



***Eglin Golf Courses***  
**Environmental Baseline Assessment**  
**Eglin AFB, FL      May 05**



# 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, 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 Compatibility Quotient

Actual ECQ	78
Potential ECQ	90

## Potential environmental challenges

The following environmental challenges were identified during the GCEBA process:

- Threatened & endangered species
- Cultural resources
- On-course drinking water
- Water quality/stormwater management
- Greens renovation project
- Invasive species

## Where do we go from here?

After confirming the environmental challenges (EC), the golf course staff should compile their preferred management approach to each in the context of their long-term goal of providing the best golfing experience for their customers. These management approaches must then be coordinated with installation environmental managers. Finally, the combined environmental and golf staff team should proceed toward finalizing the GEM Plan. The entire process is summarized on the AFCEE GEM program website (<http://www.afcee.brooks.af.mil/ec/golf/>).

# Analysis



## Eagle Course details

Architect	Unknown
Year constructed	1923
Climate	Humid/coastal
Average annual rainfall	70 inches
Average growing season	Approx. 210 days
Total Facility Acreage	850± ac
Par	36-36-72
Yardage/Rating/Slope	Blue- 6567/72.9/137 White- 6316/71.2/132 Gold- 5511/67.6/124 Red- 5158/70.1/121
Turfgrass	419 Bermudagrass
Tees-	Tifdwarf Bermudagrass
Fairways-	Tifdwarf Bermudagrass
Greens-	Common/mixed
Roughs-	

# Course descriptions

## THE EAGLE COURSE

Originally constructed as an alleged winter retreat for Al Capone and his friends as the Chicago Country Club of Valparaiso, the Eglin Eagle Course has provided quality recreation for over 80 years. The most surprising attribute of the courses at Eglin is the continuous rise and fall of the land. It is hard to find this much topographic relief any where in the state of Florida. The Eagle Course is a joy to play as it gracefully embraces a large lake on several holes. Equitable for all levels of golfers, the course can yield low scores to the able and aggressive player. Despite high customer satisfaction, Eglin’s Director, John Elkins, has the greens are slated for renovation.



Natural water features and dramatic elevation changes are the norm.

## THE FALCON COURSE

The Falcon is Eglin’s newest course and just might be the most popular with regular customers. Relatively recently added, the Falcon course inhabits similar terrain as its sister course. Rather than large bodies of water there are streams that are home to the endangered Okaloosa darter. The course recently added a large irrigation pond which has improved aesthetics and increased the challenge for golfers while reducing overall environmental impacts to the sensitive Florida panhandle ecosystem in which Eglin AFB resides. It is a testimony to Paul Wargo and his maintenance staff that both installation and local environmental professionals are pleased with the current situation at Eglin golf courses.



The Falcon Course



The 4<sup>th</sup> on the west course borders the installation’s active runway.

## Falcon Course details

Architect	Not available	
Year constructed	1973/1984	
Par	36-36-72	
Yardage/Rating/Slope	Blue- 6864/73.0/140 White- 6182/70.6/132 Gold- 5703/68.4/128 Red- 5175/71.1/130	
Turfgrass	Tees-	419 Bermudagrass
	Fairways-	Tifdwarf Bermudagrass
	Greens-	Tifdwarf Bermudagrass
	Roughs-	Common/mixed



**Eglin Golf Courses 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).



*The great blue heron is just one of the many majestic birds that call the Eglin Golf Courses home.*

## 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



Eglin Golf Courses have the best environmental signage observed.



New irrigation supply pond and pump house on the Falcon Course.

<b>Overall Management Philosophy &amp; Documentation</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Has management demonstrated that the environment is an important part of their responsibilities by initiating the 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 such as landfills, threatened or endangered species habitat, restoration sites, floodplains, etc. used in the environmental management decision-making process and is it posted for customers?		✓	
5	Environmental goals, objectives, challenges, 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?	✓		
	<b>Point totals for each column</b>	<b>7</b>	<b>2</b>	<b>1</b>

<b>Safety, Training, &amp; Awareness</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	All employees are familiar with the GEM program and are trained on the importance of environmental compliance with the goals and objectives of the program as it applies to their duties?		✓	
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 documented, regular training on all potential OSHA issues associated with their duties?	✓		
7	Are all golf course pesticide applicators active participants in a local respiratory and pulmonary testing program?	✓		
8	Are 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 day's planned or recently completed spraying of any chemical or fertilizer that may be hazardous to human health or public safety?			✓
10	Are key staff members trained regarding water quality and conservation issues pertinent to the course and their particular duties?	✓		
	<b>Point totals for each column</b>	<b>7</b>	<b>2</b>	<b>1</b>

<b>Compliance</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are fuel storage/delivery area and equipment managed in accordance with federal, state, and local regulations?	✓		
2	Are installation environmental staff members included in pertinent, on-going course management discussions and plans at scheduled meetings?	✓		
3	Are there golf course staff meetings where environmental management issues are regularly discussed?	✓		
4	Do the director of golf and the superintendent attend ESOHCAMP in-briefings and out-briefings?	✓		
5	Do 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 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?	✓		
	<b>Point totals for each column</b>	<b>8</b>	<b>1</b>	<b>1</b>

<b>Pesticide Use, Storage, &amp; Handling</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
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 current 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? <ul style="list-style-type: none"> <li>- the quantity of each pesticide used</li> <li>- the chemical or common name of the active pesticide ingredient(s) (not the product name)</li> <li>- the pest or purpose for which the pesticide was applied</li> <li>--the date and place of application.</li> </ul>	✓		
9	Is the chemical storage structure/area locked, well ventilated, fire proof, and is access limited to select personnel?	✓		
10	Are food storage and prep areas properly cleaned to reduce the likelihood of pest infestations and required pesticide applications?	✓		
<b>Point totals for each column</b>		<b>8</b>	<b>1</b>	<b>1</b>

<b>Pollution Prevention</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are there designated and documented "minimally-maintained" or natural areas (other than ponds) and "no spray zones" and vegetative 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 there 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 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 available on a regularly updated map 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?	✓		
	<b>Point totals for each column</b>	<b>6</b>	<b>3</b>	<b>1</b>

<b>Conservation Practices</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
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 maintenance practices for designated “minimally-maintained” or natural areas been coordinated with the installation Bird/Wildlife Aircraft Strike Hazard (BASH) officer and environmental management personnel?	✓		
10	Are all motorized golf course equipment checked regularly for excessive air polluting emissions?	✓		
<b>Point totals for each column</b>		<b>8</b>	<b>1</b>	<b>1</b>

<b>Water Resources</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
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 (BASH) 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	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 and appropriate installation environmental staff members for direction and action?	✓		
	<b>Point totals for each column</b>	<b>7</b>	<b>2</b>	<b>1</b>

<b>Maintenance Practices</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
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, 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 and documented procedures in place to continually improve soil health such as topdressing, organic amendments, aeration, and drainage?	✓		
5	Is there a regularly-updated and readily-available 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?	✓		
	<b>Point totals for each column - Response percentage</b>	<b>9</b>	<b>1</b>	<b>0</b>

<b>Customer Relations &amp; Education</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are the course manager and superintendent involved in a regularly updated, documented, and on-going customer 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 around or near recycled or otherwise non-potable water?	✓		
8	Are there interpretive signs posted to highlight key habitats or have appropriate areas been designated "Environmentally Sensitive Zones" per USGA rules?	✓		
9	Are course staff members trained regularly on how to improve their dealings with customers?	✓		
10	Are there clinics provided to teach beginning golfers the basics of the game and to teach all levels of golfers the rules of the game?	✓		
	<b>Point totals for each column</b>	<b>10</b>	<b>0</b>	<b>0</b>

<b>Miscellaneous Special Projects &amp; Activities</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are there projects planned and funded for the 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?			✓
	<b>Point totals for each column</b>	<b>8</b>	<b>0</b>	<b>2</b>

## ECQ Summary

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

### GCEBA Results

#### \* Eglin Golf Courses, Eglin AFB, FL

- Actual ECQ (# of "Yes") = 78 "Showing progress"

- Potential ECQ (Actual ECQ plus "Partial") = 90 "Getting there"

## Potential environmental challenges

One of the important results of the GCEBA process is the identification of potential environmental challenges (ECs) to be addressed in the long-term GEM Planning process. After confirming each EC, the golf staff will determine the best management approach that will satisfy the goals of the golf facility from the course playability and customer satisfaction perspectives first. 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 potential environmental challenges were identified during the GCEBA process:

- Threatened & endangered species
- Cultural resources
- On-course drinking water
- Water quality/stormwater management
- Greens renovation project
- Invasive species



*The Okaloosa darter is one of many species inhabiting Eglin's streams.*

## THREATENED & ENDANGERED SPECIES

In contrast to many environmental stories dealing with golf courses and their management, the Eglin Golf Courses can hold their collective heads high. The Falcon Course is bisected by Mill Creek, home to the endangered Okaloosa darter. Efforts by Wargo and his staff to ensure that pesticide and fertilizer application buffers have been established and utilized have been successful for this species that "lives only in six fresh water creeks of Okaloosa County and nowhere else in the world". The darter is recovering and may be headed for downlisting or delisting from endangered species lists. Working with the U.S. Fish and Wildlife Service, installation environmental staffers are poised to claim victory for the darter. Further work is planned that will affect the course.

In addition, the courses provide habitat for the red-cockaded woodpecker, gopher tortoise, Sherman's fox squirrel, Florida black bear, alligator snapping turtle, green sea turtle, loggerhead sea turtle, Ashe's magnolia, golden aster, panhandle lily, Gulfcoast lupine, yellow fringed orchid, orange azaleas, and whit-topped pitcher plant.



*Somewhere in the vicinity of the Eagle's 17<sup>th</sup> tee is a historical site.*

## CULTURAL RESOURCES

The lands now occupied by the Eglin Golf Courses have been in use for hundreds of years. After consulting with the installation archaeologist, Mark Stanley, at least the Eagle Course had not been recently evaluated for potential cultural sites. It is known that there was once a lumber operation near the current 17<sup>th</sup> teeing area that may have historical

significance. Mr. Stanley agreed that a scheduled complete site evaluation of the Eagle Course should be finalized soon in light of the pending greens renovation project.



*Although coolers make for a fine educational opportunity, the quality of the water and health and safety of Eglin's customers have raised concern from the golf management staff.*

## ON-COURSE DRINKING WATER

One of the few situations not up to snuff with Paul Wargo is his concern for the quality of drinking water provided for his customers. Currently Wargo and his staff fill and distribute 22, 10-gallon coolers weighing in at a hefty 88 pounds each when filled with water and ice. Based on the tragic occurrence in Glendale, AZ several years ago where a young golfer died from drinking water from a similar device, Wargo believes something must be done to ensure the safety and

health of Eglin's golfers as well as the risk borne by his staff. A potential fix that Wargo had already initiated was to install potable water lines and fountains. Further study may be required to determine the best, long-term course of action.



*Retaining walls at the Falcon's 9<sup>th</sup> hole will require engineering, environmental, and golf expertise and coordination.*

## **WATER QUALITY/STORMWATER MANAGEMENT**

Diligent management of stormwater and the quality of a course's water features are always a prime consideration of environmentally-sensitive superintendents. Paul Wargo is wary of the potential impacts he and his staff may have on the natural resources of the area. Every aspect of his maintenance program is examined for

appropriateness and correct timing and delivery prior to taking action in the field. With the many animals living on the course and relying on the quality of the waters, not discounting the Okaloosa darter, Wargo's maintenance procedures are based on doing what is best for both the environment and the courses. A great example of where this attitude comes to fruition will be the repair of retaining walls in front of the Falcon Course's 9<sup>th</sup> hole. Every expertise required to rectify the situation has or will be taken to protect the water quality of the stream just downhill of the project.



*The Falcon's 9<sup>th</sup> hole is a par three over one of the Okaloosa darter streams. Minimal impacts from erosion and runoff from reconstruction and long-term maintenance are paramount.*

## GREENS RENOVATION PROJECT

The Eagle Course has been identified as a candidate for a greens renovation project that may be started as soon as early FY06. Working with the installation environmental staff, the Director of Golf and his staff will need to complete an AF Form 813 to initiate the environmental impact analysis process. They also will need to have prepared a Stormwater Pollution Prevention Plan prior to construction beginning on the much needed project. Mitigative or restrictive instructions may have to be included in the design and construction package statement(s) of work depending on the conclusions of these two studies.



*Some of the greens at the Eagle Course are small and difficult to maintain due to poor drainage and soil quality. Renovation should eliminate or minimize potential impacts of pesticide and fertilizer applications as a result of building USGA greens.*



*Control or elimination of invasive species is a federal policy, a Florida initiative, and a priority of Eglin's natural resources managers.*

## INVASIVE SPECIES

Many of our favorite plants are not native to where we live. Some of these plants (and animals too) are so good at adapting to their surroundings that they have out-competed native species. These exotics become invasive when they are fast growing, have tasty fruits, or are particularly attractive in the landscape. Several exotic invasive species of note include Chinese tallow, melaleuca, Brazilian pepper, cogongrass, Japanese climbing fern, hedge privet, honeysuckle, lantana, nandina, china berry, and camphor trees. The golf course staff should ensure that none of these species are used in landscape development projects. They also should consult with installation natural resource managers to see how they may be able to assist their efforts.



## Conclusion

Director of Golf, John Elkins is in an enviable position. Having a great golf facility to “work” at each day is only the icing. The real cake is living in such a wonderful community that truly appreciates and supports the Air Force mission. With thousands of retirees in the area there should always be plenty of customers lining up to play one of the Eglin courses. When Elkins and his Supervisor of Maintenance, Paul Wargo, are done rebuilding the greens at the Eagle Course, they may very well be the stewards of the best facility in the U.S. Air Force inventory. Two other facts will nearly guarantee the brightness of Eglin Golf Courses’ future: the course is located off the main base allowing easy access and the exemplary working relationship between the Eglin’s environmental professionals and the golf staff.

## 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.



*Tree damaged by 2004 storms are still abundant in out of play areas.*



*Another example of Eglin’s superior signage....*



*The Falcon Course was sensitively designed and constructed.*



*The Eglin Courses are rife with sensitive water features..*



*Erosion problems on the 1st at the Falcon Course.*



*Superior conditioning is the standard at the Eglin Golf Courses .*



## Bibliography

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

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

Boehm, Rick, HQ AFSVA, Eglin AFB Golf Course Staff Assistance Visit, "Maintenance Report, Eagle & Falcon Golf Courses", 8-12 March, 2004.

Air Armament Center, Environmental Management Directorate, Natural Resources Branch, *The Okaloosa Darter*, brochure, undated.

Jacobson, Dr. S.K. and Marynowski, S.B., *Eglin Ecosystems and Eglin Wildlife*, Dept of Wildlife Ecology and Conservation, Univ. of Florida, brochures, undated.

Eglin Natural Resources Branch, "An Ounce of Prevention is Worth a Pound of Cure", "Exotic Plants", and "Wild Hogs", Eglin Fact Sheets, undated.

Air Armament Center, Environmental Management Directorate, Natural Resources Branch, Integrated Natural Resources Management Plan, Eglin Air Force Base, Florida, February 2002.

Wargo, Paul, Eglin Golf Course Supervisor of Maintenance, "Golf Course Integrated Pest Management Plan" and "Eglin AFB Golf Course Maintenance/IPM Program, 2005 thru 2006", undated.





**Air Force Center for Environmental Excellence  
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Environmental Science Division**

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