Air Force Center for Environmental Excellence

Royal Oaks Golf Course
Environmental Baseline Assessment
Whiteman AFB, MO Jun 04

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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 Environmental Excellence (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.

The primary tenets of the GEM Program are to minimize or eliminate potential negative environmental impacts, attain and maintain daily compliance with all appropriate regulations, and constantly examine all aspects of golf course management to achieve the highest standards of environmental excellence.

GEM Program process

There are five steps in the GEM program process.

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

Environmental challenges

The following environmental challenges were identified during the GCEBA process:

- Wetlands & water resources
- State park property lease renewal
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Poor surface drainage
- Clubhouse construction

Where do we go from here?

Once the environmental challenges are identified, it is paramount that the golf course staff should determine their preferred management approach in the context of their ongoing, long-term goal of providing the best golfing experience for their customer's dwindling recreation resources.

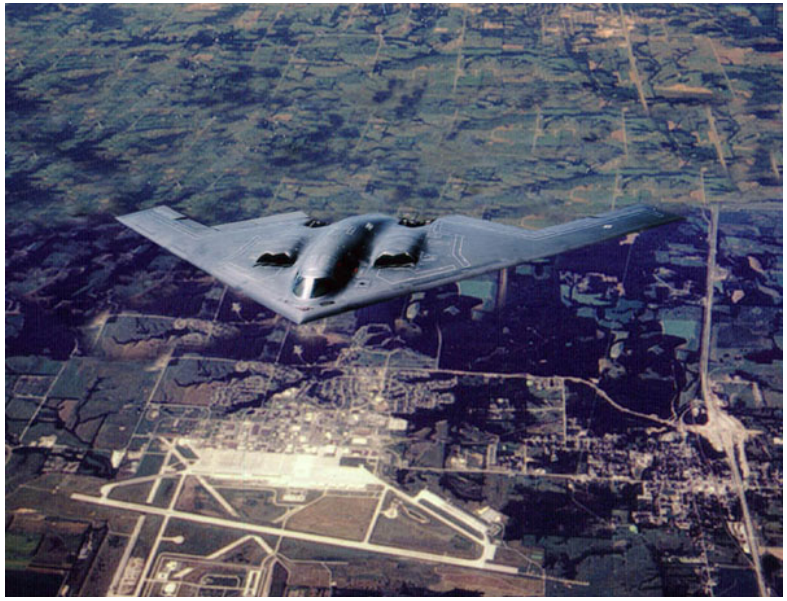
Armed with this well-conceived, golf facility-based management approach, the golf staff should then coordinate with the environmental staff to ensure that there is consistency and compatibility with installation-wide natural resource and environmental management goals and objectives.

Finally, the staff should proceed with the next steps in the GEM Program process documented in this study.

Introduction

The golf course environmental baseline assessment (GCEBA) is the initial step in the process of creating a successful ecosystem-based Golf Course Environmental Management (GEM) Plan.

The intent of the program is to provide an efficient, customer-driven management tool that will free up course managers and superintendents 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 installation's vital recreational opportunities.



A B-2 bomber cruises over Whiteman AFB, Missouri.

The 4th hole at Royal Oaks Golf Course.

Goal of the GEM Program

The goal of the U. S. Air Force GEM program is to facilitate the creation of an environmentally friendly golf course facility for its customers while supporting the installation mission. The Air Force Center for Environmental Excellence (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, the U. S. Air Force's golf courses are being managed compatibly with the environment. The GEM program is the vehicle to document our successes while communicating directly with our customers, commanders, and local community.

The 5th green is typical of Royal Oaks Golf Course.

GEM Program 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 GEM Plan process. The latest requirements for the GEM Plan components are described and outlined on the AFCEE golf course environmental management program website: http://www.afcee.brooks.af.mil/ec/golf/. Detailed explanations and directions for completing the GEM Plan will be delineated in AFCEE's proposed handbook ***Golf and the Environment, Guidelines for the 21st Century***.

The GEM Program is derived from many diverse environmental regimes such as the National Environmental Policy Act, the Environmental Compliance Assessment and Management Program, and the ISO 14001 environmental management system. There are five basic steps in the implementation of the GEM Program process:

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

The new holes feature some interesting green sites.

Fun to play and difficult to maintain.

Analysis

Experienced environmental managers realize the importance of assembling all of the data relevant to a problem prior to determining its best solution. Analysis is the first and most important task of the golf course environmental baseline assessment (GCEBA) and the GCEBA is the initial step in the process of creating an ecosystem-based Golf Course Environmental Management (GEM) Plan. Properly completing the GCEBA is paramount to the long-term compatibility of an installation's golf course management practices with the GEM Program, and more importantly, the U. S. Air Force'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 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 commanders and customers alike the environmental issues that challenge us on our golf course as well as our plans to deal with them. In order to reach the environmental stewardship goals set by the U. S. Air Force, we must consistently employ only those management practices that minimize or eliminate potential negative impacts to the environment.

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 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 program recommendations

Implementation

Positive and decisive action is the only true measure of the success of a GEM Program. 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 Royal Oaks staff should adopt the GEM Program Environmental Policy and immediately begin finding ways to minimize or eliminate any and all negative impacts to the environment.

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 Program. It is important for U. S. Air Force golf courses to show improvement over time. This can be easily accomplished by regularly evaluating golf course maintenance methods, practices, and management approaches to day-to-day issues and changing when appropriate.

Revision

The very nature of a superior GEM program implies that all documents be regularly maintained to represent the most current conditions. U. S. Air Force 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 Program. The GEM Plan should be kept as current as possible at all times. Ideally, it should be completely updated at least every three years.

Course Specific Analysis

One of the most pragmatic and enjoyable tasks in the GCEBA process is the course specific analysis. From a general overall description of the course to the details of the course's history and makeup to the various observations on the way the course plays, looks, and is managed, the course specific analysis sets the stage for the rest of the GCEBA report. It is comprised of the following tasks:

- Course description
- Course details
- Miscellaneous facilities examination

Just to the right of the intended tee shot-landing area is an extremely unforgiving, steeply sloping natural area

Course description

Situated among the dense, deciduous forest of Knob Noster State Park, the 364 acres that comprise Whiteman AFB's Royal Oaks Golf Course form the backbone of the installation's recreational inventory. The Director of Golf and his superintendent have their 18-hole golf facility hovering near the precipice of the U.S. Air Force's best. Located in west central Missouri 65 miles east of Kansas City, Royal Oaks is one of the few golf courses in the largely rural and agrarian area. 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 was possibly 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 newest holes still have not reached maturity as minor grading and drainage improvements are needed to allow for the desired dense fairway and rough turfgrasses. The routing is extremely interesting and with the clubhouse facility being rebuilt, it is just a matter of time until Royal Oaks Golf Course will challenge as the top facility in Air Combat Command.

Water is a major concern for Royal Oaks regulars.

Course details

Architect- Original nine		R. T. Jones, Sr. (?)
Architect- 2nd nine		Don Sechrest
Year constructed		1959/1995
Climate		Temperate
Average annual rainfall		40 inches w/ 25” snow
Average growing season		Mar – Oct (260 days)
Winds/Prevailing Direction		North/South
Total Facility Acreage		364 acres
Par		36-36-72
Yardage/Rating/Slope		Blue- 6880/74.7/134
		White- 6304/70.7/118
		Red- 5150/71.4/127
Turfgrass	Tees-	- Quickstand Bermuda
	Fairways-	- Bermuda & Rye/fescue
	Greens	- Bentgrass/Poa
	Roughs-	Bermuda & fescue

Royal Oaks Golf Course Aerial Photo

Miscellaneous Facility Review

Although the course is primary to the enjoyment and eventual return of most of Royal Oaks' customers, the support facilities play a huge role is the overall success of the operation. This section of the GCEBA will examine the following facilities for their aesthetic, functional, and environmental values:

- Clubhouse/pro shop/snack bar
- Maintenance complex
- Practice areas
- Pesticide mixing and storage
- Cart storage facility
- Infrastructure

Artist's rendition of the new clubhouse facility.

Existing clubhouse has exceeded its productive lifespan.

Clubhouse

The existing clubhouse is a moderately functional facility. Construction of the new clubhouse should begin immediately as the project was awarded and the initial site visit occurred during the installation site visit for this GCEBA. The clubhouse will add much needed storage space and will feature a full service snack bar along with a spacious dining area.

Maintenance complex

The maintenance complex is a recent addition to the Royal Oaks facility. Constructed in late 2001 for $685K, the complex is roomy and outfitted with most everything required by a modern golf course maintenance crew. For whatever reason, some of the amenities provided in the construction project have not worked out. The wash rack/sump/recycled water system is a total failure. Difficulties with these systems seem to have resulted from faulty or inaccurate designs. All in all though, the complex is highly functional and should prove to be a sound investment over the long haul.

The recently constructed addition provides a functional workspace.

Spacious and airy describes the interior of the new complex.

Superintendent Zach Adamson's office is all business.

Practice areas

Royal Oaks Golf Course currently has an adequate driving range and a practice putting green. It seems that the practice green will not survive the relocation of the clubhouse. There were no definite plans to construct a replacement putting green which, of course, is one of the most important amenities for a full service, high quality golf facility. A short game practice area is still lacking.

The driving range is conveniently in close proximity to clubhouse.

Mixing and storage of all pesticides is performed in this facility.

Pesticide mixing and storage

One of the most important amenities of a good golf course maintenance operation is the pesticide mixing and storage facility. Whiteman's is a relatively older structure that barely fits the bill although it is fully in compliance with all applicable rules and regulations. The facility has been the source of ECAMP findings in the past but all shortcomings have been addressed.

Carts are left outside in the elements during the golfing season.

Cart storage facility

There is no existing cart storage facility at Royal Oaks Golf Course. The new clubhouse project should provide some respite from this unacceptable situation. During the winter months the carts are stored in the golf maintenance facility.

Infrastructure

This section examines important elements of a quality golf course that are difficult to group into another category. Cart paths are in poor condition. The parking lot is in good condition and seems large enough to satisfy the regular demands of Royal Oaks' customers although it will be farther away from the new clubhouse. There is a site amenity group near most teeing areas and the course signage could be improved. Irrigation system is working well.

Cart paths are in poor condition on much of the course.

Determining the Baseline (ECQ)

The following is a brief compilation of some of the responses in each of the ten Environmental Compatibility Quotient (ECQ) categories obtained in an interview with the superintendent and the manager conducted during the site visit.

ECQ Categories

- Overall Management Philosophy & Documentation
- Safety, Training, And Awareness
- Compliance
- Pesticide Use, Storage, & Handling
- Pollution Prevention
- Conservation Practices
- Water Resources
- Maintenance Practices
- Customer Relations & Education
- Miscellaneous Special Projects & Activities

Key to checklist responses

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

ECQ Checklists

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

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

Bunker conditioning and construction quality is definitely lacking.

The greens complexes are the course's finest attribute.

Interpreting the 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
93-100%	Advanced
83-92%	Getting there
73-82%	Showing progress
63-72%	Early stages
Less than 62%	Just started

Root pruning can greatly improve turfgrass quality on a green.

Overall Management Philosophy & Documentation

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

Safety, Training, & Awareness

#	Environmental Compatibility Indicator	Yes	Partial	No
1	All employees are familiar with the overall GEM Plan and are trained on the importance of environmental compliance with the goals and objectives of the program?		✓	
2	All appropriate employees are trained to be familiar with U. S. Air Force, federal, state, and OSHA regulations that apply to storage, handling, and disposal of chemicals used on the property?	✓		
3	All employees are aware that chemical use, storage, and disposal and their potential risks to human health and the environment?	✓		
4	All employees are trained to understand that poor management practices may adversely impact worker health, on- and off-site water quality, local soil health, and wildlife species and their habitats?	✓		
5	A current copy of all Material Safety Data Sheets (MSDS) for all chemicals used anywhere on the golf course property is maintained and readily available for use by employees?	✓		
6	All employees receive regular, documented training on all potential OSHA issues?		✓	
7	Are all golf course pesticide applicators active participants in a local respiratory and pulmonary testing program?	✓		
8	Pesticides, fertilizers, and other chemicals are stored on appropriate shelving in an approved storage facility?	✓		
9	Are golfers notified in the pro shop and on the first and tenth tees about the day's planned or recently completed spraying of any chemical or fertilizer that may be hazardous to human health and safety?		✓	
10	Are key staff members trained regarding water quality and conservation issues?	✓		
	Point totals for each column - Response percentage	**7**	**3**	**0**

Compliance

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is fuel storage/delivery managed in accordance with federal, state and local regulations?	✓		
2	Are installation environmental staff members included in on-going course management discussions and plans at scheduled meetings?	✓		
3	Are there golf course staff meetings to discuss environmental management issues?	✓		
4	Does the director of golf and the superintendent attend ESOHCAMP in-briefings and out-briefings?	✓		
5	Does the director of golf and/or the superintendent coordinate with installation environmental staff on the various management plans that affect or include the golf course?		✓	
6	Have all necessary permits been secured and/or updated and their requirements satisfied in a timely manner?	✓		
7	Has appropriate impact analysis (NEPA) been performed on all proposed actions on or affecting the golf course property?	✓		
8	Are containers used to store used oil in good condition, not leaking, and clearly labeled?	✓		
9	Has the golf course staff has submitted their proposed management approach to the identified environmental challenges to the installation environmental staff for coordination and review?			✓
10	Were there less than two major golf course facility-related findings during the last official ESOHCAMP visit?	✓		
	Point totals for each column - Response percentage	**8**	**1**	**1**

Pesticide Use, Storage, & Handling

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there trained scouts on staff other than the superintendent to monitor turf and plant health and pest populations regularly using a process to notify management of pest problems and organized into a report or guide so that they can be used for future pest control solutions?			✓
2	Are there written pest profiles of common pest species with a variety of potential control measures pre-evaluated including alterations in cultural management, biological, physical, and mechanical controls prior to treating the problem on the course?		✓	
3	Are there established and documented aesthetic and functional thresholds for all managed areas to effectively manage pest populations and reduce chemical use?	✓		
4	Is there a specially designed pesticide mixing area where all mixing is performed by appropriately trained personnel?	✓		
5	Has a list of pesticides and other chemicals stored or used at the golf facility been provided to the appropriate Fire Department(s)?	✓		
6	Is there a written Integrated Pest Management Plan readily available and updated in use at the facility?		✓	
7	If personal protective equipment is required for pesticide use, storage, or handling, is it available for use by trained individuals?	✓		
8	Are written and readily available records maintained of all applications of pesticides made by certified applicators, including the following? - the quantity of each pesticide used - the chemical or common name of the active pesticidal ingredient(s) (not the product name) - the pest or purpose for which the pesticide was applied --the date and place of application.	✓		
9	Is the chemical storage structure/area locked, well ventilated, fire proof, and access is limited to select personnel?	✓		
10	Are food storage and prep areas properly cleaned to reduce the likelihood of pest infestations and required pesticide applications?	✓		
	Point totals for each column - Response percentage	**7**	**2**	**1**

Pollution Prevention

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there designated "no-mow" areas (other than ponds) and "no spray zones" and buffer areas around pond, river, stream, or lake edges and have they been communicated to mower operators and pesticide applicators?	✓		
2	Has the Installation Spill Plan been amended to include the golf course facility and is there a spill containment kit at each required location 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	Have all the golf facility employees regularly received documented and approved HAZCOM and safety and health training?	✓		
7	Are grass clippings blown off equipment with compressed air instead of or prior to washing?			✓
8	Are gasoline, motor oil, brake and transmission fluid, solvents, and other chemicals used to operate or maintain equipment and vehicles prevented from directly or indirectly entering water bodies?	✓		
9	Has the watershed in which the course resides and contributes runoff to been identified and mapped to aid the golf course staff in the management of their facility?		✓	
10	Are appropriate quantities of fertilizers applied during weather conducive to reducing the potential for leaching and runoff?	✓		
	Point totals for each column - Response percentage	**7**	**2**	**1**

Conservation Practices

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are recycling containers conveniently provided for customer and employee use throughout the golf course facility?	✓		
2	Are there officially and appropriately designated minimally maintained areas on the golf course facility grounds?	✓		
3	Has the irrigation system or its components recently been upgraded to reduce inefficiency, malfunction, and overall water use?	✓		
4	Has all “non-target” irrigation (ponds, natural, or out of play areas, etc.) been eliminated or minimized?		✓	
5	Have flow meters been installed to monitor water use and detect potential waste?		✓	
6	Has the entire golf course facility property been examined for critical habitats, threatened or endangered species, wetlands, floodplains, and historical/cultural resources?	✓		
7	Are employees encouraged to minimize their trips around the course to conserve on the use of fossil fuels?	✓		
8	Does the snack bar utilize reusable plates and silverware for use by customers throughout the facility’s operating hours?		✓	
9	Have all potential “no-mow” area maintenance practices been coordinated with the installation BASH officer and environmental management personnel?	✓		
10	Are all motorized golf course equipment checked regularly for excessive air polluting emissions?		✓	
	Point totals for each column - Response percentage	**6**	**4**	**0**

Water Resources

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are water features regularly monitored for algae, erosion, excessive aquatic plant growth, fish kills, and sedimentation?	✓		
2	Are wash and wastewater kept from making direct contact with surface water and are they recycled or allowed to filter through a vegetative area when cleaning and maintaining equipment?	✓		
3	Outdoor irrigation of non-golf course landscape areas are regularly monitored and maintained for leaks and efficient performance?	✓		
4	Has the golf course staff coordinated with stormwater management planning requirements from the installation's environmental staff?	✓		
5	Have part circle irrigation heads been installed where possible to preserve water resources and reduce maintenance while minimizing potential negative impacts to surrounding minimally maintained areas?			✓
6	Are all water feature maintenance tasks coordinated with the installation natural resource manager and bird/wildlife aircraft strike hazard officer?			✓
7	Has the irrigation system been completely checked for proper water distribution in all irrigated areas and are water leaks fixed in a timely manner?		✓	
8	Are moving water bodies such as streams or creeks that pass through the golf course regularly monitored for water quality both upstream and downstream of the course?	✓		
9	If required, does the facility have a Drought Management Plan written, ready, and available if, or when, irrigation restrictions may be instituted and required by the community or the installation?			✓
10	Are water quality problems immediately reported to supervisors or regulatory agencies (if required) for appropriate action?	✓		
	Point totals for each column	**6**	**1**	**3**

Maintenance Practices

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is there a written, regularly updated, and readily available Golf Course Maintenance Plan?			✓
2	Does the Maintenance Plan include individual plans to include Integrated Pest Management, Tree Management, Hazard Communication, Drought Management, Water Feature Management, and a Site-Specific Spill Prevention Response Plan?		✓	
3	Are green, tee, and fairway mowing heights maintained at reasonable levels without continually stressing turf or maximizing chemical inputs?	✓		
4	Are there regular procedures in place to continually improve soil health such as topdressing, organic amendments, aeration, and drainage?	✓		
5	Is there a map of the course's "hot spots" requiring special care or regular attention?			✓
6	Is all maintenance equipment maintained and cleaned in a manner that eliminates the potential for spreading of pest or disease contamination?	✓		
7	Has there been a complete examination for potential negative environmental impacts of all aspects of the golf course facility operation including the snack bar and grill, clubhouse, pro shop, and maintenance complex?	✓		
8	Is contour mowing used to conserve fuel and increase playability and aesthetics?	✓		
9	Have all playing surfaces been inventoried and mapped for soil types including soil structure, nutrient levels, organic content, compaction, and water infiltration?			✓
10	Are soil tests and plant tissue analysis used to determine nutritional requirements?			✓
	Point totals for each column - Response percentage	**5**	**1**	**4**

Customer Relations & Education

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are the course manager and superintendent involved in a regularly updated, documented, and on-going customer environmental educational program?		✓	
2	Is there a conveniently located and highly visible place at the course or clubhouse where golf course environmental management notices and informational messages are regularly posted for customers?			✓
3	Do the course manager and superintendent actively communicate with customers to determine and document their points of view?	✓		
4	Is there active and regular communication with the golf management staff, civil engineering, environmental management, the Services manager, and commanders by course management?	✓		
5	Does the golf staff regularly survey their customers on how they rate the various elements of the golf course facility?	✓		
6	Is there consistent and attractive signage around the course and grounds that would increase the awareness of the average golfer to the environmental management practices employed?			✓
7	Are there signs appropriately located to warn golfers of hazards when drinking reclaimed or otherwise non-potable water?		✓	
8	Are there interpretive signs posted to highlight key habitats or have appropriate areas been designated "Environmentally Sensitive Zones" per USGA rules?	✓		
9	Are course staff members trained regularly on how to improve their dealings with customers?	✓		
10	Are there clinics provided to teach beginning golfers the basics of the game and to teach all levels of golfers the rules of the game?	✓		
	Point totals for each column	**6**	**2**	**2**

Miscellaneous Special Projects & Activities

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there projects planned and funded for the near future that would demonstrate the compatibility of the course's management methods with protection of the environment?		✓	
2	Are there projects planned and funded to reduce the course's potential negative environmental impacts?		✓	
3	Are there tournaments or other events planned that may educate customers on the environmental challenges faced by the golf staff at this installation?			✓
4	Are there regular field trips for local students or other local community groups hosted at the course?			✓
5	Are there projects planned to eliminate or minimize a potential erosion problem?	✓		
6	Does the course have a native tree installation program complete with planting plan and maintenance schedule?	✓		
7	Are any of the local schools or universities involved in educational or research activities at your course?			✓
8	Are there special facility-wide recycling programs underway?	✓		
9	Is your course an active participant in the USAF Golf Environmental Management Program?	✓		
10	Has your facility been nominated by your MAJCOM for the golf course environmental management award in the last 3 years?			✓
	Point totals for each column	**4**	**2**	**4**

ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	5	4	1
2	Safety, Training, & Awareness	7	3	0
3	Compliance	8	1	1
4	Pesticide Use, Storage, & Handling	7	2	1
5	Pollution Prevention	7	2	1
6	Conservation Practices	6	4	0
7	Water Resources	6	1	3
8	Maintenance Practices	5	1	4
9	Customer Relations and Education	6	2	2
10	Miscellaneous Special Projects & Activities	4	2	4
	Composite point total/response percentage	**61**	**22**	**17**

GCEBA Results

Σ Royal Oaks Golf Course, Whiteman AFB, MO
- **Actual ECQ (# of "Yes") = 61 "Just started"**
- **Potential ECQ (Actual ECQ plus "Partial") = 83 "Getting there"**

Conclusion

According to the state of Missouri's Department of Natural Resources website, "just south of Highway 50, about midway between Sedalia and Warrensburg, lies an often overlooked gem of the Missouri state park system. Knob Noster State Park is an ideal spot for relaxing and forgetting the cares of the world - even if just for a few hours. The park is an interesting mixture of prairie, savanna and forest, with 3,567 acres lying along both sides of a meandering creek. Several small lakes in the park cater to the fisherman, and non-motorized boats may be used. Picnic sites dot the lakeshore and three open picnic shelters make an ideal place for group get-togethers in a tranquil setting."

If the Knob Noster State Park is an overlooked gem, then Royal Oaks Golf Course is the lustrous glow emanating through the forest. Residing on nearly 10% of the park's overall acreage, Whiteman's golf facility under the leadership of the Director of Golf is just beginning to shine. As an 18-hole facility readying itself for a new clubhouse, the future is optimistic to say the least. Combine these traits with a personable staff and a growing customer base, Royal Oaks Golf Course has a chance to be rated among the elite U.S. Air Force golf facilities.

Observations

- Begin to solve drainage problems immediately to increase playability and maintainability of the course
- Compile and document actions already taken to create "continuity" document
- Implement planned improvements to all aspects of the golf facility
- Utilize installation environmental management geographic information system and civil engineering digital aerial photographs for mapping requirements
- Need to secure computer hardware and software upgrades to increase overall efficiency and provide high speed internet access
- Expanded training for all employees a must to completely realize GEM goals
- Ensure employee's health is prime consideration
- Demonstrate genuine concern for player health and safety through actions
- Consider using AFCEE for on-site golf course environmental management training
- Do more than what is required
- Inconsistent interpretations of compliance actions among installation, MAJCOM, and ECAMP evaluators confuse
- Ensure ECAMP results are outstanding
- Relationship with installation environmental and engineering staff is improving

- Further reduce solid waste streams from clubhouse operations
- Increase the use of slow release fertilizers when appropriate
- Regularly provide training for all employees on the specifics of pollution prevention and how they can help
- Although pesticide facility is functional, consider purchasing state of the art facility and relocating nearby maintenance complex
- Fix wash rack to increase functionality of maintenance operation as well as to increase environmental stewardship
- Incorporate contour mowing procedures
- Increase communication with customer on conservation practices that are already in place
- Provide detailed input to the scheduled update of installation integrated natural resources management plan (INRMP)
- Increase training and involvement of staff on integrated pest management procedures
- Compile written pest profiles of common pest species
- Improve water hazard care to eliminate unwanted vegetation while improving aesthetics and habitat
- Increase number of trained scouts on the maintenance staff
- Create a location to communicate environmental management goals and maintenance plan in the new clubhouse
- Continue to involve installation youth through rules and instruction clinics
- Conduct field trips at the course for local school children
- Initiate Earth Day environmental awareness golf tournament

Ensure that all "minimally-maintained" area management is coordinated with BASH officer and the installation flight safety office.

Areas needing improvement

The ECQ Summary on the previous pages highlights the following areas for relative improvement at Whiteman AFB:

- Overall Management Philosophy & Documentation
- Maintenance Practices
- Miscellaneous Special Projects & Activities

The gallery

This section of the report will be where some of the more revealing photographs (of the literally hundreds taken during the site visit) of pests, maintenance practices, and other areas where improvements may be made to create the best possible golf facility.

Recycling containers are located throughout the course.

The practice putting green may not survive the new clubhouse project.

Small, poorly drained areas can eventually be classified as wetlands.

The final hole on the front side is a challenging par three over water.

Unobtrusive pump house is the irrigation system's heart and soul.

Poor turf quality may be exacerbated by the triplex cleanup pass.

A cart storage facility will be a welcome addition.

Some areas of the new fairways have not fared well.

Fertilizer storage facility is well maintained and satisfactorily outfitted.

Wash rack's water system is in need of repair or recycling.

Looking back at the narrow and severely sloping 12th fairway.

Environmental challenges

One of the important results of the GCEBA process is the identification of significant environmental challenges to be addressed in the long-term GEM Planning process. Ideally, the golf staff will address each issue from the best way to satisfy the goals of the golf facility and acceptable levels of course playability and customer satisfaction. The golf staff's preferred management approach for these issues should then be coordinated with the installation's environmental staff for refinement, coordination, and approval.

The GEM Plan would then consist of the environmental challenges, the approach to their management, a map showing where these challenges occur on the golf course, a booklet that describes the mapped challenges, goals and objectives for future years, and a set of best management practices.

The following environmental challenges were identified during the GCEBA process at Royal Oaks Golf Course, Whiteman AFB, MO:

- Wetlands & water resources
- State park property lease renewal
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Poor surface drainage
- Clubhouse construction

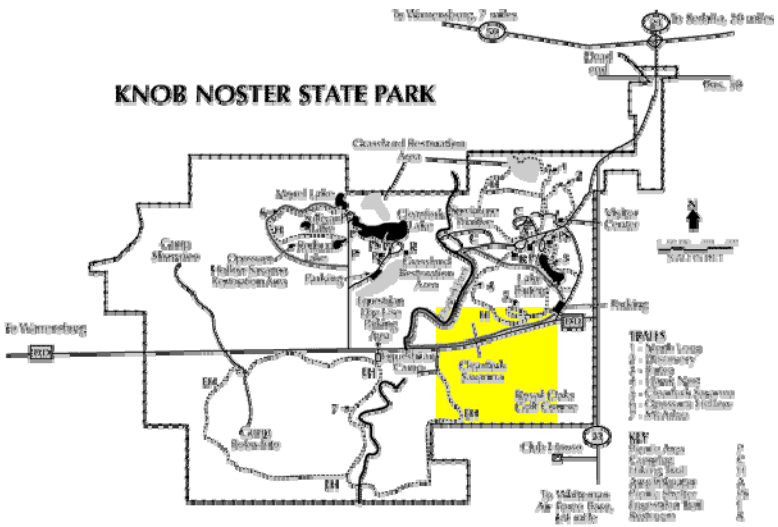
Ponds at Royal Oaks are classified as palustrine wetlands.

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". The golf course management must consult with installation environmental staff to ensure that their maintenance practices are fully compliant.

STATE PARK PROPERTY LEASE RENEWAL

Since the inception of the golf course at Whiteman AFB, the land has been leased state park property. The current lease is set to expire in 2 years. The U.S. Air Force reportedly has the ability to renew the lease at that time for 50 years at a nominal cost of $1 per year. Accordingly, the process of compiling an updated environmental baseline survey as required by AFI 32-7066 has already been initiated by installation environmental staffers. Suffice is to say, the successful procurement of the new lease will have a significant impact on the future of Royal Oaks Golf Course.



Minimally-maintained areas can be bird/wildlife attractants.

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.

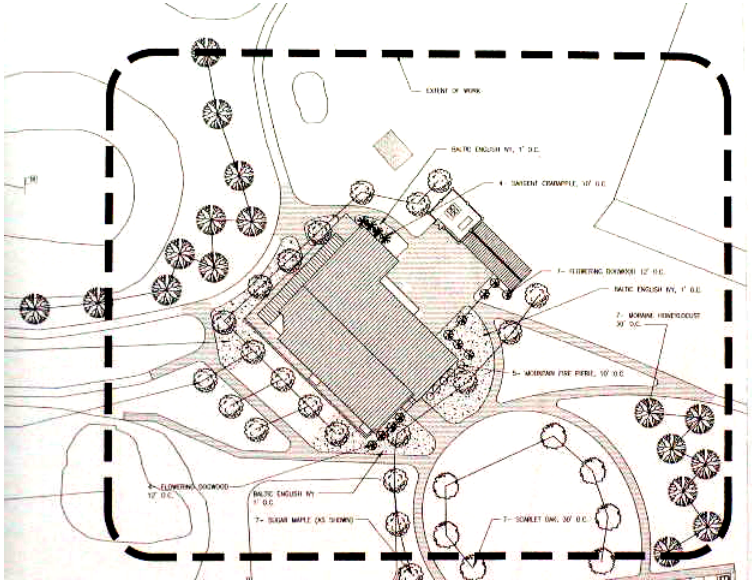
Poorly drained areas not only hinder play and cause maintenance difficulties, they can also attract birds and wildlife.

POOR SURFACE DRAINAGE

Due to soil properties, design and construction deficiencies, and other natural conditions, the course does not sufficiently drain after rainfall events. Some of these could contribute to BASH issues and definitely hinder the overall playability and maintainability of the facility.

CLUBHOUSE CONSTRUCTION

Although the construction of a new clubhouse at Royal Oaks is not an environmental issue, per se, the will be some difficulties encountered in satisfying customer and management requirements during this period. The landscape package was not part of the award and the putting green may be eliminated



The proposed site plan for the new clubhouse.

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Please visit our Golf Course Environmental Management Program website:
http://www.afcee.brooks.af.mil/ec/golf/