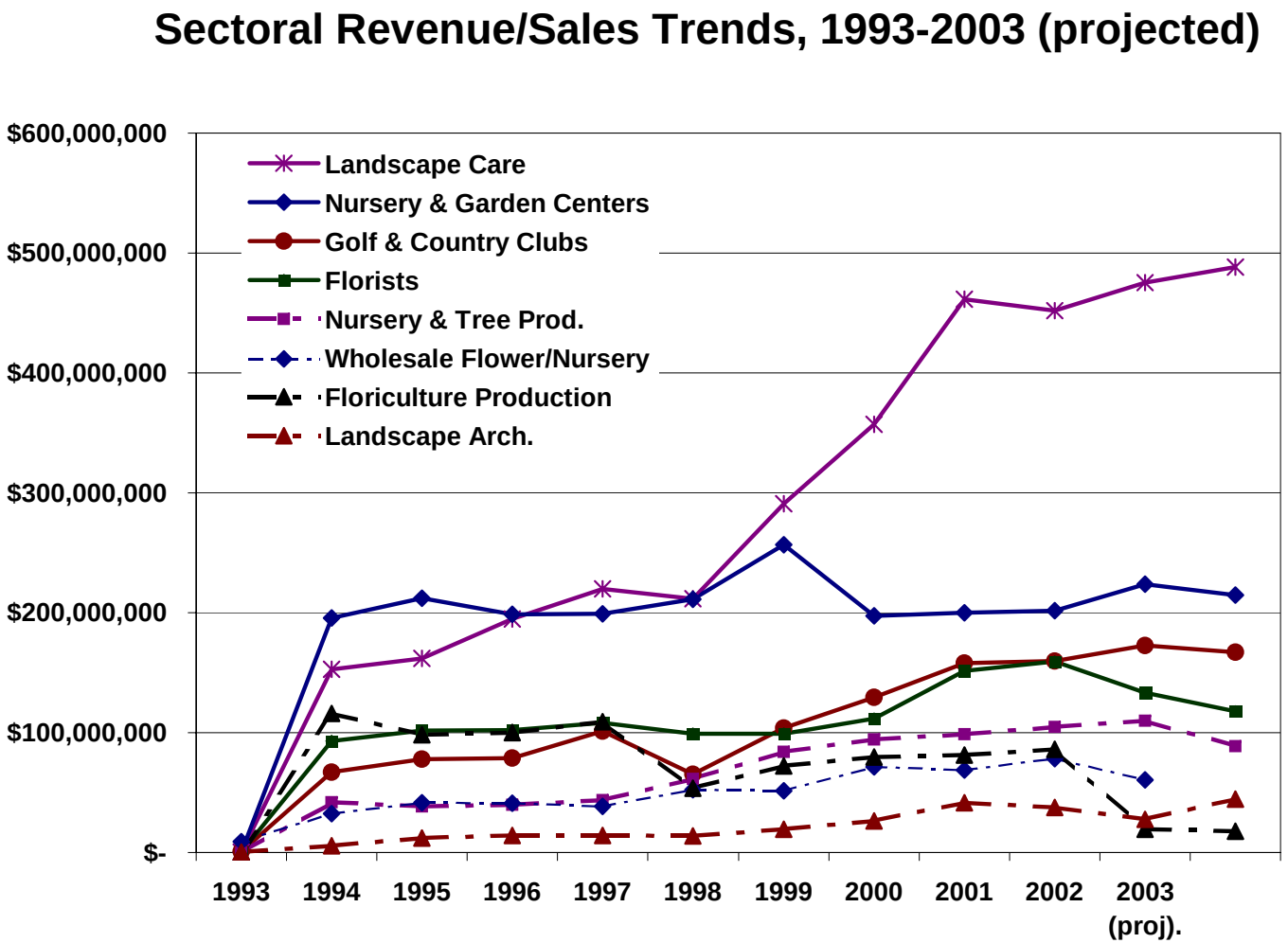

Sectoral Revenue/Sales Trends, 1993-2003 (projected)
$600,000,000
$500,000,000
$400,000,000
$300,000,000
$200,000,000
$100,000,000
$-
Landscape Care
Nursery & Garden Centers
Golf & Country Clubs
Florists
Nursery & Tree Prod.
Wholesale Flower/Nursery
Floriculture Production
Landscape Arch.
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003 (proj).

Figure 5

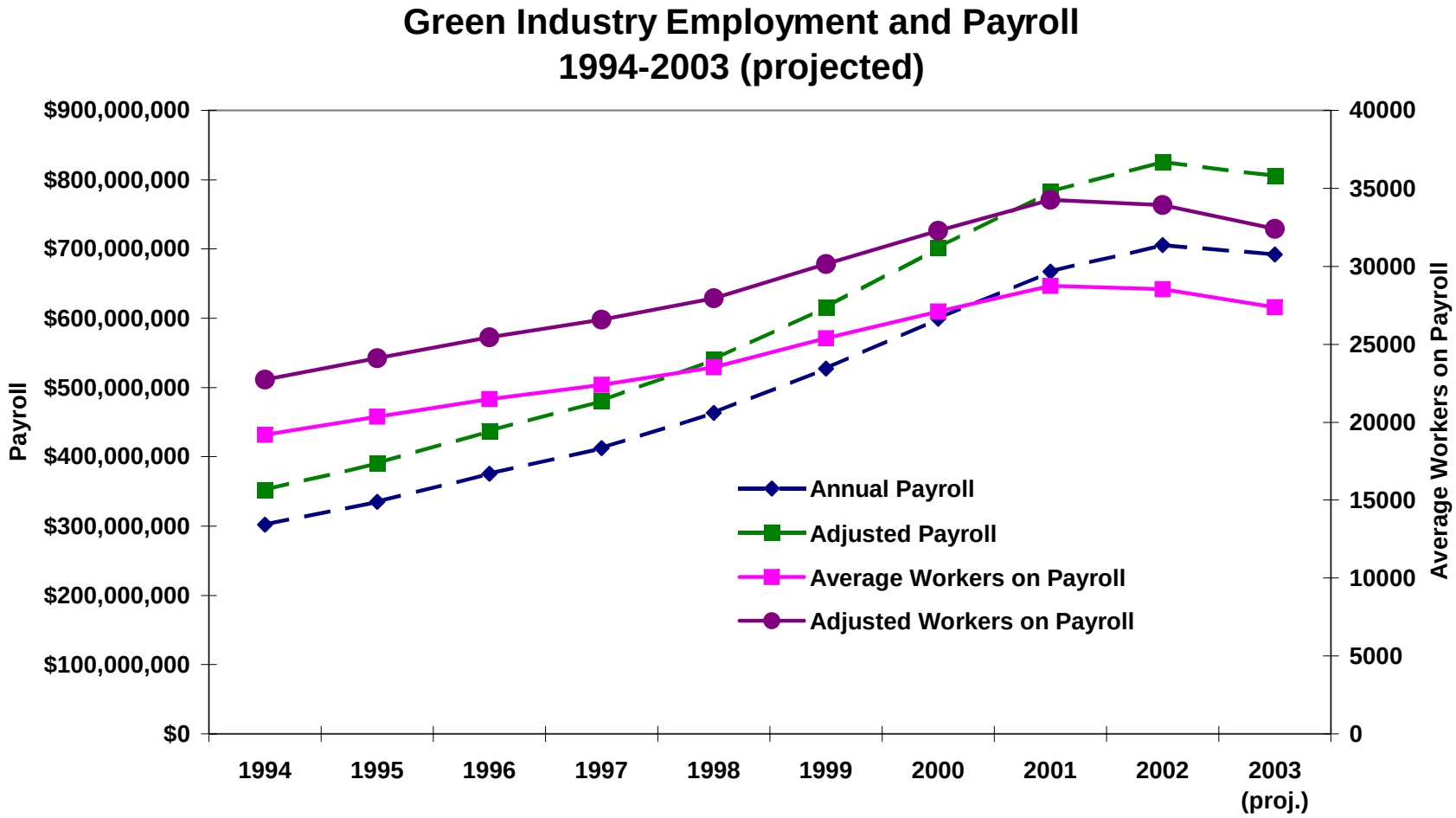

Green Industry Employment and Payroll
1994-2003 (projected)
Payroll
$900,000,000
$800,000,000
$700,000,000
$600,000,000
$500,000,000
$400,000,000
$300,000,000
$200,000,000
$100,000,000
$0
Average Workers on Payroll
40000
35000
30000
25000
20000
15000
10000
5000
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003 (proj.)
Annual Payroll
Adjusted Payroll
Average Workers on Payroll
Adjusted Workers on Payroll

Figure 6: Green Industry Workers, by Sector, 2002

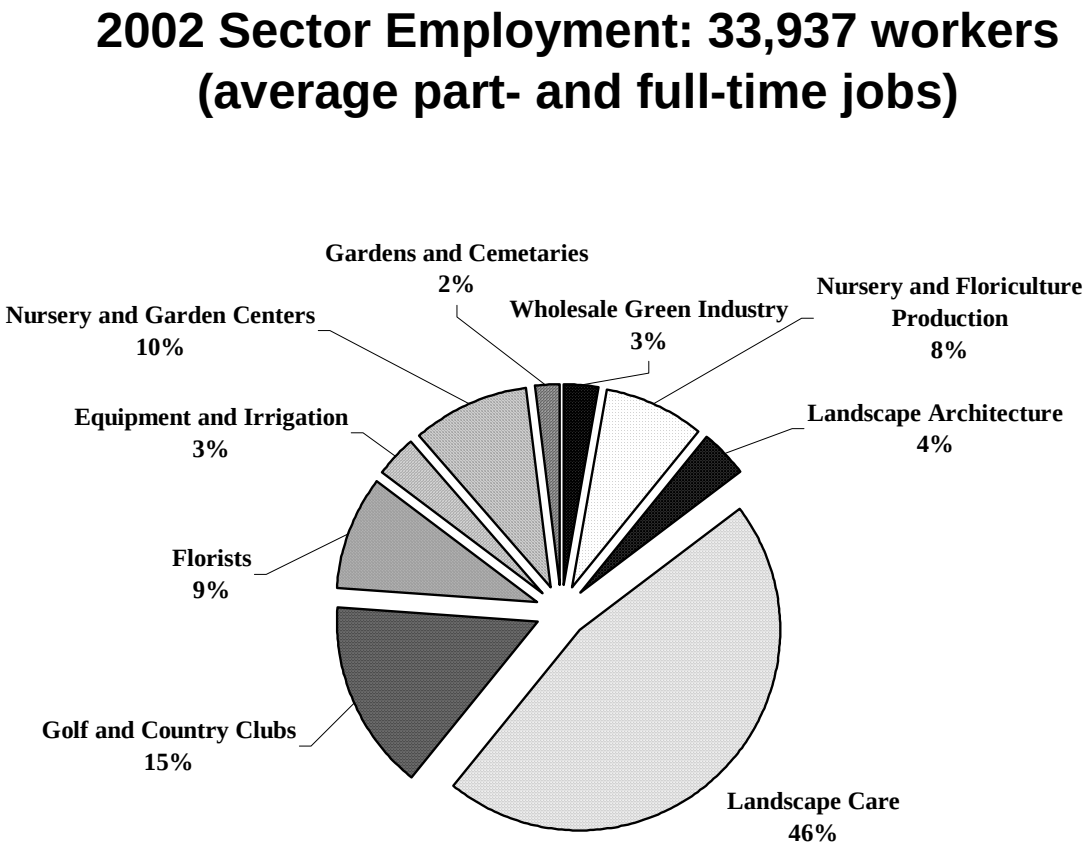


Figure 7: Green Industry Payroll, by Sector