



Golf Course Environmental Profile - Water Use and Conservation Survey

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Thank you for agreeing to participate in our golf course water use and conservation survey! This is a follow-up survey to the golf course profile survey conducted earlier this year. You are encouraged to complete this survey regardless of your participation in the first survey. If you've already completed this water use survey via the Internet, thank you! Otherwise, please complete this new survey at your earliest convenience. To begin, we have some general golf course classification questions for you. All of your individual responses will be kept strictly confidential.

- Q1. Where is your golf course located? (Enter two letter state abbreviation) ___
- Q2. What is the 5-digit zip code of your golf course? ___ ___ ___ ___ ___
- Q3. How many total golf holes do you have at your facility? (Select one)
 1 9 holes 2 18 holes 3 27 holes 4 36 holes 5 45+ holes (IF 45+, ENTER NUMBER: _____)
- Q3B. For how many of these holes do you have the ability to report water usage information? (ENTER NUMBER) _____
- Q4. What is the price of a peak-season greens fee (including cart rental) at your golf course? (If you're at a private golf course: Please indicate the "guest fee" including cart rental)
 \$ _____
- Q5. Excluding capital improvement expenditures, which of the following best describes the annual maintenance budget for your golf course? This would include payroll/salaries, operating equipment leases, water, fertilizer/chemicals, etc.
- | | | |
|--|--|---|
| <input type="radio"/> 1 Less than \$250,000 | <input type="radio"/> 4 \$750,000 to \$999,999 | <input type="radio"/> 7 \$1,500,000 or higher |
| <input type="radio"/> 2 \$250,000 to \$499,999 | <input type="radio"/> 5 \$1,000,000 to \$1,249,999 | |
| <input type="radio"/> 3 \$500,000 to \$749,999 | <input type="radio"/> 6 \$1,250,000 to \$1,499,999 | |

WATER USAGE

This survey requests information about WATER USE at your golf course. It may be necessary for you to gather some information regarding your total water usage and water costs in order to fully complete the survey. **(Unless otherwise stated please use reference data for the calendar year 2005!)**

- Q1A. Approximately, what is the total number of irrigated turf and landscape acres at your golf course? _____ irrigated acres
- Q1B. Using the total in the previous question, what are the acreages for each feature below that you irrigate? Please specify irrigated acres for each feature. **If you do not irrigate a feature, please indicate by using a Zero "0" in the space provided. A blank will be treated as no response.**
- _____ Greens
 _____ Tees
 _____ Fairways
 _____ Roughs
 _____ Practice Areas (driving range, short game area, etc.)
 _____ Other landscaped areas (clubhouse lawn and landscape, entryway, etc.)
- Q1C. How has the overall irrigated acreage at your golf course changed over the past five years? (SELECT ONE)
 1 Increased 2 Remained the same 3 Decreased
- Q1D. IF INCREASED OR DECREASED AT PREVIOUS QUESTION: By approximately how many acres? _____ Acres
- Q2. A) Approximately how much water has your golf course used for irrigation during each of the past three years? (Input numbers into column A and specify unit of measurement in the table below)
 B) Is this number based on the metered amount or is it estimated? (Select one for each year in column B in the table below)
 C) Are you required to report the volume of irrigation water used to a state or local governing entity? (Select one for each year in column C in the table below)

Year	A) Input Number and Unit	B) Metered / Estimated	C) Reporting Required
2005	_____ <input type="radio"/> 1 Gallons <input type="radio"/> 2 Acre-Feet	<input type="radio"/> 1 Metered <input type="radio"/> 2 Estimated <input type="radio"/> 2 Both	<input type="radio"/> 1 Yes <input type="radio"/> 2 No
2004	_____ <input type="radio"/> 1 Gallons <input type="radio"/> 2 Acre-Feet	<input type="radio"/> 1 Metered <input type="radio"/> 2 Estimated <input type="radio"/> 2 Both	<input type="radio"/> 1 Yes <input type="radio"/> 2 No
2003	_____ <input type="radio"/> 1 Gallons <input type="radio"/> 2 Acre-Feet	<input type="radio"/> 1 Metered <input type="radio"/> 2 Estimated <input type="radio"/> 2 Both	<input type="radio"/> 1 Yes <input type="radio"/> 2 No

Q3. Generally, what percentage of the total irrigation at your course occurs in the following months? (Specify number for each. The total must sum/equal 100%.)

_____ % January – February _____ % March – April _____ % May - June _____ % July – August

_____ % September – October _____ % November - December

Q4A. Approximately, how many inches of precipitation per year does your golf course receive? _____ Inches

Q4B. Generally, what is the total precipitation at your course in the following months? (Specify number for each in either inches or as a percentage. If percentage, the total must sum/equal 100%.)

Please indicate your unit of measurement: ₁ Inches ₂ Percentages

_____ January – February _____ March – April _____ May - June _____ July – August

_____ September – October _____ November - December

- Q5. A) Which of the following water sources do you use for irrigation at your golf course? (Select all that apply in column A in the table below)
- B) For each source used, please provide a percentage the source provides of total irrigation. (Input numbers based on best estimate in column B in the table below. The total for column B must sum or equal 100%.)
- C) What was your golf course's approximate total water cost by source for 2005? (i.e., water itself, not electricity for pumping or delivery) (Input numbers into column C in the table below.) If there was NO COST for the irrigation water, please indicate by using a Zero "0" in column C. A blank will be treated as no response to part C.

A) Water Source	B) Percentage of Total Irrigation	C) 2005 Total Water Cost
<input type="checkbox"/> ₁ Open Water (Lake(s), Pond(s), etc.)	_____	\$ _____
<input type="checkbox"/> ₂ River(s), Stream(s), Creek(s)	_____	\$ _____
<input type="checkbox"/> ₃ Canal(s)	_____	\$ _____
<input type="checkbox"/> ₄ Well(s)	_____	\$ _____
<input type="checkbox"/> ₅ Re-claimed/ effluent / re-use water	_____	\$ _____
<input type="checkbox"/> ₆ Municipal water system (Drinking water supply)	_____	\$ _____
<input type="checkbox"/> ₇ Brackish water	_____	\$ _____
<input type="checkbox"/> ₈ On-site desalinization plant	_____	\$ _____
<input type="checkbox"/> ₉ Other (Specify) _____	_____	\$ _____
TOTAL	100%	

D) How has the overall cost of your water (per gallon or acre-feet) for your course changed over the past five years?

- ₁ Increased ₂ Remained the same ₃ Decreased

E) By approximately what percent did the overall cost of your water (per gallon or acre-feet) for your course [INCREASE OR DECREASE] over the past 5 years?

_____ %

Q6. [ANSWER IF YOUR COURSE DOES NOT USE "RE-CLAIMED/ EFFLUENT/ RE-USE WATER AT Q5]

Which best describes why your golf course does not use re-claimed/effluent/re-use water? (Select one that best describes reason)

- ₁ No source of re-claimed/ effluent/ re-use water available
- ₂ No infrastructure to deliver available water
- ₃ The cost of the re-claimed, effluent, or re-use water is too expensive
- ₄ Re-claimed/ effluent, re-use water is of poor quality making it difficult to grow turf
- ₅ Not necessary given other available water resources
- ₆ Other (Specify) _____

Q7. Has an analysis of the irrigation water at your golf course (from your major irrigation source) been conducted since 2003? (e.g., electrical (specific) conductivity or TDS, sodium absorption ratio, residual sodium carbonate, pH)

- ₁ YES ₂ NO

Q8. [ANSWER IF "YES" AT Q7] If known, based on your most recent test for your major irrigation source, what were the following measures of your irrigation water?

Electrical (Specific) conductivity or TDS	_____	→ Specify unit of measurement for Electrical (Specific) conductivity or TDS
Sodium absorption ratio (SAR)	_____	<input type="radio"/> ₁ dS/M
pH	_____	<input type="radio"/> ₂ mmhos/cm
Residual sodium carbonate (RSC)	_____	<input type="radio"/> ₃ ppm
		<input type="radio"/> ₄ mg/L
		<input type="radio"/> ₅ Other (Specify) _____



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- Q9. Please indicate the top three methods or techniques you primarily use to make irrigation scheduling decisions on a day-to-day basis at your golf course, if any? (Please indicate the top three.)
- | | | |
|---|---|---|
| <input type="checkbox"/> 1 Evapotranspiration (ET) from a weather service | <input type="checkbox"/> 4 Soil moisture observations | <input type="checkbox"/> 7 Evapotranspiration from onsite weather station |
| <input type="checkbox"/> 2 Soil moisture sensors | <input type="checkbox"/> 5 Long-term weather records | <input type="checkbox"/> 8 Other (Specify) _____ |
| <input type="checkbox"/> 3 Observations of turf | <input type="checkbox"/> 6 Short-term weather forecasts | <input type="checkbox"/> 9 None |

- Q10. A) Which water conservation measures have been utilized at your golf course since 1996? (Select all that apply)
 B) For each measure used, please check the box if the measure was required by state/local regulations. (Select required)

A) Water Conservation Measures Used?		B) Required?	
<input type="checkbox"/> 1 Use of wetting agents		<input type="checkbox"/> 1 Required by state/local regulations	
<input type="checkbox"/> 2 Keeping turf drier than in the past		<input type="checkbox"/> 2 Required by state/local regulations	
<input type="checkbox"/> 3 Reduction of irrigated acres		<input type="checkbox"/> 3 Required by state/local regulations	
<input type="checkbox"/> 4 Use of hand watering		<input type="checkbox"/> 4 Required by state/local regulations	
<input type="checkbox"/> 5 Adjusted fertilizer practices		<input type="checkbox"/> 5 Required by state/local regulations	
<input type="checkbox"/> 6 Raised mowing heights		<input type="checkbox"/> 6 Required by state/local regulations	
<input type="checkbox"/> 7 Complete upgrade to irrigation system		<input type="checkbox"/> 7 Required by state/local regulations	
<input type="checkbox"/> 8 Partial upgrade to irrigation system for conservation (nozzles, software, converted irrigation heads to part-circle, etc.)		<input type="checkbox"/> 8 Required by state/local regulations	
<input type="checkbox"/> 9 Course design to enhance water collection (water harvesting)		<input type="checkbox"/> 9 Required by state/local regulations	
<input type="checkbox"/> 10 Utilize irrigation scheduling techniques (i.e. weather stations, forecasts, etc.)		<input type="checkbox"/> 10 Required by state/local regulations	
<input type="checkbox"/> 11 Pruning tree roots		<input type="checkbox"/> 11 Required by state/local regulations	
<input type="checkbox"/> 12 Irrigation system audit by qualified professional		<input type="checkbox"/> 12 Required by state/local regulations	
<input type="checkbox"/> 13 Switch to more drought tolerant turfgrass species or cultivars		<input type="checkbox"/> 13 Required by state/local regulations	
<input type="checkbox"/> 14 Soil amendments incorporated to improve soil properties		<input type="checkbox"/> 14 Required by state/local regulations	
<input type="checkbox"/> 15 Automatic rain shut-off switches		<input type="checkbox"/> 15 Required by state/local regulations	
<input type="checkbox"/> 16 Drip irrigation system for landscape plants		<input type="checkbox"/> 16 Required by state/local regulations	
<input type="checkbox"/> 17 Mulch landscape beds		<input type="checkbox"/> 17 Required by state/local regulations	
<input type="checkbox"/> 18 Switch to low water use landscape plants		<input type="checkbox"/> 18 Required by state/local regulations	
<input type="checkbox"/> 19 Soil Sensors to regulate irrigation / watering		<input type="checkbox"/> 19 Required by state/local regulations	
<input type="checkbox"/> 20 Other (Specify) _____		<input type="checkbox"/> 20 Required by state/local regulations	

- Q11A. [ANSWER IF "REDUCED IRRIGATED" ACRES AT Q10] You mentioned your golf course has reduced irrigated acres, how many acres were removed from irrigation, temporarily or permanently? (Use best approximation if exact number is not known. If none, enter "0")

_____ Enter greatest number of acres Temporarily Removed in a single year since 1996 and for a period greater than 30 consecutive days.

_____ Enter Acres Permanently Removed (Since 1996)

- Q11B. [ANSWER IF "REDUCED IRRIGATED" ACRES AT Q10] What were the key factors motivating the decision to reduce irrigated acres at your golf course? (Select all that apply)

- | |
|--|
| <input type="checkbox"/> 1 Cost of water |
| <input type="checkbox"/> 2 State/Local Regulations |
| <input type="checkbox"/> 3 Conserve water |
| <input type="checkbox"/> 4 Environmental Stewardship Program (Specify) _____ |
| <input type="checkbox"/> 5 Other (Specify) _____ |

- Q12. What level of automation does your golf course irrigation system use? (Please specify the percentage of system's composition across the different levels of automation. The total of the column must sum/equal 100%.)

_____	Fully-automated (has central control system or can be controlled remotely)
_____	Semi-automated (has field or satellite controls only; not centralized)
_____	Manual system (no automation present)
_____	Other (Specify) _____
100%	TOTAL

Q13. Using your best judgment, what is the **AVERAGE** age (in years) of the following components of your golf course's irrigation system. We're referring to the chronological age of your irrigation system; NOT the expected life cycle. (Input number. If less than "1" year old, enter "0")

Main lines	_____	year(s)
Lateral lines	_____	year(s)
Irrigation heads	_____	year(s)
Field controllers	_____	year(s)
Master controllers	_____	year(s)
Pump stations	_____	year(s)
Pumps	_____	year(s)

Q14A. Has your irrigation system undergone an audit conducted by a certified irrigation auditor since 2001? 1 YES 2 NO

Q14B. [ANSWER IF "YES" TO Q14A] What was the distribution uniformity for the following course features? (Input numbers below)

_____ % Fairways _____ % Tees _____ % Greens _____ % Total/Overall Course

Q14C. Which measures have you taken to improve the irrigation system? (Select all that apply)

<input type="checkbox"/> 1 New nozzles	<input type="checkbox"/> 7 New software to control irrigation
<input type="checkbox"/> 2 New sprinkler heads	<input type="checkbox"/> 8 New pumps
<input type="checkbox"/> 3 Added sprinkler heads	<input type="checkbox"/> 9 New pump station
<input type="checkbox"/> 4 Removed sprinkler heads	<input type="checkbox"/> 10 New lateral lines
<input type="checkbox"/> 5 New field controllers	<input type="checkbox"/> 11 New main lines
<input type="checkbox"/> 6 New master controller	<input type="checkbox"/> 12 Other (Specify) _____

Q15. Which of the following water treatments or delivery systems, if any, do you use with your irrigation system? (Select all that apply)

<input type="checkbox"/> 1 Fertigation unit	<input type="checkbox"/> 5 Gypsum injector
<input type="checkbox"/> 2 Acid Injection unit	<input type="checkbox"/> 6 Biological control agents
<input type="checkbox"/> 3 Sulfur burner	<input type="checkbox"/> 7 Other (Specify) _____
<input type="checkbox"/> 4 Wetting agents	<input type="checkbox"/> 8 None

Q16A. Does your golf course have a written drought management or water conservation plan for the golf course? 1 YES 2 NO

Q16B. [ANSWER IF "YES" AT Q16A] Was your drought management plan required by a state or local governing entity?

1 YES
2 NO

Q17. On an annual, recurring basis, is your course subject to water allocations (*i.e.*, a specified yearly allocation of water for irrigation purposes)?

1 YES
2 NO

Q18. Has you course been subject to either temporary or additional mandatory water restrictions in the past five years **(that are more stringent than normal allocations)**? If "Yes," please indicate the years that these more stringent restrictions occurred.

1 YES → 1 2001 2 2002 3 2003 4 2004 5 2005
2 NO

Thank you for your taking time to participate in the survey. Please provide your contact information so we can notify you if you win the drawing. The drawing winner will be notified at the conclusion of this year's project.

Name: _____ **E-mail address:** _____

Golf Course Name: _____

Title: 1 Superintendent 2 Assistant Superintendent 3 Other (Specify) _____