



**Environmental Baseline Assessment  
Carolina Lakes Golf Course  
Shaw Air Force Base, South Carolina**

**Air Force Center for Environmental Excellence**

**October 2000**

# Table of Contents

Introduction .....	1	Overall management philosophy & documentation .....	6
Goal of the GEM Program.....	1	Safety, training, & awareness .....	8
Program Implementation .....	2	Compliance .....	10
GEM Plan Process .....	2	Course playability .....	12
Accreditation Process .....	2	Pollution prevention .....	14
Course Description .....	3	Conservation practices .....	16
Details .....	3	Aesthetics & Naturality.....	18
Assessment Summaries.....	4	Maintenance practices .....	20
ECQ Categories.....	4	Customer relations & education.....	22
ECQ Checklists .....	4	Miscellaneous special projects & activities .....	24
Key to checklist responses.....	4	Conclusion .....	26
Determining the Environmental Compatibility Quotient .....	5	ECQ Summary.....	27
ECQ Scoring Scale .....	5	GCEBA Results.....	27
		Bibliography.....	28
		Acknowledgements .....	Error! Bookmark not defined.

## Introduction

The golf course environmental baseline assessment (GCEBA) is the initial step in the process of creating an ecosystem-based Golf Course Environmental Management (GEM) Plan. Shaw AFB is the first to volunteer their course for this new and evolving program idea.

The ultimate desire of the program is to provide a foolproof, customer-driven management tool that will free up course managers and superintendents to care for customers and the course. Properly designed and implemented, the program will keep the facility in compliance with the ever-changing environmental rules and regulations.



*Opportunities for improvement abound outside of the pro shop.*



*Attractive first tee offers opportunity for education and awareness.*

## Goal of the GEM Program

The goal of the Air Force GEM program is to facilitate the creation of an environmentally friendly golf course facility for its customers. The Air Force Center for Environmental Excellence is dedicated to helping provide a way that more rounds can be played on better conditioned courses that minimize or eliminate negative impacts to the environment. In many cases, our golf courses are being managed compatibly with the environment. The GEM program is the vehicle to document our successes while communicating them to the golfers, our commanders, and the local community.

## Program Implementation

The implementation of the golf course environmental management program is comprised of the requirement-driven products of the GEM Plan and the quality of service-based accreditation. The specifics for the GEM Plan requirements and accreditation procedures will be delineated in the ***Golf and the Environment, Guidelines for the 21<sup>st</sup> Century*** handbook soon to be published by AFCEE. The two processes are summarized below.

### GEM Plan Process

The GEM Plan process is comprised of three separate steps:

- Assessment
- Documentation
- Evaluation & Revision

### ASSESSMENT

Since this is the first golf course environmental baseline assessment (GCEBA), two site visits were required to secure the required data. The following steps were taken in the completion of this task.

- Conduct site visits to collect data, conduct interviews, and complete Environmental Compatibility Quotient checklists
- Photograph and analyze golf course and facilities
- Compile GCEBA report

### DOCUMENTATION

The GEM Plan integrates selected information to create a foundation for sound management decisions.

Components of the GEM Plan include:

- Environmental policy statement
- Opportunities & Constraints Map
- Description and explanation of opportunities & constraints
- Goals, objectives, and plans to improve performance in each of the ten Environmental Compatibility Quotient categories
- Compilation of all best management practices (BMPs) regularly employed at facility

### EVALUATION & REVISION

In order to ensure the highest quality of customer service, there must be continual self-evaluation and improvement. The very nature of a superior GEM program requires that all documents must be regularly updated and maintained to represent the most current conditions. The GEM Plan will be completely updated every three years.

### Accreditation Process

The accreditation process is a voluntary, comprehensive expansion of the GEM Plan. It is comprised of an ongoing self-assessment with validation by an external team. Accreditation is awarded based on the attainment of specific levels or standards of service for all aspects of the golf course facility operation. None of the accreditation process is required.



*Vegetative barrier along lake is an example of ecosystem management.*

## Course Description

Carolina Lakes Golf Course is truly one of the highlights of Shaw AFB. The course is situated prominently between Memorial Lake, 9<sup>th</sup> Air Force Headquarters, the senior officer quarters, and the flightline. The course is characterized by gently rolling terrain with native tree populations of loblolly pine, southern live oak, hickory, willow oak, and magnolia. Three strategically located lakes help Carolina Lakes challenge golfers of all abilities.

Despite Hurricane Hugo ravaging the course of many of its trees in 1989, Carolina Lakes is still a beautiful, naturally flowing, and extremely playable collection of golf holes. This is definitely one of the USAF's best courses.

## Details

Course designer	E. R. Riccoboni
Year constructed	1954
Climate	Humid
Average annual rainfall	43 inches
Elevation	250 feet ASL
Par	36-35-71
Yardage/Rating/Slope	Blue- 6495/69.3/122 White- 6123/67.8/117 Yellow- 5234/68.9/111 Red- 4852/66.9/108
Golf course manager	Taylor Brooks
Superintendent	Rory Cox
Turfgrass	419 Hybrid Bermudagrass
Tees	Common Bermudagrass
Fairways	328 Hybrid Bermudagrass
Greens	Bermudagrass/Bahiagrass
Roughs	



## Assessment Summaries

The following is a brief compilation of some of the opportunities and constraints observed in each of the ten Environmental Compatibility Quotient (ECQ) categories during the site visits conducted Apr 99 and Jul 00.

### ECQ Categories

- Overall Management Philosophy & Documentation
- Safety, Training, And Awareness
- Compliance
- Course Playability
- Pollution Prevention
- Conservation Practices
- Aesthetics & Naturality
- Maintenance Practices
- Customer Relations & Education
- Miscellaneous Special Projects & Activities

## ECQ Checklists

The Environmental Compatibility Quotient (ECQ) checklists are a convenient method of assessing the overall performance, implementation, and completeness of an installation's Golf Course Environmental Management Plan. The checklists can be used in many ways including:

- As an analytical tool while compiling a Golf Course Environmental Baseline Assessment like this one.
- As a self-assessment tool for the golf course manager or superintendent leading to accreditation.
- As an award nomination evaluation by a Golf Course Assessment Team (GCAT).

### Key to checklist responses

- **Yes** = Practice is complete or ongoing and can be verified.
- **Partial** = Practice has been initiated but needs further attention and improvement.
- **No** = Practice is not in place.

## Determining the Environmental Compatibility Quotient

The ECQ compiled for an installation's course is a snapshot of the overall performance and compliance with the GEM Plan. There are two ways to use the ECQ checklists to determine the status or quality of the environmental management program: determining the actual and potential environmental compatibility quotients.

- **Actual ECQ-** the total percentage of "Yes" responses for all ten checklists.
- **Potential ECQ-** the total percentage of "Yes" responses plus the total percentage of "Partial" responses for all ten checklists.

### ECQ Scoring Scale

Percent Responses Yes or Partial per Category	Level
93-100%	Advanced
83-92%	Getting there
65-82%	Early stages
Less than 65%	Just started



*The uphill twelfth hole is short, yet challenging and beautiful.*

# Overall management philosophy & documentation

## GEM PROGRAM GOALS

- Enhance the installation ecologically and economically
- Demonstrate that the golf course is managed with consideration for the unique conditions of the ecosystem of which it is a part
- Document management practices to promote more widespread understanding and appreciation for environmentally sound golf course facilities

## OPPORTUNITIES

- Compile and document actions already taken
- Demonstrate environmental stewardship
- Assemble pertinent information on paper
- Create “continuity” document
- Utilize installation environmental management geographic information system and civil engineering digital aerial photographs for mapping requirements

## CONSTRAINTS

- Superintendent not “connected” with computer network and internet access
- Difficulty finding time for additional duties
- Lack of understanding of program goals
- Lack of funding



*Clubhouse is scheduled for interior and exterior improvements.*

<b>Overall Management Philosophy &amp; Documentation</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Has management demonstrated that the environment is an important part of their responsibilities by initiating the accreditation process?		✓	
2	Has the golf course adopted and posted an Environmental Policy?			✓
3	Is the GEM Plan underway or completed, available, and updated regularly?			✓
4	Is a map of the property highlighting environmental opportunities or constraints such as wildlife habitat, water resources, sensitive landscapes, special management zones, etc. posted for customers?			✓
5	Environmental goals, objectives, issues, projects, and progress are evaluated at least annually and are regularly communicated to employees, customers, management, and the local community?			✓
6	Are written records of water quality monitoring activities, results, and control measures readily available?		✓	
7	Is there an inventory of bird and mammal species documented, maintained, and readily available?		✓	
8	Is there a general understanding of how course management practices may positively enhance or adversely impact wildlife species and habitats?		✓	
9	Are the environmental impacts of pest control measures such as leaching and runoff potential, toxicity to non-target organisms, soil absorption capacity, pesticide persistence, water solubility, and effects on soil microorganisms and non-target species considered as part of the course management planning process?	✓		
10	Are records of pest treatments employed and their effectiveness maintained and used to guide future pest control decisions?		✓	
	<b>Point totals for each column - Response percentage</b>	<b>1 - 10</b>	<b>5 - 50</b>	<b>4 - 40</b>

## Safety, training, & awareness

### GEM PROGRAM GOALS

- Educate all employees on the benefits of an ecosystem based golf course environmental management program
- Store and handle all potentially harmful products to minimize employee exposure
- Regularly train employees on the potential health hazards associated with their duties
- Involve entire staff in ensuring a safe golfing opportunity for their customers



*Existing maintenance facility set to be replaced with MILCON project.*

### OPPORTUNITIES

- Expanded training for all employees a must
- Ensure employee's health is prime consideration
- Demonstrate real concern for player health and safety
- Utilize AFCEE for on-site golf course environmental management training

### CONSTRAINTS

- Potential burden of new tasks or requirements
- Lack of staff, time, and funds

<b>Safety, Training, &amp; Awareness</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	All employees are familiar with the GEM Plan and are trained regularly on the importance of environmental performance and compliance with the goals and objectives of the program?			✓
2	All employees are trained to be familiar with USAF, federal, state, and OSHA regulations that apply to storage and handling of chemicals used on the property?			✓
3	All employees are aware that chemical manufacturing, use, storage, and disposal may pose risks to human health and the environment?		✓	
4	All employees are trained to understand that poor management practices may adversely impact worker health, on- and off-site water quality, local soil health, and wildlife species and their habitats?		✓	
5	A current copy of all Material Safety Data Sheets (MSDS) for all chemicals used anywhere on the golf course property is maintained and readily available for use by employees?		✓	
6	Course maintenance employees are encouraged to apply for continuing education programs and receive regular training to maintain currency?		✓	
7	The chemical storage structure/area is locked, well-ventilated, fire proof, and access is limited to select personnel?	✓		
8	Pesticides, fertilizers, and other chemicals are stored on plastic or metal shelving?	✓		
9	Are golfers notified in the pro shop and on the first and tenth tees about the day's planned or recently completed spraying of any chemical or fertilizer that may be hazardous to human health and safety?		✓	
10	Are key staff members trained regarding water quality and conservation issues?		✓	
	<b>Point totals for each column - Response percentage</b>	<b>2 - 20</b>	<b>6 - 60</b>	<b>2 - 20</b>

# Compliance

## GEM PROGRAM GOALS

- Make management practices integral with appropriate regulatory requirements and procedures
- Guarantee safe, healthy, and enjoyable experience for golfers while ensuring long-term operation of the facility
- Utilize installation expertise regularly on all matters dealing with bird aircraft strike hazards, regulators, impact analysis, and cleanup



*Minimal fuel tank capacity negates need for secondary containment.*

## OPPORTUNITIES

- Assemble all documents in one place
- Do more than what is required
- Turn compliance from a chore to a marketing approach to increase playership
- Ensure ECAMP results are outstanding

## CONSTRAINTS

- No “official” regularly scheduled meeting with installation environmental staff
- No computer link for superintendent
- No compiled, written historical references on which to base daily management decisions

<b>Compliance</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Is fuel storage/delivery managed in accordance with federal, state and local regulations?	✓		
2	Are installation environmental staff members included in on-going course management discussions and plans at regularly scheduled quarterly meetings?			✓
3	Are there regularly scheduled staff meetings to discuss environmental management issues?			✓
4	Does the director of golf and the superintendent attend ECAMP in-briefings and out-briefings?		✓	
5	Does the director of golf and/or the superintendent coordinate with installation environmental staff on the various management plans that affect or include the golf course?		✓	
6	Are MSDSs readily available for all required substances?	✓		
7	Has appropriate impact analysis (NEPA) been performed on all proposed actions on or affecting the golf course property?	✓		
8	Are containers used to store used oil in good condition, not leaking, and clearly labeled?	✓		
9	Are oil/water separators operating properly and correctly maintained?	✓		
10	Are written and readily available records maintained of all applications of restricted-use pesticides, including the following? <ul style="list-style-type: none"> <li>- the quantity of each pesticide used</li> <li>- the chemical or common name of the active pesticidal ingredient(s) (not the product name)</li> <li>- the pest or purpose for which the pesticide was applied</li> <li>--the date and place of application.</li> </ul>	✓		
	<b>Point totals for each column - Response percentage</b>	<b>6 - 60</b>	<b>2 - 20</b>	<b>2 - 20</b>

# Course playability

## GEM PROGRAM GOALS

- Create desirable playing conditions through the utilization of sound, ecosystem based environmental management practices
- To daily offer and enjoyable and challenging yet fair golfing experience for all levels of golfers
- Establish a open, courteous, and friendly relationship between the course manager, the superintendent, and the customer to maintain enthusiasm and interest



*The diminutive finishing hole at Carolina Lakes.*

## OPPORTUNITIES

- Increase number of rounds played annually by 35-50%
- Improve challenge while maintaining equitable playing conditions for all levels of golfers
- Maximize variety in course set-up by including a diversity of challenging pin placements and numerous tee locations

## CONSTRAINTS

- Staff size requires superintendent to perform many of the required maintenance tasks
- Superintendent has insufficient time to play course to evaluate setup and maintenance practices from a players' perspective

<b>Course Playability</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Pin placements and tee markers are regularly moved to minimize the impacts of play while increasing the enjoyment and diversity of the experience of the customer?			✓
2	Course has sufficient number of tees to satisfy need of all types of golfers and their individual talent levels?	✓		
3	At least 75% of the greens are proportionally sized for the average length of approach shot for required all levels of golfers?		✓	
4	The speed of the greens is appropriate to their contours and size?		✓	
5	Fairway width and turf quality is sufficient for equitable challenges to all levels of golfers?		✓	
6	Roughs are regularly maintained to produce an equitable challenge to all levels of golfers?		✓	
7	Course conditioning and maintenance practices do not contribute to extending average playing times?	✓		
8	Extraneous fairway bunkers have been eliminated or converted to grass bunkers to help speed play?	✓		
9	Is bunker sand of appropriate quality and consistency?	✓		
10	Is proper drainage maintained near at least 95% of all greens and tees?	✓		
	<b>Point totals for each column - Response percentage</b>	<b>5 – 50</b>	<b>4 – 40</b>	<b>1 - 10</b>

# Pollution prevention

## GEM PROGRAM GOALS

- Employ practices that eliminate or avoid the potential for polluting the environment
- Guarantee that the golf course facility will not allow chemicals, fertilizers, detergents, or petroleum products they use outside their property boundaries
- Create and utilize a comprehensive pollution prevention plan for all aspects of the golf course and its facilities



*Covered pesticide mixing area greatly reduces potential negative impacts to the environment.*

## OPPORTUNITIES

- Further reduce solid waste streams from clubhouse operations
- Create covered fueling area with impervious surface
- Increase the use of slow release fertilizers
- Regularly provide training for all employees on the basic tenets of pollution prevention

## CONSTRAINTS

- Potential hesitation to explore new strategies or techniques
- Lack of a comprehensive pollution prevention plan

<b>Pollution Prevention</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are there designated "no-mow" areas and established "no spray zones" and buffer areas around pond, stream, or lake edges and have they been communicated to mower operators and technicians?		✓	
2	A spill containment kit is readily available and spill containment procedures are in place?	✓		
3	Does the chemical storage area have a sealed metal or concrete floor and are all pesticides handled over an impermeable surface?	✓		
4	Does the chemical storage area have a sump in the middle of the floor and a lip along the edges to contain spills?	✓		
5	Are liquid products stored below dry products and are dry materials stored on pallets or shelves to keep them off the floor?	✓		
6	Wash and wastewater is kept from making direct contact with surface water and is recycled or allowed to filter through a vegetative area when cleaning and maintaining equipment?	✓		
7	Are grass clippings blown off equipment with compressed air instead of or prior to washing?		✓	
8	Are gasoline, motor oil, brake and transmission fluid, solvents, and other chemicals used to operate or maintain equipment and vehicles prevented from directly or indirectly entering water bodies?	✓		
9	Does the fuel storage and delivery area comply with local, state, and federal regulations?	✓		
10	Are slow-release fertilizers used to reduce the negative potential for runoff?		✓	
<b>Point totals for each column - Response percentage</b>		<b>7 - 70</b>	<b>3 - 30</b>	<b>0 - 0</b>

# Conservation practices

## GEM PROGRAM GOALS

- Use natural resources efficiently while respecting their long term value to the local community and the mission of the USAF
- Provide important greenspace benefits
- Closely monitor and manage water use to prevent unnecessary depletion of installation or local water resources



*Practices that minimize potential for bird strikes aren't always attractive or ideal for golfers.*

## OPPORTUNITIES

- Potential to eliminate selected areas from intense maintenance
- Incorporate contour mowing procedures
- Designation of certain areas as “environmentally sensitive”
- Increase communication with customer

## CONSTRAINTS

- Imperative bird aircraft strike hazard minimization procedures
- “Tried and true” practices of the past still prevalent
- No long range conservation plan

<b>Conservation Practices</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Is all motorized golf course equipment checked regularly for excessive air polluting emissions?		✓	
2	Has the irrigation system been completely checked for proper water distribution in all irrigated areas and are water leaks fixed in a timely manner?	✓		
3	Has the irrigation system or its components recently been upgraded to reduce inefficiency, malfunction, and overall water use?	✓		
4	Has all "non-target" irrigation (ponds, out of play areas, etc.) been eliminated or minimized?	✓		
5	Have flow meters been installed to monitor water use and detect potential waste?	✓		
6	Have part circle irrigation heads been installed where possible to save water resources?		✓	
7	Are employees encouraged to minimize their trips around the course to conserve on the use of fossil fuels?	✓		
8	Does the snack bar utilize reusable plates and silverware for use by customers throughout the facility's operating hours?		✓	
9	Have all potential wildlife habitats and their maintenance practices been coordinated with the installation BASH officer and environmental management personnel?	✓		
10	Are recycling containers conveniently provided for customer and employee use throughout the golf course facility?		✓	
<b>Point totals for each column - Response percentage</b>		<b>6 - 60</b>	<b>4 - 40</b>	<b>0 - 0</b>

# Aesthetics & Naturality

## GEM PROGRAM GOALS

- Create and maintain an attractive golf course facility that requires minimal outside chemical or fertilizer inputs
- Utilize native or indigenous plant materials exclusively
- Consider every aspect of the golf course facility as a positive contributor to the overall satisfaction of the customer



*Carolina Lakes offers attractive aquatic habitat for waterfowl that has potential to be hazardous to pilots and their aircraft.*

## OPPORTUNITIES

- Increase number and variety of new native trees added to course every year
- Elimination of patchy turf areas in roughs through the use of pine straw and revised cultural practices
- Plant native understory trees and shrubs in areas where play will not be impacted
- Increase the use of “contour” mowing of fairways to highlight hazards and landing areas
- Improve signage and cart paths

## CONSTRAINTS

- Lack of adequate funding
- No specific, long term tree planting plan
- Clubhouse area landscape

<b>Aesthetics &amp; Naturality</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Is the area near the clubhouse attractively landscaped and maintained?		✓	
2	Is there an appropriately located and attractive facility sign and has the on course signage been designed and maintained attractively?		✓	
3	Does the course seem to be part of the natural landscape and overall contours?	✓		
4	Are pest-resistant and drought-tolerant native trees, shrubs, groundcovers, or their cultivars used in landscaped areas?	✓		
5	Are there "targeted", highly visible areas where flowering annuals or perennials are appropriately maintained?			✓
6	Are the relative numbers of the prominent deciduous, evergreen, and flowering golf course trees balanced and at least 75% native species?	✓		
7	Are the maintenance facility and the course's miscellaneous "outbuildings" maintained sufficiently and/or screened from view?		✓	
8	Is there an attractive and well-maintained site amenity group (bench, washer, etc.) at least 75% of the tees?	✓		
9	Do the driving range, practice areas, and parking areas present a positive image?		✓	
10	Is the cart barn integrated into the overall landscape plan of the course or the area in which it is located?		✓	
	<b>Point totals for each column - Response percentage</b>	<b>4 – 40</b>	<b>5 – 50</b>	<b>1 - 10</b>

# Maintenance practices

## GEM PROGRAM GOALS

- Integrate the concept of ecosystem management into all course management decisions and practices
- Employ the principles of integrated pest management
- Document all activities for future reference



*Golfer's view from behind the excellent par-5 thirteenth hole.*

## OPPORTUNITIES

- Incorporate contour mowing procedures
- Increased training and involvement of staff on integrated pest management procedures
- Utilize civil engineering digital aerial photos to locate and monitor "hot spots"
- Compile pest profiles of common pest species

## CONSTRAINTS

- No "scouting" required or encouraged among regular maintenance staff members
- No specific, delineated, and communicated management goals to enhance the environment
- Staff training funds lacking

<b>Maintenance Practices</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Is contour mowing used to conserve fuel and increase playability and aesthetics?		✓	
2	Are there designated non-maintained or minimally maintained buffers around core wildlife habitats?	✓		
3	Are green, tee, and fairway mowing heights maintained at reasonable levels without continually stressing turf or maximizing chemical inputs?	✓		
4	Are there regular procedures in place to continually improve soil health such as organic amendments, aeration, and drainage?	✓		
5	Is there a map of the course's "hot spots" requiring special care or regular attention?			✓
6	Are there trained scouts on staff other than the superintendent to monitor turf and plant health and pest populations using scouting forms to record the type, severity, location, and treatment of pest problems and organized into a report or guide so that they can be used for future pest control solutions?			✓
7	Are there written pest profiles of common pest species with a variety of potential control measures pre-evaluated including alterations in cultural management, biological, physical, and mechanical controls prior to treating the problem on the course?		✓	
8	Are there established and documented aesthetic and functional thresholds for insects, fungal diseases, and weeds for all managed areas to precisely and effectively manage pest populations and reduce chemical inputs?		✓	
9	Have all playing surfaces been inventoried and mapped for soil types including soil structure, nutrient levels, organic content, compaction, and water infiltration?			✓
10	Are soil tests and plant tissue analysis used to determine nutritional requirements?	✓		
	<b>Point totals for each column - Response percentage</b>	<b>4 – 40</b>	<b>3 – 30</b>	<b>3 - 30</b>

## Customer relations & education

### GEM PROGRAM GOALS

- Ensure that the customer knows that their opinions count and will be acknowledged, assessed, and acted upon
- Educate the customers about the benefits of environmentally responsible golf course management and the future of the game and the environment
- Enlist customer support and assistance on caring for the course and its facilities as well as GEM Plan goals



*Friendly, knowledgeable staff members are a plus at Carolina Lakes.*

### OPPORTUNITIES

- Provide a more convenient, on-going vehicle to solicit customer opinions and concerns
- Create a location to communicate environmental management goals and maintenance plan
- Involve installation youth through rules and instruction clinics

### CONSTRAINTS

- No “greens” committee
- Minimal customer involvement in planning or decision-making processes

<b>Customer Relations &amp; Education</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Is the course manager and superintendent involved in a long-term customer educational program that is regularly updated and documented?			✓
2	Is there a conveniently located and highly visible place at the course or clubhouse where golf course environmental management notices and informational messages are regularly posted?			✓
3	Does the course manager and superintendent actively communicate with customers to determine and document their points of view?		✓	
4	Is there active and regular communication with the Greens Committee, Civil Engineering, Environmental Management, the Services manager, and commanders by course management?		✓	
5	Are there warning signs posted near parking lots to make highly sensitive individuals aware of the potential danger to their health?			✓
6	Is there consistent and attractive signage around the course and grounds that would increase the awareness of the average golfer to the environmental management practices employed?			✓
7	Are there signs appropriately located to warn golfers of hazards when drinking reclaimed or otherwise non-potable water?			✓
8	Are there interpretive signs posted to highlight key habitats or have appropriate areas been designated "Environmentally Sensitive Zones" per USGA rules?			✓
9	Are course staff members trained regularly on how to improve their dealings with customers?		✓	
10	Are there clinics provided to teach beginning golfers the basics of the game and to teach all levels of golfers the rules of the game?	✓		
	<b>Point totals for each column - Response percentage</b>	<b>1 - 10</b>	<b>3 - 30</b>	<b>6 - 60</b>

## Miscellaneous special projects & activities

### GEM PROGRAM GOALS

- Educate the local community about the benefits of an environmentally responsible golf course management approach is for the future of the game and the environment
- Reach out to school children to raise their awareness and appreciation for the game of golf and the GEM Plan principles
- Further the great game of golf at all times in as many ways as possible



*Some of the new trees showing healthy growth.*

### OPPORTUNITIES

- Conduct field trips at the course for local school children
- Enlist the assistance of local city and county officials on golf course environmental planning initiatives
- Initiate Earth Day tree planting fundraiser golf tournament
- Educate customers about the benefits of an environmentally friendly golf course

### CONSTRAINTS

- No long term community involvement plan

<b>Miscellaneous Special Projects &amp; Activities</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are there projects planned and funded for the next year that would communicate the compatibility of the course's management methods with protection of the environment?	✓		
2	Are there projects planned and funded to reduce the course's potential negative environmental impacts?	✓		
3	Are there fundraising tournaments planned that may provide for future environmentally-related projects?			✓
4	Are there regular field trips for local students or other local community groups hosted at the course?			✓
5	Are there projects planned to eliminate or minimize a potential erosion problem?	✓		
6	Does the course have a native tree installation program complete with planting plan and maintenance schedule?		✓	
7	Are any of the local schools or universities involved in educational or research activities at your course?			✓
8	Are there special facility-wide recycling programs underway?	✓		
9	Is your course an accredited participant in the USAF Golf Environmental Management Program?			✓
10	Has your facility been nominated by your MAJCOM for the golf course environmental management award in the last 3 years?			✓
	<b>Point totals for each column - Response percentage</b>	<b>4 - 40</b>	<b>1 - 10</b>	<b>5 - 50</b>



*The unique par 3 finishing hole at Shaw's Carolina Lakes.*

## Conclusion

Overall, the Shaw AFB Carolina Lakes course facility and staff have the potential to be among the very best the Air Force has to offer. The course design and usual conditioning is top notch. The clubhouse and pro shop are amply sized to accommodate the regular customer traffic at the course.

Environmentally, the course staff regularly practices many of the basic tenets of an ecosystem-based management program. The largest problems facing them are documenting their efforts, taking proper credit for their sound practices, and communicating them to the customer. And, like most Air Force golf facilities, little funding is available. In this light, Carolina Lakes is well on its way to being one of the stellar examples of the Air Force's GEM program.

The ECQ Summary on the following page highlights the following areas for improvement at Shaw AFB:

- Overall Management Philosophy & Documentation
- Customer Relations & Education
- Miscellaneous Special Projects & Activities

## ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	1 - 10	5 - 50	4 - 40
2	Safety, Training, & Awareness	2 - 20	6 - 60	2 - 20
3	Compliance	6 - 60	2 - 20	2 - 20
4	Course Playability	5 - 50	4 - 40	1 - 10
5	Pollution Prevention	7 - 70	3 - 30	0 - 0
6	Conservation Practice	6 - 60	4 - 40	0 - 0
7	Aesthetics & Naturality	4 - 40	5 - 50	1 - 10
8	Maintenance Practices	4 - 40	3 - 30	3 - 30
9	Customer Relations and Education	1 - 10	3 - 30	6 - 60
10	Miscellaneous Special Projects & Activities	4 - 40	1 - 10	5 - 50
	<b>Composite points &amp; response percentage</b>	<b>40</b>	<b>36</b>	<b>24</b>

## GCEBA Results

Σ Carolina Lakes Golf Course, Shaw AFB, SC

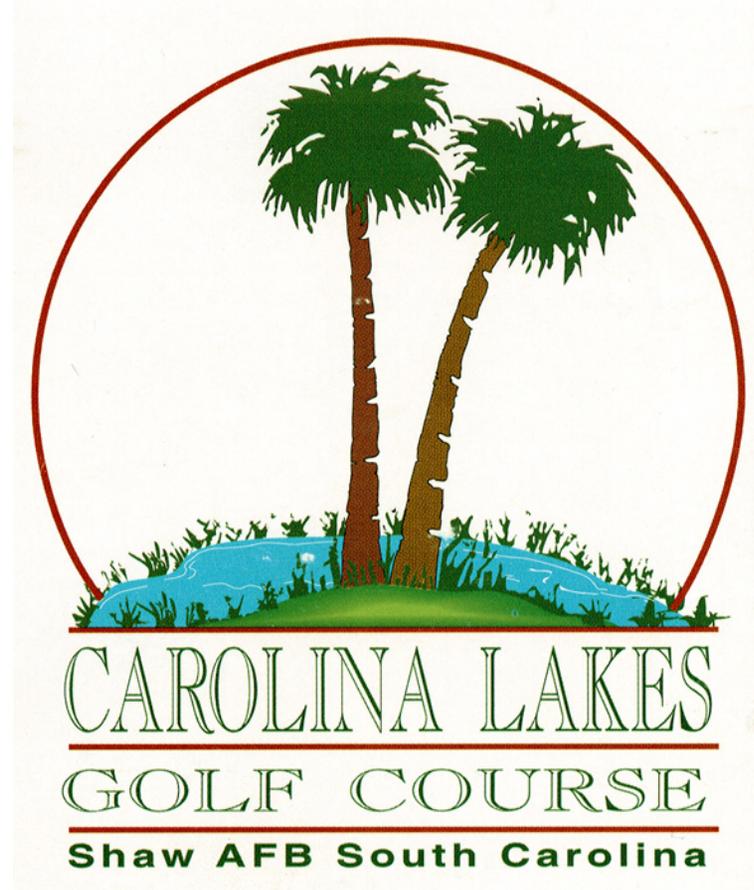
- Actual ECQ (# of "Yes") = 40 (Just started)

- Potential ECQ (Actual ECQ plus "Partial") = 76 (Getting there)

## Bibliography

Audubon International, Environmental Performance Audit, *Integrated Environmental Management*, Golf Course Superintendents Association of America, February 2000, New Orleans, LA.

The Center for Resource Management, Golf & the Environment: Charting a sustainable future. Environmental Principles for Golf Courses in the United States, 1996, Salt Lake City, UT.





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