



Eagle Creek Golf Course
Environmental Management Plan
Dover AFB, Delaware Sep 07



Eagle Creek Golf Course Environmental Policy

**In concert with the
Dover 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.**



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. AFI 32-7064 requires a GEM Plan as part of the Integrated Natural Resources Management Plan (INRMP).

The primary tenets of the GEM Program are to minimize or eliminate potential negative environmental impacts, 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 Compatibility Quotient

Actual ECQ	78
Potential ECQ	88

Final environmental challenges

The following environmental challenges were identified during the GEM Plan process:

- Wetlands, floodplains & water quality
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Air quality
- Environmental Restoration Program (ERP) sites
- Cultural resources
- Leased golf course property acreage

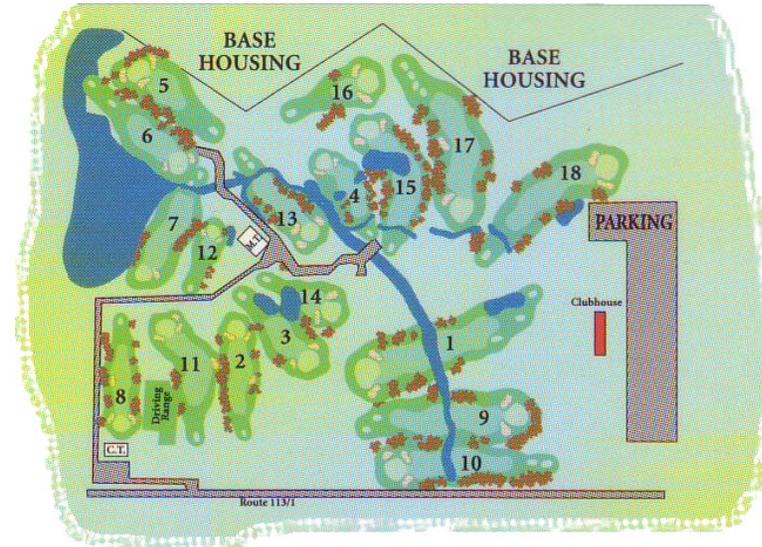
Where do we go from here?

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/>).

Analysis

Course details

Architect	Civil engineering
Year constructed	1950s /1960s
Climate	Warm, humid, tropical
Average annual rainfall	42.7 inches
Average growing season	163 days
Winds/Prevailing Direction	North/East/South
Total Facility Acreage	140
Par	35-35-70
Yardage/Rating/Slope	Back- 6026/68.0/117 Middle- 5676/66.8/113 Forward- 4889/69.4/119
Turfgrass	Ryegrass/Bluegrass
Tees-	Ryegrass/Bluegrass
Fairways-	Poa annua/Bentgrass
Greens	Mix
Roughs-	
Irrigation water source	Non-potable groundwater



Eagle Creek Course Layout

Course description

The team of Eagle Creek Golf Course Director of Golf and superintendent represent one of the great success stories in U.S. Air Force golf. Not only have they endured a number of major changes to their course to include a new clubhouse, which required renumbering of the golf holes, security fencing, new housing fencing and construction, and a complete changeover from ryegrass/bluegrass fairway turfgrass mix to Patriot Bermudagrass, they have somehow increased their rounds and kept their customers. The new clubhouse is extremely nice and the course has never been in better shape. Always a lot of fun to play, Eagle Creek tests the better players while enabling all levels of golfers to recreate in the Delaware “countryside”.

Image removed due to perceived potential security risk.

Eagle Creek Golf Course Aerial Photo

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)



Waterways abound on the Eagle Creek Golf Course.

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



Water quality monitoring wells are seemingly everywhere.



Fuel tank for golf carts complies with applicable regulations.

Overall Management Philosophy & Documentation				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Has installation environmental and golf 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 identified environmental challenges available, used in the environmental management decision-making process, and is it posted for customers?	✓		
5	Are environmental challenges and their management method, target, and objective, and overall golf course GEM program goals evaluated at least annually and are they regularly communicated to employees, customers, management, and the local community?		✓	
6	Are written records of water quality monitoring activities, results, and control measures collected and readily available?	✓		
7	Is there an inventory of bird and mammal species 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 considered prior to their use as part of the course environmental management planning process?	✓		
10	Are records of pest treatments and their effectiveness maintained and used to guide future pest control decisions?	✓		
Point totals for each column		8	2	0

Safety, Training, & Awareness				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are all golf course employees familiar with the principles of the GEM program and are they trained on the importance of environmental compliance with the goals and objectives of the program as it applies to their specific duties?		✓	
2	Are all appropriate employees trained to be familiar with U. S. Air Force, federal, state, and OSHA regulations that apply to the storage, handling, and disposal of all chemicals potentially used on the property?	✓		
3	Are all employees aware of the potential risks to human health and the environment of chemical use, storage, and disposal?	✓		
4	Do all maintenance employees receive documented training on their work duties that may adversely impact on- and off-site water quality and wildlife species and their habitats?	✓		
5	Is a current copy of Material Safety Data Sheets (MSDS) for all chemicals used anywhere on the golf course property maintained and readily available for use by regularly trained employees?	✓		
6	All employees receive regular, documented training on all potential OSHA issues associated with their specific duties?	✓		
7	Are all golf course pesticide applicators active participants in a respiratory and/or pulmonary testing program?	✓		
8	Are all pesticides, fertilizers, and other chemicals 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 planned or recently completed spraying of any chemical or fertilizer that may potentially be hazardous to human health or general public safety?	✓		
10	Are key staff members trained regarding water quality and conservation issues pertinent to the course and their particular duties?	✓		
	Point totals for each column	8	2	0

Compliance				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are the fuel storage/delivery area and associated equipment managed in accordance with federal, state, and local regulations?	✓		
2	Are installation environmental staff members regularly consulted on pertinent course management discussions and plans?	✓		
3	Are there golf course staff meetings where environmental management issues are regularly discussed with all employees?	✓		
4	Do the director of golf and the superintendent attend all internal and external ESOHCAMP in-briefings and out-briefings?	✓		
5	Do the director of golf and/or the superintendent coordinate their input on the various management plans that affect or include the golf course with installation environmental staff?	✓		
6	Have all environmental challenges been physically identified and mapped to aid the golf staff's daily management efforts?	✓		
7	Has appropriate impact analysis (NEPA) been performed on all proposed actions on or affecting the golf course property?	✓		
8	Are oil containers used to collect old oil in good condition and correctly labeled?	✓		
9	Has the golf course staff assisted the installation environmental staff with the required Golf course Environmental Management Plan requirements?	✓		
10	Were there less than two major golf course facility-related findings during the last official ESOHCAMP visit?	✓		
Point totals for each column		10	0	0

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 pest populations that notify management include findings into a report or guide for future use?	✓		
2	Are there written pest profiles of common pest species with a variety of potential control measures including cultural, biological, physical, and mechanical controls prior to treating the problem on the course?	✓		
3	Are there established, documented, and utilized aesthetic and functional thresholds for effective management of pests that may also reduce chemical use?	✓		
4	Is there a specially designed pesticide mixing area where all mixing is performed by appropriately trained personnel?	✓		
5	Has a current list of all pesticides and other chemicals stored or used at the golf facility recently been provided to the appropriate Fire Department(s)?	✓		
6	Is there a written, readily available, and regularly updated Integrated Pest Management Plan for the entire golf course 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); - the pest or purpose for which the pesticide was applied; and the date and place of application.	✓		
9	Is the chemical storage structure/area well ventilated, fire resistant, and locked with access limited to select personnel?		✓	
10	Are there designated and documented "no spray" areas around pond, river, stream, or lake edges and have they been communicated to pesticide applicators?	✓		
Point totals for each column		9	1	0

Pollution Prevention				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there designated and documented "minimally-maintained" or natural vegetative buffer areas around pond, river, stream, or lake edges and have they been communicated to mower operators and pesticide applicators?	✓		
2	Is there a readily available copy of the Installation Spill Plan that includes the golf course facility and is there a spill containment kit at each required location with spill containment procedures in place?	✓		
3	Does the chemical storage area have a sealed metal or concrete floor and are all liquid 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 appropriate pallets or shelves to keep them off the floor?	✓		
6	Do all golf facility employees regularly receive documented and approved HAZCOM and safety and health training?	✓		
7	Are grass clippings removed from 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?	✓		
10	Are appropriate quantities of fertilizers applied during weather conducive to reducing the potential for leaching and runoff?	✓		
Point totals for each column		8	0	2

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 appropriately designated and mapped 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 irrigation system flow meters been installed to monitor water use and detect potential waste?	✓		
6	Has the entire golf course facility property been examined for landfills, critical habitats, threatened or endangered species, wetlands, floodplains, and historical/cultural resources or other environmentally sensitive features?	✓		
7	Are employees encouraged to minimize their trips around the course to conserve on the use of fossil fuels and minimize potentially harmful exhaust emissions?	✓		
8	Do the restaurant and/or snack bar utilize reusable plates and silverware for use by customers throughout the facility’s operating hours?		✓	
9	Have the annual maintenance practices for the officially designated “minimally-maintained” or natural areas been coordinated with the installation Bird/Wildlife Aircraft Strike Hazard (BASH) officer and installation environmental management personnel?	✓		
10	Are all motorized golf course equipment regularly checked for excessive air polluting emissions?	✓		
Point totals for each column		8	2	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 equipment wash or wastewater kept from directly entering surface water and are they recycled or allowed to filter through a vegetative area?	✓		
3	Are outdoor irrigation of non-golf course landscape areas regularly monitored and maintained for leaks and efficient performance?	✓		
4	Has the golf course staff coordinated with the installation’s environmental staff on potential storm water management planning requirements?	✓		
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, natural, or water feature areas?	✓		
6	Are all water feature maintenance tasks coordinated with the installation Bird/Wildlife Aircraft Strike Hazard (BASH) officer and installation environmental management personnel?	✓		
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 that pass through the golf course such as streams or creeks regularly monitored both upstream and downstream of the course for overall water quality?	✓		
9	Does the facility have an approved written and readily available Drought Management Plan if, or when irrigation restrictions may be required by the community or the installation?			✓
10	Is there a comprehensive, up to date, and readily available written Water Resource Management Plan for the entire golf course facility?		✓	
	Point totals for each column	8	1	1

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 such as Integrated Pest Management, Tree Management, and Hazard Communication?	✓		
3	Are green, tee, and fairway mowing heights maintained at reasonable levels that do not unduly stressing turf or requiring additional chemical inputs?	✓		
4	Are there regular and documented procedures in place to continually improve overall course soil health such as topdressing, organic amendments, aeration, and drainage improvements?	✓		
5	Is there an up to date and readily-available map of the course's "hot spots", or those areas requiring special care or regular attention?			✓
6	Is all maintenance equipment maintained and cleaned in a manner that minimizes or eliminates the potential for spreading of pest or disease contamination?	✓		
7	Has there been a complete examination of all aspects of the golf course facility operation (including the snack bar and grill, clubhouse, pro shop, cart storage facility, and maintenance complex) for potential negative environmental impacts?	✓		
8	Is contour mowing used to conserve fuel and increase playability and aesthetics?	✓		
9	Have all playing surfaces been inventoried and mapped to identify potentially challenging soil types?		✓	
10	Are soil tests and/or plant tissue analysis used to determine nutritional requirements?	✓		
Point totals for each column		8	1	1

Customer Relations & Education				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are the course manager and superintendent involved in an on-going and documented customer environmental management educational program?			✓
2	Is there a highly visible location at the course or clubhouse where golf course environmental management notices and informational messages are regularly posted for the education and enjoyment of customers?			✓
3	Do the course manager and superintendent actively communicate with customers to determine their points of view?	✓		
4	Is there documented, communication by course management with installation civil engineering, environmental, and leadership on GEM program issues or concerns?	✓		
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 around or near recycled or otherwise non-potable water?			✓
8	If applicable, have areas of the course been designated "Environmentally Sensitive Zones" per USGA rules?	✓		
9	Are course staff members regularly trained on how to improve their dealings with customers?	✓		
10	Are there clinics provided to teach beginning golfers the basics of the game to include the rules as well as the environmental challenges faced by the golf staff at their facility?	✓		
	Point totals for each column	6	0	4

Miscellaneous Special Projects & Activities				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there project(s) planned and funded for execution in the near future that would demonstrate the compatibility of the course's management methods with GEM program initiatives?	✓		
2	Are there project(s) 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?			✓
4	Are there regular field trips hosted at the course for local students or other community groups?			✓
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 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	5	1	4

ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	8	2	0
2	Safety, Training, & Awareness	8	2	0
3	Compliance	10	0	0
4	Pesticide Use, Storage, & Handling	9	1	0
5	Pollution Prevention	8	0	2
6	Conservation Practices	8	2	0
7	Water Resources	8	1	1
8	Maintenance Practices	8	1	1
9	Customer Relations & Education	6	0	4
10	Miscellaneous Special Projects & Activities*	5	1	4
	Composite point total/response percentage	78	10	12

Sep 07 - Eagle Creek Golf Course, Dover AFB, DE

- Actual ECQ (# of “Yes”) = 78 (“**Yellow**” Showing progress)

- Potential ECQ (Actual ECQ plus “Partial”) = 88 (“**Yellow**” Showing progress)

* = Category requires improvement or attention

Environmental challenges

One of the important results of the GCEBA process is the identification of potential environmental challenges to be addressed in the long-term GEM Planning process. After determining the relative significance and validation of each potential environmental challenge, the installation golf and environmental staffs should determine the set of final challenges that will be actively managed in the GEM Plan. Armed with the list of final environmental challenges, the golf staff should determine the best management approach that satisfies the goals of the golf facility from the course playability and customer satisfaction perspectives. Then the golf staff's preferred management approach should be coordinated with the installation's environmental staff for refinement, coordination, and approval.

Ultimately, the combined environmental and golf staff team should proceed toward finalizing the GEM Plan. The entire process can be viewed at the AFCEE GEM website (<http://www.afcee.brooks.af.mil/ec/golf/>).

The following environmental challenges were identified during the GCEBA process conducted June 2002 at Eagle Creek Golf Course, Dover AFB, DE:

- Watersheds, wetlands, floodplains, & water quality management
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Threatened & endangered species
- Air quality
- Water use

- Biodiversity enhancement
- Installation Restoration Program (IRP) sites
- Pest management



Professional character and quality of the new clubhouse finally matches that of the Eagle Creek Golf Course staff.

FINAL ENVIRONMENTAL CHALLENGES

The following final environmental challenges were identified during the GEM Plan process:

- Wetlands, floodplains & water quality
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Air quality
- Environmental Restoration Program (ERP) sites
- Cultural resources
- Leased golf course property acreage

Image removed due to perceived potential security risk.

Eagle Creek Golf Course Environmental Challenges



Water related topics are the primary challenges for Eagle Creek.

WETLANDS, FLOODPLAINS & WATER QUALITY

Just about every golf course has water related issues. Eagle Creek deals with several related specifically to water quality management to include pollution prevention, floodplain management, wetland protection, and irrigation supplies. The protection of the watershed and connected water bodies are among the most important environmental challenges for Dover AFB managers. The Eagle Creek Golf Course is the owner of the only designated floodplains on Dover AFB. Regeneration of the woodland buffers around wetlands area is desired.

There are three large watersheds draining Dover AFB. One of these watersheds drains to the Golf Course Tributary that crosses the property draining

into the St. Jones River and, eventually, the Delaware Bay. The St. Jones River receives drainage from 907 acres from buildings, parking areas, and the golf course.

Although there are no naturally occurring ponds on Dover AFB, the golf course has at least 5 small water bodies that support grass carp and turtles. There is also a wet meadow that was created by Dover AFB to satisfy stormwater management requirements associated with outfall 007 (the James Bond outfall).

According to the superintendent, “The creek was redesigned for improving the water quality leaving the golf course and entering the Jones River. The only maintenance needed is trash removal and some sort of algae prevention which is limited because of the fact that the water runs downstream into the Saint Jones River, so an algaecide treatment is not feasible. The water quality is tested monthly by CE.

No fertilizer or pesticides are applied within 20 yards of the ditch. A no mow area of around 10 feet is maintained along the ditch. Some sort of dredging will need to take place soon because of over growth limiting the flow of water off the property in severe heavy rains. Unfavorable conditions are reported to CE environmental.”

Driver/requirement

- Clean Water Act
- National Pollutant Discharge Elimination System
- Delaware Nutrient Management Program



Small quantities of pesticides are being used at Eagle Creek.

Objective

Ensure that all water bodies are not subject to pollution from any golf course management practice.

Management Practices

- Continue to manage pesticide and fertilizer application buffers around all water bodies
- Utilize slow release fertilizers whenever appropriate

Target

Virtually eliminate the potential for degradation of the water resources at Eagle Creek Golf Course by establishing, documenting, and communicating all pesticide and fertilizer application buffers to appropriate personnel prior to the end of the year.



Wetlands and flooding are part of the St Jones River system.

BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH)

Since Dover AFB is close to large migratory routes and over wintering sites, BASH has been a long-time concern. The state-operated Ted Harvey Wildlife Area encompasses the St. Jones River corridor adjacent to the golf course. This river corridor acts as an attraction to several and diverse species of animals and birds. Birds of primary concern include Canada geese, snow geese, sea gulls, and flocks of starlings and blackbirds.

Driver/requirement

- Dover AFB Instruction 91-12, Dover AFB Bird Aircraft Strike Hazard (BASH) Program, Sep 07

Objective

In direct support of the Dover AFB mission, the Eagle Creek golf staff shall continue to cooperate and assist installation environmental management staff with BASH reduction efforts.

Management Practices

- Coordinate pond and stream maintenance procedures with installation environmental management staff
- Install only BASH-approved plant material listed in the INRMP
- Secure membership on BASH Working Group and attend all meetings

Target

Eliminate 25% of the BASH conditions on Eagle Creek Golf Course prior to the next Dover NRMP.



Water bodies of all shapes, types, and sizes abound in Delaware.

AIR QUALITY

Dover AFB is located in a region of severe non-attainment for ozone. This designation is largely driven by large quantities of volatile organic compounds (VOCs), a precursor of ozone pollution, used in maintaining its aircraft operations.

Driver/requirement

Clean Air Act, Early Action Compact

Objective

Minimize or eliminate excessive emissions from golf course equipment, vehicles, and equipment care.

Management Practices

- Replace older equipment when funding allows
- Encourage employees to minimize their trips on and around the course
- Ensure equipment cleaning solution containers are closed at all times
- Eliminate all aerosols from maintenance and clubhouse inventories
- Replace 2-cycle powered equipment as funding and technology allow
- Prepare policy to alter maintenance staff work plans during announced regional air quality health alert days

Target

- Perform scheduled annual engine overhauls and regular equipment maintenance as necessary to minimize or eliminate excessive exhaust emissions



Monitoring sites are evidence of something lurking down below.

ENVIRONMENTAL RESTORATION PROGRAM (ERP) SITES

Landfills seem to occur under nearly every U.S. Air Force golf course. Eagle Creek is no exception as it includes LF18 and LF25. Two landfills that have been identified as the source of contamination to both groundwater and soil. LF18 was partially excavated in 1998 to remove an area of hazardous contaminants. Landfill debris, primarily construction refuse, is still present underneath the turf at LF18 and LF25.

An old fire training area adjacent to the Golf Course Tributary was also identified, but has been completely remediated. Groundwater contamination underneath

the golf course is currently being remediated and monitored.

Land use controls required to ensure protection of public health include prohibitions on use of groundwater from the Columbia Aquifer, maintenance of the turf covers over the landfills to prevent exposure to landfill contents, and prohibitions on digging and other ground-disturbing activities that could disturb landfill contents.

Driver/requirement

- CERCLA/RCRA

Objective

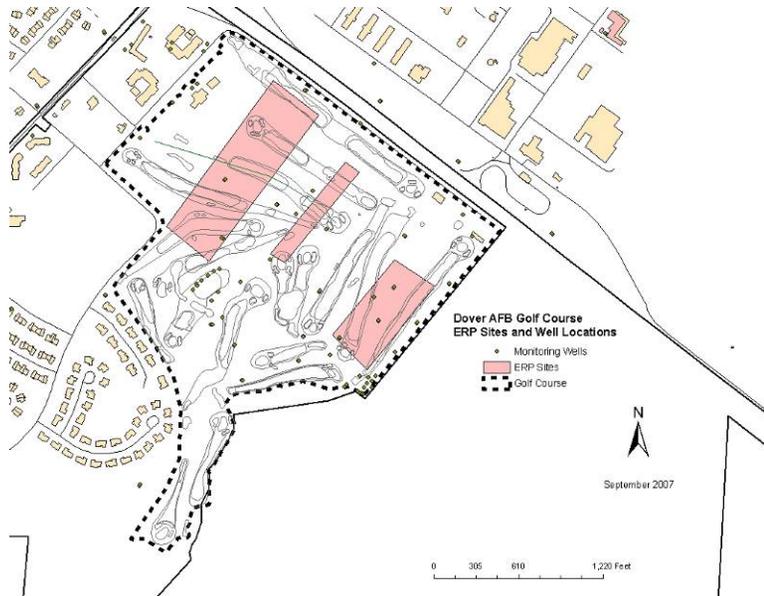
Comply at all times with the prescribed land use controls provided by the installation environmental manager.

Management Practices

- Comply with formal land use controls, if any
- The golf course staff will continue to coordinate all digging activities with appropriate installation environmental staffers

Target

Consult with installation environmental and historical staff prior to initiating any significant changes to management practices.



CULTURAL RESOURCES

According to the Integrated Cultural Resource Management Plan (ICRMP), there are archaeological sites on or near the golf course. The first is Site 7K-D-5. This site “is located on a terrace above the St. Jones River in the southwestern corner of the base. A drainage, which may represent the remnants of a former stream channel, forms the eastern boundary of the site, and the stream confluence with the St. Jones River at the southern end of the site. Data regarding the nature of the site, the period(s) of occupation, etc. are not available on the Delaware state site form. The form merely indicates that the site is prehistoric and that the site was destroyed by 1965”.



One of the identified cultural resource areas is nearby the 5th green.

Testing in the vicinity of Site 7K-D-5 was accomplished through the systematic excavation of STPs in the southeastern portion of the Eagle Heights Housing Area. A total of 7 STPs produced prehistoric artifacts. STP profiles in this part of the housing area and the golf course did not identify any intact portions of the site within the developed portion of the base housing, or in landscaped portions of the golf course. Intact, artifact bearing soils were found only at the southeastern periphery of base property near the St. Jones River, and within the golf course in the vicinity of the few trees that predate the course. Despite the apparent lack of integrity of the site, it is possible that some significant data still remains in portions of the site.

The eligibility of the untested remainder of the site is unknown. Because of this, avoidance or Phase II evaluation of the remainder has been recommended.

The other site is 7K-D-135 which “was identified in 1998 during shovel-testing on the golf course (HQ AMC 1999), which is located directly east of the Eagle Heights Housing Area south of Lebanon Road. The site is located on the opposite bank (i.e., left bank) and upstream from Site 7K-D-5. This site included three positive shovel tests, producing lithic flakes and fire-cracked rock. These positive tests were located within a small wooded area that was not disturbed during construction of the golf course. Tests excavated in the other portions of the golf course indicated that the landscape was heavily modified during construction.

Given the small size of the area containing relatively intact deposits, it is unlikely that this site has the potential to contain significant information. This site is recommended not eligible for the NRHP, and the SHPO has concurred with that determination”.

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 Practices

- Regularly consult with installation cultural resource manager to ensure constant compliance with the CRMP

Target

No negative impacts to cultural amenities shall be attributed to the golf course staff or its management practices.



Eagle Creek is one of the most aesthetic courses in the U.S. Air Force.



The new clubhouse has proven to be an asset to the facility overall.

LEASED GOLF COURSE PROPERTY ACREAGE

According to the ICRMP, there are 10.5 acres of the golf course that are leased. No other information on this topic has been provided.

Driver/requirement

- Long term viability of the golf course operation on this property

Objective

Ensure that property lease is intact at all times.

Management Practices

- Ensure that the lease on the golf course land is kept updated and intact at all times

Target

Secure a long-term lease for the property.

GEM Plan goals & objectives

Goals are defined as actions or results that should be accomplished in the next year. A detailed description of these should be inserted here.

- Continue to protect the environment through the use of the new recycle wash and fill station, and closely monitor all practices that may contaminate the environment, including pesticide applications
- Create a place to post GEM information like the environmental policy statement and the Environmental Challenges map in a highly visible location in the clubhouse
- Train all employees on the principles of the GEM program the importance of environmental compliance with the goals and objectives of the program as it applies to their specific duties

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

- Dredge main creek beds to enable runoff to proceed downstream
- Continue monitoring water quality, and identify practices to improve water quality
- Compile and implement a Water Resource Management Plan that includes a Drought Management Plan for the entire facility

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.

- Restore degraded habitats, such as eroded slopes around irrigation pond, and areas overrun with exotic species
- Keep the trash cleaned in habitat areas
- Follow the BASH program to ensure that we are using only local plants that are natural to Delaware, and meet the requirements for flight safety



Non-appropriated funds are fixing pesticide compliance issue.



Conclusion

The Civil Engineering Squadron's unit environmental coordinator program should provide the key oversight to assist in improving the ability of the golf and environmental staffs to work together to better support the installation mission. In addition, conserving precious water supplies through the application of science, engineering, and demonstrated environmental stewardship may be the only other major issue facing the installation's environmental and golf staff members.

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 within the limited budget and support of the mission.



Wet meadow project site.



Duckweed detracts from the aesthetics of this water feature.



The recently completed clubhouse has proven to be a good investment.



Maintenance is getting a compliant pesticide mixing & storage area



Eagle Creek is well-maintained and a lot of fun to play.



New security fence along the 6th greatly diminished its quality.



The course maintains these insect traps along the St. Jones River fence



Louvered wall design limits utility of cart storage facility.



Eagle Creek features bentgrass greens and Bermudagrass fairways.



Clubhouse snack bar does a brisk business during lunch.



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**Air Force Center for Engineering & the Environment
Technical Directorate
Natural Infrastructure Division**

For additional assistance or more information, please contact:
U.S. Air Force GEM Program Manager – 210-536-3719 - DSN 240-3719
AFCEE/TDN, 3300 Sidney Brooks, San Antonio, TX 78235-5112
afcee.td.awag@brooks.af.mil?subject=golf

Please visit our Golf course Environmental Management (GEM) Program website:
<http://www.afcee.brooks.af.mil/ec/golf/>