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**Economic Impacts and Environmental Aspects
of the Arizona Golf Course Industry***

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DRAFT FINAL REPORT

*Please treat this report as confidential until the final version has been posted on the web.



This report is also available online at <http://agb.east.asu.edu/workingpapers/0501.pdf>

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Executive Summary

The population of all existing golf course facilities that existed in Arizona in 2004 were identified and basic information regarding city, county, number of holes, and year established were collected for all 338 Arizona golf facilities. In addition, the economic impacts from revenue, tourism, and real estate premiums attributed to the Arizona golf course industry were estimated for 2004 based upon a survey of all Arizona golf course facilities. 77 golf course managers returned either partially or fully completed questionnaires, representing an overall response rate of 22.8 percent. Golf courses were disaggregated into four types: nine hole-courses, eighteen hole-courses, twenty seven hole-courses, and thirty six hole-courses. There are 46 nine-hole courses, 268 eighteen hole-courses, 11 twenty seven hole-courses, and 13 thirty six-hole courses in Arizona. Surveys were returned by 7 nine-hole courses, 61 eighteen-hole courses, 3 twenty seven hole-courses, and 6 thirty six-hole courses. Unbiased mean-based estimates of various impacts and other types of information contained in the survey were obtained through use of both the sample and population data, disaggregated by these four types of facilities. These estimates are summarized below. The estimates are reported for all golf courses in Arizona in 2004.

The overall economic impact of the golf course industry on the state of Arizona was estimated to be \$3,437,838,055 in 2004. This included revenue directly collected by Arizona golf courses of \$806,357,856, indirect revenues of \$252,294,393 for those businesses that supply the golf course industry, and induced revenues of \$391,179,669 spent by employees of the golf course industry and employees of its suppliers. The total economic impact attributed to direct, indirect, and induced golf course revenues was 1,449,831,733.

The overall economic impact also included revenue from additional tourism activities undertaken by golfers who visited Arizona from outside the state of \$1,927,148,334. This number included the direct amount spent on golf-related tourist activity by golfers who visited Arizona from outside the state of \$1,178,794,440, indirect tourism revenues of \$304,637,588 for those businesses that supply the golf-related tourism industry, and induced revenues of \$443,716,298 spent by employees in the golf-related tourism industry and employees of its suppliers.

The overall economic impact also included additional residential housing premiums for those homes built in 2004 and located in a golf course community of \$60,857,988. The premium attributable to all homes ever built in all golf course communities in Arizona was estimated to be \$2,057,000,000.

68 percent of those who played golf in Arizona were Arizona residents, 29 percent were U.S. visitors from outside the state, and 3 percent were international visitors (as approximated by the managers that responded to the survey). 11,643,987 eighteen hole-equivalent paid rounds of golf were played. 6,918,086 of the paid rounds were played in Maricopa County. 677,468 visiting golfers from outside the state played 1,354,937 of the paid rounds of golf in Arizona. 49 percent of rounds were played over the peak season, 26 percent over the off-peak season, and 25 percent were played over the shoulder season(s). 103,767 paid half hour-equivalent lessons were given by facility personnel. Average green and cart fees were \$35.28 in Pima County, \$31.97 in Maricopa County, and ranged from \$26.91 to \$28.00 across other regions of the state.

The total revenue collected by all Arizona golf courses in 2004 was \$806,357,856. \$396 million was collected from green and cart fees, \$143 million from food and beverage sales, \$122 million from membership fees, \$66 million from retail sales, \$30 million from initiation fees, \$17.8 million from driving range fees, \$8.9 million from tournaments, \$4.8 million from private lessons given by facility personnel, and \$17.8 million from other sources.

19,481 full-time and part-time workers were employed by Arizona golf course facilities in 2004, 55 percent of whom were full-time and 45 percent of which were part-time. 28 percent of the workers were employed in the golf shop, 39 percent in maintenance, 27 percent in food and beverage sales, and 4 percent in administration. Total wages and benefits paid to Arizona golf course employees was \$342,166,736. Total state and federal taxes paid by all golf courses in Arizona was \$79,455,853. Cash and in-kind charitable contributions totaled \$5,737,694. The assessed value of total assets held by Arizona golf courses was estimated as \$2,392,650,438.

The total costs for all Arizona golf courses (including state and federal taxes paid in 2004) was \$696,937,776. \$169 million went towards the clubhouse payroll, \$123 went towards the maintenance payroll, \$79.5 million was paid in state and federal taxes, \$66.7 million was paid for administration costs, \$57.6 million for the purchase of food and beverages, \$40.9 million for the purchase of variable agricultural inputs (irrigation, fertilizer, pesticides, and herbicides), \$32.8 million for the purchase of merchandise, \$30.1 million for utilities, \$23.7 million for lease expenses, \$15.6 million for advertising, \$9.7 million for facility insurance, and \$48.8 million for other expenses.

Arizona golf course facilities occupied an estimated 44,454 acres in 2004 (excluding resort and residential space). The golf course itself occupied 42,555 acres, irrigation water was applied on an estimated 30,749 acres, and the total area of turfgrass was 28,793 acres. The total amount of irrigated water used on all Arizona golf courses in 2004 was 145,982 (acre/feet). 61,591 acre/feet was ground water, 56,022 acre/feet was reclaimed water, 23,129 was Central Arizona Project water, and 5,241 was surface water. The total amount paid for variable agricultural inputs was \$27.3 million for irrigation water, \$8.0 million for fertilizer, \$3.0 million for herbicides, and \$2.5 million for pesticides. Finally, 69 percent of the courses modified their current irrigation systems in 2004, 68 percent adjusted fertilizer practices, 60 percent used soil wetting agents, 54 percent hand watered the area in fairways, 51 percent reduced rough irrigation, 45 percent eliminated irrigation in selected areas, 39 percent hand watered tees, 34 percent raised mowing heights, and 26 percent reduced fairway irrigation.

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1. Introduction

The purpose of this study was to: (1) Identify and count the population of all golf course facilities that existed in Arizona in 2004 and collect data regarding the city, county, number of holes, and year established for each one; (2) Establish a focus group of golf industry experts in order to create a questionnaire and conduct a detailed survey of the characteristics of the golf course industry in Arizona in 2004; and (3) Estimate the economic impacts and environmental aspects of the Arizona golf course industry.

The overall economic impact on the state of Arizona in 2004 was divided into seven components. These components were: (1) Revenue directly collected by Arizona golf courses, estimated from survey data; (2) Indirect revenues for those businesses that supply the golf course industry, estimated using a regional input-output model; (3) Induced revenues from money spent by employees of the golf course industry and employees of its suppliers, estimated using a regional input-output model; (4) Revenue spent directly on golf-related tourist activity by golfers who visited Arizona from outside the state, estimated using both survey and national data; (5) indirect tourism revenues for those businesses that supply the golf-related tourism industry, estimated using a regional input-output model; (6) Induced tourism revenues from money spent by employees in the golf-related tourism industry and employees of its suppliers, estimated using a regional input-output model; and (7) Additional residential housing premiums for those homes located in golf course communities around the state.

In addition, other characteristics of golf course facilities were estimated. These estimates include total costs and the breakdown of total costs across categories, the breakdown of total revenue across categories, geographical profile of golfers that play in Arizona, number of rounds of golf played, number of rounds played by golfers from outside the state, number of rounds played by season, number of lessons given, average cart and green fees for a round of golf, number of full-time and part-time employees paid by golf course facilities, and asset values.

Golf course facilities also affect the environment in terms of their use of variable agricultural inputs such as irrigation water, fertilizer, herbicide, and pesticides. Water use for landscape irrigation is becoming an increasingly important issue in terms of Arizona government policy. The rapid growth of urban economies in several Arizona counties is placing increasing pressure on the natural resource base of Arizona. At the same time, there seems to be an increase in public awareness regarding such issues as water, fertilizer, and pesticide use. On the other hand, the application of certain pesticides on golf courses in Arizona may actually be viewed as beneficial. For example, the use of pesticides to control the mosquito population can help control the spread of certain viruses, such as the West Nile Virus and Western Equine Encephalitis. Moreover, the use of alternative water sources, such as reclaimed water, can help reduce the increasing pressures on land development near urban areas. Estimates of the costs of these variable agricultural inputs were also calculated.

In addition, estimates of the land area used by golf course facilities, the area of irrigated golf course land, and the amount of irrigation water used by golf course facilities were estimated. Finally, the degree of utilization of various environmental management practices by Arizona golf course facilities was also measured.

2. Focus Group and Survey Methodology

The type of information initially deemed necessary to estimate the economic impacts of the Arizona golf course industry was originally determined through a literature review of previously published state golf economic impact studies, as well as informal interviews with key Arizona golf industry experts. Three previous studies were identified for this purpose:

- (1) “Golf in Arizona: An Economic Impact Analysis” prepared by the National Golf Foundation for the Arizona Golf Association and Arizona Department of Commerce and published November 1997;
- (2) “Economic Impacts of the Florida Golf Course Industry” written by John J. Haydu and Alan W. Hodges and published by the Institute of Food and Agricultural Sciences, University of Florida in June 2002; and
- (3) “Economic Impacts of California’s Golf Course Facilities in 2000” written by Scott R. Templeton, Mark S. Henry, Bihui Jin, and David Zilberman and published by the Department of Agricultural and Applied Economics at Clemson University and the Department of Agricultural and Resource Economics at University of California at Berkeley in December 2002.

In addition to the above studies, members of the following organizations were informally interviewed:

- (1) Golf Industry Association (GIA)
- (2) Cactus & Pine Golf Course Superintendents Association (GCSA);
- (3) Southwest Section of the Professional Golfer’s Association (PGA);
- (4) Professional Golf Management Program, Arizona State University at the Polytechnic Campus; and
- (5) Bank One Economic Outlook Center, W.P. Carey School of Business, Arizona State University.

2.1. Focus Group Methodology

A preliminary questionnaire was developed by synthesizing information from the above sources. In addition, certain questions were modified to help clarify potential statistical inconsistencies and, after consultation with the aforementioned experts, other questions were added that were of interest or deemed to be useful.

The preliminary questionnaire was submitted to the Human Subjects Institutional Review Board of Arizona State University and the focus group session was approved on January 25, 2005 (HS#08326-05). Twelve participants for the focus group were recruited from a combination of Arizona golf superintendents, agronomists, golf professionals, owners and managers of golf courses, and tourism professionals. Potential participants were recruited with help from the GIA, GCSA, and PGA Southwest Section through a recruitment letter that was sent on January 31, 2005 (Appendix A).

The focus group session was held in the newly constructed, state-of-the-art Consumer Marketing Lab in the Agribusiness complex at Arizona State University’s Polytechnic Campus. This lab consists of two rooms. The first room is where the participants assembled. Of the twelve that stated they were willing to participate in the focus group session, only eight actually showed up on February 4, 2005. A letter of informed consent and assent was distributed among

the participants (Appendix B) and they were all asked to sign it before proceeding. Each question from the preliminary questionnaire was displayed on the computer screen in the front of the room and participants were asked their opinions regarding each of the preliminary questions in terms of degree of importance, readability, format, and likelihood of response. They were also asked if there was anything they would like to add, and which questions should be placed in which sections of the survey.

The focus group session was videotaped with the aid of four cameras (one tape for each camera placed in the room plus one master tape that is comprised of selected segments from the four cameras). In addition, certain responses were recorded in an Access database on the computer in the room adjacent to the assembly room via the eight electronic keypads available in the assembly room. This "master room" allows for individuals to monitor the responses behind a one way mirror. Those helping conduct the experiment (two graduate students researchers in this instance) were able to view the participants but the participants could not view those in the master room.

In order to ensure strict confidentiality with respect to both the names and responses of the participants, certain precautionary measures were followed. Participants were randomly identified by assigning a number from 1 through 8. No other identifier of the participants was recorded. During the session (which began after they signed and handed in the letters of informed consent and assent) the participants were never asked any personal information. This included, but was not limited to, their background, income, address, names, contact information or any other socio-economic variables. Hence, they were not differentiated in any way except for by the random number assigned to them.

Upon completion of the focus group, certain precautions were taken in order to handle and dispose of the data. First, the videotaping and computer system in the master room was in no way accessible through any remote electronic means from any other location. Second, once the focus group session was completed, the five videotapes were taken out of the master room and placed in a locked cabinet. No copies of the videotapes were ever made and viewing of the five videotapes, in order to establish the final survey questions, took place only in the Consumer Marketing Lab master room. Once the final survey was developed all of the videotapes were destroyed. Third, the responses that were stored and coded in the Access database in the master room were transferred to a thumbdrive that was held in the office of the principal investigator. The data from the master room computer was then purged. Only one copy of the database was ever available. Finally, once the final survey was developed, the data was deleted from the thumbdrive. Through this process all evidence of the focus group responses was destroyed once the final survey was created.

2.2. Survey Methodology

Once the information from the focus group was synthesized, a final questionnaire was created (Appendix C) and was submitted to the Human Subjects Institutional Review Board of Arizona State University. The final questionnaire was approved on March 10, 2005 (HS#08437-05). The objective of the survey was to gather financial and other relevant information regarding the operation of golf courses in Arizona and use the obtained data to perform economic and statistical analyses in order to obtain empirical estimates of the economic impacts of the Arizona golf course industry. The final questionnaire was mailed in an envelope with Arizona State University letterhead that include a cover letter explaining the survey and also provided

information regarding how the survey results were to be used, how the confidentiality of the data was to be maintained, requested contact information, and contained a statement of passive consent form (Appendix D) that was to be returned with the completed questionnaire. The envelope also included a self-addressed stamped envelope to ensure that the responses would be sent back to the principal investigator.

Potential participants were recruited initially from a database compiled by the Golf Industry Association. This database contained the most recent contact information for 369 golf-related facilities in Arizona. This information, while publicly available, was gathered by the Golf Industry Association in a user-friendly Excel file for ease of use. The questionnaires were sent out in April 2005. After approximately three weeks, only three completed surveys had been returned, while 19 others were returned as undeliverable. Therefore, a follow-up call was placed by two graduate student researchers to each potential golf facility that had not yet responded. If the potential participants had not seen the questionnaire but were willing to complete it, one was either mailed, e-mailed, or faxed. By the middle of May 2005, only 17 questionnaires had been completed.

A second round of follow-up calls was made by the author at the end of May 2005 and it was determined that some of the facilities in the original GIA database had either shut-down operations, changed names, changed management companies, could not be contacted (via mail or telephone), or sold golf-related products (such as lessons) but did not actually possess a golf course with at least 9 holes. These courses were identified and alterations to the database were made with the help of the online Arizona Golf Course Directory <http://www.1golf.com/az/>, the Complete USA Golf Course Guide <http://www.usagolf.com/>, and the Dex Official Directory by Qwest <http://www.dexonline.com/>. After removing duplicates, identifying those courses that changed names, and removing companies that did not have a golf course with at least 9 holes, the initial database was consolidated and reduced to 338 golf courses and a final round of follow-up calls was made. Those who had not previously received a questionnaire were sent one either via mail, e-mail, or fax.

At this point, two separate databases were constructed - one from the contact information for all 338 golf courses and one from the survey responses. The database that holds the finalized contact information for all 338 golf courses in Arizona contains the name of the course, the name of a contact person, phone number, city, county, year(s) in which the course(s) were built, and the number of holes for each course. In order to ensure the confidentiality of information regarding individual golf courses, the following procedure was followed. Each golf course in the contact database was assigned a uniform non-duplicating random number between 101 and 998. If survey information was received, the name and phone number of the person that completed the survey was updated in the contact database. Once the contact information was recorded in the contact database, the random number assigned to the golf course from the contact database was placed on both the signed cover letter (that includes the passive consent statement) and the completed questionnaire itself. The questionnaire was then detached from the cover letter and all such cover letters and survey responses were placed in two separate folders - one for the cover letter with the contact information and one with just the survey responses and the random number assigned to that golf course.

As a result of this process, the randomly assigned number written at the top of each survey is the only identifier attached to the survey response database. Hence, the two databases are kept separate and without the contact database, there is no way to match the name of the actual golf

course with the survey data within the survey response database. Indeed, even the person that entered the responses into the survey response database could not identify which particular golf course corresponds to which set of responses.

3. Arizona Golf Course Population

Two separate databases were constructed using the aforementioned methodology. The first, henceforth referred to as the “population database”, contains information for each of the 338 golf courses in Arizona, regarding the city, county, region, number of holes per course, and year(s) the course(s) were built. The second database, henceforth referred to as the “sample database” contains the sample information from the 77 completed surveys. The information regarding Arizona golf facilities is summarized in Table 1. Notice that the sample survey response rate (the sample size) for qualified golf courses in Arizona was 22.8 percent. The information contained in the population database will be discussed in this Section, while the statistical methodology and empirical results from the sample database will be discussed in the following Sections.

Table 1: Arizona Golf Facilities

Item Description	Number
Potential golf course facilities surveyed	369
Undeliverable Questionnaires	19
Qualified Golf Courses	338
Survey Respondents	77
Response Rate for Qualified Golf Courses	22.8%
Overall Expansion Factor	4.4

The process of counting the number of golf courses or golf course facilities in Arizona can be somewhat complicated. The main reason for this is that most managers returned questionnaires in which they grouped all of the courses in one facility together, while a small number of managers completed separate questionnaires for separate courses located on the same facility.

In this study, the following procedure was employed in order to obtain the 338 qualified golf courses found in Table 1. First, 321 unique golf course facilities were identified using the sources described in Section 2.2 by explicitly not taking into account the number of courses or number of holes managed by the facility. Information regarding the number of courses on each facility and the year(s) in which those courses were built was then obtained through the sources described previously or through a telephone conversation. If a certain facility had courses built in different years, those courses were then split into two sets (one for each year in which they were built). As a result of this procedure, sixteen such facilities were identified. Splitting those sixteen facilities into two resulted in 337 separate entities.

The above process eliminated the need for any further adjustments with respect to the sample, because those facilities whose managers had reported results for separate courses within the same facility were accounted for as a result. However, one adjustment still needed to be made to the population database in order to use the statistical methodology discussed in Section 4.2. One facility out of the entire population of 337 still contained a larger number of holes (fifty four) than any other courses. Hence, this facility was split into one eighteen hole-course and one thirty

six hole-course. The final result is that the number of qualified golf courses (henceforth referred to simply as “golf courses”) used in the population database became 338.

The distribution of new golf courses built in Arizona over time (taken directly from the population database described above) is displayed in Figure 1. The first course that is still being utilized was built in 1912. Notice that there was a significant increase in new golf courses built from 1985-1989 and again from 1995-1999 and a moderate increase in 2000-2004. 99 new golf courses were built in Arizona from 1995-2004. This represents nearly one-third of all new courses in Arizona. It should be noted that Figure 1 is drawn with respect to only new courses that are still in existence as of 2005, because in order for them to show up in the population database, they had to be available to answer questions regarding the facility. Hence, the numbers shown in Figure 1 are lower than the true number of new courses built, which would also include any courses that were built but then closed down before 2005.

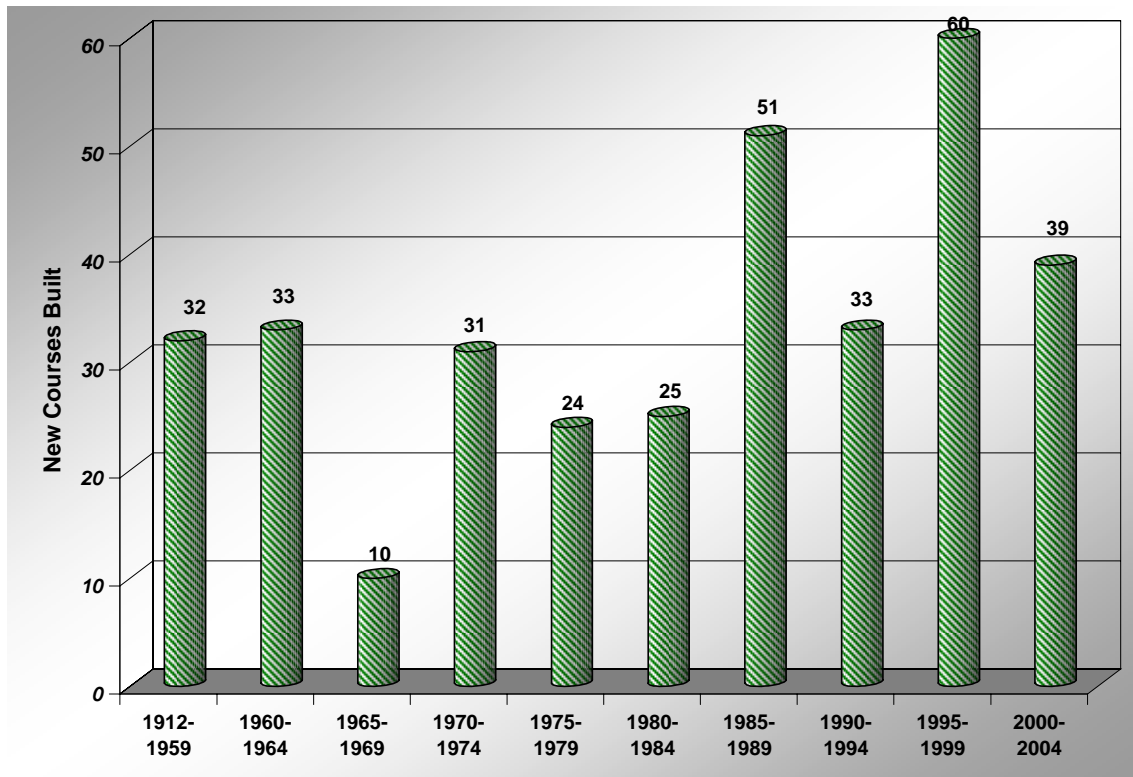


Figure 1: Distribution of New Courses Built Over Time

The information contained in Figure 1 is reproduced in Figure 2 along with the historical growth in Arizona population. Notice that the number of new courses built over any five-year period is positively correlated with the population growth over that same five-year span. For example, the largest increase in the Arizona population over any five-year period was approximately 900,000 people in 1995-1999. Over the same time period, the number of new courses built in Arizona also reached a historical high of 60. It should be noted that the population for 2000-2004 is a forecast based off census data from 2000 and before. It is likely

that when the results of the special 2005 census are tabulated, the actual increase in population from 2000-2004 will be higher than the estimate reported in Figure 2.

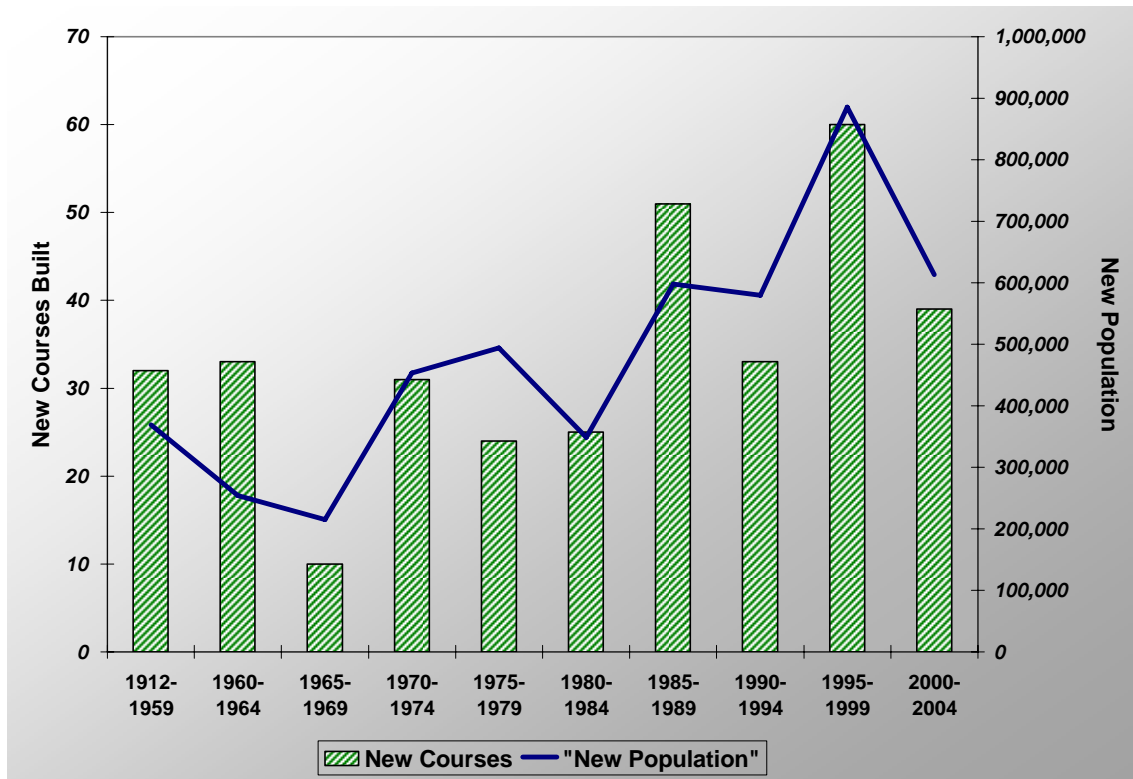


Figure 2: Arizona Population and Golf Course Growth over Time

The distribution of the 338 Arizona golf courses in existence as of December 2004, by region, is provided in Figure 3. All counties in Arizona were grouped into five regions for the purposes of summarizing a subset of results in this study:

- **Central:** Yavapai, La Paz, Gila, Pinal
- **North:** Mohave, Coconino, Navajo, Apache
- **Maricopa:** Maricopa
- **Pima:** Pima
- **South:** Yuma, Graham, Greenlee, Santa Cruz, Cochise

The majority of golf courses in Arizona are located in Maricopa County (59 percent). These courses are located in or near the Phoenix metropolitan area. Pima County has the next highest number of golf courses (12 percent). These courses are located in or near the Tucson metropolitan area. Of the remaining courses, 12 percent are in Central Arizona, 10 percent are in Northern Arizona, and 7 percent are in Southern Arizona.

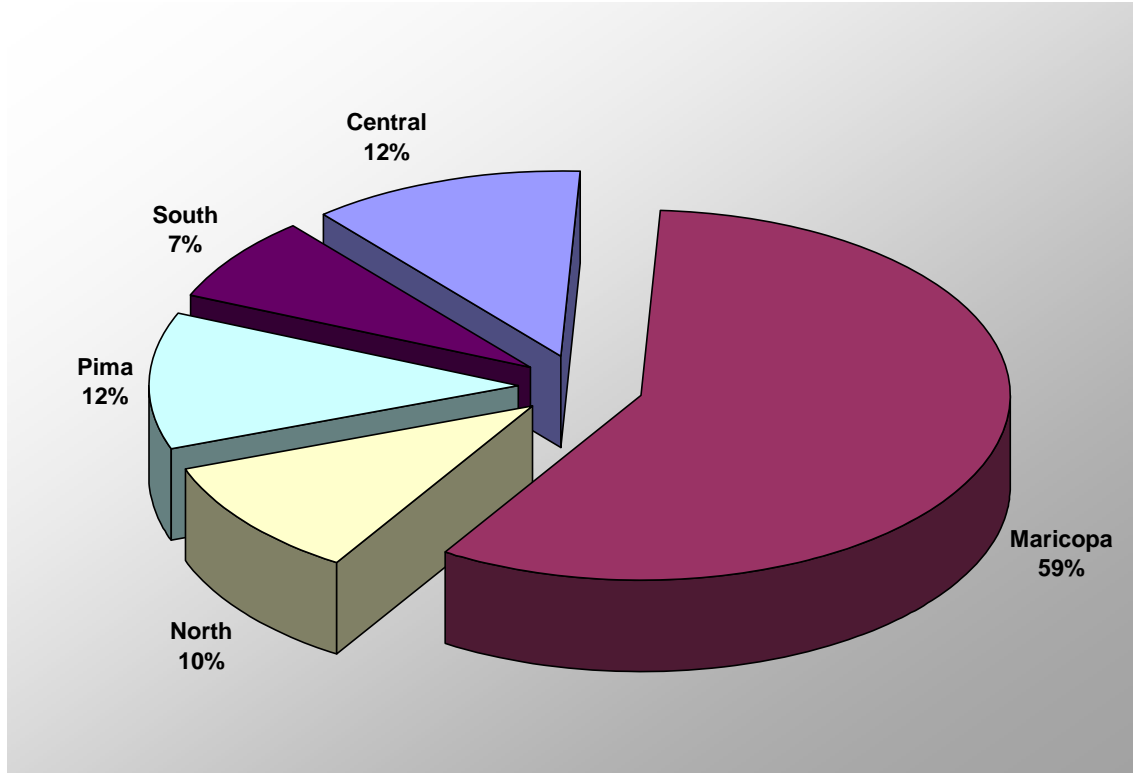


Figure 3: Distribution of 338 Courses by Region

More detailed information regarding the distribution of courses both by region and number of holes is provided in Table 2. For example, Maricopa County has 21 nine-hole courses, 160 eighteen-hole courses, 7 twenty seven-hole courses, and 9 thirty six-hole courses. Arizona is comprised of 46 nine-hole courses, 268 eighteen-hole courses, 11 twenty seven-hole courses, and 13 thirty six-hole courses. Notice that nearly 50 percent of all golf facilities in Arizona are eighteen-hole courses located in Maricopa County. As shown in the next section, this dominance of eighteen-hole courses in Maricopa County is even more pronounced in the sample data obtained from the survey responses.

Table 2: Regional Distribution of Courses by Number of Holes

# of Holes	Central	Maricopa	North	Pima	South	Totals
9	9	21	10	1	5	46
18	30	160	24	34	20	268
27	0	7	0	4	0	11
36	1	9	1	2	0	13
Totals	40	197	35	41	25	338

4. Survey Responses and Statistical Methodology

4.1. Survey Responses

A total of 79 questionnaires were received that were either fully or partially completed. After making some follow-up calls, it was discovered that one survey was sent in by a golf instructional facility without a golf course and another was sent in by a golf course that did not open until 2005. Since this questionnaire specifically asked for every question to be filled out using 2004 data (because this study is for the year 2004), the course that opened in 2005 was dropped from the sample. After these two surveys were removed, the total number of fully or partially completed questionnaires was 77. This represents a 22.8 percent response rate (Table 1).

The distribution of respondents by number of holes (9, 18, 27, or 36) and by type (independently owned, municipal tax supported ownership, tribal ownership) is provided in Table 3. Notice that not all cross-product of categories are represented in the sample. Only seven of the twelve possible pairings of number of holes and type of facility are represented in the sample. Also, notice that eighteen-hole independent courses dominate the sample.

Table 3: Distribution of Respondents by Holes and by Type

Type	Respondents
9 Hole Independent	3
9 Hole Municipal	4
18 Hole Independent	53
18 Hole Municipal	6
18 Hole Tribal	2
27 Hole Independent	3
36 Hole Independent	6
Totals	77

The distribution of respondents by region is displayed in Figure 4. Notice that 58 out of the 77 respondents are from Maricopa, which represents approximately 69 percent of all golf courses. This number is larger than the true population percentage (59 percent from Figure 3).

Respondents were also asked whether their facility was located in: (1) a real estate development; (2) a resort; (3) a park or recreation area; (4) a military installation; and/or (5) tribal land. Several respondents were located in more than one of these locations and several others were not located in any. The distribution of respondents by location is shown in Figure 5.

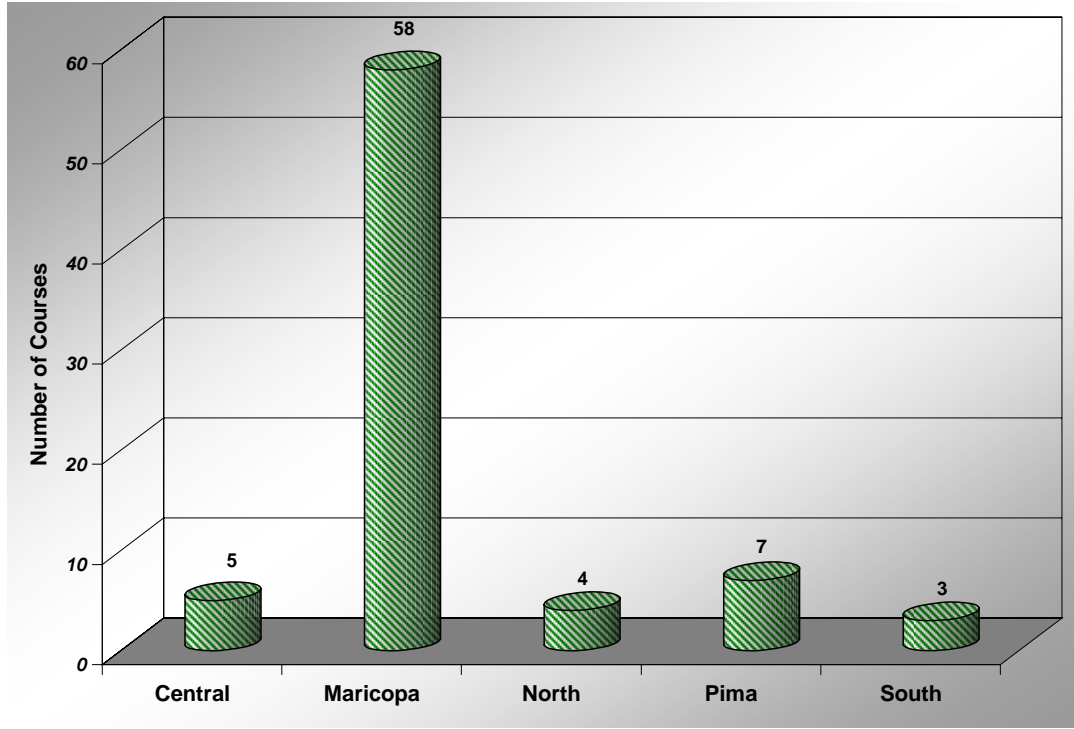


Figure 4: Distribution of 77 Respondents by Region

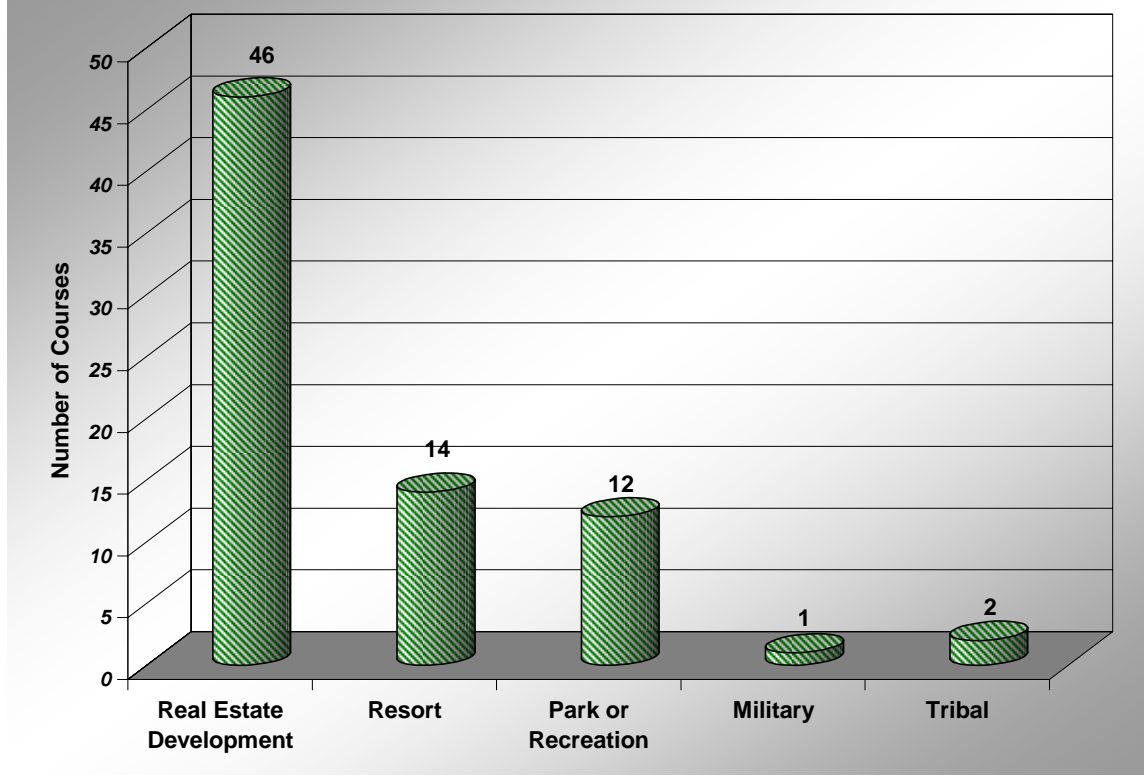


Figure 5: Distribution of Respondents by location

Considering the results from Table 3, Figure 4, and Figure 5 taken together it becomes apparent that there are not enough data points in the sample to be able to group the data using more than one set of characteristics. For example, Templeton *et. al.* were able to group the sample data into nine types of facilities using two characteristics - number of holes and location. They were able to achieve this level of disaggregation because, even though their response rate was 21 percent (slightly lower than the response rate in this study) the number of the facilities in their sample was 187 (roughly 250% higher than in this study). Furthermore, while the overall sample size in this study is 77, all questions involving financial data had a lower (and in some cases, a much lower) sample size. For example, the distribution of respondents by revenue bracket is shown in Table 4. Notice that only 72 of the 77 surveys returned contained information regarding total revenue. As another example, only 19 of the 77 surveys returned contained information regarding total asset values (not shown). This difference in the number of responses to nearly all relevant questions makes the process of estimating the results more difficult.

Table 4: Distribution of Respondents by Revenue Bracket

Revenue Bracket	Midpoint	Observations
Less than \$500 thousand	\$250,000	7
\$500-\$599 thousand	\$550,000	1
\$600-\$699 thousand	\$650,000	1
\$700-\$799 thousand	\$750,000	1
\$800-\$899 thousand	\$850,000	7
\$900-\$999 thousand	\$950,000	1
\$1.0-\$1.249 million	\$1,125,000	7
\$1.25-\$1.499 million	\$1,375,000	8
\$1.5-\$1.749 million	\$1,625,000	2
\$1.75-\$1.999 million	\$1,875,000	3
\$2.0-\$2.249 million	\$2,125,000	5
\$2.25-\$2.499 million	\$2,375,000	2
\$2.5-\$2.99 million	\$2,750,000	5
\$3.0-\$3.99 million	\$3,500,000	8
\$4.0+ million*	\$5,600,000*	14
Number of returned questionnaires		77
Respondents that provided revenue		72

4.2. Statistical Methodology

To remain consistent, while reducing potential aggregation bias and preserving a reasonable level of statistical significance with respect to the estimates, the sample was divided into four categories: nine-hole courses; eighteen-hole courses; twenty seven-hole courses; and thirty six-hole courses. In terms of the overall number of surveys received, 7 were from nine-hole facilities; 61 were from eighteen-hole facilities; 3 were from twenty seven-hole facilities; and 6 were from thirty six-hole facilities.

Mathematically, the methodology used for obtaining unbiased mean-based empirical estimates of revenues, jobs etc. for the state of Arizona in this study is statistically equivalent to the methodology employed by Templeton *et. al.* However, the level of aggregation is different. As previously mentioned, the Templeton *et. al.* disaggregated the courses into 9 categories. This left 13 types of facilities that existed in the California golf course population that were not represented in the sample. In order to obtain results for those 13 types of facilities, the numbers for the 9 different course categories were extrapolated by using multipliers based on the number of holes. For example, the impact of a resort with 27, 36, or 54 regulation holes was estimated as 1.5, 2.0, or 3.0 times the average economic impacts of a resort with 18 regulation holes. In this study, the higher level of aggregation (into four categories instead of nine) alleviates these types of problems with one exception. As mentioned previously, there is one golf facility in Arizona represented in the population (not in the sample) that has 54 holes. This facility was split into two in the population database and treated as one eighteen-hole facility and one thirty six-hole facility, thus eliminating the need for extrapolation of the type employed by Templeton *et. al.*

To obtain unbiased estimates of the various characteristics for all of Arizona, we multiply the mean characteristic of one of the four types of courses found in the sample database by the number of courses of that type found in the population database. In formal terms (along the lines of the methodology described in Templeton *et. Al.*) an unbiased, mean-based estimator of the characteristic of the j^{th} type of facility is:

$$(E1) \quad \hat{Y}_j = N_j \bar{y}_j, \forall j \in \{1, \dots, 4\} \text{ where:}$$

- N_j represents the number of facilities of type j in the population
- \bar{y}_j is the sample mean for facilities of type j
- $j \in \{1, \dots, 4\}$ corresponds to each of the four types of facility
(1 = 9-hole, 2 = 18-hole, 3 = 27-hole, 4 = 36-hole)

Equation 1 can be written in a slightly different fashion that will be more useful when presenting the results of the analysis. Specifically, Equation 1 can be rewritten as:

$$(E2) \quad \hat{Y}_j = \alpha_j \sum_{i=1}^{n_j} y_{ij}, \forall i \in \{1, \dots, n_j\}, j \in \{1, \dots, 4\} \text{ where:}$$

- y_{ij} is the actual value entered into the questionnaire by the manager of the i^{th} facility of type j for the specific question under analysis
- n_j is the number of facilities of type j in the sample
- $\alpha_j = N_j / n_j$ is the expansion factor for a facility of type j

The expansion factor (α_j) is the number that is multiplied by the sum of the sample observations in order to estimate the contribution of each type of facility to the unbiased estimate of the overall characteristic. For example, an expansion factor of $\alpha_1 = 5.0$ would mean that the sum of the data available from the surveys for all nine hole-courses is multiplied by 5.0 in order to obtain the total contribution of all nine hole-courses to the unbiased estimate of the overall population mean impact. The expansion factor can also be viewed as the reciprocal of the fraction that the sample represents as a percentage of the total number of courses of that type. For example, if the number of nine hole-courses in the sample was $n_1 = 6$, then an expansion factor of $\alpha_1 = 5.0$ would imply that the sample represents $(1.0/5.0) = 20$ percent of all nine hole-courses

in the state and that the total number of nine hole-courses in the state equals 6 multiplied by 5.0, which equals 30.

The overall expansion factor for the entire sample can be expressed as:

$$(E3) \quad \alpha = \frac{\sum_{j=1}^4 \alpha_j N_j}{\sum_{j=1}^4 N_j} = \frac{N}{n}, \text{ where}$$

- N is the size of the entire population of courses of all types in the state ($N = 338$); and
- n is the sample size of all courses of all types that responded to the particular question.

For example, the overall expansion factor (α) in Table 1 was 4.4. This number is simply equal to the overall population size (number of all golf courses in Arizona = 338) divided by the overall sample size (number of golf courses that completed the questionnaire = 77). In general, the expansion factor(s) will vary for each unbiased mean-based estimate calculated in the following sections, because while the total number of golf courses in the state never changes, each particular question asked in the survey elicited a different number of responses from each of the four types of courses.

Standard deviations are reported wherever possible in the following sections in order to get an idea of the accuracy of each estimated impact. An unbiased estimator of the variance of the estimator shown in Equation 1 is:

$$(E4) \quad \hat{v}(\hat{Y}_j) = N_j^2 \frac{s_j^2 (N_j - n_j)}{n_j N_j}, \forall j \in \{1, \dots, 4\} \text{ where:}$$

$$(E5) \quad s_j^2 = \sum_{i=1}^{n_j} \frac{(y_{ij} - \bar{y}_j)^2}{n_j - 1} \text{ is the sample variance, and}$$

$$(E6) \quad \frac{(N_j - n_j)}{N_j} \text{ is the finite, sub-population correction factor}$$

In order to compute the standard deviation of the estimator, one takes the square root of Equation 4. Making use of the expansion factor from Equation 2, an unbiased estimator of the standard deviation of the estimator of each sub-population total (E1) can be reduced to:

$$(E7) \quad \hat{\sigma}_j = s_j \sqrt{\alpha_j (N_j - n_j)}, \text{ where } s_j \text{ is the sample standard deviation of the } j^{\text{th}} \text{ type}$$

The estimate of the sample standard deviation for each sub-population is extremely useful in helping determine the statistical accuracy of the contribution of each of the 4 types of facilities to the overall economic impact. For example, suppose the estimate of the overall contribution of all nine hole-courses to total golf course revenue in the state was $\hat{Y}_1 = \$25,000,000$ with an estimated standard deviation of $\hat{\sigma}_1 = \$2,000,000$. A general rule of thumb from statistics (which is derived from the Central Limit Theorem) is that there exists approximately a 95 percent probability that the true population mean lies within two standard deviations of the estimated mean. Using this as an example only, one would be 95 percent certain that the contribution of all

nine-hole facilities to total revenue in the state would lie somewhere between \$21,000,000 and \$29,000,000.

An unbiased estimator of the overall economic impact for all golf courses within the state is calculated using the following formula:

$$(E8) \quad \hat{Y} = \sum_{j=1}^4 \hat{Y}_j,$$

An unbiased estimator of the standard deviation of the above estimator can be simplified and written as:

$$(E9) \quad \hat{\sigma} = \sqrt{\sum_{j=1}^4 \hat{\sigma}_j^2}$$

For example, suppose that the empirical estimate for total revenue for all golf facilities in the state is $\hat{Y} = \$800,000,000$ and that the unbiased estimate of the standard deviation is $\hat{\sigma} = \$100,000,000$. Using this as an example only, there is roughly a 95 percent probability that the true population estimate of the total revenue from all courses in the state is somewhere between \$600,000,000 and \$1,000,000,000 with a midpoint equal to \$800,000,000.

5. Golf Play

Survey respondents were asked to approximate the percentage of players on their golf course who are from Arizona, from the United States but outside of Arizona, and from other countries. The geographical origin of golfers who play in Arizona is provided in Figure 6. It was estimated that 68 percent of golfers in Arizona are residents, 29 percent are U.S. visitors, and 3 percent are international visitors.

The total paid rounds of golf played in Arizona in 2004 were estimated using the statistical methodology described in Section 4.2. The results were tabulated and are provided in Table 5. Managers from all 77 of the courses that turned in questionnaires also answered this particular question regarding the number of rounds played during the year. It was estimated that 11,643,987 eighteen-hole equivalent rounds of paid golf were played in Arizona in 2004. Further, based on the unbiased estimate of the overall standard deviation of 451,539 (bottom row of Column 4), there is a 95 percent probability that the true number of rounds played in Arizona in 2004 was between 10,740,909 and 12,547,065. It is important to note that the total number of rounds played in Arizona is actually larger than the estimates presented here because a non-trivial number of rounds played in 2004 were not paid for.

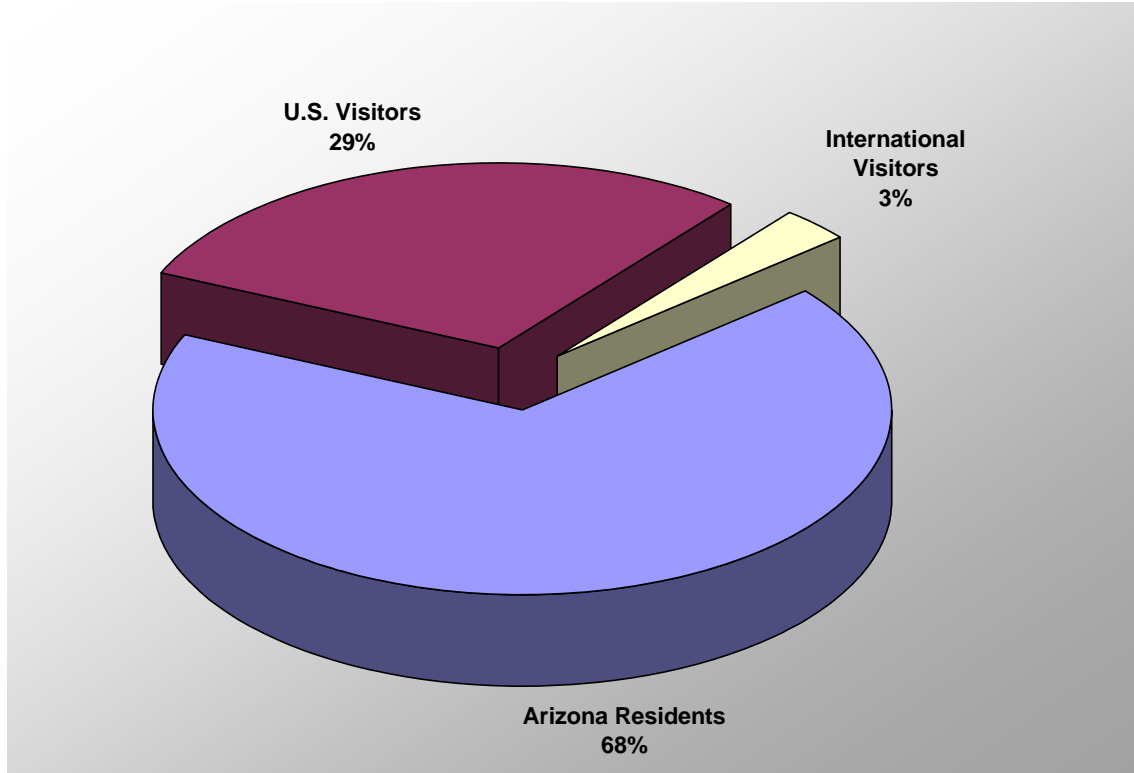


Figure 6: Geographical Origin of Golfers who Play in Arizona

Table 5: Total Rounds by Number of Holes

# Holes	Rounds	Observations	Std Deviation	Expansion Factor
9	883,910	7	187,805	6.6
18	9,554,964	61	400,504	4.4
27	432,637	3	26,714	3.7
36	772,475	6	86,602	2.2
Totals	11,643,987	77	451,539	4.4

Respondents were also asked to give specific dates for their peak season, off-peak season, shoulder season(s), and dates when no golf was played. The averages were computed and tabulated in Table 6. Notice that golf is not played in Northern Arizona from approximately November 1 through March 31, while in the other regions, golf is played all year round except when the grass needs to be over-seeded, which takes anywhere from two weeks to a month.

Table 6: Golf Seasons by Region

Region	Peak Begin	Peak End	Off-Peak Begin	Off-Peak End	No Golf Begin	No Golf End	Observations
Central	15-Mar	23-Jul	21-Mar	15-May	25-Sep	9-Oct	4
Maricopa	16-Dec	20-Apr	2-Jun	26-Sep	22-Sep	8-Oct	50
North	11-Dec	30-Jun	16-Jun	7-Jul	1-Nov	31-Mar	3
Pima	18-Nov	28-Apr	14-May	8-Oct	20-Sep	20-Oct	7
South	11-Jan	31-May	1-Jul	10-Nov	1-Jun	30-Jun	3
Respondents to this question							67

The total number of rounds by region was approximated by taking the unbiased estimates of the total number of rounds for each of the four types of courses from Table 5, dividing by the number of courses of each type that exist in Arizona, and then multiplying by the distribution of courses of the four types across the five regions (making use of Table 2). The results are displayed in Figure 7. Almost 7 million rounds were played in Maricopa County, followed by 1.5 million in Pima County, 1.3 million in Central Arizona, 1.1 million in Northern Arizona, and 800 thousand in Southern Arizona.

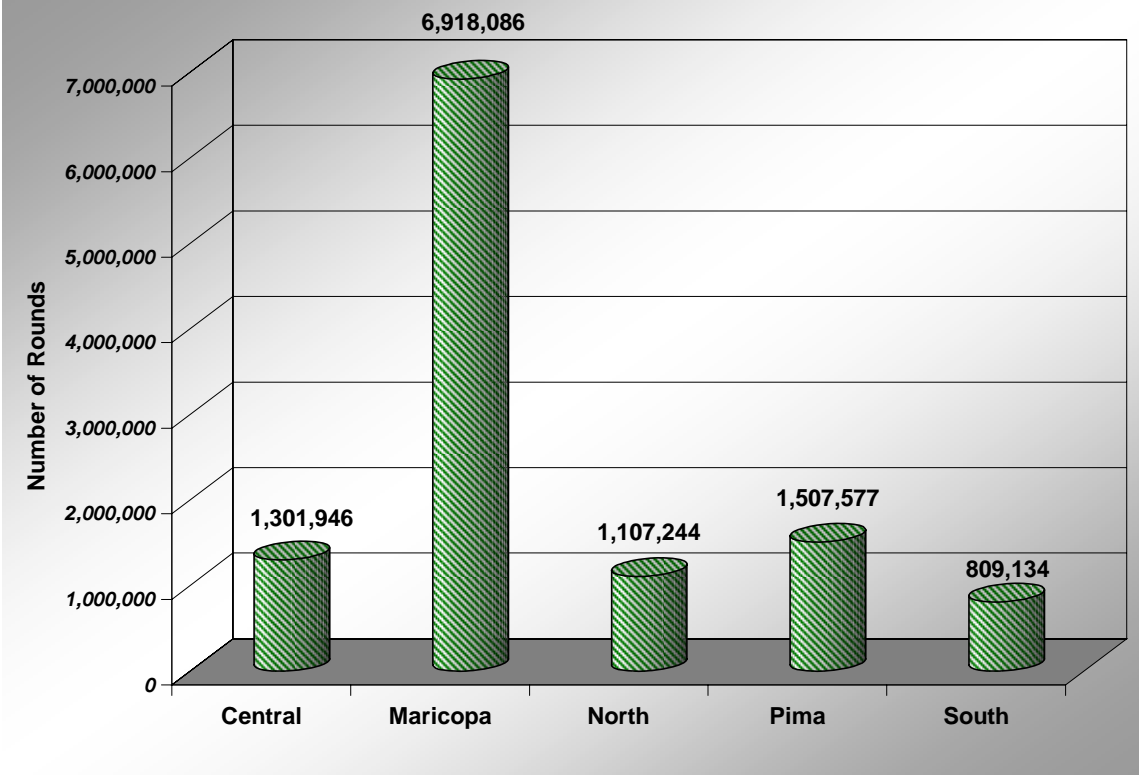


Figure 7: Total Rounds by Region

The seasonal breakdown of rounds played was estimated using the responses to Question 9 (Appendix C) which asked the number of rounds that were played during the peak season, off-peak season, and shoulder season(s). These numbers were converted to percentages of the total. They could easily be multiplied by the unbiased estimate of the total number of rounds played (from Table 5) to get an unbiased estimate of the number of rounds played by season. Notice that 49 percent of rounds are played during the peak season, 26 percent during the off-peak season, and 25 percent during the shoulder season(s).

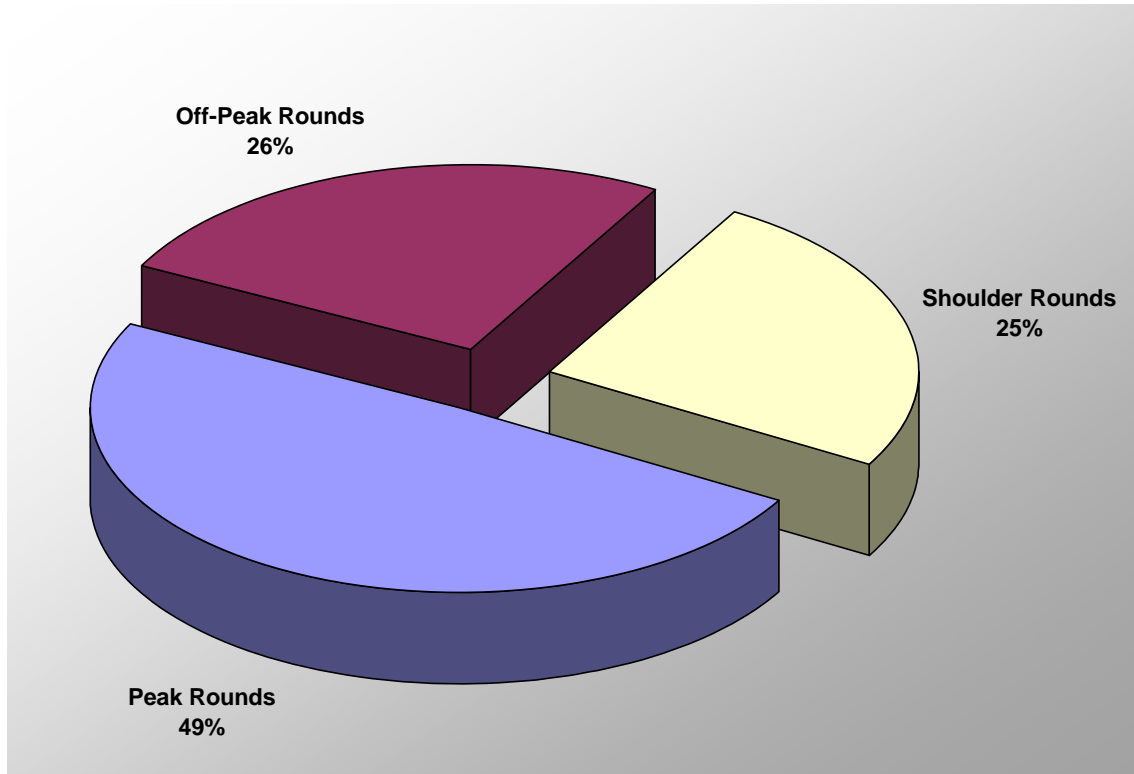


Figure 8: Seasonal Breakdown of Rounds Played

The number of paid half-hour lessons given by facility personnel in 2004 was estimated using the methodology described in Section 4.2 and the results are shown in Table 7. There were 56 respondents to this particular question. The unbiased estimate of the number of paid half-hour lessons given in Arizona at all facilities with golf courses was 103,767 and there is approximately a 95 percent probability that the true number of lessons given in Arizona in 2004 was between 67,073 and 140,461.

Table 7: Number of Lessons by Number of Holes

# Holes	Lessons	Observations	Std Deviation	Expansion Factor
9	9,660	4	6,172	11.5
18	57,973	44	13,013	6.1
27	11,499	3	6,894	3.7
36	24,635	5	9,037	2.6
Totals	103,767	56	18,347	6.0

Average green and cart fees were estimated by adding the two responses from Question 19 (Appendix C) for each individual course and dividing by the number of rounds reported by that individual course. The results were then averaged across all courses of each type. Green and cart fees were added together prior to estimation because some courses include cart fees with green fees, while others charge for each separately. The estimated average green and cart fees for the equivalent of an eighteen hole-round of golf are provided in Figure 9. As expected, the average green and cart fees increase as the number of holes available at the facility increase. The average green and cart fees were only \$12.47 per round for nine hole-courses, \$29.62 for eighteen hole-courses, \$58.15 for twenty seven-hole courses, and \$58.48 for thirty six-hole courses. The overall average price paid for green and cart fees in Arizona was \$31.05 (not shown). It is important to note that this number includes all public and private courses. The average price paid for green and cart fees only on public courses would be much smaller. Moreover, the actual overall average price for green and cart fees in Arizona would actually be lower than \$31.05 if the number of unpaid rounds were incorporated in the average.

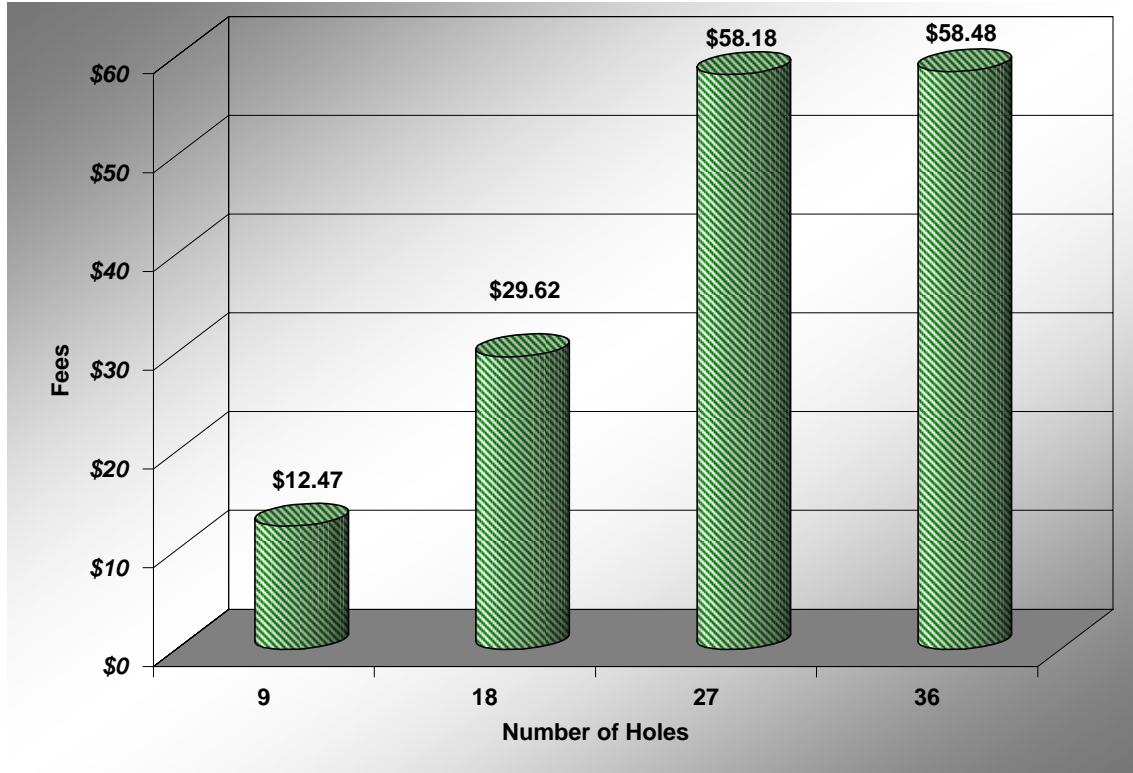


Figure 9: Average Green and Cart Fees by Number of Holes

Average green and cart fees by region were estimated by taking the average green and cart fees by number of holes from Figure 9 and weighting the results by the number of courses of each type in each region (from Table 2). The results are provided in Figure 10. According to the survey results from this study, Pima County had the highest average green and cart fees (\$35.28), followed by Maricopa with \$31.97. The lowest estimate of average green and cart fees of \$26.91 occurred in Northern Arizona.

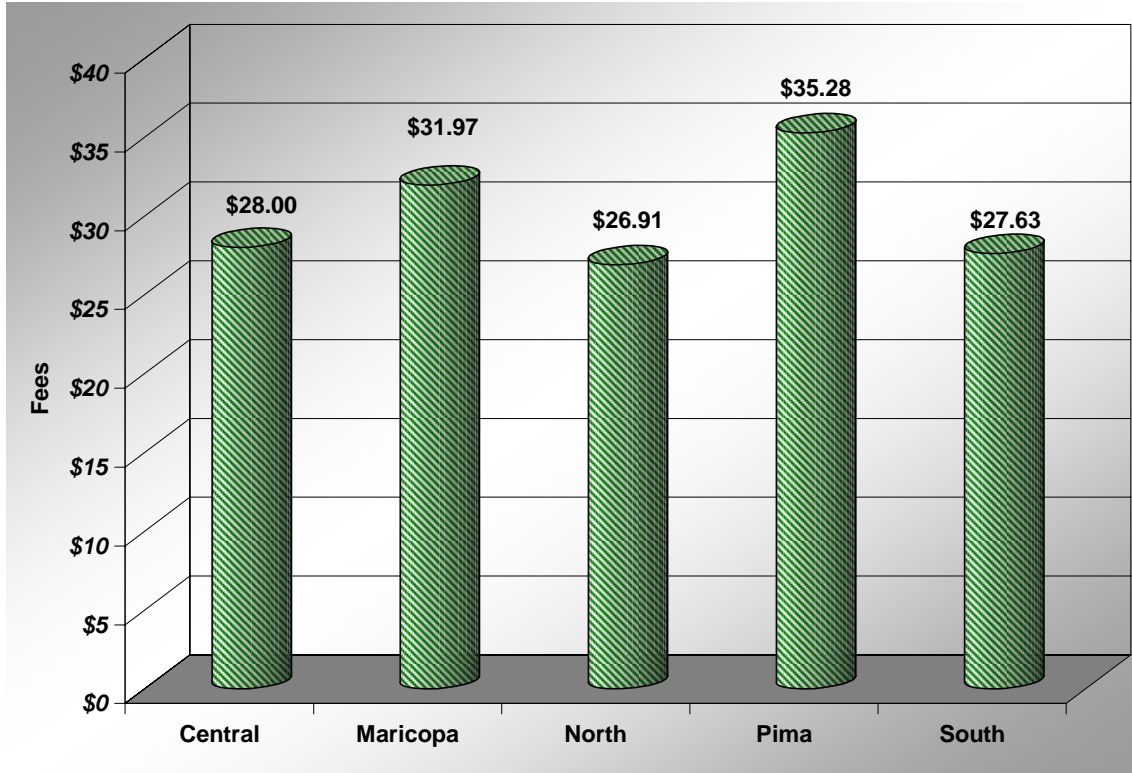


Figure 10: Average Green and Cart Fees by Region

6. Direct Economic Impact from Golf Course Revenues

Golf course revenues, estimated by type of facility, were estimated and are provided in Table 8. Prior to estimation, the answer from Question 17 (total gross revenues excluding initiation fees) was added to the gross revenue collected from initiation fees in 2004. Once these numbers were added together, the methodology described in Section 4.2 was used to obtain unbiased estimates of the contribution of revenue from each type of course, as well as an unbiased estimate of total revenue. There were 72 respondents to the question regarding total revenue. If the question regarding initiation fees was answered, that number was added to total revenues. If the question regarding initiation fees was left blank, there were assumed to be no initiation fees collected in 2004.

As an example of how to interpret Table 8, 57 of the 72 respondents to the question regarding total revenue were from eighteen hole-courses. The unbiased estimate of the contribution of all eighteen hole-courses to overall total revenue for the state is \$629,523,654. The expansion factor associated with eighteen hole-courses of 4.7 indicates that each eighteen hole-course that responded in the sample represents 4.7 eighteen hole-courses in the population. The standard deviation of \$49,359,987 indicates that there is approximately a 95 percent probability that the true revenue from all eighteen hole-courses in the state lies between \$530,803,680 and \$728,243,628.

The unbiased estimate of total revenue collected by Arizona golf courses in 2004 is \$806,357,856. There is approximately a 95 percent probability that the true total revenue from all golf courses in Arizona lies between \$691,104,640 and \$921,611,072.

Table 8: Total Revenue by Number of Holes*

# Holes	Total Revenue	Observations	Std Deviation	Expansion Factor
9	\$23,341,083	7	\$5,578,581	6.6
18	\$629,523,654	57	\$49,359,987	4.7
27	\$49,214,000	3	\$16,999,185	3.7
36	\$104,279,118	5	\$23,755,520	2.6
Totals	\$806,357,856	72	\$57,626,608	4.7

*Includes Initiation Fees

The breakdown of total revenue collected by region was estimated by taking the average contribution of each of the four types of courses to overall revenue (from Table 8) and then multiplying by the distribution of courses in the state across type and region (from Table 2). The results are provided in Figure 11. Maricopa County golf courses received an estimated \$490 million in total revenue, followed by \$114 million in Pima County. The region with the lowest revenue from golf courses was Southern Arizona with \$49.5 million.

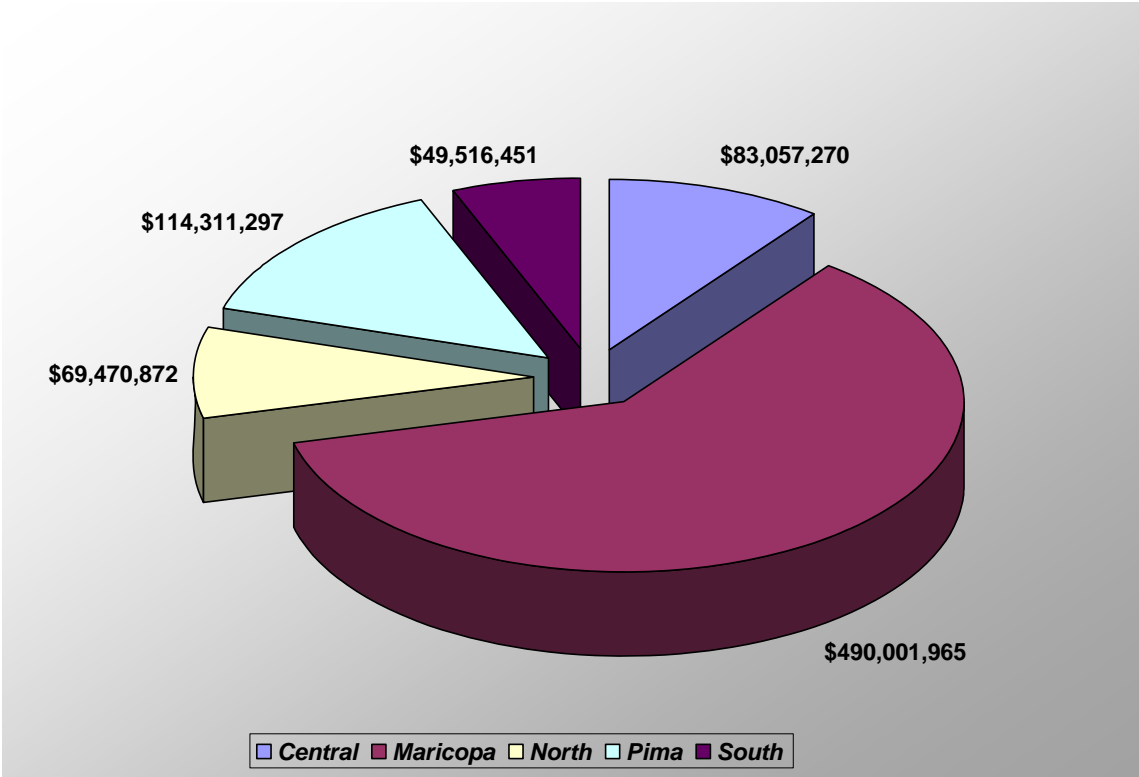


Figure 11: Total Revenue by Region

The seasonal breakdown of revenue from golf courses collected in Arizona in 2004 was estimated using the responses to Question 18 (Appendix C) which asked for the total (or percentage of total) revenue collected during the peak season, off-peak season, and shoulder season(s). These results are provided in Figure 12. The numbers were converted to percentages of the total. 51 percent of rounds were played during the peak season, 24 percent during the off-peak season, and 25 percent during the shoulder season(s). These percentages are very close to the seasonal breakdowns for golf rounds played (Figure 8).

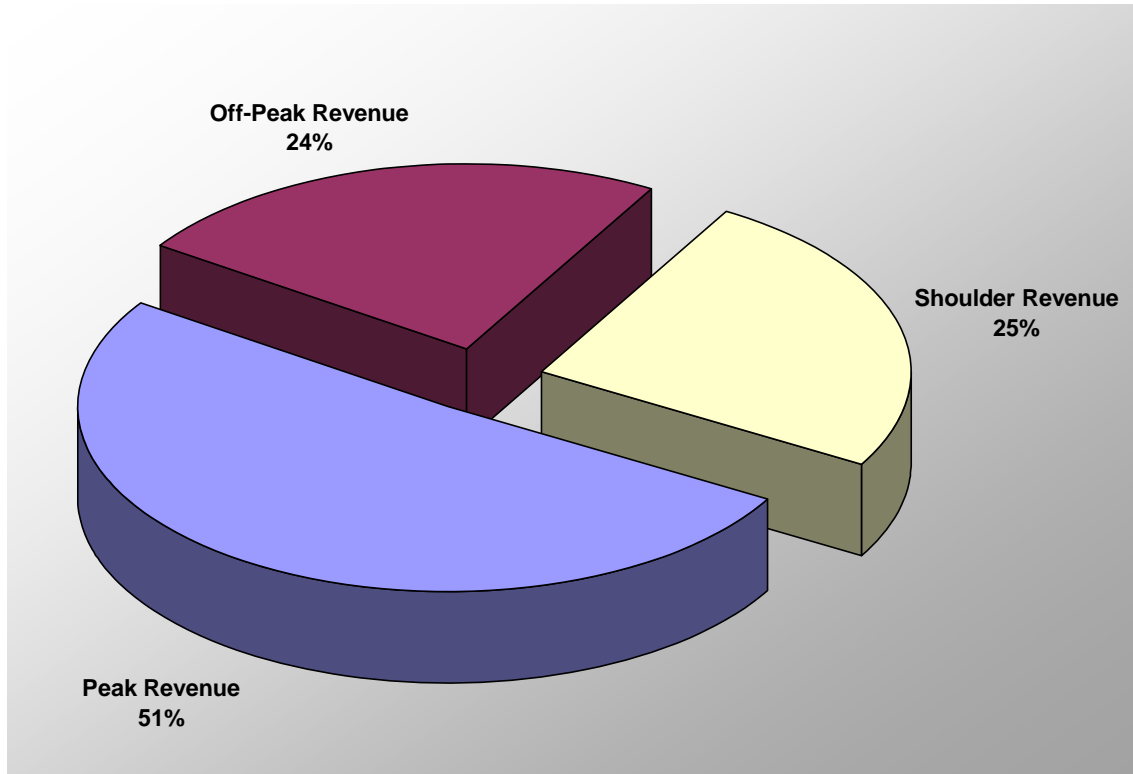


Figure 12: Seasonal Breakdown of Total Revenue

The breakdown of revenue by category and number of holes is provided in Table 9. Notice that the number of responses varied with each question. For example, 67 respondents answered the question regarding green and cart fees but only 44 respondents answered the question regarding revenue from lessons. Estimates for each of the nine categories were calculated separately in a similar fashion as total revenue (Table 8) but in the interest of space and time constraints, only the unbiased estimate of the contribution of each category and the number of sample observations, by hole are reported in Table 9.

Green and cart fees comprised the largest portion of revenue (\$396 million), followed by food and beverage sales (\$142 million) and membership fees (\$122 million). Retail sales accounted for \$65 million of total revenue, while initiation fees collected in 2004 amounted to \$30 million. Driving range fees, which comprise a relatively larger portion of the revenue from nine hole-courses when compared to larger sized courses, amounted to \$8.9 million in 2004.

Table 9: Revenue Breakdown by Category and Number of Holes

# Holes	9	18	27	36	All Holes
Green and Cart Fees	\$11,460,829	\$307,883,869	\$26,837,593	\$49,727,705	\$395,909,996
n	7	52	3	5	67
Food and Beverage	\$3,563,680	\$120,825,083	\$2,436,249	\$16,134,515	\$142,959,527
n	4	44	2	4	54
Membership Fees	\$799,477	\$99,544,754	\$10,265,602	\$11,561,335	\$122,171,168
n	6	47	3	4	60
Retail Sales	\$2,419,018	\$47,410,184	\$5,996,630	\$10,038,199	\$65,864,031
n	4	45	3	4	56
Initiation Fees	\$0	\$23,097,554	\$1,761,765	\$5,269,103	\$30,128,422
n	4	43	3	4	54
Driving Range	\$3,582,748	\$13,081,087	\$532,013	\$608,775	\$17,804,624
n	4	43	2	4	53
Tournaments	\$855,688	\$6,972,677	\$775,289	\$315,597	\$8,919,251
n	4	36	3	3	46
Lessons	\$659,643	\$2,100,550	\$608,858	\$1,471,586	\$4,840,636
n	4	36	2	4	44
Others	\$0	\$8,607,898	\$0	\$9,152,302	\$17,760,200
n	4	36	3	3	46
Totals	\$23,341,083	\$629,523,654	\$49,214,000	\$104,279,118	\$806,357,856

A compact and easier to read version of Table 9 is provided in Figure 13. Green and cart fees comprised 49 percent of the revenue from all golf courses in Arizona in 2004, followed by 18 percent for food and beverage sales, 15 percent in membership fees, 8 percent in retail sales, and 4 percent from initiation fees.

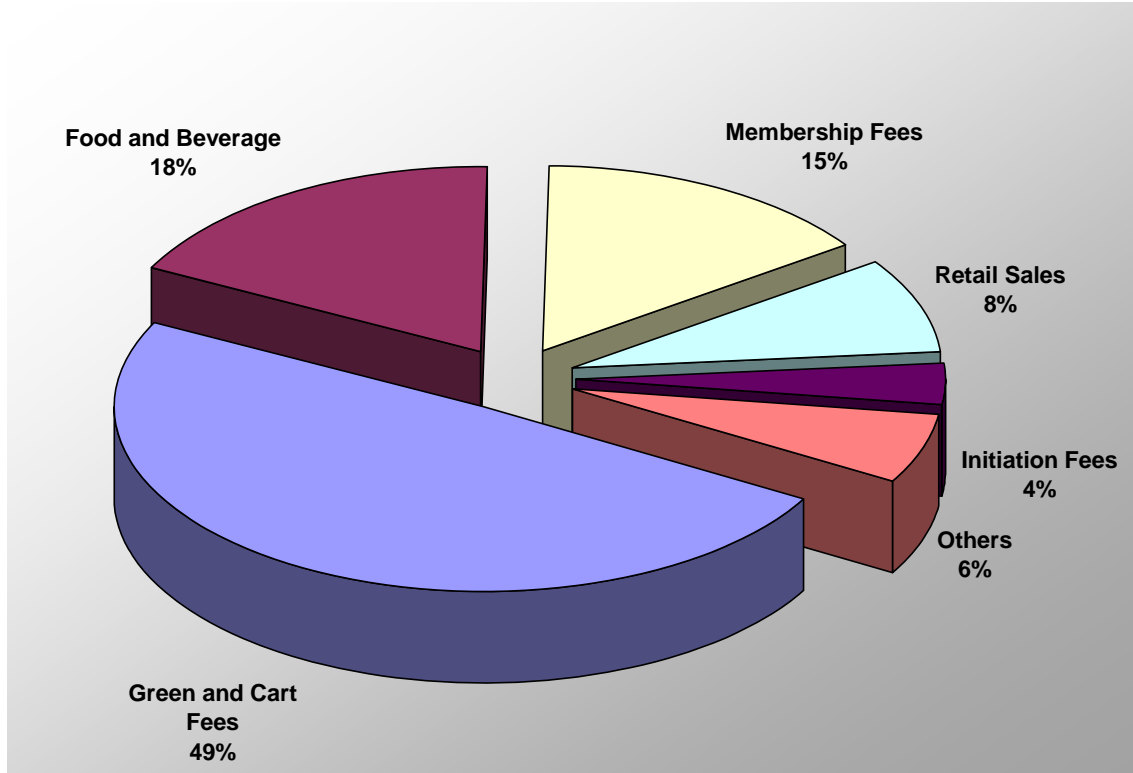


Figure 13: Revenue Breakdown by Category

7. Other Contributions to the Economy

The number of full-time and part-time workers employed at golf courses in 2004 was estimated and the results are provided in Table 10. The unbiased estimate of the total number of workers employed on all golf courses in 2004 is 19,481. 55 percent of those employed were full-time workers while 45 percent were part-time. The number of respondents who completed the question regarding employees was 60. There is approximately a 95 percent probability that the true number of workers employed at Arizona golf courses was between 16,895 and 22,067.

Table 10: Number of Employees

# Holes	Employees	Full-Time	Part-Time	Observations	Std Deviation	Expansion Factor
9	1,093	45%	55%	4	336	11.5
18	15,991	53%	47%	48	1,145	5.6
27	869	77%	23%	3	318	3.7
36	1,529	74%	26%	5	385	2.6
Totals	19,481	55%	45%	60	1,293	5.6

The breakdown of the percentage of employees by type of employment on Arizona golf courses is shown in Figure 14. Notice that 39 percent of those employed on golf courses in Arizona in 2004 were involved in maintenance activities, 28 percent worked in the golf shop, 27 percent were involved in the food and beverage operations, and 4 percent worked in administration.

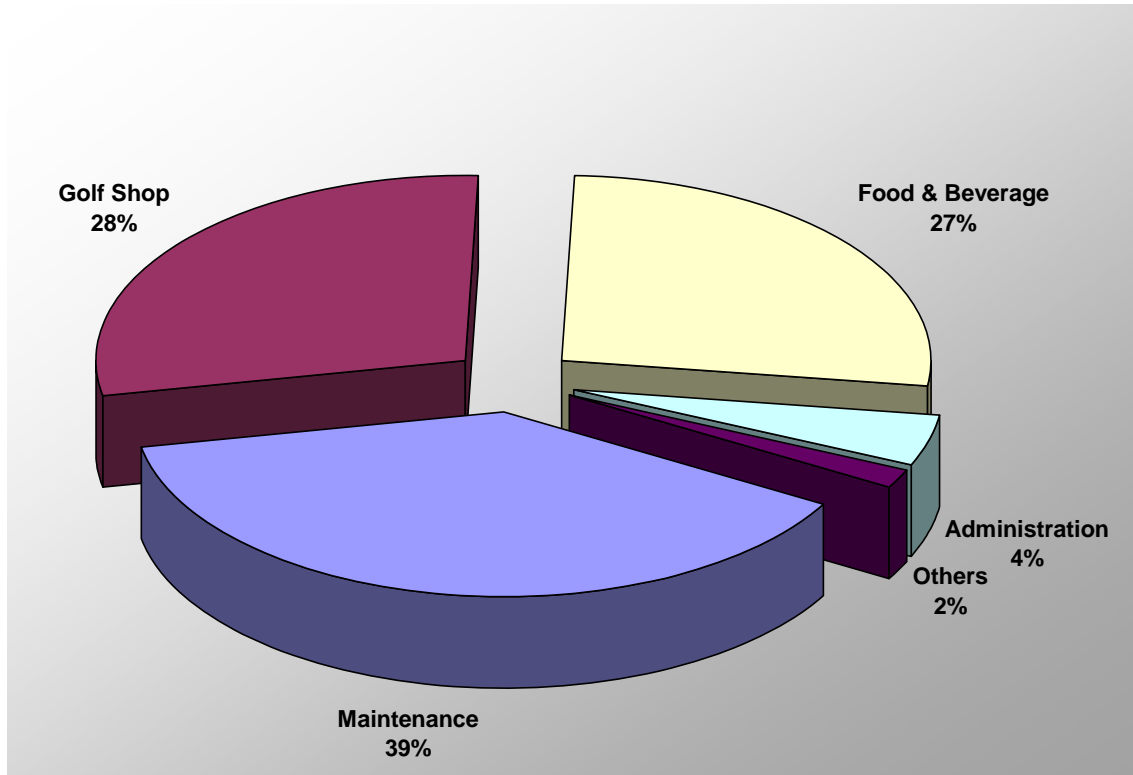


Figure 14: Percentage of Employees by Type of Job

The breakdown of workers employed on Arizona golf courses by region was estimated by taking the average contribution of each of the four types of courses to the overall number of employees (from Table 10) and then multiplying by the distribution of courses in the state across type and region (from Table 2). The results are provided in Figure 15. Maricopa County golf courses employed 11,657 full-time and part-time workers in 2004. Pima County employed 2,604 workers. Northern Arizona employed the least number of workers in 2004 (1,787).

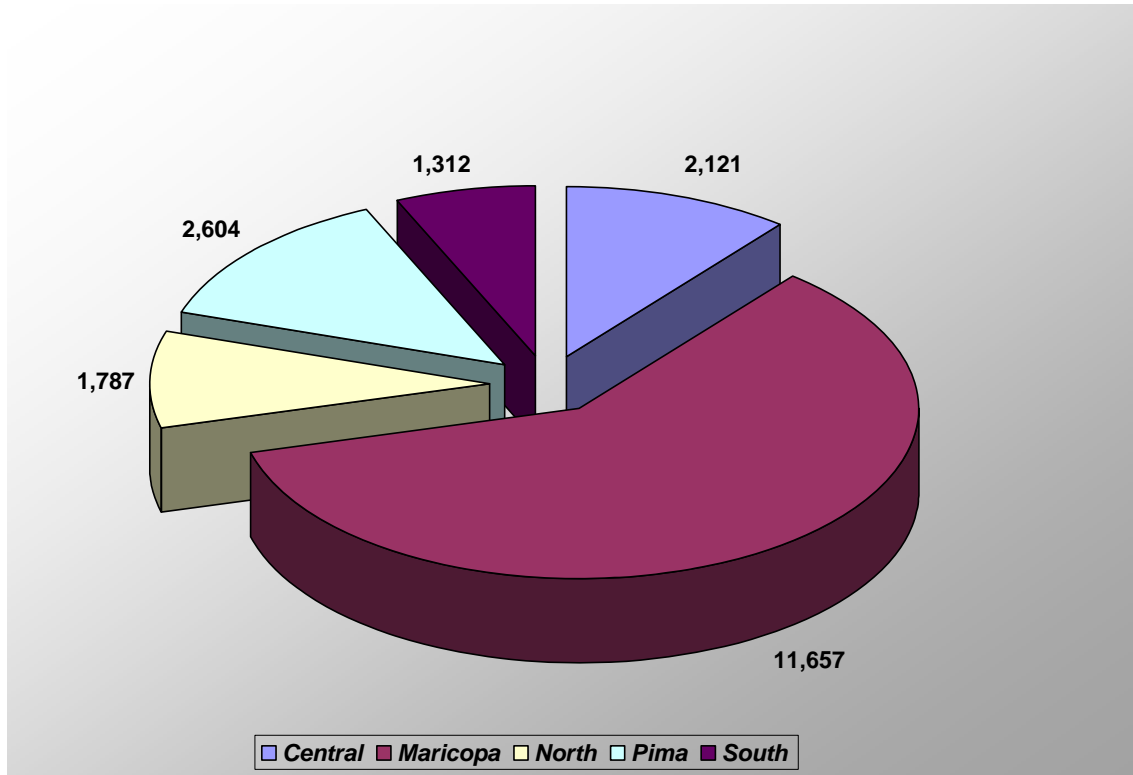


Figure 15: Number of Employees by Region

An unbiased estimate of the total wages and benefits paid to all golf course employees in Arizona is provided in Table 11. Those employees that worked in the clubhouse received a total of \$168,577,751 in wages and benefits in 2004 while those that worked in maintenance received \$122,875,061. These numbers were estimated separately. One estimate was obtained for clubhouse payroll and another estimate was obtained for maintenance payroll. The resulting estimates of the two were added together to get total wages and benefits, which are estimated at \$291,452,812 for 2004.

Table 11: Wages and Benefits by Number of Holes

# Holes	Total	Clubhouse Payroll	Maintenance Payroll	Observations	Expansion Factor
9	\$22,137,916	\$16,461,402	\$5,676,514	2	23.0
18	\$218,546,386	\$116,711,769	\$101,834,617	39	6.9
27	\$11,723,456	\$5,107,394	\$6,616,063	3	3.7
36	\$39,045,053	\$30,297,186	\$8,747,867	2	6.5
Totals	\$291,452,812	\$168,577,751	\$122,875,061	46	7.4

Unbiased estimates of state and federal taxes paid in 2004, by number of holes, are provided in Table 12. It is estimated that approximately \$79,455,853 was paid in total taxes by all golf courses in the State in 2004. The standard deviation for total taxes can not be calculated (because there is no standard deviation for a sample size of one). However, the standard deviation for each type of course, except nine hole-courses, is provided in Table 12. Note that the sample size of 27 associated with the answers to this question is relatively small, and therefore these estimates are somewhat less reliable than most of the other estimates calculated in this study.

Table 12: State and Federal Taxes Paid in 2004

# Holes	Taxes	Observations	Std Deviation	Expansion Factor
9	\$3,404,000	1		46.0
18	\$60,116,822	22	\$9,734,076	12.2
27	\$1,760,000	2	\$348,246	5.5
36	\$14,175,031	2	\$7,959,741	6.5
Totals	\$79,455,853	27	---	12.5

Estimates of charitable donations by all Arizona golf courses in 2004 are given in Table 13. This impact was estimated by taking the answer for cash contributions to charities from Question 25 (Appendix C) and adding it to the monetary value of all In-kind contributions to charities in 2004 (Question 26). In-kind contributions are defined as non-cash contributions such as free golf rounds, free lessons, etc. The unbiased estimate of charitable contributions is \$5,737,694. There is a 95 percent probability that the true value of charitable contributions by all golf courses in the state of Arizona in 2004 was between \$3,943,114 and \$7,532,274. This is a highly conservative estimate of the true impact of charitable donations attributable to the golf course industry because it does not include money raised by private groups who hold charitable events on golf courses (see survey Question 14). A much more detailed study that would gather information regarding the number of spectators at golf tournaments, the amount spent by spectators at golf tournaments, and the amount of money actually donated to charities from tournament events would be required to get more accurate estimates.

Table 13: Cash and In-Kind Charitable Contributions

# Holes	Charity	Observations	Std Deviation	Expansion Factor
9	\$179,400	4	\$91,534	11.5
18	\$4,286,386	46	\$598,068	5.8
27	\$324,665	2	\$203,823	5.5
36	\$947,242	5	\$630,493	2.6
Totals	\$5,737,694	57	\$897,290	5.9

Estimates of the total assessed value of all assets by number of holes are provided in Table 14. Notice that the sample size for Question 27 (Appendix C) regarding total assets is only 19. Furthermore, there are no sample observations for nine hole-courses and for twenty seven-hole courses. Therefore, the contribution of nine hole-courses was approximated by taking the average contribution of eighteen hole-courses, dividing by two, and then multiplying by the total population of all nine hole-courses in the State (46). The contribution of twenty seven-hole courses was approximated by taking the midpoint between the average contribution of eighteen hole-courses and the average contribution of thirty six hole-courses, and then multiplying by the total population of all twenty seven hole-courses (11). This is the only instance, throughout this study, where such an approximation method became necessary. Due to the small sample size, the estimate of \$2.4 billion is less reliable than all other estimates calculated throughout this report.

Table 14: Assessed Value of Total Assets by Number Holes

# Holes	Assets	Observations	Std Deviation	Expansion Factor
9	\$148,361,163	---	---	---
18	\$1,728,730,075	17	\$5,462,802	15.8
27	\$178,204,611	---	---	---
36	\$337,354,589	2	\$27,382,149	6.5
Totals	\$2,392,650,438	19	---	---

8. Golf Course Costs

The total costs for Arizona golf course in 2004, by type of facility, were estimated and are provided in Table 15. Prior to estimation, the answer from Question 24 (total costs excluding taxes) was added to the answer from Question 23 (total state and federal taxes). Once these numbers were added together, the methodology described in Section 4.2 was used to obtain unbiased estimates of each type of course to total costs, as well as an unbiased estimate of total costs. There were 68 respondents to the question regarding total costs. If the question regarding state and federal taxes was answered, that number was added to total costs. If the question regarding taxes was left blank, there were assumed to be no taxes paid by that course in 2004.

As an example of how to interpret Table 14, 54 of the 68 respondents to the question regarding total costs were from eighteen hole-courses. The unbiased estimate of the contribution of all eighteen hole-courses to overall total costs for the state is \$543,214,729. The expansion factor associated with eighteen hole-courses of 5.0 indicates that each eighteen hole-course that responded in the sample represents 5 eighteen hole-courses in the population. The standard deviation of \$37,440,113 indicates that there is approximately a 95 percent probability that the true total costs (including taxes) from all eighteen hole-courses in the state lies between \$468,334,503 and \$618,094,955.

The unbiased estimate of total costs paid by all Arizona golf courses in 2004 is \$696,937,776. The unbiased estimate of the total standard deviation of \$44,841,078 indicates that there is approximately a 95 percent probability that the true total costs (including taxes) from all golf courses in Arizona lies between \$607,255,620 and \$786,619,932.

Table 15: Total Costs by Number of Holes*

# Holes	Total Costs	Observations	Std Deviation	Expansion Factor
9	\$22,407,356	7	\$4,553,016	6.6
18	\$543,214,729	54	\$37,440,113	5.0
27	\$34,771,000	3	\$9,844,218	3.7
36	\$96,544,692	4	\$22,165,778	3.3
Totals	\$696,937,776	68	\$44,841,078	5.0

*Includes State and Federal Taxes

The breakdown of total costs by region was estimated by taking the average contribution of each of the four types of courses to total costs (from Table 15) and then multiplying by the distribution of courses in the state across type and region (from Table 2). The results are provided in Figure 16. Total costs for Maricopa county golf courses were estimated at \$375 million, followed by \$86.4 million in Pima County. The region with the contribution to total costs from golf courses was \$38.1 million in Southern Arizona.

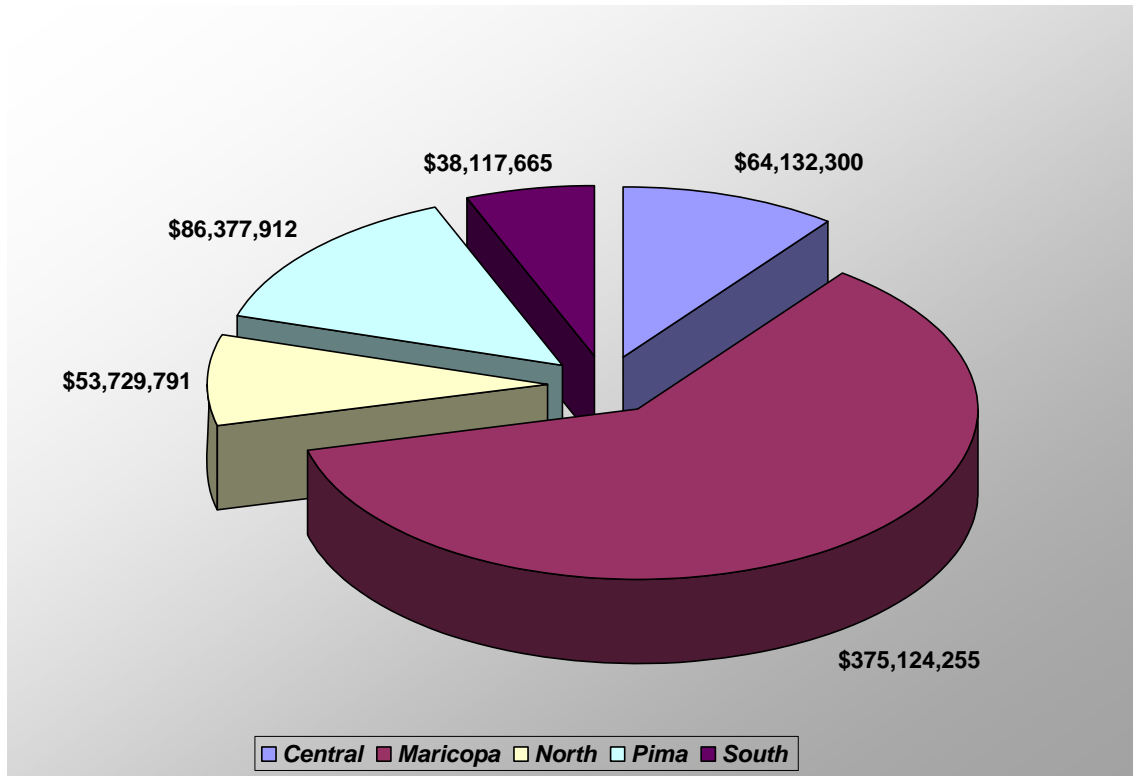


Figure 16: Total Costs by Region

The breakdown of total costs by category and number of holes is provided in Table 16. Notice that the number of responses varied with each question. For example, 47 respondents answered the question regarding maintenance payroll but only 27 respondents answered the question regarding taxes. Estimates for each of the twelve categories were calculated separately in a similar fashion as total costs (Table 15) but in the interest of space and time constraints, only the unbiased estimate of the contribution of each category and the number of sample observations, by hole are reported in Table 16.

Clubhouse and maintenance payroll comprised the largest portions of total costs (\$168 million and \$122 million, respectively), followed by administrative expenses (excluding utilities, payroll, and advertising) of \$66.7 million. The cost of purchasing food and beverages was \$57.6 million, the total cost of buying merchandise was \$32.8 million. Arizona golf courses paid a total of \$30.1 million for utilities and \$23.7 million for lease expenses.

Table 16: Cost Breakdown by Category

# Holes	9	18	27	36	All Holes
Clubhouse Payroll	\$105,753,995	\$48,201,734	\$2,109,344	\$12,512,679	\$168,577,751
n	2	39	3	2	46
Maintenance Payroll	\$74,472,289	\$42,057,499	\$2,732,421	\$3,612,852	\$122,875,061
n	2	39	3	3	47
Administration	\$954,747	\$48,742,592	\$843,815	\$16,136,889	\$66,678,043
n	1	30	2	2	35
Food and Beverage	\$2,579,435	\$44,244,341	\$1,343,115	\$9,434,218	\$57,601,109
n	2	38	2	2	44
Taxes	\$3,404,000	\$60,116,822	\$1,760,000	\$14,175,031	\$79,455,853
n	1	22	2	2	27
Agricultural Inputs	\$680,913	\$30,934,092	\$4,647,160	\$4,659,119	\$40,921,284
n	2	31	2	2	37
Merchandise	\$1,553,487	\$23,746,331	\$3,214,772	\$4,283,364	\$32,797,953
n	2	38	3	3	46
Utilities	\$1,338,782	\$24,351,242	\$762,191	\$3,680,851	\$30,133,066
n	3	39	3	3	48
Lease	\$799,641	\$20,316,433	\$835,843	\$1,772,117	\$23,724,035
n	2	33	1	2	38
Advertising	\$354,875	\$11,558,625	\$367,732	\$3,302,832	\$15,584,064
n	2	32	2	2	38
Insurance	\$802,311	\$7,775,944	\$244,600	\$923,689	\$9,746,545
n	3	30	1	2	36
Others	\$3,008,489	\$42,628,789	\$1,126,531	\$2,079,204	\$48,843,013
n	1	18	2	1	22
Totals	\$195,702,963	\$404,674,442	\$19,987,525	\$76,572,845	\$696,937,776

A simplified version of Table 16 is provided as Figure 17. Clubhouse payroll comprised 24 percent of the total costs for all golf courses in Arizona in 2004, followed by 18 percent for the maintenance payroll, 11 percent for taxes, and 10 percent for administration. Merchandise costs comprised 5 percent of the overall costs while utilities also comprised 4 percent of the overall costs.

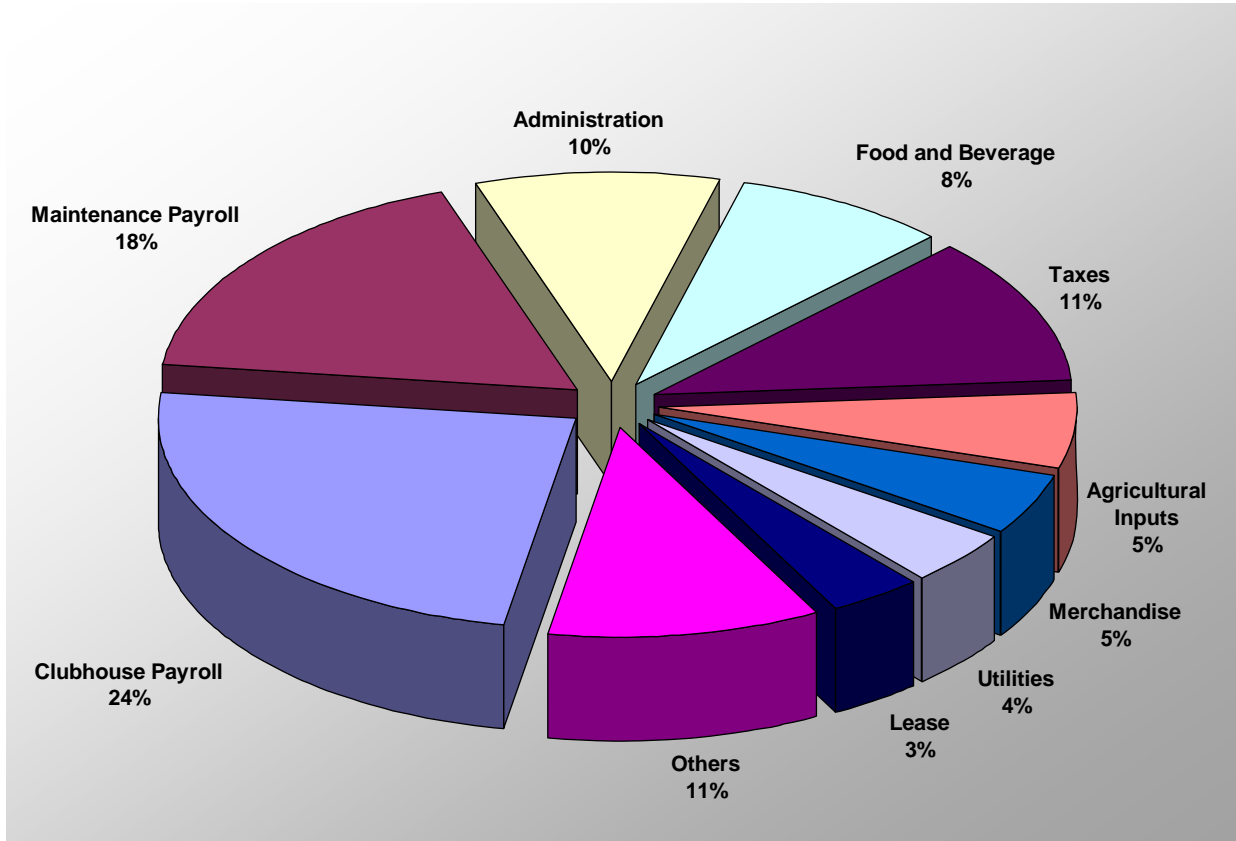


Figure 17: Cost Breakdown by Category

9. Environmental Considerations

Respondents were asked to provide the total acres of the entire facility, not including resort space and residential area, in Question 4 (Appendix C). They were also asked the total area of the golf course, area irrigated, and turf-grass area maintained in Question 29 (Appendix C). Unbiased estimates of the total area of land used by Arizona golf courses in 2004 are provided in Figure 18. Golf course facilities in Arizona used an estimated 44,454 acres in 2004. The actual course used 42,555 acres, of which 30,749 acres were irrigated, and 28,793 acres was maintained turf-grass.

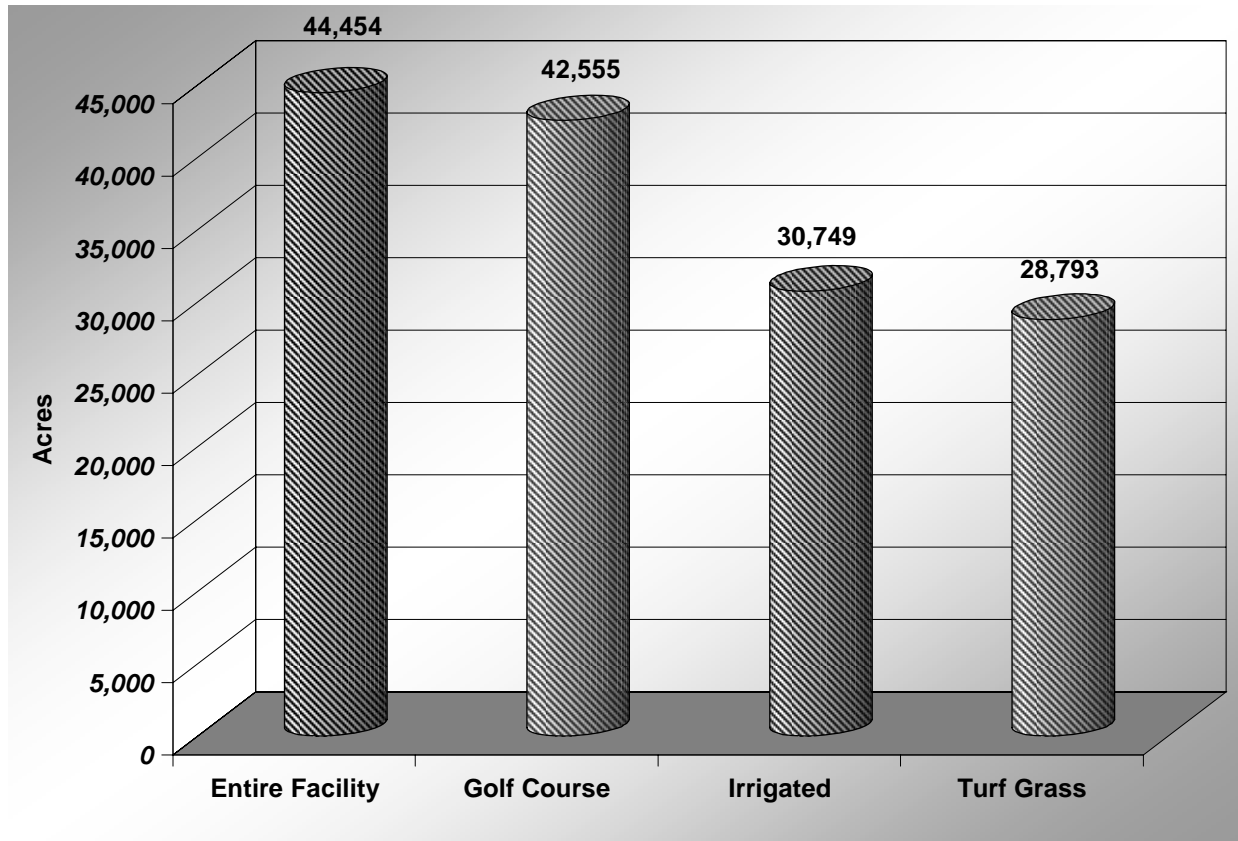


Figure 18: Golf Course Area (acres)

Unbiased estimates of the area of land that irrigated by all Arizona golf courses in 2004 are provided in Table 17, reported by number of holes. Golf course facilities in Arizona irrigated an estimated 30,749 acres. Of this amount, nine hole-courses irrigated 1,978 acres, eighteen hole-courses irrigation 25,717 acres, twenty seven hole-courses irrigated 1,183 acres, and thirty six hole-courses irrigated 1,872 acres.

Estimates of the standard deviations associated with the amount of land irrigated in 2004 are also provided in Table 17. Based on the unbiased estimate of the overall standard deviation, there is approximately a 95 percent probability that the true total area of land irrigated by all Arizona golf courses in 2004 lies between 28,169 and 33,329 acres.

Table 17: Total Area Irrigated by Arizona Golf Courses (acres)

# Holes	Area Irrigated	Observations	Std Deviation	Expansion Factor
9	1,978	3	531	15.3
18	25,717	47	1,157	5.7
27	1,183	2	174	5.5
36	1,872	4	116	3.3
Totals	30,749	56	1,290	6.0

Unbiased estimates of the total amount of irrigation water used in 2004 by all golf courses in Arizona are shown in Table 18. Nine hole-courses in Arizona used 4,462 acre/feet, eighteen hole-courses used 124,784 acre/feet, twenty seven-hole courses used 4,807 acre/feet, and thirty six hole-courses used an estimated 11,930 acre/feet of water in 2004. The unbiased estimate of the total irrigation water used on all golf courses in Arizona in 2004 is 145,982 acre/feet. Note that the overall standard deviation can not be estimated because the standard deviations for both nine hole-courses and twenty seven hole-courses do not exist.

Table 18: Total Irrigation Water Used in 2004 (acre/feet)

# Holes	Water Used	Observations	Std Deviation	Expansion Factor
9	4,462	1		46.0
18	124,784	36	7,172	7.4
27	4,807	1		11.0
36	11,930	3	740	4.3
Totals	145,982	41	---	8.2

Respondents were asked to identify the sources of water used for irrigation and the percentage of each source used. The four possible sources are: (1) Central Arizona Project (CAP); (2) Surface Water; (3) Ground Water; (4) Reclaimed Water. Unbiased estimates of total water used by source are provided in Table 19. These estimates were calculated by allocating the percentages reported by the respondents for each type of course (Question 31) across the water use by category from Table 18. Notice that a large portion of the water used to irrigate golf courses in Arizona is reclaimed water (56,022 acre/feet), which represents 38 percent of the total irrigation water used.

Table 19: Irrigation Water by Source (acre/feet)

# Holes	CAP	Surface Water	Ground Water	Reclaimed Water	Totals
9	1,487	0	1,487	1,487	4,462
18	16,571	5,241	57,700	45,272	124,784
27	0	0	2,404	2,404	4,807
36	5,070	0	0	6,860	11,930
Totals	23,129	5,241	61,591	56,022	145,982

The information provided in Table 19 is also summarized in Figure 19. 38 percent of irrigation is reclaimed water, 42 percent is groundwater, 4 percent is surface water, and 16 percent is CAP.

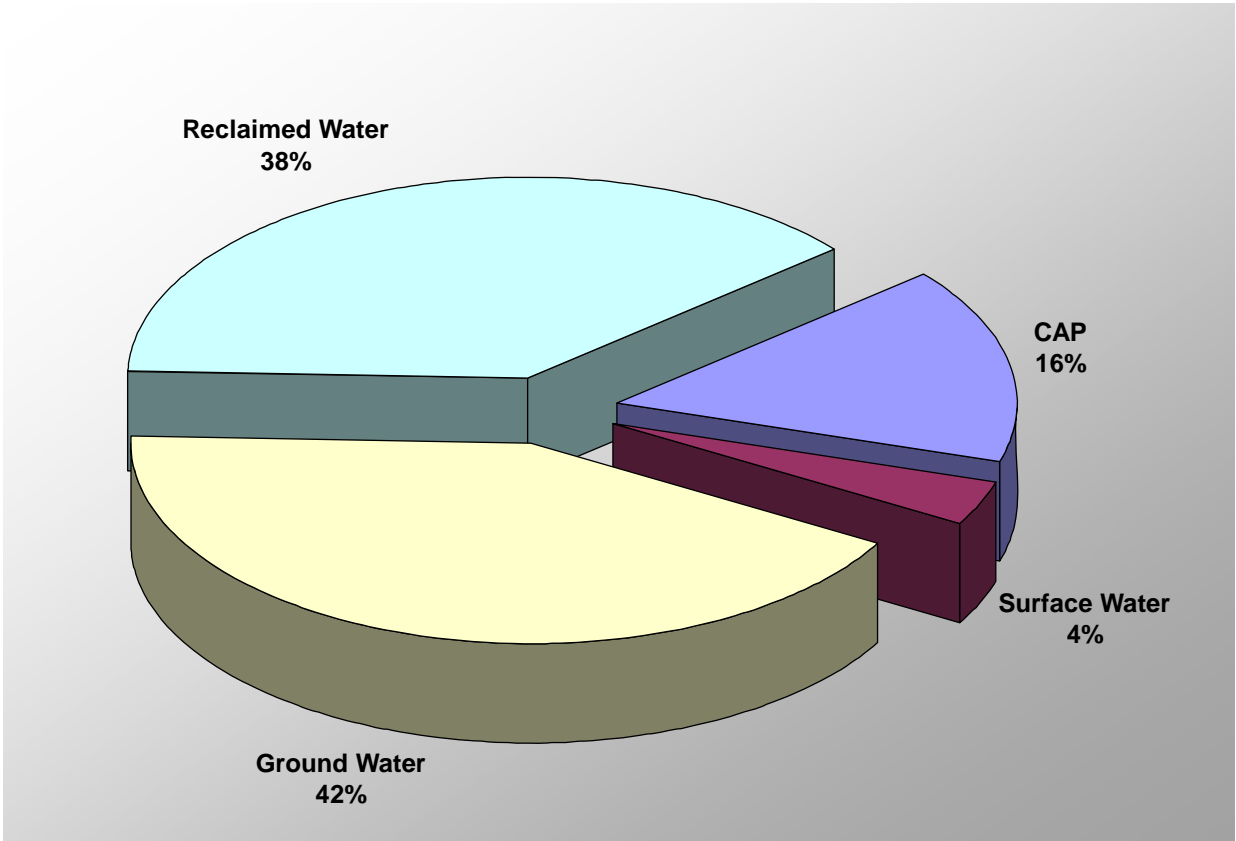


Figure 19: Irrigation Water by Source

The cost of four types of variable agricultural inputs was estimated using the responses provided in the cost breakdown section of the survey (Question 25). The overall estimates for all Arizona golf courses for 2004 are shown in Figure 19. Irrigation water is by far the largest variable input. Golf courses in Arizona spent an estimated \$23,091,023 on irrigation water in 2004. The total cost of fertilizer, herbicides, and pesticides was \$6,782,898, \$2,575,918, and \$2,106,128, respectively.

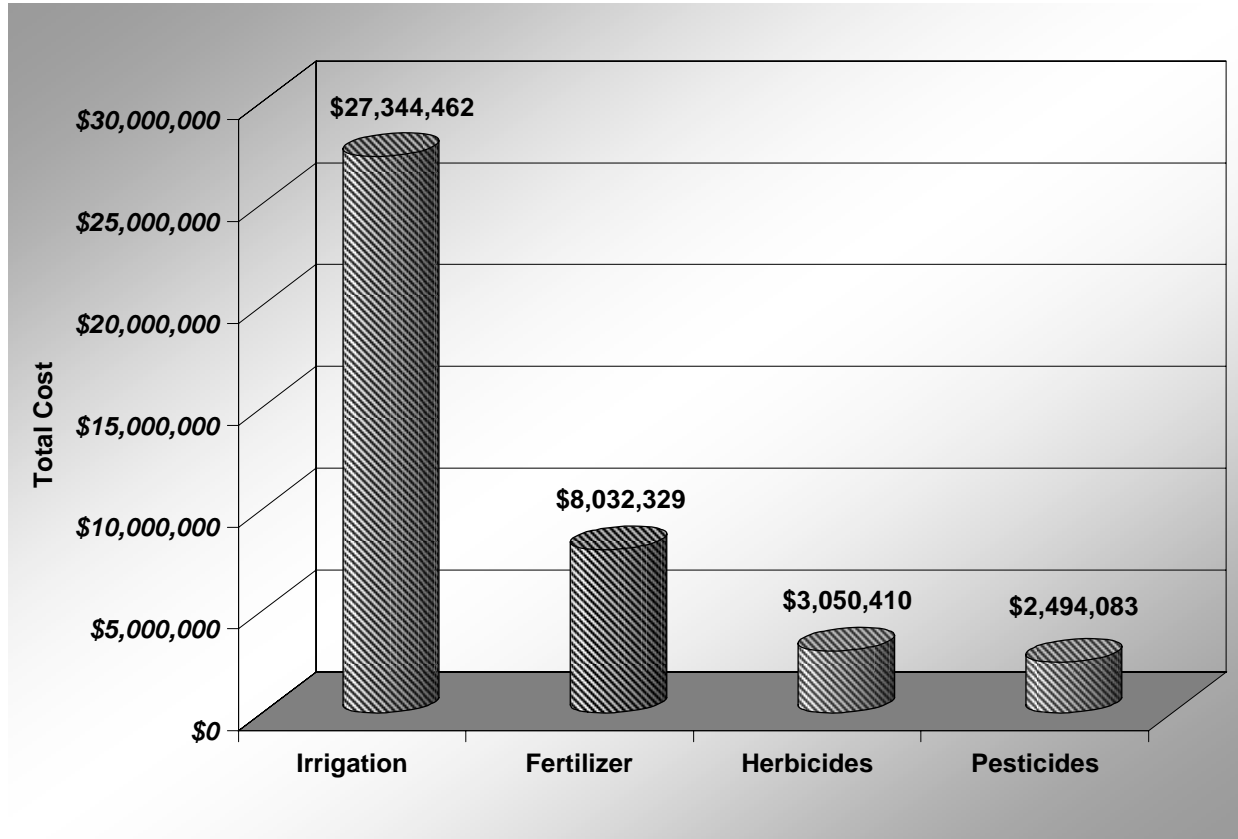


Figure 20: Cost of Variable Agricultural Inputs

The last question in the survey referred to environmental management strategies. Nine different possible strategies were listed and respondents were asked to place a check mark besides each strategy that was employed in 2004. A summary of the percentage of courses that responded affirmative to at least one of these management strategies is provided in Figure 20. 69 percent of courses in Arizona modified the current irrigation system at some point during 2004. 68 percent adjusted fertilization practices, 45 percent eliminated irrigation in selected areas, and 26 percent of the courses reduced the amount of water used to irrigate the fairways.

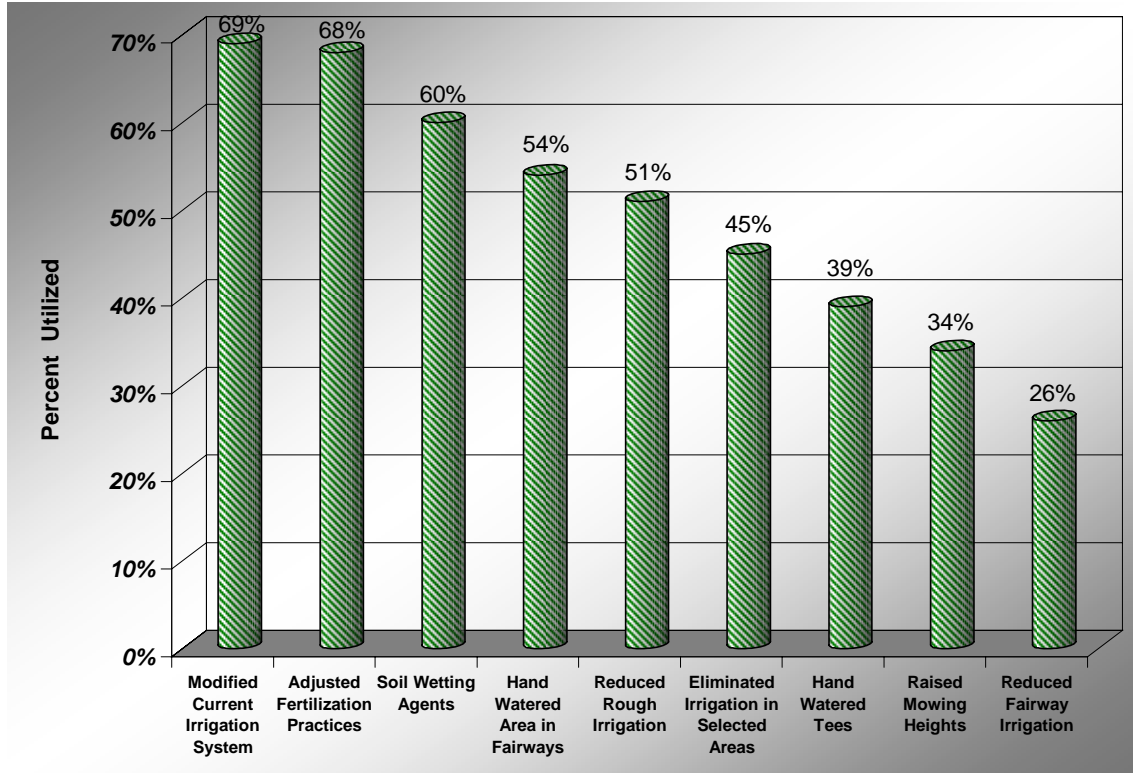


Figure 21: Environmental Management Strategies

10. Indirect and Induced Economic Impact from Golf Course Revenues

The direct economic impact from golf course revenues in 2004 was found to be \$806,357,856 in Section 6. This estimate was obtained directly from the survey results. However, there are also other ways in which golf course revenues have an economic impact on the Arizona economy. Economists who perform input-output analysis refer to these impacts as indirect and induced effects.¹ Any time that money is spent in the economy it has a direct, indirect, and induced effect. The direct effect represents the actual value of all goods and services that are demanded. In this case, the direct effect of golf course revenues collected in Arizona in 2004 was \$806,357,856, as estimated directly from the survey.

In order to help explain what comprises the indirect effects, it will be helpful to break the process down into stages. Refer to the direct effect above as Stage 1. The indirect effect is made up of several additional stages beyond Stage 1. The first component of the indirect effect, Stage 2, consists of the value of all goods and services that must be purchased in order to satisfy the demand for goods and services in Stage 1. What makes it complicated is that in order to satisfy the demand in Stage 1, goods and services that are bought in Stage 2 come from many different sectors of the economy. Hence, in order to satisfy the demand for the goods and services in Stage 2, each sector of the economy represented in Stage 2 must purchase goods and services in Stage 3, in order to satisfy its demand in Stage 2. This process continues until you reach a final stage

¹ See Miller and Blair for an academic treatment of Input-Output models.

where the amount of money spent to purchase goods and services in the previous stage is negligible.

Computing the indirect effect of revenue generated by the Arizona golf course industry in Stage 2 alone requires knowledge of the percentage breakdown of input costs for Arizona golf courses. Fortunately, the breakdown of costs for the golf course industry was already estimated (Table 16). Unfortunately, in order to calculate numbers for Stage 3 and beyond, one basically needs to have knowledge of the percentage cost breakdown for every single sector of the Arizona economy. This task is obviously beyond the scope of this study. As an alternative, one can use a previously developed input-output model for this purpose. IMPLAN 2.0 is the input-output model used for estimating indirect effects in this study. IMPLAN has built-in estimates of regional purchase coefficients for each broadly defined sector in Arizona. These regional purchase coefficients are essentially nothing more than the percentage input cost breakdowns for each sector of the Arizona economy. The particular IMPLAN data set used in this study is aggregated from 2002 data on individual counties in Arizona, and the structural matrices (that contain the regional purchase coefficients) are from 2003. All dollar value estimates computed using IMPLAN are first deflated from 2004 to 2002 dollars, entered into IMPLAN, and then inflated back to 2004 dollars in order to adjust for inflation.

Estimating the indirect effects of the golf course industry would be easily facilitated using IMPLAN if one could simply choose the sector code for the golf course industry in IMPLAN, enter the \$806,357,856 in direct revenue obtained from the survey, run the model, and get an answer. However, the golf course industry is not a sector that IMPLAN keeps track of. Therefore, one has to take the breakdown of direct revenues by category (Table 9), find the IMPLAN sector codes that best correspond to each category, enter the revenues associated with each sector, and then run the model.² The allocation of Arizona golf course revenues across IMPLAN industry sectors is shown in Table 20.

Table 20: Allocation of Golf Course Revenues across IMPLAN Industry Sectors

CATEGORY	IMPLAN SECTOR NAME	SECTOR	REVENUE
Green and Cart Fees	Fitness and recreational sports centers	476	395,909,996
Food and Beverage	Food services and drinking places	481	142,959,527
Membership Fees	Fitness and recreational sports centers	476	122,171,168
Retail Sales	Sporting goods- hobby- book and music stores	409	65,864,031
Initiation Fees	Fitness and recreational sports centers	476	30,128,422
Driving Range	Fitness and recreational sports centers	476	17,804,624
Tournaments	Spectator Sports	472	8,919,251
Lessons	Fitness and recreational sports centers	476	4,840,636
Others	Other amusement- gambling- and recreation industries	478	17,760,200
Total			806,357,856

² It would be possible to create a customized set of regional purchase coefficients for the golf course industry in Stage 2 by using the percentage cost breakdowns estimated from the survey (Table 16). However, this was considered beyond the scope of this study. Even if customized purchase coefficients were estimated in Stage 2, one would still have to use the built-in IMPLAN coefficients for every other sector.

The third type of effect that the revenues collected by the golf course industry have on the state of Arizona is called the induced effect. The induced effect “Represents the impacts on all local industries caused by the expenditures of new household income generated by the direct and indirect effects of direct final demand changes. Induced effects may also reflect government or investment if these are selected with the SAM multiplier.”³ In other words, people employed in all the industries directly affected by the golf course industry or indirectly affected by the golf course industry (at any stage) receive additional income that originated from revenue collected by the golf course industry. These employees will spend some of that extra money in Arizona on goods and services also, which leads to more direct, indirect, and induced effects on the Arizona economy. In addition to consumer spending, the induced effects estimated in this study also reflect government and investment spending in a similar fashion.

A summary of the various types of direct, indirect, and induced impacts from revenue collected by Arizona golf courses in 2004 is provided in Table 21. The overall economic impact is measured by the output numbers provided in the first row. The direct number is \$806,357,718 which comes from the survey and is what is inputted into IMPLAN in order to estimate the other effects. The indirect impact from golf course revenues was \$252,294,393 and the induced impact was \$391,179,669. Therefore, the total economic impact from revenue collected by all Arizona golf courses in 2004 was \$1,449,831,733.

Other types of impacts are shown in Table 21 for completeness. These results are provided for researchers who are familiar with input-output analysis. Value added (second row) is comprised of employee compensation, proprietary income, other property type income, and indirect business taxes. Labor income (third row) consists of employee compensation and proprietary income. Indirect business taxes (fourth row) consist of excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses. Finally, employment (fifth row) represents the number of jobs in Arizona that can be attributed to the golf course industry in 2004, either directly or indirectly.⁴

Table 21: Direct, Indirect, and Induced Impacts from Revenue Collected by all Arizona Golf Courses in 2004 (Dollars)

IMPACT TYPE	DIRECT	INDIRECT	INDUCED	TOTAL
Output	806,357,718	252,294,393	391,179,669	1,449,831,733
Value Added	507,721,406	160,744,443	244,263,449	912,729,304
Labor Income	416,248,871	78,097,316	135,787,478	630,133,667
Indirect Business Taxes	47,425,426	13,499,418	24,328,551	85,253,396
Employment* (jobs)	21,657	2,028	4,091	27,776

³ Minnesota IMPLAN Group, page 79.

⁴ IMPLAN generates an estimated direct employment number of 21,657 (Table 21). However, the survey results estimate a direct employment number of 19,481 (Table 10). These estimates differ because the IMPLAN model was not customized to adjust the purchase coefficients for the golf course industry. The employee numbers in Table 21 are generated by the coefficients for each individual sector in Table 20 that are pre-built into IMPLAN and are used only to get an estimate of the indirect and induced effects. The employment estimates from the survey (Table 10) are more accurate.

The welfare multipliers corresponding to Table 21 are presented in Table 22. For example, each dollar spent on a golf course in Arizona in 2004 had an additional indirect impact on output of 31 cents and an additional induced impact of 49 cents on the Arizona economy. Therefore, every dollar spent on the golf course had a \$1.80 impact on the Arizona economy (first row, Table 22). As another example, for every 100 jobs by those employed on the golf course, another 28 jobs are created in the Arizona economy in industries that support the golf course (last entry, Table 22).

Table 22: Welfare Multipliers for Indirect and Induced Impacts from Revenue Collected by all Arizona Golf Courses in 2004 (Dollars)

IMPACT TYPE	DIRECT	INDIRECT	INDUCED	TOTAL
Output	1.00	0.31	0.49	1.80
Value Added	1.00	0.32	0.48	1.80
Labor Income	1.00	0.19	0.33	1.51
Indirect Business Taxes	1.00	0.28	0.51	1.80
Employment (# jobs)	1.00	0.09	0.19	1.28

A detailed list of the direct, indirect, induced, and total impacts from golf course revenues (corresponding to each row in Table 21) are provided in Appendices E1-E5 for the top 20 affected sectors. For example, the top five IMPLAN sectors that are most impacted by the golf course industry, in terms of output, are provided in Appendix E1. They are: (1) Fitness and recreational sports centers (\$571 million); (2) Food services and drinking places (\$167 million); (3) Real estate (\$80.2 million); (4) Sporting goods, hobby, book, and music stores (\$67.5 million); and (5) Owner-occupied dwellings (\$44.9 million). The last column in each of Appendices E1-E5, indicates the deflator that IMPLAN uses in order to adjust for inflation in each sector of the economy. For example, the deflator of 1.03 in the top row of Appendix E1 indicates that every dollar spent on fitness and recreational sports centers in 2002 in Arizona, is worth \$1.03 in 2004 dollars. This adjustment is made for each sector because although the survey data are in 2004 dollars, the IMPLAN data are in 2002 dollars.

11. Additional Direct Economic Impact from Tourism

The direct revenues reported by Arizona golf courses for 2004 (Table 9) includes money collected from Arizona residents as well as from golfers visiting Arizona from outside the state. The IMPLAN analysis of indirect and induced revenues (Section 10) estimates the other ways in which these revenues affect Arizona residents (through job creation, increased demand for goods and services needed to supply Arizona golf courses, and the extra income spent by Arizona residents who work on the golf course or who work for golf course industry suppliers, etc). However, the IMPLAN analysis in Section 11 does not include money spent by golfers visiting Arizona from outside the state on related expenses they incur while on a golf trip in Arizona.

The National Golf Foundation reports that the typical U.S. golfer who traveled specifically to play golf incurred the following expenses while on a golf trip in 2002: (1) \$277 on transportation to destination; (2) \$168 on transportation at destination; (3) \$353 on lodging; (4) \$127 on green fees; (5) \$177 on lesson/golf school fees; (6) \$142 on food and beverage; (7) \$112 on entertainment; (8) \$69 on gifts and souvenirs; and (9) \$97 on other expenses.⁵ In order to

⁵ National Golf Foundation, "U.S. Golf Travel Market: 2003 Edition" (page 16).

estimate the additional economic impact of golfers visiting from outside the state, the additional amount of money spent directly in Arizona must be estimated, and then the indirect and induced impact of that money must be calculated using another IMPLAN model. The direct impact of tourism is estimated in this section, while the indirect and induced impacts are estimated in the next section using a second IMPLAN analysis.

Not all expenditures made by golfers visiting Arizona from outside the state can be attributed to the Arizona economy, because not all of the money is spent in Arizona. In particular, the \$277 expenditure on transportation to destination is most likely spent outside of the state on airplane tickets, rental cars, and gas to get to Arizona. Hence, \$277 is subtracted in the final analysis. Furthermore, any money spent directly at an Arizona golf course facility must be eliminated in order to avoid double counting, since this number is already contained in the direct revenue reported in the golf course survey (Table 9). In particular, the \$127 expenditure on green fees and \$177 expenditure on lesson/golf school fees is subtracted from the final analysis. In addition, it is most likely that some of the \$142 spent on food and beverage was actually spent on the golf course, either on the golf course while golfing, or in the restaurant or bar after completing the course. For the purposes of this analysis, we approximate that 50% of these expenses are incurred on the golf course, while the other 50% is spent elsewhere in the Arizona economy. Finally, due to the absence of further information, we attribute 50% of the \$168 transportation at destination to those who pay for rental cars while staying in Arizona, and 50% to those who use transit (such as taxis, buses, trains, shuttles, etc.) while staying in Arizona.

Once the above items have been subtracted from the analysis, the additional amount of money spent by golfers visiting Arizona from outside the state is \$870 per trip. Assuming the typical golfer visiting Arizona from outside the state fits the average profile of all U.S. golfers who travel to play golf, then that person takes an average of 2.0 trips per year. In addition, that person plays an average of 5.5 rounds per year while on golf trips.⁶ Moreover, the survey results found that 32% of all rounds in Arizona were played by golfers visiting Arizona from outside the state in 2004 (Figure 6). Hence, approximately 677,468 people visited Arizona for the purposes of playing golf, they played a total of 1,354,937 rounds of golf in Arizona, and spent a total of \$1,178,794,902 which was collected in the form of direct revenues from tourism. The allocation of this additional direct tourism revenue collected from golfers visiting from outside the state is provided in Table 23.⁷

⁶ National Golf Foundation, "U.S. Golf Travel Market: 2003 Edition" (page 4).

⁷ The IMPLAN category and sector are included in this section for completeness. The numbers in this table will be inputted into IMPLAN in the next section, in order to estimate the indirect and induced impact of tourism.

Table 23: Allocation of Additional Tourism Revenue from Golfers Visiting Arizona from Outside the State across IMPLAN Industry Sectors

CATEGORY	IMPLAN SECTOR NAME	SECTOR	EXPENDITURES
Transportation by Rental	Automotive equipment rental and leasing	432	113,814,680
Transportation by Transit	Transit & ground passenger transport	395	113,814,680
Lodging	Hotels and motels- including casino hotels	479	478,292,644
Food and beverage	Food services and drinking places	481	96,200,504
Entertainment	Other amusement- gambling- and recreation industries	478	151,752,907
Gifts and souvenirs	Miscellaneous store retailers	411	93,490,630
Other	Miscellaneous store retailers	411	131,428,857
Total			1,178,795,000

12. Additional Indirect and Induced Impacts from Tourism

The direct economic impact from additional revenue collected from golfers visiting Arizona from outside the state was found to be \$1,178,795,000 in Section 11. This estimate was obtained directly from the survey results, combined with travel data reported by the National Golf Foundation for the typical U.S. golf traveler. However, golf tourism also has an indirect and induced impact on the state of Arizona in much the same way that direct golf course revenues had an indirect and induced impact (Section 10).

Estimating the indirect and induced effects of the golf course industry would be easily facilitated using IMPLAN if one could simply choose the sector code for the tourism industry in IMPLAN, enter the \$1,178,795,000 in direct golf-related tourism revenues, run the model, and get an answer. However, golf-related tourism is not a sector that IMPLAN directly tracks. Therefore, one has to take the breakdown of direct additional tourism revenues by category, find the IMPLAN sector codes that best correspond to each category, enter the revenues associated with each sector, and then run the model.

The numbers entered into the IMPLAN model are provided in Table 23 and a summary of the various types of direct, indirect, and induced impacts of additional tourism revenue from golfers visiting Arizona from outside the state in 2004 is provided in Table 24. The overall economic impact is measured by the output numbers provided in the first row. The direct additional tourism impact was \$1,178,794,440 in 2004. The indirect additional tourism impact was \$304,637,588 and the induced additional impact was \$443,716,298. Therefore, the total economic impact from additional tourism revenue from golfers visiting Arizona from outside the state was approximately \$1,927,148,334 in 2004.

Other types of impacts are also shown in Table 24 for completeness. For example, additional tourism revenue from golfers visiting Arizona from outside the state generates 18,788 jobs in those industries that received tourism revenues directly, another 2,753 jobs indirectly, and another 4,640 induced jobs. In total, Golf-related tourism generates 26,181 jobs in Arizona.

Table 24: Direct, Indirect, and Induced Impacts of Additional Tourism Revenue from Golfers Visiting Arizona from Outside the State in 2004 (Dollars)

IMPACT TYPE	DIRECT	INDIRECT	INDUCED	TOTAL
Output	1,178,794,440	304,637,588	443,716,298	1,927,148,334
Value Added	807,212,376	188,339,827	277,068,740	1,272,620,979
Labor Income	463,099,730	107,632,705	154,024,196	724,756,628
Indirect Business Taxes	125,005,581	13,489,837	27,595,919	166,091,339
Employment*	18,788	2,753	4,640	26,181

The welfare multipliers corresponding to Table 24 are presented in Table 25. For example, each dollar spent by golfers visiting Arizona from outside the state in 2004 had an additional indirect impact on output of 26 cents and an additional induced impact of 38 cents on the Arizona economy. Therefore, every dollar spent by golfers visiting Arizona from outside the state had a \$1.63 impact on the Arizona economy (first row, Table 25). As another example, for every 100 jobs that exists in those industries that golf visitors from outside of Arizona spend money on, another 39 jobs are created in the Arizona economy in industries that support those industries (last entry, Table 25). A detailed list of the direct, indirect, induced, and total impacts in additional tourism revenue from golfers visiting Arizona from outside the state (corresponding to each row in Table 24) are provided in Appendices F1-F5 for the top 20 affected sectors.

Table 25: Welfare Multipliers for Indirect, and Induced Impacts of Additional Tourism Revenue from Golfers Visiting Arizona from Outside the State (Dollars)

	DIRECT	INDIRECT	INDUCED	TOTAL
Output	1.00	0.26	0.38	1.63
Value Added	1.00	0.23	0.34	1.58
Labor Income	1.00	0.23	0.33	1.57
Indirect Business Taxes	1.00	0.11	0.22	1.33
Employment (# jobs)	1.00	0.15	0.25	1.39

13. Residential Housing Premiums Attributed to Golf Courses

The existence of golf courses in residential developments has an impact on the Arizona economy in terms of increased housing premiums, when compared to homes that are not built near golf course facilities. A detailed state-wide real estate study would have to be undertaken in order to directly measure these real estate premiums for the state of Arizona. Ideally, one would use Global Position Satellite (GPS) maps to identify all houses in all golf course communities in the state and to identify all homes within one square mile distance from each of these golf communities. Once identified, such a study would compare the average price of homes in each golf community with the average price of homes adjacent to each community, compute a weighted average premium attributed to all homes in all golf course communities, and multiply that by the number of homes located in golf course communities in the entire state.

In the absence of such a study, a rough estimate of the real estate premium attributed to all homes located in golf course communities in Arizona can be calculated. The approach taken in this study is to use national averages for real estate premiums attributed to golf course communities, and combine that with survey data regarding the number of courses in Arizona that are located in residential areas. This approach closely follows the methodology used by SRI

International, and all of the values used in this calculation (except the actual number of residential golf course developments in the state of Arizona) are taken directly from pages 21 and 22 of that report.⁸ The values used to estimate the results, as well as the estimates for all homes located in golf course communities in Arizona are provided in Table 26.

Table 26: Arizona Golf Real Estate Premium Estimates for all Homes located in all Residential Golf Course Communities in Arizona

ITEM	VALUE	SOURCE
Average Home Sites Per Golf Course	500	SRI International page 21
Average Non-adjacent Lots	350	SRI International page 22
Average Golf Frontage Lots	150	SRI International page 22
Percentage of Non-adjacent Lots	0.70	computed
Percentage of Golf Frontage Lots	0.30	computed
Non-adjacent Premium	10,000	SRI International page 22
Frontage Premium	50,000	SRI International page 22
Arizona Golf Course Facilities	338	Directly from survey
Number of Residential Courses	187	Directly from survey
Percentage of Courses with Homes	0.55	Directly from survey
Arizona Non-adjacent Lots	65,450	Author calculations
Arizona Golf Frontage Lots	28,050	Author calculations
Total Houses on Golf Courses	93,500	Author calculations
Total non-adjacent Premium	654,500,000	Author calculations
Total Frontage Premium	1,402,500,000	Author calculations
Total Premium	2,057,000,000	Author calculations

SRI International reports that the number of lots per golf course is between 400 and 600 homes, the number of lots in golf course communities that are not adjacent to the golf course is between 300 and 400, and the number of golf frontage lots is between 100 and 200. They also report a premium of \$10,000 per non-adjacent lot, and \$50,000 per adjacent lot. Therefore, 70% of the lots located in golf course communities receive a \$10,000 premium and 30% of the lots receive a \$50,000 premium. The population of all golf course facilities in Arizona is 338 golf course facilities (Table 1). The unbiased estimate of the number of Arizona golf courses located in residential developments (estimated from the 2004 survey) is 187. Hence, the total number of homes located within residential communities on non-adjacent lots is approximately 65,450 while the number of homes located on golf frontage lots is approximately 28,050. Applying the average premiums to each home, the total real estate premium that can be attributed to all homes located in all residential communities in Arizona is \$2,057,000,000.

The \$2.1 billion in real estate premiums estimated above can not be directly added to the other economic impacts in this study without adjustment. The reason is that \$2.1 billion represents the total premium for all golf courses in Arizona built in all years over time. However, the revenue and tourism impacts calculated elsewhere in this study are estimates for the year 2004 alone. One

⁸ SRI International, "The Golf Economy Report" funded by the World Golf Foundation GOLF 20/20. December 22, 2002.

way to adjust the real estate premium so that it considers the additional real estate premium for 2004 only is to perform a similar calculation as above, but to scale it down by multiplying by the fraction of courses built in 2004. From the population database of all 338 courses in Arizona, only 10 were built in 2004. Therefore, one estimate of the real estate premiums attributed to 2004 alone is computed by multiplying \$2,057,000,000 by 10/338 which yields \$60,857,988. Hence, the additional real estate premiums attributed to the existence of the golf course industry in Arizona in 2004 is approximately \$60,857,988.

14. Comparison of Results with Previous Golf Studies

The key results from this study are compared to recent studies that estimated the economic impact of golf on a state's economy in Table 27. While there are slight methodological differences among studies and not all studies estimated all impacts, direct comparisons across the results of these studies can be made in general. The first row represents the state and the second row gives the year in which the data from the surveys were collected. The response rate for the current study is 23 percent, which is higher than the Florida and California study, but lower than the Colorado and Arizona 1996 studies. In Arizona, 11.6 million rounds of golf were played in 2004 when compared to 12 million in 1996. However, the 1996 study counted all rounds played, including those that were not paid for. The estimated percentage of out of state visitors in the current study is 32 percent, which is similar to the 1996 Arizona study and the Florida study. California and Colorado both have a smaller percentage of out of state golf visitors.

Table 27: Comparison of Results with Previous Golf Studies

	Arizona 2004	Arizona 1996	Florida 2000	California 2000	Colorado 2002
Number of Courses	338	247	1334	891	264
Courses in Survey	77	75	223	187	99
Response Rate (%)	0.23	0.30	0.17	0.21	0.38
Rounds Played (millions)	11.6	12.0	58.6	39.5	7.8
Out of State Visitors (%)	0.32	0.30	0.33	0.20	0.17
Employees (1000s)	19.5	15.4	73.0	62.1	10.9
Wages and Benefits (mil \$)	291	176	1,526	1,500	177
Total Costs (mil \$)	697	338	3,700	---	462
Direct Revenue (mil \$)	806	452	4,440	4,251	560
Total Revenue (mil \$)	1,450	962	---	7,872	1,130
Direct Tourism (mil \$)	1,179	---	5,400	501	368
Total Tourism (mil \$)	1,927	---	12,860	---	---
Residential Courses (%)	0.55	---	0.54	0.21	---
Total Real Estate Premium (mil \$)	2,057	---	14,691	---	832

Revenues collected directly by Arizona golf courses increased by 78 percent from 1996 to 2004. Wages and benefits increased by 65 percent, total costs increased by 106 percent, and employment jumped 27 percent over that same period.

Florida and Arizona exhibit similar patterns in terms of the percentage of out of state visitors and the percentage of golf courses that are built in residential real estate developments. Therefore, it may be helpful to compare the economic impacts of these two states (at least in terms of percentages). As a benchmark for comparison, the Arizona golf course industry is 25

percent of the size of Florida in terms of the number of golf courses. Arizona has 20 percent of the rounds played, 27 percent of the employment, 18 percent of the direct golf course revenue, 22 percent of the direct tourism revenue, 15 percent of the total golf-related tourism revenue, and 14 percent of the additional total real estate value, when compared to Florida. Based on these rough comparisons, it would seem that the estimates in the current study are generally inline, if not slightly more conservative, than the economic impacts obtained for the state of Florida.

15. Conclusions and Future Research Needed

The overall economic impact of the golf course industry on the state of Arizona was estimated to be \$3,437,838,055 in 2004. This included revenue directly collected by Arizona golf courses of \$806,357,856, indirect revenues of \$252,294,393 for those businesses that supply the golf course industry, and induced revenues of \$391,179,669 spent by employees of the golf course industry and employees of its suppliers. The total economic impact attributed to direct, indirect, and induced golf course revenues was 1,449,831,733.

The economic impact also included revenue from additional tourism activities undertaken by golfers who visited Arizona from outside the state of \$1,927,148,334. This number included the direct amount spent on golf-related tourist activity by golfers who visited Arizona from outside the state of \$1,178,794,440, indirect tourism revenues of \$304,637,588 for those businesses that supply the golf-related tourism industry, and induced revenues of \$443,716,298 spent by employees in the golf-related tourism industry and employees of its suppliers.

The economic impact also included additional residential housing premiums for those homes located in a golf course community of \$60,857,988 that were built in 2004. The premium attributable to all homes ever built in all golf course communities in Arizona is \$2,057,000,000.

While this study provides estimates of the direct, indirect, and induced impacts of both golf course revenues and golf-related tourism spending by visitors from outside the state and it also provides an estimate of the residential housing premiums for those homes located in a golf course community, it does not include the potential impact of other golf-related activity. The types of activities not estimated in this study that would also contribute to the economic impact of golf on the state of Arizona, include: (1) Retail stores that sell golf equipment and accessories; (2) Golf instructional companies that do not have at least a 9-hole golf course; and (3) Contractors and sub-contractors involved in the construction of golf facilities. Furthermore, the estimates of tourism and real estate obtained in this study heavily rely on national average estimates.

Of primary concern is the reliability of the estimates of real estate premiums attributed to the Arizona golf industry. A detailed state-wide real estate study should be undertaken in order to directly measure these real estate premiums for the state of Arizona. Ideally, one would use Global Position Satellite (GPS) maps to identify all houses in all golf course communities in the state and to identify all homes within one square mile distance from each of these golf communities. Once identified, such a study would compare the average price of homes in each golf community with the average price of homes adjacent to each community, compute a weighted average premium attributed to all homes in all golf course communities, and multiply that by the number of homes located in golf course communities in the entire state.

More accurate tourism estimates specific to the state of Arizona, are also needed. These could be obtained in at least two ways. The first, would be to create a brief survey (less than a page)

designed to solicit information from actual golfers on the courses in Arizona regarding state of origin, how much they spent that day on the golf course, and how often they golf during the year. One could randomly select a small sample of golf courses from the 338 in Arizona, and send research assistants to these courses at various times throughout the year. These research assistants could verbally solicit the responses from patrons in under five minutes. Another way to measure golf-related tourism would be to create a different type of survey designed to solicit information regarding the impact of tournaments. One could collect as much information as desired in one weekend by sending several research assistants to the FBR open to solicit responses from spectators all at once.

Finally, a much more detailed survey focusing solely on environmental management practices combined with an engineering model of the long-term effects of changes in water flow and a biological model of the movement of various animal species across Arizona, would be required in order to perform a true environmental impact study of the impact of golf on the state of Arizona.

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Appendix A: Focus Group Recruitment Letter

January 31, 2005

Dear Arizona Golf Course Superintendent, Agronomist, Golf Professional,
Owner, Manager, or Tourism Professional:

The Morrison School of Agribusiness and Resource Management, which houses the Professional Golf Management and Golf Facilities Management programs at Arizona State University East, is conducting a focus group session in order to develop a questionnaire that is expected to be used to gather information regarding the economic and environmental impacts of the golf industry in Arizona. For the initial stage of this project, we are asking for approximately 12 volunteers with expertise in the Arizona golf industry to participate in a focus group session in the Consumer Marketing Lab in the new Agribusiness complex at Arizona State University East on February 4, at 11:00 AM. It is expected that this focus group session will last for 3 hours, with a break for lunch (which will be provided by the Morrison School of Agribusiness and Resource Management).

If you are interested in participating on the above date and at the above time, please RSVP by calling (480) 727-1566 and leaving a message giving your name. In addition, please detach the letter of consent and assent attached to this document, sign it, and bring it with you to the focus group session.

If you choose to participate, you will not be forced to answer any of the questions during the focus group, rather please respond when you feel you can contribute. There is no compensation for participating in this focus group, however, you may receive a copy of the final survey that will be developed as a result of this effort if you wish. If you have any questions you can contact me directly at the number provided below.

Thank you, in advance, for volunteering for this effort. If you do not wish to participate, or can not attend during the time and date specified above no further communication will be forthcoming. The Agribusiness complex is located on the campus of Arizona State University East in Mesa near the intersection of Williams Field Road and Power Road. Please find the attached map of the ASU East Campus (located in southeast Mesa) along with directions from I-60. Please try to give yourself plenty of time to get here, especially if you are coming from across town.

Sincerely,

Dr. Troy G. Schmitz
Associate Professor
(480) 727-1566

Appendix B: Focus Group Letter of Informed Consent and Assent

Dear Potential Focus Group Participant:

I am an associate professor in the Morrison School of Agribusiness and Resource Management at Arizona State University East. I am conducting a focus group session for purposes of developing questions for a survey that could eventually be sent to golf courses in Arizona and used to obtain information regarding the economic and environmental impact of the golf industry in Arizona.

I am requesting your participation, which will involve 12 volunteers with expertise in the Arizona golf industry to participate in a focus group session in the Consumer Marketing Lab in the new Agribusiness complex at Arizona State University East on Friday, February 4, at 11:00 AM. It is expected that this focus group session will last for 3 hours, with a break for lunch (which will be provided by the Morrison School of Agribusiness and Resource Management)

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. The results of the research study may be published, but your name will not be used.

Although there may be no direct benefit to you, the possible benefit of your participation is to help establish a questionnaire that could eventually be sent to Arizona golf courses. The results from the survey that you help establish in this focus group could eventually be used to perform a study on the economic impact of the golf industry in Arizona, which would be instrumental in gauging the costs and benefits of the golf industry on the state of Arizona. If requested, you may receive a copy of the final survey that could be developed as a result of this effort as well as a copy of a possible study on the economic impact of the golf industry on the state of Arizona

If you have any questions concerning the research study, please call me at (480) 727-1566.

Sincerely,

Dr. Troy G. Schmitz
Associate Professor
Morrison School of Agribusiness and Resource Management
Arizona State University East

By signing below you are giving consent to participate in the above study. When you show up for the focus group session you will be assigned a randomly identified number from 1 through 12. During the session you will never be asked any personal information, including, but not limited to, your name, background, income or any other socio-economic variables. The session will be monitored behind a two-way mirror in the master room that adjoins the consumer marketing lab during the focus group session. Your responses will be videotaped and recorded in an Access database located in the master room. Once the final questionnaire has been developed using information in the focus group, all records of your responses, including the information recorded in the database and the videotapes used to record your responses will be destroyed.

Signature

Printed Name

Date

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through Karol Householder, at (480) 965-6788.

Appendix C: Final Questionnaire

Appendix D: Statement of Passive Consent

March 17, 2005

Dear Arizona Golf Course Manager, Superintendent, or Owner:

The Morrison School of Agribusiness and Resource Management, which houses the Professional Golf Management and Golf Facilities Management programs at Arizona State University East, is conducting a survey of Arizona golf courses as part of a research project to document the economic impact of the Arizona golf industry. The survey is being sent to all golf courses in the state of Arizona. It is important that you provide information for your golf course, so that your type of facility is represented in this study.

Your participation in this study is voluntary. You do not have to answer any questions that you do not wish. Although you will receive no compensation for participating in this survey, the results of the study will be instrumental in gauging the costs and benefits of the golf industry on the state of Arizona. If requested, you may receive a copy of the final project report.

This information is being submitted to Dr. Troy G. Schmitz, Associate Professor in the Morrison School of Agribusiness and Resource Management at Arizona State University East. It is agreed that Arizona State University can distribute the aggregate information to parties that may find the information useful. However, information regarding individual courses will be kept confidential and no entity besides Dr. Troy G. Schmitz or his Arizona State University student research assistants will ever be allowed access to information regarding individuals or individual golf courses that complete the survey. Furthermore, your completion and subsequent mailing of the survey responses will be your consent to participate in the survey.

If you choose to participate, please answer all questions in this survey with respect to the most recent fiscal year (2004). Please return a copy of this cover letter with your contact information provided below, as well as the completed questionnaire to the investigators in the postage-paid, return addressed envelope provided. If you have any questions about this survey, you may contact the investigators (see below). If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of Human Subjects Institutional Review Board, through Karol Householder, at (480) 965-6788. Thank you for your cooperation!

Sincerely,



Dr. Troy G. Schmitz
Associate Professor
Morrison School of Agribusiness and Resource Management

PLEASE COMPLETE AND RETURN THIS PAGE ALONG WITH YOUR RESPONSES:

Name of golf course: _____

Name of person completing this survey: _____ Golf course owner: _____

Street address: _____ City, Zip Code: _____

Arizona County: _____ Contact Phone Number: _____

Appendix E1: Direct, Indirect, and Induced Output Impacts from Revenue Collected by all Arizona Golf Courses in 2004 (Top 20 IMPLAN Sectors in Dollars)

SECTOR	IMPLAN SECTOR NAME	DIRECT	INDIRECT	INDUCED	TOTAL	Deflator
476	Fitness and recreational sports centers	570,854,784	250,112	553,262	571,658,112	1.03
481	Food services and drinking places	142,959,488	2,663,842	20,953,774	166,577,104	1.05
431	Real estate	0	59,597,968	20,612,760	80,210,728	1.05
409	Sporting goods- hobby- book and music stores	65,864,000	125,952	1,507,732	67,497,680	1.06
509	Owner-occupied dwellings	0	0	44,965,820	44,965,820	0.96
390	Wholesale trade	0	11,364,579	20,114,130	31,478,708	1.05
478	Other amusement- gambling- and recreation industries	17,760,198	58,559	3,873,483	21,692,240	1.03
465	Offices of physicians- dentists- and other health	0	6	21,544,590	21,544,596	1.08
467	Hospitals	0	0	20,165,972	20,165,972	1.08
498	State and local government electric utilities	0	11,512,771	5,503,150	17,015,922	1.11
499	Other State and local government enterprises	0	8,491,938	7,024,633	15,516,572	1.06
451	Management of companies and enterprises	0	11,100,988	3,730,121	14,831,109	1.08
430	Monetary authorities and depository credit intermediaries	0	3,700,583	11,104,139	14,804,722	1.04
425	Nondepository credit intermediation and related activities	0	7,992,000	5,196,815	13,188,814	1.04
422	Telecommunications	0	5,348,568	6,494,826	11,843,394	1.04
401	Motor vehicle and parts dealers	0	1,205,352	10,326,377	11,531,729	1.06
30	Power generation and supply	0	7,232,983	4,011,019	11,244,003	1.05
427	Insurance carriers	0	1,504,701	9,670,352	11,175,052	1.07
472	Spectator sports	8,919,248	1,295,652	723,966	10,938,865	1.04
436	Lessors of nonfinancial intangible assets	0	9,134,936	1,151,433	10,286,369	1.04
	Total	806,357,718	252,294,393	391,179,669	1,449,831,733	

Appendix E2: Direct, Indirect, and Induced Value-Added Impacts from Revenue Collected by all Arizona Golf Courses in 2004 (Top 20 IMPLAN Sectors in Dollars)

SECTOR	IMPLAN SECTOR NAME	DIRECT	INDIRECT	INDUCED	TOTAL	Deflator
476	Fitness and recreational sports centers	376,289,824	164,866	364,693	376,819,392	1.03
481	Food services and drinking places	63,059,260	1,175,018	9,242,684	73,476,960	1.05
431	Real estate	0	42,050,032	14,543,570	56,593,600	1.05
409	Sporting goods- hobby- book and music stores	51,164,980	97,843	1,171,248	52,434,068	1.06
509	Owner-occupied dwellings	0	0	36,026,660	36,026,660	0.96
390	Wholesale trade	0	8,227,912	14,562,553	22,790,466	1.05
465	Offices of physicians- dentists- and other health	0	5	17,529,282	17,529,288	1.08
498	State and local government electric utilities	0	9,231,024	4,412,467	13,643,491	1.11
478	Other amusement- gambling- and recreation industries	9,804,668	32,328	2,138,389	11,975,385	1.03
499	Other State and local government enterprises	0	5,735,938	4,744,837	10,480,774	1.06
451	Management of companies and enterprises	0	7,558,389	2,539,747	10,098,136	1.08
436	Lessors of nonfinancial intangible assets	0	8,743,562	1,102,101	9,845,663	1.04
467	Hospitals	0	0	9,570,454	9,570,454	1.08
430	Monetary authorities and depository credit intermediaries	0	2,378,115	7,135,879	9,513,994	1.04
425	Nondepository credit intermediation and related activities	0	5,621,098	3,655,131	9,276,229	1.04
472	Spectator sports	7,402,674	1,075,347	600,867	9,078,889	1.04
401	Motor vehicle and parts dealers	0	908,349	7,781,922	8,690,271	1.06
422	Telecommunications	0	3,587,257	4,356,047	7,943,304	1.04
30	Power generation and supply	0	5,091,608	2,823,529	7,915,137	1.05
437	Legal services	0	2,481,754	4,697,700	7,179,454	1.06
	Total	507,721,406	160,744,443	244,263,449	912,729,304	

Appendix E3: Direct, Indirect, and Induced Labor Income Impacts from Revenue Collected by all Arizona Golf Courses in 2004 (Top 20 IMPLAN Sectors in Dollars)

SECTOR	IMPLAN SECTOR NAME	DIRECT	INDIRECT	INDUCED	TOTAL	Deflator
476	Fitness and recreational sports centers	317,268,576	139,007	307,491	317,715,072	1.03
481	Food services and drinking places	54,901,812	1,023,015	8,047,037	63,971,868	1.05
409	Sporting goods- hobby- book and music stores	31,621,364	60,470	723,864	32,405,696	1.06
465	Offices of physicians- dentists- and other health	0	4	14,561,370	14,561,374	1.08
390	Wholesale trade	0	4,553,310	8,058,887	12,612,197	1.05
431	Real estate	0	9,064,403	3,135,046	12,199,448	1.05
467	Hospitals	0	0	9,358,029	9,358,029	1.08
472	Spectator sports	6,661,523	967,684	540,709	8,169,916	1.04
478	Other amusement- gambling- and recreation industries	5,795,596	19,109	1,264,014	7,078,719	1.03
451	Management of companies and enterprises	0	5,163,996	1,735,190	6,899,186	1.08
437	Legal services	0	1,954,910	3,700,440	5,655,351	1.06
401	Motor vehicle and parts dealers	0	571,109	4,892,751	5,463,860	1.06
43	Maintenance and repair of nonresidential buildings	0	4,517,066	752,292	5,269,358	1.03
425	Nondepository credit intermediation and related activities	0	2,953,072	1,920,241	4,873,313	1.04
398	Postal service	0	3,043,496	1,282,310	4,325,806	1.06
454	Employment services	0	2,768,201	1,513,694	4,281,895	1.06
405	Food and beverage stores	0	406,807	3,799,525	4,206,333	1.06
438	Accounting and bookkeeping services	0	2,583,606	1,408,801	3,992,407	1.07
430	Monetary authorities and depository credit intermediaries	0	910,431	2,731,880	3,642,310	1.04
410	General merchandise stores	0	429,549	3,109,937	3,539,486	1.06
	Total	416,248,871	78,097,316	135,787,478	630,133,667	

Appendix E4: Direct, Indirect, and Induced Indirect Business Tax Impacts from Revenue Collected by all Arizona Golf Courses in 2004 (Top 20 IMPLAN Sectors in Dollars)

SECTOR	IMPLAN SECTOR NAME	DIRECT	INDIRECT	INDUCED	TOTAL	Deflator
476	Fitness and recreational sports centers	31,274,860	13,703	30,311	31,318,874	1.03
409	Sporting goods- hobby- book and music stores	9,903,519	18,939	226,707	10,149,166	1.06
431	Real estate	0	6,668,281	2,306,315	8,974,595	1.05
509	Owner-occupied dwellings	0	0	5,969,761	5,969,761	0.96
390	Wholesale trade	0	1,890,562	3,346,100	5,236,662	1.05
481	Food services and drinking places	4,168,893	77,681	611,041	4,857,615	1.05
401	Motor vehicle and parts dealers	0	170,253	1,458,573	1,628,826	1.06
478	Other amusement- gambling- and recreation industries	1,239,616	4,087	270,359	1,514,062	1.03
30	Power generation and supply	0	836,927	464,114	1,301,041	1.05
405	Food and beverage stores	0	123,974	1,157,901	1,281,875	1.06
422	Telecommunications	0	503,803	611,774	1,115,576	1.04
472	Spectator sports	838,538	121,810	68,063	1,028,411	1.04
410	General merchandise stores	0	124,233	899,447	1,023,680	1.06
404	Building material and garden supply stores	0	72,623	634,618	707,241	1.06
479	Hotels and motels- including casino hotels	0	181,322	449,056	630,378	1.06
425	Nondepository credit intermediation and related activities	0	377,873	245,713	623,586	1.04
412	Nonstore retailers	0	55,947	541,140	597,087	1.06
408	Clothing and clothing accessories stores	0	53,573	532,688	586,260	1.06
407	Gasoline stations	0	48,771	470,395	519,166	1.06
427	Insurance carriers	0	65,476	420,802	486,278	1.07
	Total	47,425,426	13,499,418	24,328,551	85,253,396	

Appendix E5: Direct, Indirect, and Induced Employment Impacts from Revenue Collected by all Arizona Golf Courses in 2004 (Top 20 IMPLAN Sectors – Jobs Created)

SECTOR	IMPLAN SECTOR NAME	DIRECT	INDIRECT	INDUCED	TOTAL
476	Fitness and recreational sports centers	16,150	7	16	16,173
481	Food services and drinking places	3,446	64	505	4,015
409	Sporting goods- hobby- book and music stores	1,644	3	38	1,685
431	Real estate	0	368	127	496
478	Other amusement- gambling- and recreation industries	238	1	52	290
472	Spectator sports	179	26	15	219
465	Offices of physicians- dentists- and other health	0	0	219	219
390	Wholesale trade	0	77	136	213
467	Hospitals	0	0	194	194
454	Employment services	0	105	57	162
410	General merchandise stores	0	19	136	155
405	Food and beverage stores	0	13	123	136
494	Private households	0	0	128	128
468	Nursing and residential care facilities	0	0	121	121
43	Maintenance and repair of nonresidential buildings	0	101	17	118
483	Automotive repair and maintenance- except car wash	0	11	104	116
451	Management of companies and enterprises	0	80	27	107
401	Motor vehicle and parts dealers	0	11	95	106
470	Social assistance- except child day care services	0	0	105	105
438	Accounting and bookkeeping services	0	67	37	104
	Total	21,657	2,028	4,091	27,776

Appendix F1: Direct, Indirect, and Induced Output Impacts from Golfers Visiting Arizona from Outside the State in 2004 (Top 20 IMPLAN Sectors in Dollars)

SECTOR	IMPLAN SECTOR NAME	DIRECT	INDIRECT	INDUCED	TOTAL	Deflator
479	Hotels and motels- including casino hotels	478,292,416	1,783,413	3,206,141	483,281,984	1.06
411	Miscellaneous store retailers	224,919,376	950,649	2,711,500	228,581,520	1.06
478	Other amusement- gambling- and recreation industries	151,752,896	65,631	4,393,734	156,212,256	1.03
481	Food services and drinking places	96,200,480	3,930,363	23,767,814	123,898,656	1.05
395	Transit and ground passenger transportation	113,814,640	4,960,141	1,311,975	120,086,760	1.05
432	Automotive equipment rental and leasing	113,814,632	2,232,518	1,766,507	117,813,656	1.07
431	Real estate	0	31,681,350	23,381,044	55,062,392	1.05
509	Owner-occupied dwellings	0	0	51,004,964	51,004,964	0.96
390	Wholesale trade	0	16,491,341	22,815,434	39,306,776	1.05
465	Offices of physicians- dentists- and other health	0	6	24,438,028	24,438,034	1.08
467	Hospitals	0	0	22,874,448	22,874,448	1.08
451	Management of companies and enterprises	0	17,726,846	4,231,085	21,957,930	1.08
499	Other State and local government enterprises	0	13,086,561	7,968,062	21,054,624	1.06
430	Monetary authorities and depository credit intermediaries	0	6,208,477	12,595,356	18,803,832	1.04
425	Nondepository credit intermediation and related activity	0	10,952,464	5,894,760	16,847,224	1.04
427	Insurance carriers	0	5,494,356	10,969,118	16,463,473	1.07
498	State and local government electric utilities	0	10,094,821	6,242,223	16,337,043	1.11
422	Telecommunications	0	7,138,998	7,367,077	14,506,073	1.04
401	Motor vehicle and parts dealers	0	2,579,975	11,713,199	14,293,175	1.06
437	Legal services	0	4,880,326	6,929,465	11,809,790	1.06
	Totals	1,178,794,440	304,637,588	443,716,298	1,927,148,334	

Appendix F2: Direct, Indirect, and Induced Value-Added Impacts from Golfers Visiting Arizona from Outside the State in 2004 (Top 20 IMPLAN Sectors in Dollars)

SECTOR	IMPLAN SECTOR NAME	DIRECT	INDIRECT	INDUCED	TOTAL	Deflator
479	Hotels and motels- including casino hotels	407,262,752	1,518,564	2,730,008	411,511,360	1.06
411	Miscellaneous store retailers	163,380,400	690,547	1,969,621	166,040,560	1.06
478	Other amusement- gambling- and recreation industries	83,776,480	36,232	2,425,598	86,238,312	1.03
395	Transit and ground passenger transportation	66,351,072	2,891,638	764,848	70,007,560	1.05
481	Food services and drinking places	42,433,916	1,733,678	10,483,955	54,651,552	1.05
432	Automotive equipment rental and leasing	44,007,756	863,229	683,041	45,554,028	1.07
509	Owner-occupied dwellings	0	0	40,865,224	40,865,224	0.96
431	Real estate	0	22,353,142	16,496,765	38,849,908	1.05
390	Wholesale trade	0	11,939,667	16,518,287	28,457,952	1.05
465	Offices of physicians- dentists- and other health	0	5	19,883,466	19,883,470	1.08
451	Management of companies and enterprises	0	12,069,772	2,880,841	14,950,612	1.08
499	Other State and local government enterprises	0	8,839,408	5,382,082	14,221,490	1.06
498	State and local government electric utilities	0	8,094,102	5,005,060	13,099,161	1.11
430	Monetary authorities and depository credit intermediaries	0	3,989,768	8,094,183	12,083,951	1.04
425	Nondepository credit intermediation and related activity	0	7,703,313	4,146,024	11,849,337	1.04
467	Hospitals	0	0	10,855,854	10,855,854	1.08
401	Motor vehicle and parts dealers	0	1,944,260	8,827,026	10,771,287	1.06
422	Telecommunications	0	4,788,090	4,941,061	9,729,150	1.04
437	Legal services	0	3,752,864	5,328,607	9,081,471	1.06
436	Lessors of nonfinancial intangible assets	0	7,725,427	1,250,116	8,975,543	1.04
	Totals	807,212,376	188,339,827	277,068,740	1,272,620,979	

Appendix F3: Direct, Indirect, and Induced Labor Income Impacts from Golfers Visiting Arizona from Outside the State in 2004 (Top 20 IMPLAN Sectors in Dollars)

SECTOR	IMPLAN SECTOR NAME	DIRECT	INDIRECT	INDUCED	TOTAL	Deflator
479	Hotels and motels- including casino hotels	187,644,096	699,670	1,257,836	189,601,600	1.06
411	Miscellaneous store retailers	115,101,600	486,491	1,387,599	116,975,688	1.06
478	Other amusement- gambling- and recreation industries	49,520,760	21,417	1,433,785	50,975,964	1.03
481	Food services and drinking places	36,944,604	1,509,407	9,127,734	47,581,744	1.05
395	Transit and ground passenger transportation	44,594,880	1,943,484	514,058	47,052,420	1.05
432	Automotive equipment rental and leasing	29,293,790	574,609	454,666	30,323,066	1.07
465	Offices of physicians- dentists- and other health	0	4	16,516,962	16,516,967	1.08
390	Wholesale trade	0	6,607,388	9,141,187	15,748,574	1.05
467	Hospitals	0	0	10,614,897	10,614,897	1.08
451	Management of companies and enterprises	0	8,246,235	1,968,230	10,214,465	1.08
431	Real estate	0	4,818,496	3,556,081	8,374,577	1.05
437	Legal services	0	2,956,181	4,197,414	7,153,595	1.06
401	Motor vehicle and parts dealers	0	1,222,421	5,549,842	6,772,263	1.06
425	Nondepository credit intermediation and related activity	0	4,046,974	2,178,135	6,225,109	1.04
438	Accounting and bookkeeping services	0	4,445,946	1,598,003	6,043,948	1.07
454	Employment services	0	4,062,537	1,716,990	5,779,527	1.06
405	Food and beverage stores	0	870,745	4,309,797	5,180,542	1.06
43	Maintenance and repair of nonresidential buildings	0	3,834,214	853,329	4,687,543	1.03
430	Monetary authorities and depository credit intermediaries	0	1,527,431	3,098,754	4,626,186	1.04
444	Management consulting services	0	3,398,960	1,136,473	4,535,433	1.04
	Totals	463,099,730	107,632,705	154,024,196	724,756,628	

Appendix F4: Direct, Indirect, and Induced Indirect Business Tax Impacts from Golfers Visiting Arizona from Outside the State in 2004 (Top 20 IMPLAN Sectors in Dollars)

SECTOR	IMPLAN SECTOR NAME	DIRECT	INDIRECT	INDUCED	TOTAL	Deflator
479	Hotels and motels- including casino hotels	75,989,016	283,341	509,378	76,781,736	1.06
411	Miscellaneous store retailers	31,475,112	133,033	379,446	31,987,592	1.06
478	Other amusement- gambling- and recreation industries	10,591,959	4,581	306,671	10,903,211	1.03
509	Owner-occupied dwellings	0	0	6,771,530	6,771,530	0.96
390	Wholesale trade	0	2,743,428	3,795,477	6,538,905	1.05
431	Real estate	0	3,544,754	2,616,052	6,160,806	1.05
481	Food services and drinking places	2,805,337	114,615	693,102	3,613,053	1.05
395	Transit and ground passenger transportation	2,376,104	103,553	27,390	2,507,047	1.05
401	Motor vehicle and parts dealers	0	364,415	1,654,458	2,018,872	1.06
432	Automotive equipment rental and leasing	1,768,053	34,681	27,442	1,830,176	1.07
405	Food and beverage stores	0	265,358	1,313,405	1,578,764	1.06
422	Telecommunications	0	672,451	693,934	1,366,385	1.04
410	General merchandise stores	0	265,912	1,020,242	1,286,154	1.06
30	Power generation and supply	0	750,381	526,445	1,276,826	1.05
404	Building material and garden supply stores	0	155,445	719,846	875,291	1.06
425	Nondepository credit intermediation and related activity	0	517,848	278,713	796,561	1.04
412	Nonstore retailers	0	119,751	613,814	733,566	1.06
408	Clothing and clothing accessories stores	0	114,669	604,227	718,896	1.06
427	Insurance carriers	0	239,085	477,317	716,402	1.07
407	Gasoline stations	0	104,391	533,568	637,959	1.06
	Totals	125,005,581	13,489,837	27,595,919	166,091,339	

Appendix F5: Direct, Indirect, and Induced Employment Impacts from Golfers Visiting Arizona from Outside the State in 2004 (Top 20 IMPLAN Sectors – Jobs Created)

SECTOR	IMPLAN SECTOR NAME	DIRECT	INDIRECT	INDUCED	TOTAL
479	Hotels and motels- including casino hotels	6,911	26	46	6,983
411	Miscellaneous store retailers	5,093	22	61	5,176
481	Food services and drinking places	2,319	95	573	2,987
478	Other amusement- gambling- and recreation industries	2,032	1	59	2,092
395	Transit and ground passenger transportation	1,746	76	20	1,842
432	Automotive equipment rental and leasing	687	13	11	711
431	Real estate	0	196	144	340
390	Wholesale trade	0	112	155	266
465	Offices of physicians- dentists- and other health	0	0	248	248
467	Hospitals	0	0	220	220
454	Employment services	0	153	65	218
410	General merchandise stores	0	40	154	195
405	Food and beverage stores	0	28	139	167
451	Management of companies and enterprises	0	128	31	159
438	Accounting and bookkeeping services	0	116	42	157
494	Private households	0	0	145	145
483	Automotive repair and maintenance- except car wash	0	24	118	142
468	Nursing and residential care facilities	0	0	137	137
401	Motor vehicle and parts dealers	0	24	108	131
470	Social assistance- except child day care services	0	0	119	119
	Totals	18,788	2,753	4,640	26,181