



***Cypress Tree Golf Course  
Environmental Management (GEM) Plan  
Maxwell AFB, Alabama***



**June 2008**



**San Antonio, Texas**



## ***Cypress Tree Golf Course Environmental Management Policy***

**In concert with the  
Maxwell AFB mission,  
we pledge to employ  
only those management practices  
that minimize or eliminate the potential  
for negative impacts to the environment  
and the surrounding community,  
ensure compliance with all  
appropriate regulations,  
and to regularly reevaluate our processes  
to achieve the highest standards  
of environmental excellence.**

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## **Executive Summary**

### **U. S. Air Force GEM Program**

The U. S. Air Force Golf Course Environmental Management (GEM) program is a proactive Air Force Center for Engineering & the Environment (AFCEE) initiative to foster a better understanding of the environmental challenges facing our golf courses worldwide.

Armed with the support and approval of the Air Force Services Agency golf program, AFCEE's goal is to facilitate the creation of an environmentally friendly golf course facility while supporting the installation mission. Chapter 11 of AFI 32-7064 requires a GEM Plan as part of the Integrated Natural Resources Management Plan (INRMP).

### **GEM Program process**

There are five steps in the GEM program process.

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

### **Environmental Compatibility Quotient (ECQ) scores**

The following is the summary of the environmental compatibility quotient (ECQ) scores for the site visit conducted in Month Year:

- **Actual ECQ = 71, Getting started**
- **Potential ECQ = 87, Showing progress**

### **Final environmental challenges**

The following potential environmental challenges were identified in compiling this Final GEM Plan:

- Floodplain/water quality
- Wetlands
- Cultural resources
- Bird/wildlife Aircraft Strike Hazard (BASH)
- Long-term water supply
- Invasive species

## **Where do we go from here?**

The true measure of a successful GEM program is how well is it executed in the field each and every day. The installation golf and environmental staffs should continue to analyze, document, monitor, evaluate, revise, and implement changes based on lessons learned. The GEM Plan should be updated annually and revised during the next INRMP iteration update. The entire GEM process can be found on the regularly improved AFCEE GEM program website (<http://www.afcee.brooks.af.mil/ec/golf/>).

The golf course environmental baseline assessment (GCEBA), or the Draft Golf course Environmental Management (GEM) Plan is the initial step in creating a successful ecosystem-based comprehensive GEM Plan. The intent of the GEM Plan is to provide an efficient management tool that will enable course managers to devote more of their efforts to caring for their customers and the golf course. Properly designed and implemented, the GEM Plan will keep the entire golf facility in compliance with the constantly changing environmental requirements while contributing to the local community.

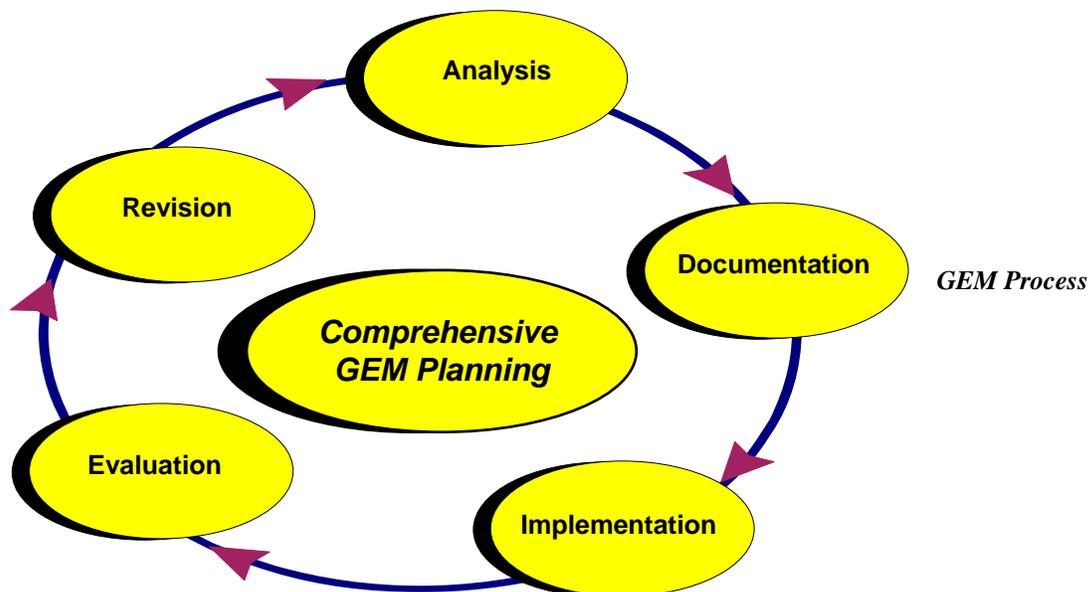


*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*Renovation of the University Course greens is the primary challenge currently facing the Cypress Tree Golf Course managers.*

## **The GEM Initiative**

The goal of the GEM initiative is to facilitate the creation of an environmentally friendly approach to golf course management while protecting and promoting the great game of golf. AFCEE is dedicated to helping to increase rounds played on better-conditioned courses while minimizing or eliminating negative impacts to the environment. In most cases, golf courses are being managed compatibly with the environment. The comprehensive GEM planning process is the vehicle to document our successes for our customers, commanders and the local community.



*The five steps of the GEM Process are based on continual improvement.*

## **GEM Process**

Efficient implementation is the most important aspect of any initiative where practices and procedures are examined and may undergo significant change. This is especially true of the comprehensive GEM planning process. The GEM Plan is derived from several diverse environmental regimes to include the National Environmental Policy Act and the ISO 14001 environmental management system.

There are five basic steps in the implementation of the GEM Planning process:

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

### **Analysis**

Experienced environmental managers realize the importance of assembling all of the data relevant to a problem prior to determining its best solution. Comprehensive analysis is the most important task of the GEM process. Properly completing the analysis is paramount to the long-term compatibility of a golf course's management practices with the local community's natural resource and environmental management goals and objectives.

## **GCEBA COMPONENTS**

The GCEBA, or Draft GEM Plan, is compiled based on the following components:

- Site visit, interviews, and data collection
- Course specific analysis
- Miscellaneous facility review
- Environmental compatibility quotient checklists
- Identification of potential environmental management challenges
- Summary report

## **Documentation**

It is not enough just to know how to create a successful golf course environmental management program. There must be a written record documenting existing site data, maintenance practices, pesticide applications, and other historical golf course activities. By documenting what we know, we will be able to determine how to make better decisions in the future. The completed GEM Plan will assist in the daily management of the course while providing a convenient vehicle to communicate to the community and customers alike the environmental issues that challenge golf course managers as well as their plans to deal with them. In order to reach established environmental stewardship goals the golf course staff must consistently employ only those management practices that minimize or eliminate potential negative impacts to the environment.



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*The 14<sup>th</sup> on the River Course is short and exacting.*

## **U.S. AIR FORCE GEM PLAN COMPONENTS**

The GEM Plan will be comprised of the following components:

- GCEBA report (Draft GEM Plan)
- Map of the entire golf course facility grounds depicting locations of the significant environmental management challenges and the golf course facilities
- Booklet that describes the environmental management challenges depicted on the GEM Plan map
- Specific practices that will be employed by the golf course staff to deal with each environmental management challenge after coordination with and approval by the installation environmental staff
- Compilation of best management practices employed at the golf course in their implementation of the GEM initiative recommendations

### **Implementation**

Positive and decisive action is the only true measure of the success of the GEM Plan. By implementing new practices, whether to knowingly improve the course's role in the environmental stewardship of the installation or to just try new ideas to determine their value, will the golf staff and golfers benefit. The installation golf staff should consider adopting the GEM Initiative process and establish an environmental policy that minimizes or eliminates any and all potential negative environmental impacts.

### **Evaluation**

In order to ensure the highest quality of customer service and environmental stewardship, there must be continual self-evaluation and improvement. There also should be consistent, ongoing measurement of the reduction or elimination of environmental impacts the newly implemented practices have on the course. For example, documenting the reduced use of inputs such as fertilizers, pesticides, and irrigation can be used to demonstrate the increased environmental stewardship of the golf course management practices as well as the overall value of the GEM initiative. It is important for golf courses to show improvement over time. Improvements can be easily accomplished by regularly evaluating golf course maintenance methods, practices, and management approaches to day-to-day issues in concert with the desire and ability to change.

### **Revision**

The very nature of a superior GEM Plan implies that all documents be regularly maintained to represent the most current conditions. Golf course managers and superintendents should be constantly looking for ways to improve their environmental stewardship. Acting on lessons learned is right behind initial implementation as the most important aspect of a successful GEM Plan. The GEM Plan should be kept as current as possible at all times. Ideally, it should be updated annually and completely rewritten on the same cycle as the Integrated Natural Resources Management Plan.

## Course Specific Analysis

One of the most pragmatic and enjoyable tasks in the baseline assessment portion of the GEM process is the course specific analysis. From a general description of the course to the details of the course's history and makeup to the various observations on course playability, aesthetics, and style of management, the course specific analysis sets the stage for the rest of the GEM Plan report.



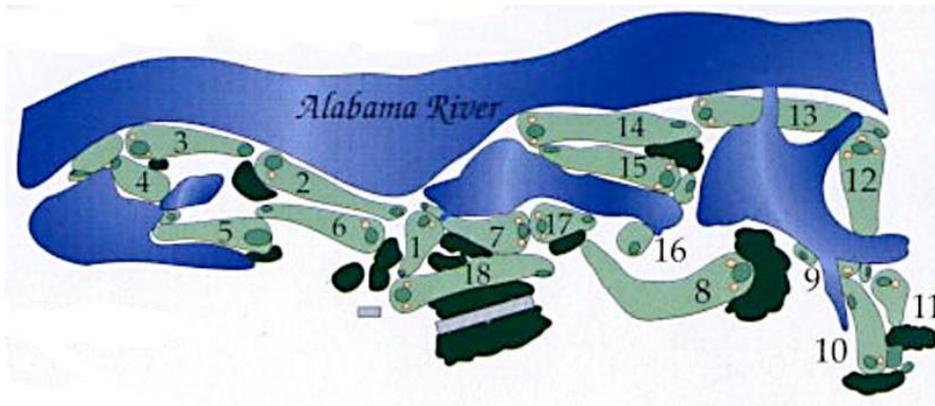
*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*The 12<sup>th</sup> on the River Course is a prime example of the quality recreation experience provided by the good folks at Cypress Tree and Maxwell AFB.*

## River Course

### Description

The River Course has been a favorite of Maxwell AFB's Cypress Tree Golf Course customers for many years. The course is an old-fashioned layout that is both diverse and homey. Blessed with numerous elevation changes and forced carries over ponds and other topographically-interesting features, the River Course is just plain fun. Unfortunately, the course is subject to far-too-regular flooding as it is enveloped by the Alabama River on nearly all sides. Silt deposition and near drowning of the turfgrasses can be a time-consuming and expensive condition to rectify. The superintendent and his staff are somehow still able to make it work. A decision may be needed as to whether or not this course stays open for the long haul. It is easy to guess how their customers would answer.



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

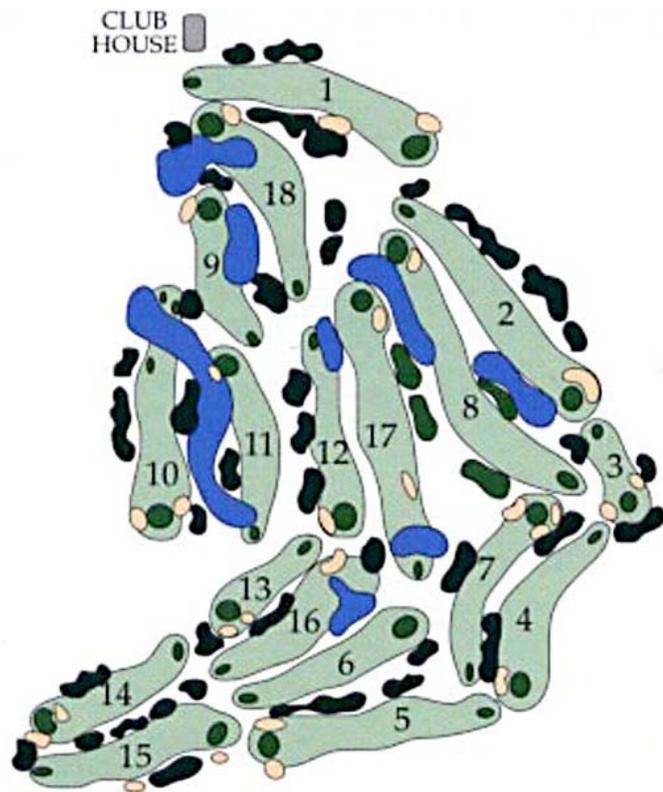
*River Course Layout Map*

### **River Course Details**

Architect	Army corporal/lieutenant
Year constructed	1934
Climate	Humid subtropical
Average annual precipitation	52 inches
Average growing season	Approx. 250 days
Prevailing wind direction	NW/SE
Total facility acreage	Not provided
Total actively maintained acreage	258± acres (not including roughs?)
Par	36-35-71
Yardage/Rating/Slope	Black- 6217/69.7/122 Gold - 5937/68.4/119 Silver- 5615/66.4/118 Green- 5090/69.2/118
Turfgrass	Common Bermudagrass
Tees-	Common Bermudagrass
Fairways-	Common Bermudagrass
Greens	328 Bermudagrass
Roughs-	Common
Irrigation source	Untreated Alabama River water

### **University Course Description**

As Cypress Tree's newest links, the University Course may be the toughest track to register low scores for all skill levels. It has always been relatively flat and long from the back tees. Now that the greens have been redesigned by a young and talented golf course architect, the University Course is not only challenging, but easier to maintain. In addition, now that the pine trees installed during initial construction have had a chance to mature, the University Course is becoming well-defined off the tee. Approach shots have a backdrop of natural green to assist in club selection as well.



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*University Course Layout Map*

**University Course details**

Architect	Civil Engineering
Year constructed	1953
Total facility acreage	Not provided
Total actively maintained acreage	258± acres (not including roughs?)
Par	36-36-72
Yardage/Rating/Slope	Black- 6917/73.0/132 Gold- 6620/71.7/129 Silver- 5877/67.6/125 Green- 5325/71.2/123
Turfgrass	Common Bermudagrass
Tees-	Common Bermudagrass
Fairways-	Tifdwarf
Greens	Common
Roughs-	Potable water
Irrigation source	



**Cypress Tree Golf Course Aerial Photo**



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*The River's uphill par 3, 16<sup>th</sup> is another great golf hole at Cypress Tree.*

## **Environmental Compatibility Quotient (ECQ) Checklists**

Many diverse and complex aspects of golf course management have been revealed through the literature search conducted to compile this study. In order to simplify the process, these aspects have been summarized into eight main topics and incorporated into five distinct environmental compatibility categories.

- Planning & Compliance
- Operations & Maintenance
- Water Resource Management
- Conservation
- Pesticides & Pollution Prevention

The environmental compatibility quotient (ECQ) checklist questions have been compiled using examples from several sources including Audubon International, Center for Resource Management, and Committed to Green. The ECQ checklists represent the best method currently available to determine the relative environmental compatibility of a golf course's management practices. The checklists can be used in many ways including:

- As a tool to establish a current snapshot or baseline of a golf course's relative environmental compatibility
- As a tool to identify areas for improvement or to demonstrate current successes
- As a self-assessment tool for the golf course manager and superintendent
- As documentation for an environmental award nomination
- As documentation for regulatory requirements or inquiries from customers, the media, or the general public

## **Determining the Environmental Compatibility Quotient (ECQ)**

The ECQ compiled for an installation's course is a snapshot of the overall performance and compliance with the GEM Plan. There are two measures obtained as a result of using the ECQ checklists to determine the status or quality of the environmental management program: 1) determining the actual and; 2) potential environmental compatibility quotients.

- **Actual ECQ-** the total percentage of "Yes" responses for all ten checklists. This number represents the current level of the golf course management practice compatibility with the environment
- **Potential ECQ-** the total percentage of "Yes" responses plus the total percentage of "Partial" responses for all ten checklists. Maybe the most significant measure; the potential ECQ represents a level of compatibility that could be reached by finalizing or fully implementing a particular practice or procedure.

## **ECQ Scoring Scale**

Percent Responses Yes  
or Partial per Category Level

90-100%	Advanced (Green)
70-89%	Showing progress (Yellow)
69% or less	Getting started (Red)



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*Only the fortunate get this view of the River Course's 1<sup>st</sup> hole at daybreak.*

The following ECQ checklists are a record of the interview conducted with the golf course superintendent during the visit.

<b>Planning &amp; Compliance</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Has management demonstrated that environmental stewardship is an important part of their responsibilities by initiating the Comprehensive Golf course Environmental Management (GEM) Planning process?	✓		
2	Is the GEM Plan complete, updated regularly, and readily available to employees and customers?		✓	
3	Has the golf course adopted and posted an environmental policy?			✓
4	Is a map of the property highlighting environmental challenges posted for employees and customers?			✓
5	Are environmental challenges and their approved and implemented management practices, objectives, and targets evaluated at least annually, and are they regularly communicated to employees, customers, management, and the local community?		✓	
6	Are there signs appropriately located to warn golfers of hazards of drinking reclaimed or otherwise non-potable water?	✓		
7	Are there signs posted that highlight key habitats or have appropriate areas been designated "Environmentally Sensitive Zones" per The Rules of Golf?	✓		
8	Is there a general understanding by the entire course management staff of how their practices may potentially adversely impact the environment?	✓		
9	Are the environmental impacts of pest control measures considered as part of the comprehensive GEM planning process?	✓		
10	Is there at least one project planned and funded for the next year that would increase the compatibility of the course's management program with comprehensive GEM planning goals and objectives?		✓	

**Planning & Compliance Checklist (continued).**

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Have all employees been familiarized with the GEM Plan and are they trained regularly on the importance of environmental performance and compliance with its goals and objectives?		✓	
12	Are environmental management issues regularly discussed during staff meetings?		✓	
13	Does the superintendent document the actual amount of each pesticide or fertilizer annually used on each major golf course feature (greens, tees, fairways, roughs, water features, and natural areas)?	✓		
14	Has the course attained full certification in the Audubon Cooperative Sanctuary Program or similarly recognized environmental management program?			✓
15	Are all employees trained in their native language on the benefits of minimizing potential negative impacts?	✓		
16	Are comprehensive written records maintained to measure and document the environmental compatibility of the entire facility's management practices?		✓	
17	Are there documented aesthetic or functional thresholds integrated into the pest control decisions?	✓		
18	Is there a written and regularly updated Integrated Pest Management Plan for the entire golf course property?	✓		
19	Are employees trained on what to do in case of a spill and have spill containment kits been provided at all appropriate locations?	✓		
20	Has course management comprehensively examined the course to determine the activities that have a potential to negatively impact an identified environmental challenge?			✓
<b>Totals</b>		<b>10</b>	<b>6</b>	<b>4</b>

<b><u>Operations &amp; Maintenance</u></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/or to 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 levels that do not excessively stress important playing surfaces?	✓		
4	Are aeration, topdressing, and drainage improvements regularly implemented to improve soil health and minimize or eliminate use of pesticides or fertilizers?	✓		
5	Have all playing surfaces been inventoried and mapped for soil types including soil structure, nutrient levels, organic content, compaction, and water infiltration?			✓
6	Are soil tests or plant tissue analysis used to determine turfgrass nutritional requirements?	✓		
7	Are there projects planned and funded for the next year that would increase the compatibility of the course's management methods with protection of the environment?		✓	
8	Are all appropriate employees trained to be familiar with (national, federal, state, and OSHA) regulations that apply to storage and handling of potentially hazardous materials used on the property?	✓		
9	Has there been a complete examination of all aspects of the operation other than the golf course (snack bar/restaurant, clubhouse, pro shop, pesticide mixing and storage facilities, fuel storage and delivery areas, and maintenance complex) for potential negative environmental impacts?	✓		
10	Are all employees encouraged to apply for education and training opportunities that may increase their awareness of the GEM Plan goals?	✓		

**Operations & Maintenance Checklist (continued).**

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Are containers used to store used oil for equipment maintenance in good condition, not leaking and clearly labeled?	✓		
12	Are oil/water separators and/or golf course wash racks operating properly and correctly maintained?	✓		
13	Are all golf course vehicles and equipment maintained and cleaned in a manner that eliminates the potential for spreading of contamination?	✓		
14	Are recycling containers located throughout the facility for use by customers and employees?		✓	
15	Are grass clippings left in place, (other than greens) collected, composted and/or recycled?	✓		
16	Are products that minimize unnecessary packaging considered prior to purchasing for use throughout the facility?			✓
17	Are energy efficiency ratings factored into equipment purchases for use throughout the facility?	✓		
18	Has the entire facility been studied to quantify solid waste streams to identify functions that produce the greatest quantities and have steps been taken to reduce these quantities?			✓
19	Does the restaurant/snack bar facility utilize at least 90% plates, cups and utensils that are reusable rather than disposable?	✓		
20	Is the food storage and prep area regularly cleaned to reduce the likelihood of pest infestations and required pesticide applications?	✓		
	<b>Totals</b>	<b>15</b>	<b>2</b>	<b>3</b>

<b><u>Water Resource Management</u></b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are written records of water quality monitoring activities, results, and pollution control measures readily available?	✓		
2	Where appropriate, are slow-release fertilizers and/or spoon-feeding techniques used to reduce the potential for runoff impacts and nutrient loading to water quality?	✓		
3	Is the irrigation system utilized solely based on the specifically calculated local daily evapotranspiration rate?	✓		
4	Are outdoor irrigation of non-golf course areas and indoor plumbing regularly monitored and maintained for leaks?	✓		
5	Have low-flow water saving devices been installed wherever possible?	✓		
6	Are recycled or other non-potable water supplies being used to irrigate at least 65% of the golf course property?			✓
7	Are there projects planned that should eliminate or minimize a potential water quality or erosion problem?	✓		
8	Are water features regularly monitored for algae, erosion, excessive aquatic plant growth, eutrophication, and sedimentation?	✓		
9	Is runoff from parking lots cleansed by control measures such as vegetative or drainage filters prior to leaving the golf course property?	✓		
10	Are there procedures for reporting water quality problems to supervisors (as required) for appropriate action?	✓		

**Water Resource Management Checklist (continued).**

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Is the irrigation pumping station and associated equipment regularly checked for proper operation and leaks?	✓		
12	Has the irrigation system or its components recently been upgraded to reduce inefficiency, malfunction, and overall water use and are flow meters used to monitor water use and detect potential waste?		✓	
13	Is there a map of the watershed in which the golf course property resides and location(s) of floodplains and stormwater drainage that exist on the property?		✓	
14	Is the quality of the water entering and leaving the property tested regularly for contaminants, pH, dissolved oxygen, and nutrients?	✓		
15	Is water quality data collected to establish baseline conditions for all water features on the property?			✓
16	Are settling ponds and/or detention ponds used to effectively remove sediments and pollutants from water features?	✓		
17	Are biological processes such as the addition of grass carp or white amur used to control unwanted aquatic vegetation in water features?	✓		
18	Is there a written Water Resource Management Plan that delineates the care of the course's water features to include creeks, streams, ponds, irrigation system components, conservation efforts and water supply concerns?			✓
19	Has the property been examined for potentially significant wetlands or associated sensitive water-based habitats?	✓		
20	Have the property's water features been studied to determine the aquatic and amphibious species population?	✓		
<b>Totals</b>		<b>15</b>	<b>2</b>	<b>3</b>

<b><u>Conservation</u></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 entire golf course property been examined for critical habitats, state species of concern, and threatened or endangered species?	✓		
3	Have all potentially significant wildlife habitats and their maintenance practices been coordinated with local natural resource manager, the Fish & Wildlife Service, or other appropriate local or regional regulatory agency?	✓		
4	Are employees encouraged to minimize their trips around the course to conserve on the use of fossil fuels?	✓		
5	Have efforts been made to connect natural areas to facilitate wildlife movement through the course property?	✓		
6	If applicable, have all necessary permits been updated and their requirements satisfied in a timely manner?	✓		
7	Are recycling containers conveniently provided for customer and employee use throughout the golf course facility?		✓	
8	Has there been a study to determine the presence of invasive or exotic species on or near the course?	✓		
9	Is there a readily available Drought Management Plan for the entire golf course facility?			✓
10	Is there at least one project planned and funded that is expected to minimize or eliminate the course's potentially existing negative environmental impacts?		✓	

**Conservation Checklist (continued).**

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Is stormwater collected for supplementing irrigation water supplies for use anywhere on the golf course facility grounds?	✓		
12	Are a majority of plants used in landscaped areas drought-tolerant native trees, shrubs, groundcovers, or their cultivars?	✓		
13	Have local wildlife species and their habitats been documented and mapped?		✓	
14	Does the course have a Tree Management Plan complete with planting plan and maintenance schedule?	✓		
15	Are all employees trained to understand that poor management practices may adversely impact worker and environmental health and welfare?	✓		
16	Is there an inventory of bird and mammal species documented, maintained, and readily available?	✓		
17	Are food, shelter, and nesting attributes of plant species for landscape development considered during the design/selection process?	✓		
18	Have all degraded habitats due to construction or maintenance of the course been fully restored or improved?	✓		
19	Has the entire property been examined for archaeological, cultural, or historical resources?	✓		
20	Are customers and employees regularly informed/trained on the golf course's conservation practices?		✓	
<b>Totals</b>		<b>15</b>	<b>4</b>	<b>1</b>

<b><u>Pesticides &amp; Pollution Prevention</u></b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are there minimally maintained, natural areas, no spray zones, and buffer areas around water features or sensitive landscapes and have they been communicated to equipment operators and pesticide applicators?	✓		
2	Is a spill containment kit readily available and are spill containment procedures 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 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	Are equipment or vehicle wash and wastewater kept from making direct contact with surface water?	✓		
7	Is equipment cleaned with compressed air or with blowers on part of the course instead of or prior to washing at a designated wash rack where pollution prevention measures are employed?			✓
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/delivery area comply with local, state, federal, or other applicable regulations?	✓		
10	Are written records maintained of all applications of pesticides to include: - the pest and treatment type (preventative/curative); - the location (specific playing area) of each pesticide used; - the area (SF/SM) and quantity of each pesticide used; - the chemical or common name of the active ingredient(s); - the date, location, or purpose?	✓		

**Pesticides & Pollution Prevention Checklist (continued).**

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Is there a map of the course's "hot spots" that may require special care or attention?		✓	
12	Are there trained scouts on staff other than the superintendent to monitor turf and plant health and pest problems?	✓		
13	Are there scouting forms utilized, and are they collected and organized into a report or guide for use in future pest control decisions?	✓		
14	Is there an established aesthetic or functional threshold for insects, fungal diseases, and weeds for all managed areas that may possibly reduce pesticide and fertilizer inputs?	✓		
15	Are current copies of all Material Safety Data Sheets (MSDS) for all chemicals used anywhere on the golf course property maintained and readily available?	✓		
16	Are chemical applicator(s) encouraged to apply for regular training to maintain currency?	✓		
17	Is the chemical storage structure/area locked, well-ventilated, fire resistant and is access limited to appropriate personnel?	✓		
18	Are records of pest treatments and their effectiveness maintained and used to guide future pest control decisions?	✓		
19	Are golfers adequately 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?		✓	
20	Are there written pest profiles for common regional pests along with alternative potential control measures readily available?			✓
<b>Totals</b>		<b>16</b>	<b>2</b>	<b>2</b>



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*Early progress on the newly renovated putting green just outside the clubhouse.*

<b><u>Environmental Compatibility Quotient Summary</u></b>			
<b>Environmental Compatibility Category</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
<b>Planning &amp; Compliance</b>	<b>10</b>	<b>6</b>	<b>4</b>
<b>Operations &amp; Maintenance</b>	<b>15</b>	<b>2</b>	<b>3</b>
<b>Water Resource Management</b>	<b>15</b>	<b>2</b>	<b>3</b>
<b>Conservation</b>	<b>15</b>	<b>4</b>	<b>1</b>
<b>Pesticides &amp; Pollution Prevention</b>	<b>16</b>	<b>2</b>	<b>2</b>
<b>Totals</b>	<b>71</b>	<b>16</b>	<b>13</b>

Key to checklist responses

- **Yes** = Practice is complete or ongoing and can be verified
- **Partial** = Practice has been initiated yet is not completed
- **No** = Practice is not in place

### **June 2008 – Cypress Tree Golf Course ECQ:**

- **Actual ECQ = 71, Just started (Red)**
- **Potential ECQ = 87, Showing progress (Yellow)**

<b><u>Environmental Compatibility Quotient Scoring Scale</u></b>	
<b>Total Yes or Partial Responses</b>	<b>Environmental Compatibility Level</b>
<b>90-100%</b>	<b>Advanced (Green)</b>
<b>70-89%</b>	<b>Showing progress (Yellow)</b>
<b>69% or less</b>	<b>Just started (Red)</b>



**Cypress Tree Golf Course Environmental Challenges Map**



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*Water and its many management issues are the primary challenges at  
Cypress Tree Golf Course.*

## Environmental Challenges

One of the important results of the GEM process is the identification of significant environmental challenges to be addressed in the GEM Plan. Along with the newly established baseline, the GEM Plan consists of a map and description of the final environmental challenges and the prescribed approach to their management. In addition, the GEM Plan includes a comprehensive list of future environmental management goals and objectives and a course-specific set of best practices.

The following potential environmental challenges were identified during the GCEBA process:

- Floodplains
- Cultural resources
- Bird/wildlife Aircraft Strike Hazard (BASH)
- Long-term water supply
- Human health & safety
- Threatened or endangered species

After additional analysis during the GEM process, the following environmental challenges were identified and will be managed accordingly:

- Floodplain/water quality
- Wetlands
- Cultural resources
- Bird/wildlife Aircraft Strike Hazard (BASH)
- Water supply
- Invasive species
- Human health & safety

## **Assessing environmental challenges**

The assessment of the environmental challenges is probably the most crucial as it provides a prioritized list of coordinated actions significant to the long-term success of the golf facility. The finalized GEM Plan will include the description, driver or requirement, management practice, objective, and target:

### **DESCRIPTION**

Once the challenge has been identified, a short description and a few historical or statistical details assist greatly in understanding the key factors in devising management practices.

### **DRIVER/REQUIREMENT**

Challenges are defined as “things that are bigger than the course”. Some of the reasons behind why a particular issue becomes a challenge are important to recognize and understand. A driver or requirement may be a local, regional, or national law, regulation, or initiative that creates the requirement to protect species, habitat, or preserve a resource such as open space or unique ecosystems.

### **OBJECTIVE**

Objectives are the overall goals for environmental performance focusing specifically on management activities associated with each challenge and the potential for impacts. The objective should directly relate to the environmental policy.

### **MANAGEMENT APPROACH**

A course’s approach to managing environmental challenges in accordance with the driver or requirement, environmental policy (see page 2), and established objectives and targets is the heart of the GEM Plan.

### **TARGET**

The target is the time frame and/or quantifiable unit of measure to achieve the established objectives.



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*The Alabama River can be both a positive and a negative for the River Course.*



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*This hazard/water feature on the 18<sup>th</sup> hole of the University Course collects storm water and eventually drains into the Alabama River.*

### **Floodplain/water quality**

Depending on which document you select, anywhere from 30-45 % of the installation is within the 100-year floodplain. Most, if not all, of the River Course is within this zone as the Alabama River and the course are intimately connected. The River Course is regularly inundated by the river's flood waters. Many of the lakes or ponds along the lower elevation holes have been created over time to help alleviate this problem. According to the General Plan, the "floodplain elevation at Maxwell AFB is approximately 161 to 162 feet." A majority of the River Course is well below this mark as heavy siltation occurs to include some greens and tees. This contributes greatly to the overall maintenance requirements along with the added expense to the course manager's bottom line. When lost income is factored into the equation due to the River Course being closed, the entire facility's economic situation is affected.

### **DRIVER/REQUIREMENT**

- Clean Water Act, Section 401
- National Pollutant Discharge Elimination System (NPDES)

### **OBJECTIVE**

Maintain compliance with all appropriate regulations at all times.

### **MANAGEMENT APPROACH**

- Eliminate the potential for degradation of the water resources at the golf course by establishing, documenting and communicating all pesticide and fertilizer application buffers to appropriate personnel prior to the end of the year
- Establish, document and communicate fertilizer and pesticide application buffers to all appropriate employees or service providers
- Consult with environmental staff prior to any changes in creek bed or pond

bank maintenance

- Comply with all requirements included in the approved installation SWPPP
- Ensure all spill prevention procedures and spill kits are in place and all pertinent employees are adequately trained to correctly and promptly perform required actions in an emergency situation

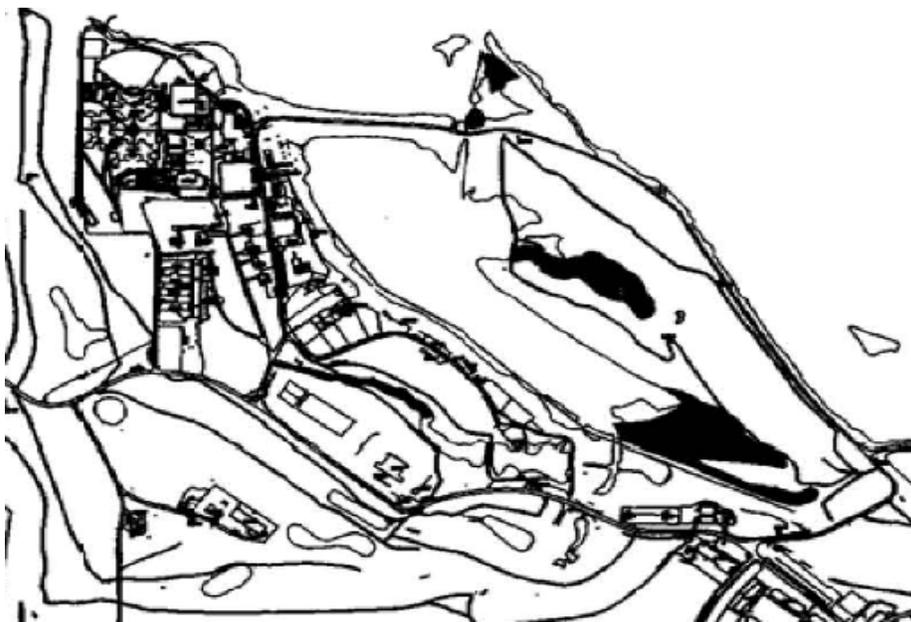
**TARGET**

Continue to maintain compliance every day.



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*The last flood to damage the east course took place in 2005. This photo shows the resulting damage some months after the event.*



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*This excerpt from the INRMP shows wetlands in solid black near the golf course.*

## **Wetlands**

The INRMP states “Wetlands are important because they provide socioeconomic benefits, contribute to environmental quality values, and support fish and wildlife. Wetland vegetation can reduce shoreline erosion in several ways, including increasing durability of the sediment through binding with its roots; dampening waves through friction; and reducing the velocity of the current through friction.” It continues “Because of Maxwell AFB management concerns with erosion problems along the Alabama River, it is important that an evaluation of potential impacts to wetlands be conducted.”

It appears that some of the Alabama River backwaters that function as water hazards on the River Course are probably among the delineated wetlands identified in the INRMP.

### **DRIVER/REQUIREMENT**

- Clean Water Act, Section 404

### **OBJECTIVE**

Ensure that all water bodies continue to be free of pollutants due to a golf course management practice.

### **MANAGEMENT APPROACH**

- Ensure all spill prevention procedures and spill kits are in place and all pertinent employees are adequately trained to correctly and promptly perform required actions in an emergency situation
- Comply with all requirements included in the approved installation SWPPP
- Establish, document and communicate fertilizer and pesticide application buffers to all appropriate employees or service providers

### **TARGET**

Eliminate the potential for degradation of the water resources by establishing, documenting and communicating all pesticide and fertilizer application buffers and spill prevention procedures to appropriate personnel prior to the end of the year.



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*Alabama River backwaters are everywhere on the River Course. Many of these are probably delineated wetlands and should be managed as such regardless.*

### **Cultural resources**

Many installations located near water features such as the Alabama River have been associated with historical or cultural resources. Maxwell AFB is no exception. The East course has been identified as containing a multi-component site dating to the Late Archaic Period, Woodland Stage, and Mississippian Stage.

#### **DRIVER/REQUIREMENT**

- Archeological and Historical Preservation Act (16 U.S.C. 469)
- National Historic Preservation Act

#### **OBJECTIVE**

Comply at all times with the prescribed practices identified in the Cultural Resources Management Plan (CRMP).

#### **MANAGEMENT APPROACH**

- Consult with installation cultural resources manager prior to any planned excavation or major changes to the management or design of the River Course golf holes
- Comply with all management procedures as directed by the installation environmental staff

#### **TARGET**

Continue to work closely with cultural resources manager as required to realize environmental challenge objective.



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*Canada geese regularly make themselves at home on and around the Cypress Tree Golf Course ponds.*

### **Bird/wildlife Aircraft Strike Hazard (BASH)**

At Cypress Tree, the University Course actually abuts the airfield as the 4<sup>th</sup> hole runs along the airfield at the courses far western boundary. The installation's BASH Plan states "The golf course poses a significant bird attractant and threat to the Maxwell AFB flying mission, which must be intensely managed to reduce this threat as much as possible. Trees, shrubs and ponds maintained on the golf course must be managed to reduce their attractiveness to birds to the maximum achievable degree."

The BASH Plan further discusses the severity of the problem. "The Canadian [sic] Goose is the greatest potential migratory hazard to flight operations at Maxwell AFB. They fly up and down the river and congregate at the lake adjacent to the Montgomery Zoo. They are often found at the boat ramp area near the federal prison camp. They like to come in to settle at the base lakes where people enjoy feeding them. They also graze on the grass at the ball fields, golf course and airfield. They have been seen in numbers exceeding 100 birds. The most effective tool for getting rid of the geese has been the consistent use of pyrotechnics."

#### **DRIVER/REQUIREMENT**

- 42 ABW Plan 91-1, Bird Aircraft Strike Hazard (BASH)
- AFPAM 91-212, *Bird Aircraft Strike Hazard (BASH) Management Techniques*
- AFI 13-213, *Airfield Management*

#### **OBJECTIVE**

Minimize or eliminate the potential for BASH concerns as a result of golf course management practices. In addition, in direct support of the installation mission, the golf staff shall continue to cooperate and assist the environmental and airfield management staffs with BASH reduction efforts.

**MANAGEMENT APPROACH**

- Mow all non-play areas in accordance with AFPAM 91-212
- Secure membership on BASH Working Group and attend all meetings
- Continue to assist installation airfield and environmental managers with BASH concerns on the golf course

**TARGET**

Identify all and eliminate 25% of the potential BASH concerns on the course prior to the next iteration of the natural resources management plan.



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*A white heron investigates the possibility of lunch at the University Course's 9<sup>th</sup>.*



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*The Alabama River can be both a positive and a negative for the River Course.*

### **Long-term water supply**

Recycled water or treated effluent is currently being discussed for use for irrigation of the University course. A firm is studying this change which appeared imminent during the site visit. Cost caps, energy conservation, and expansion of the pond on the 17<sup>th</sup> hole were all discussed as potential ramifications of this project. Any time a course can utilize recycled water rather than potable, city water supplies, there is a positive environmental impact.

The installation currently holds a permit to use water directly from the Alabama River surface. This is a phenomenal potential boon to the course's bottom line as well as providing a solution to this challenge. The installation needs a project that would pump water up the hill to the University Course irrigation pond eliminating potable water use by the Cypress Tree Golf Course staff and drastically reducing long-term maintenance costs. Another option would be to tap into the recycled water from the treatment plant near the University Course.

In addition, the General Plan states "A 1995 study found that the base's water distribution system functions well for average daily, maximum daily, and peak hourly demands. However, there is not sufficient pressure to provide adequate water supply to base facilities during golf course irrigation periods." This elevates the issue even further dictating at least an initiation of an action plan.

### **DRIVER/REQUIREMENT**

- Executive Order 13123, Greening the Government Through Efficient Energy Management
- Energy Independence & Security Act

### **OBJECTIVE**

Eliminate use of potable water for irrigating any of the golf course grounds.



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*Sewage treatment plant is right next door to the University Course.*

**MANAGEMENT APPROACH**

- Water only as much as the turf needs and the soils can absorb
- Compile a comprehensive Drought Management Plan for the entire facility

**TARGET**

Secure project funding for necessary upgrades to include pumping river water to University Course irrigation system supply pond prior to the end of CY2010.



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*Additional potable water used during establishment of the University Course's new greens has proven to be expensive.*



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*Invasives species have been found in the area to the right of the River's 6<sup>th</sup> hole.*

## **Invasive species**

“Invasive species may prey upon, displace or otherwise harm native species. Some invasive species also alter ecosystem processes, transport disease, interfere with crop production, or cause illnesses in animals and humans; affecting both aquatic and terrestrial habitats. For these reasons, invasive species are of national and global concern.” So states the National Invasive Species Management Plan. Maxwell AFB has several issues with invasives. Many of these species have the best chance of establishment on or near the Cypress Tree Golf Course property and the adjoining Alabama River.

### **DRIVER/REQUIREMENT**

- Executive Order 13112, Invasive Species
- National Invasive Species Act (1996)
- Plant Protection Act (2000)

### **OBJECTIVE**

Prevent introduction and establishment of invasive species to reduce their impact on the environment, economy and health of the United States.

### **MANAGEMENT APPROACH**

- Never knowingly plant a potential or a listed invasive species
- Regularly inspect likely areas for invasives to establish themselves
- Work with installation environmental staff to contain or reduce invasives
- When possible, restore native species and habitat conditions
- Train all pertinent employees on the latest invasive species identification and control measures

### **TARGET**

Obtain training immediately, inspect regularly, and compile action plan by Dec 09.



*Cypress Tree  
Golf Course  
Maxwell AFB, AL*

*Obviously stagnant and poor condition, water features like this one can be a major source of mosquitoes for customers and employees alike.*

## **Human health & safety**

One of the recurring issues related to the River Course's lack of drainage and recurring flooding is the potential for West Nile viral infections. Mosquitoes are a huge problem in general for Maxwell AFB and the region. The River Course grounds are definitely a potential source for this human health and safety hazard. There are also several ponds with little to no circulation and small, poorly drained areas that can also function as a home to the decidedly unfriendly mosquito.

### **DRIVER/REQUIREMENT**

- AFI 48-102, Medical Entomology Program

### **OBJECTIVE**

Protect customers, employees, and installation personnel at all times from preventable health and safety concerns.

### **MANAGEMENT APPROACH**

- Begin concerted efforts to eradicate all poorly drained areas on the golf course grounds
- Continue to monitor poorly drained areas and utilize mosquito dunks (*Bacillus thuringiensis*) or larvacide (IGRs and/or pesticides) distributed by certified pesticide applicators in all poorly drained areas
- Consider stocking permanent water sources with fish (*Gambusia affinis*), or small larvae feeding minnows
- Consult with base environmental and stormwater personnel (MSD/CEV) before altering wetland areas or drainage features.

### **TARGET**

Eliminate all poorly drained areas near high use areas within 3 years.

## Implementation

No plan is worth the time it took to compile it if it does not generate or include active implementation in the field. The golf course management staff should use the following goals and objectives as their roadmap for the future.

### **GEM Plan goals & objectives**

**Goals** are defined as actions or results that should be accomplished in the next year.

- Adopt and post an environmental policy statement
- Post environmental challenges map for customers and employees
- Compile written pest profiles of all common pests and include in a comprehensive integrated pest management plan
- Train all employees on the GEM Plan management approaches and include environmental management issues during all staff meetings

**Objectives** are defined as actions or results that are desired to be accomplished prior to the next INRMP update.

- Obtain and install recycling containers throughout the facility for use by customers and employees
- Compile a comprehensive Water Resource Management Plan for the entire golf course facility
- Comprehensively examine the course to determine the activities that may have a potential to negatively impact an identified environmental challenge

### **GEM Plan best practices**

Best practices are defined as any action, method, practice, or result that has proven its value and worth over time. The GEM program has been designed to create a body of scientific data to share with all U.S. Air Force installation golf and environmental staff members.

- Utilization of compost on the courses as a result of the Green Waste program within the installation's Solid Waste Management Plan

## Conclusion

Despite the limitations of the economy, an unpredictable river and continually shrinking operational budgets, Cypress Tree Golf Course and its staff manage to provide an enjoyable golfing experience for Maxwell AFB Airmen and their families. There are several environmental challenges to keep the staff busy, yet the environmental compatibility quotient is improving. Continued teaming with installation environmental staffers is crucial. Thankfully, the overall relationship between civil engineering and services is great. All of these factors indicate a fine future for this important recreational facility.

### **The gallery**

On the following pages are some of the more revealing photographs of challenges, maintenance practices, and other areas of the golf course facility.



*Canada geese seem to love the University Course ponds.*



*Alabama River backwaters on the River Course.*



*Shelters will need upgrade to comply with ADA.*



*Once the new greens are ready, this will be a great course.*



*Maintenance complex wash rack is a busy place.*



*Creeks and ditches tend to drain slowly.*

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**<https://www.afceeprivweb.brooks.af.mil/ec/golf/default.asp>**