



***Royal Oaks Golf Course  
Environmental Management (GEM) Plan  
Whiteman AFB, Missouri***



**April 2008**



**San Antonio, Texas**



## ***Royal Oaks Golf Course Environmental Management Policy***

**In concert with the  
Whiteman 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 April 2008:

- **Actual ECQ = 70, Showing progress**
- **Potential ECQ = 82, Showing progress**

### **Potential or Final environmental challenges**

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

- Wetlands & water resources
- Energy use
- Bird/wildlife Aircraft Strike Hazard (BASH)

## **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/>).



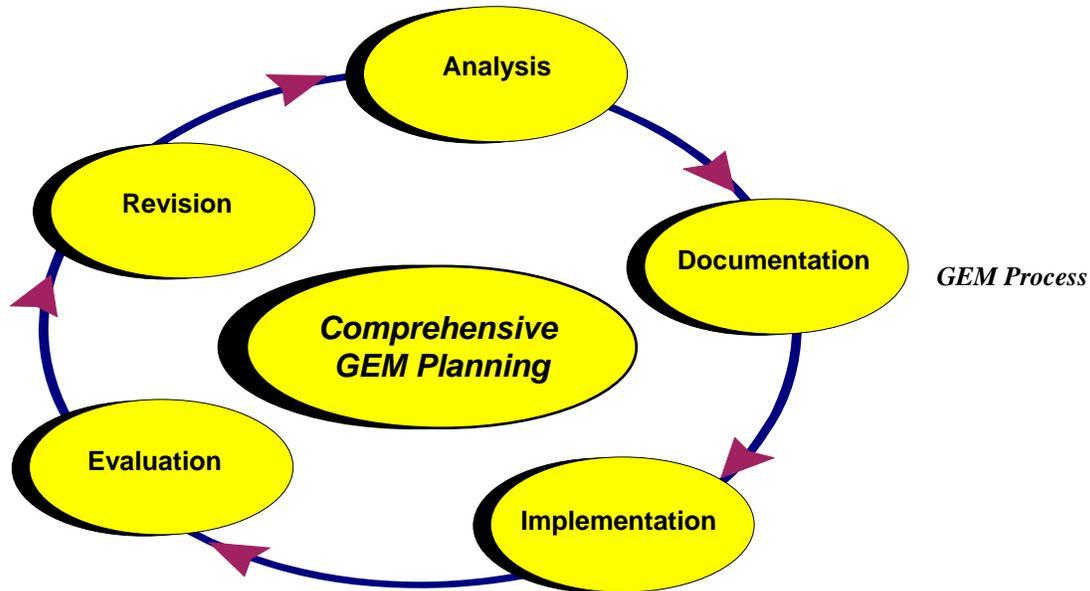
*Royal Oaks  
Golf Course  
Whiteman AFB, MO*

*The finishing hole of the outgoing nine is an interesting one-shotter.*

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.

## **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 identify ways that more rounds can be 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 while communicating directly with our customers, commanders, and 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 is comprised of 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.



*Royal Oaks  
Golf Course  
Whiteman AFB, MO*

*The new clubhouse is a positive contributor to the golfing experience at Royal Oaks.*

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

The GEM Plan will be comprised of the following components:

- GCEBA report
- 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, on-going 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.



## Course Description

Located in west central Missouri 65 miles east of Kansas City, Whiteman AFB is located on the edge of the tallgrass prairie on one of the few plateaus in Missouri. The 364 acres that comprise the installation's Royal Oaks Golf Course is situated among the dense, deciduous forest of Knob Noster State Park effectively forming the backbone of the installation's recreational inventory. The new Director of Golf, who is also the superintendent, has the 18-hole golf facility hovering near the precipice of the U.S. Air Force's best. Since the golf facility is located across the highway from the main cantonment area or "outside the fence", access is not an issue during the increasingly common elevated security measures.

Like many military courses, Royal Oaks was constructed in two phases. The original nine holes opened in 1959 and is rumored to have been routed by the legendary Robert T. Jones, Sr. A mere 36 years later, the second nine was added from the drawings of golf course architect, Don Sechrest. Both nines feature narrow, tree-lined fairways and small and often rolling greens. The routing of the course offers both challenge and interest and along with the new clubhouse, provide a setting for a top-notch golfing experience. It is just a matter of time until Royal Oaks Golf Course will challenge as the top facility in Air Combat Command.



**Royal Oaks Golf Course Aerial Photo**

**Course Details**

Architect	R. T. Jones, Sr. / Don Sechrest
Year constructed	1959/1995
Climate	Temperate
Average annual precipitation	40 inches w/ 25" snow
Average growing season	Mar – Oct (260 days)
Prevailing wind direction	North/South
Total facility acreage	364 acres
Total actively maintained acreage	160 acres
Par	36-36-72
Yardage/Rating/Slope	Blue- 6880/74.7/134 White- 6304/70.7/118 Red- 5150/71.4/127
Turfgrass	Quickstand Bermuda
Tees-	Bermuda & Rye/fescue
Fairways-	Bentgrass
Greens	Bermuda & fescue
Roughs-	Non-potable well water
Irrigation source	



*Royal Oaks  
Golf Course  
Whiteman AFB, MO*

*Modern greens design and construction techniques help minimize inputs.*

## **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)



*Royal Oaks  
Golf Course  
Whiteman AFB, MO*

*Updating the pesticide storage facility will increase overall golf course facility environmental compatibility.*

The following ECQ checklists are a record of the interview conducted with the Royal Oaks manager, superintendent, and environmental staffer during the visit to Whiteman AFB in April 2008.

<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>11</b>	<b>5</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>14</b>	<b>1</b>	<b>5</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 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	Has the property's water features been studied to determine the aquatic and amphibious species population?	✓		
<b>Totals</b>		<b>14</b>	<b>1</b>	<b>5</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>16</b>	<b>3</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	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 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>15</b>	<b>2</b>	<b>3</b>



*Royal Oaks  
Golf Course  
Whiteman AFB, MO*

*This is where maintenance equipment is currently being washed due to poor design and inoperability of wash rack.*

<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>11</b>	<b>5</b>	<b>4</b>
<b>Operations &amp; Maintenance</b>	<b>14</b>	<b>1</b>	<b>5</b>
<b>Water Resource Management</b>	<b>14</b>	<b>1</b>	<b>5</b>
<b>Conservation</b>	<b>16</b>	<b>3</b>	<b>1</b>
<b>Pesticides &amp; Pollution Prevention</b>	<b>15</b>	<b>2</b>	<b>3</b>
<b>Totals</b>	<b>70</b>	<b>12</b>	<b>18</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

**April 2008 – Royal Oaks Golf Course ECQ:**

- Actual ECQ = **70**, Showing progress (**Yellow**)
- Potential ECQ = **82**, 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 (<b>Green</b>)</b>
<b>70-89%</b>	<b>Showing progress (<b>Yellow</b>)</b>
<b>69% or less</b>	<b>Just started (<b>Red</b>)</b>



**Environmental Challenges Map**

## Environmental Challenges

One of the important results of the GCEBA process is the identification of significant environmental challenges to be addressed in the GEM Plan. Ideally, the golf staff will address their management approach to each challenge to accomplish course and local community environmental management objectives while still attaining acceptable levels of course playability and customer satisfaction. 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 environmental challenges were identified during the GEM process:

- Wetlands & water resources
- Energy use
- Bird/wildlife Aircraft Strike Hazard (BASH)

## **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.

### **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.

### **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.

### **TARGET**

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



*Royal Oaks  
Golf Course  
Whiteman AFB, MO*

*Recent work by civil engineering on this well has left the area in need.*



*Royal Oaks  
Golf Course  
Whiteman AFB, MO*

*Several drainages enter or leave the playing areas throughout the course.*

## **Wetlands & water resources**

The INRMP states that potential mission impacts on the natural resources of the area include soil and groundwater contamination, stormwater runoff on the watershed, and the storage, use, transport, and disposal of hazardous materials plus seven others. Each of the potential impacts listed above could possibly occur at Royal Oaks GC. There are over 88 acres of palustrine wetlands or surface water bodies on Whiteman AFB. The golf course ponds have been identified as non-jurisdictional wetland habitats. There are streams that pass through the golf course grounds that have been designated as “waters of the United States”.

In addition, there is a drinking water well located near the clubhouse that is lacking appropriate backflow prevention. This is a potentially serious potential health hazard and regulatory violation. Based on undocumented information secured during the site visit, the well is rumored to be deactivated resulting in possibly violating property lease with the state that included providing drinking water to the horse trail in Knob Noster State Park.

Even though the course is using non-potable water for irrigation, there is a source of recycled water available nearby. The only element lacking is an adequately-sized supply line from the wastewater treatment plant to the irrigation pond. Proactive coordination with civil engineering on the project is paramount to success. The INRMP states “well No. 7 is used exclusively to supply water for the base golf course. Water from the wells is pumped into an on-base water treatment plant that has a capacity of 1.35 million gallons per day (MGD) and is designed as a single-stage lime-softening treatment with recarbonation, filtration and disinfection”. The wash rack at the maintenance complex may be the worst of the issues that define this challenge. According to the director of golf, the wash rack was not

designed or constructed properly and has never truly worked since installation. On top of this fact, the Storm Water Pollution Prevention Plan (SWPPP) lists the golf course maintenance facility as a regulated industrial activity points (RIAPs), which are defined by the SWPPP as “buildings or areas where certain industrial activities take place that could potentially contribute to storm water contamination”.

According to the SWPPP in Table 4-6, the wash rack at the golf course is approved. The table describes the wash rack as “An outdoor wash rack is adjacent to this building [3084]. Wash water is pumped to an AST. Collected water can be trucked to the wastewater treatment plant or applied by irrigators over a flat grassy area”. It appears that an approved wash rack does not have to actually function properly.

#### **DRIVER/REQUIREMENT**

- Clean Water Act
- Safe Drinking Water Act

#### **OBJECTIVE**

Maintain positive relationship with civil engineering and environmental staffers to attain and maintain compliance without delay on all water-related regulations and requirements.

#### **MANAGEMENT APPROACH**

- Consult with installation environmental staff to ensure that golf course maintenance practices are fully compliant with complex water-related regulations
- Compile a comprehensive Water Resource Management Plan for the entire golf course facility
- Continue to enlist assistance to correct backflow deficiency
- Establish, document and communicate pesticide and fertilizer application buffers around all water features

#### **TARGET**

Correct all potentially non-compliant water resource aspects prior to the end of CY 2008.



*Royal Oaks  
Golf Course  
Whiteman AFB, MO*

*Growing family of Canada geese is a potential BASH concern in the making.*

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

Although there are no immediate issues associated with the golf course and BASH, the Royal Oaks staff should consult with flight safety to ensure compatibility with installation goals and objectives. Falconry has been proposed in the INRMP as a means to control the hazards around the airfield at Whiteman AFB. The golf course staff has the ability to assist with the overall flying mission by actively participating on the Bird/wildlife Hazard Working Group and reviewing the BASH Plan. The INRMP also states “Due to Bird Aircraft Strike Hazard concerns, WAFB will discourage habitat management around the airfield. Overall habitat management will continue in the following areas: golf course, green belt areas and unimproved grounds northwest and southwest of the base.”

#### **DRIVER/REQUIREMENT**

- Installation BASH Plan

#### **OBJECTIVE**

Ensure that all potential BASH-reduction measures are incorporated into daily golf course maintenance procedures.

#### **MANAGEMENT APPROACH**

- Regularly consult with installation environmental staff and airfield managers
- Actively participate on the installation BASH Working Group
- Manage all minimally-maintained areas in accordance with airfield mowing criteria

#### **TARGET**

Initiate consultation immediately and regularly thereafter to ensure compliance with airfield management and BASH criteria.



*Royal Oaks  
Golf Course  
Whiteman AFB, MO*

*The roof of the new clubhouse is ideally suited for solar energy modifications.*

## **Energy use**

Energy use and conservation of precious natural resources becomes more important with each passing day. Quality design should provide energy efficient facilities as a matter of course. Sometimes the target is either too high or missed by a designers' focus on aesthetics and/or budget constraints. Washington has sent a fairly strong signal that efficient energy use is high on their list of priorities as evidenced by the long list of drivers or requirements for this challenge. The clubhouse has not proven to be efficient energy user. Solar energy collection may be the answer.

### **DRIVER/REQUIREMENT**

- Executive Order 13123, Greening the Government Through Efficient Energy Management
- Executive Order 13423, Strengthening Federal Environmental, Energy and Transportation Management
- Energy Independence & Security Act
- Energy Policy Act

### **OBJECTIVE**

Meet all presidential and regulatory directives on energy conservation.

### **MANAGEMENT APPROACH**

- Consider energy efficiency for all equipment purchases throughout the facility
- Pursue solar energy generation modifications to the clubhouse

### **TARGET**

Attain comprehensive compliance with all directives within prescribed milestones for the entire golf course facility.





*Royal Oaks  
Golf Course  
Whiteman AFB, MO*

*Recycling works at Royal Oaks.*

## **Conclusion**

Despite the limitations of the economy, an unpredictable climate and always shrinking operational budgets, Royal Oaks Golf Course and its staff manage to provide an enjoyable golfing experience for the Whiteman AFB Airmen and their families. There are no severely limiting environmental challenges and the environmental compatibility quotient is improving. Teaming with installation environmental staff has been difficult due to limited staff members but 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.



*Clubhouse dining area is spacious to a fault.*



*Golf carts are stored outside during the day.*



*Some aspects of the maintenance complex are ideal.*



*Redbuds abound in the many acres of natural areas.*



*Wash rack is now used for vehicle parking.*



*Drainage is a constant struggle throughout the course.*



*Clubhouse dining area is spacious to a fault.*



*Irrigation pond and pump house function well.*



*Royal Oaks has a great collection of one-shot holes.*



*On-course recycling and minimally-maintained areas.*



*Good water feature maintenance practices minimize BASH.*



*Course design interrupts the flow of several creeks.*

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**<http://www.afcee.brooks.af.mil/ec/golf/>**