



***Gator Lakes Golf Course
Environmental Management (GEM) Plan
Hurlburt Field, FL***



June 2011



San Antonio, Texas



Gator Lakes Golf Course Environmental Management Policy

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

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Executive Summary

U. S. Air Force GEM Program

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

Armed with the support and approval of the Air Force Services Agency golf program, AFCEE's goal is to facilitate the creation of an environmentally friendly golf course facility while supporting the installation mission. Chapter 11.4 of AFI 32-7064 requires a GEM Plan as part of the Integrated Natural Resources Management Plan (INRMP).

GEM Program process

There are five steps in the GEM program process:

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

Environmental Compatibility Quotient (ECQ) scores

The following is the summary of the environmental compatibility quotient (ECQ) scores for the site visit conducted in June 2011:

- **Actual ECQ = 79, Showing progress (Yellow)**
- **Potential ECQ = 89, Showing progress (Yellow)**

Environmental challenges

The following environmental challenges were identified in compiling this document:

- Water supply
- Wetlands
- Tree management
- Invasive species
- Proposed new road project
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Protected species
- Floodplains
- Installation Restoration Program (IRP) sites
- Erosion/storm water quality

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/>).



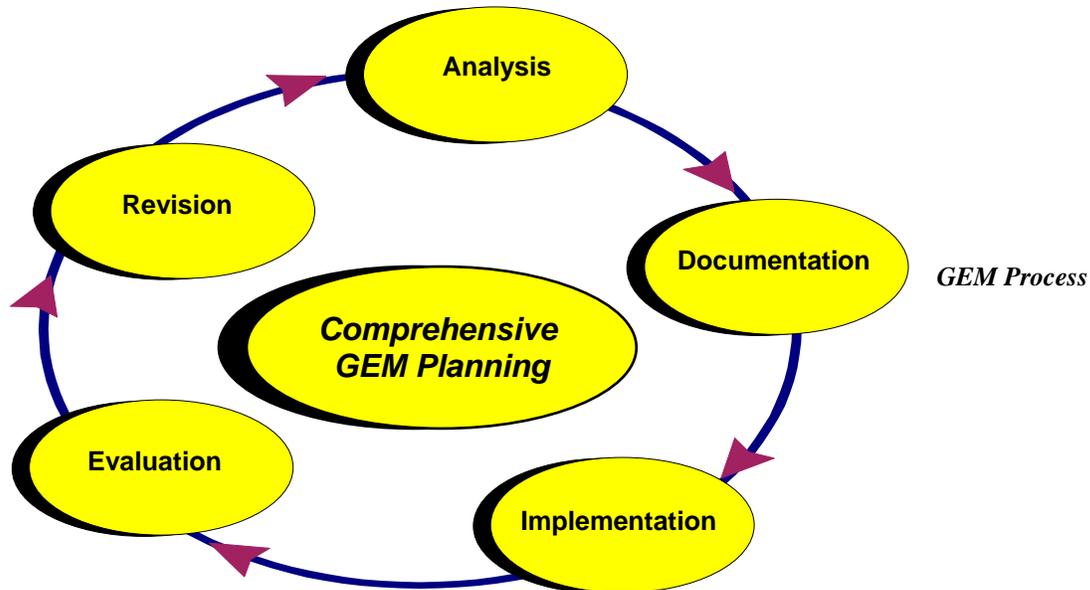
*Gator Lakes
Golf Course
Hurlburt Field, FL*

The course is not the only challenge faced by Gator Lakes' customers.

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

The GEM Initiative

The goal of the GEM initiative is to facilitate the creation of an environmentally friendly approach to golf course management while protecting and promoting the great game of golf. AFCEE is dedicated to helping to identify ways that more rounds can be played on better-conditioned courses while minimizing or eliminating negative impacts to the environment. The comprehensive GEM planning process is the vehicle to document our successes while communicating directly with our customers, commanders, and local community.



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

GEM Process

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

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

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

Analysis

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

The site assistance visit accomplishes several important activities to include:

- Site visit, interviews, and data collection
- Course specific analysis & miscellaneous facility review
- Compilation of the environmental compatibility quotient checklists
- Identification of potential environmental management challenges

Documentation

It is not enough just to know how to create a successful golf course environmental management program. There must be a written record documenting existing site data, maintenance practices, pesticide applications, and other historical golf course activities. By documenting what we know, we will be able to determine how to make better decisions in the future.

The completed GEM Plan will assist in the daily management of the course while providing a convenient vehicle to communicate to the community and customers alike the environmental issues that challenge golf course managers as well as their plans to deal with them. In order to reach established environmental stewardship goals the golf course staff must consistently employ only those management practices that minimize or eliminate potential negative impacts to the environment.

GEM PLAN COMPONENTS

The GEM Plan will be comprised of the following components:

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



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The Gator Lakes greens were recently renovated and topped with salt-tolerant paspalam turfgrass.

Implementation

Positive and decisive action is the only true measure of the success of the GEM Plan. By implementing new practices, both the golf staff and their customers will benefit. The installation golf staff should consider adopting the GEM Initiative process and establish an environmental policy that minimizes or eliminates any and all potential negative environmental impacts.

Evaluation

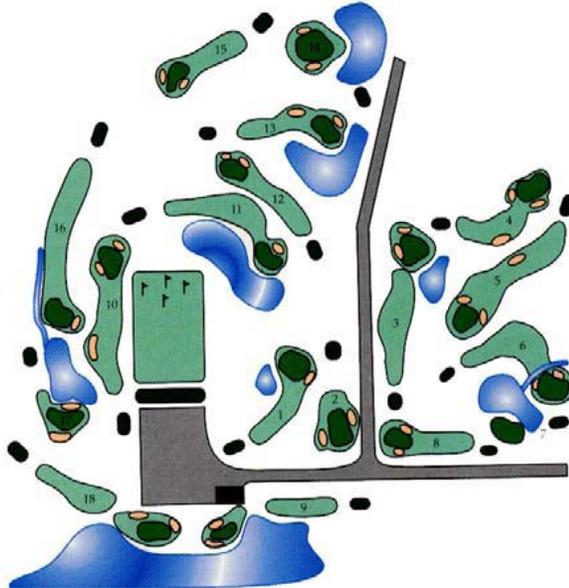
In order to ensure the highest quality of customer service and environmental stewardship, there must be continual self-evaluation and improvement. There also should be consistent, on-going measurement of the reduction or elimination of environmental impacts the newly implemented practices have on the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

Revision

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

Course Specific Analysis

One of the most important tasks in the initial phase of the GEM process is the course specific analysis. From a general description of the course to the details of the course's history and makeup to the various observations on course playability, aesthetics and style of management, the course specific analysis establishes and communicates the context for the rest of the GEM Plan report.



Gator Lakes Golf Course Layout Map

*Gator Lakes
Golf Course
Hurlburt Field, FL*

Course Description

Blessed with a wonderful site on the far northeastern edge of the installation, Gator Lakes Golf Course is a top-notch Air Force golf facility. Featuring newly renovated greens and all of the desired amenities, Hurlburt Field's customers are able to enjoy one of the best values in the military. Gator Lakes features two distinctively different nines. The original course, or the outward nine, was designed and built in-house and features a minimalist approach with very little soil being moved during construction.

Built roughly ten years later, the inward nine is an example of more modern golf course construction style. Greens and fairways are much larger with significant manipulation of the native contours resulting in greater flexibility in pin placements.

Overall, the Gator Lakes Golf Course is a lot of fun for all levels of players. There is sufficient challenge for the low handicappers yet beginners should not be overly intimidated during their round. High quality turf and the desire to continually improve the golfing experience are testament to the continued success at Hurlburt Field.



Gator Lakes Golf Course, Hurlburt Field, FL



*Gator Lakes
Golf Course
Hurlburt Field, FL*

The course is separated from the mission facilities by a large water feature and the seemingly endless installation wetlands.

Course Details

Architect	Red Horse & Civil Engineering
Year constructed	Front-1976, Back-1986
Climate	Hot and humid subtropical
Average annual precipitation	~62 inches
Average growing season	~275 days
Elevation	Just above sea level
Prevailing wind direction	North/south
Total facility acreage	220 acres
Total actively maintained acreage	120 acres
Par	36-36-72
Yardage/Rating/Slope	CV-22 - 6768/73.3/128 AC-130 - 6241/70.4/126 MH-53 - 5126/70.5/117
Turfgrass	Common Bermudagrass / Tifway 419
Tees-	Common Bermudagrass / Tifway 419
Fairways-	Common Bermudagrass / Tifway 419
Greens	Paspalam (Sea Isle Supreme)
Roughs-	Bermudagrass/Bahia
Irrigation source/Sustainability rating	Non-potable (runoff, lake/well)/Green

Environmental Compatibility Quotient (ECQ) Checklists

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

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

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

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

Determining the Environmental Compatibility Quotient (ECQ)

The ECQ compiled for an installation's course is a snapshot of the overall performance and compliance with the GEM Plan. There are two measures obtained as a result of using the ECQ checklists to determine the relative status or quality of the environmental management program in regards to stewardship. Although several of the ECQ questions address compliance-related issues or practices, there are no formal requirements or mandates implied or actual connected to this process. The ECQ checklists establish two measures, or scores:

- **Actual ECQ-** the total percentage of "Yes" responses for all five 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 of the checklists. Maybe the most significant measure; the potential ECQ represents a level of compatibility that could be reached by fully implementing a particular practice or procedure.

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

Planning & Compliance				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Has management demonstrated that environmental stewardship is an important part of their responsibilities by initiating the Comprehensive Golf course Environmental Management (GEM) Planning process?	✓		
2	Is the GEM Plan complete, updated regularly and readily available to employees and customers?		✓	
3	Has the golf course adopted and posted an environmental policy?	✓		
4	Is a map of the property highlighting environmental challenges posted for employees and customers?		✓	
5	Does management conduct a comprehensive annual evaluation for each identified environmental challenge and its management approach, objective and target?		✓	
6	Does the course have a written Tree Management Plan?			✓
7	Is there a readily-available and regularly updated golf course-specific Integrated Pest Management Plan?	✓		
8	Is there a map of the course's areas that may require regular special care or attention?	✓		
9	Is there an up-to-date comprehensive golf course development plan or master plan that details the desired short- and long-term facility improvements?		✓	
10	Is there at least one project planned and funded for the next year that would increase the compatibility of the course's management program with comprehensive GEM planning goals and objectives?	✓		

Planning & Compliance Checklist (continued).

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Are all employees familiar with the GEM Plan and are they trained regularly on the importance of its overall goals and objectives?		✓	
12	Are environmental management issues regularly discussed during staff meetings?	✓		
13	Are the quantities and application rates of each pesticide or fertilizer used over the last year on the facility available in writing?	✓		
14	Has the golf facility maintained compliance with all environmental regulations over the past year (no notice of violations or enforcement actions)?	✓		
15	Are employees trained in their native language on GEM Plan and compliance with its intent and specific goals and objectives?	✓		
16	Does the golf manager and superintendent facilitate and assist with compilation and implementation of the GEM Plan and its inherent goals and objectives as a quantifiable portion of their daily activities?	✓		
17	Are there documented functional and/or aesthetic thresholds integrated into pest control decisions?	✓		
18	Is there a written comprehensive Golf Course Water Resources Management Plan that describes the care for each of the course's water-related activities?			✓
19	Are employees trained on what to do in case of a spill and have spill containment kits been provided at all appropriate locations?	✓		
20	Have all maintenance procedures been examined to determine their potential to impact the course's identified environmental challenges?	✓		
	Totals	13	5	2

<u>Operations & Maintenance</u>				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is there a written, regularly updated and readily-available comprehensive Turfgrass Management Plan for the entire facility?	✓		
2	Does the design and condition of the Maintenance Complex facility positively contribute to the stated installation environmental stewardship goals contained in the INRMP?	✓		
3	Are mowing heights maintained at levels that do not excessively stress important playing surfaces and increase chemical or fertilizer inputs?	✓		
4	Are aeration, topdressing and other drainage improvements regularly implemented to improve soil health and minimize or eliminate inputs of pesticides or fertilizers?	✓		
5	Are soil tests or plant tissue analysis regularly used to determine turfgrass nutritional requirements?	✓		
6	Is the information collected in soil tests and plant tissue analysis integrated into a regularly updated Nutrient Requirement Plan?	✓		
7	Is there at least one project planned and funded for the next year that would mitigate the potential for environmental impacts due to the course's operational or maintenance procedures?	✓		
8	Are all appropriate employees trained to be familiar with (national, federal, state, and OSHA) regulations that apply to storage and handling of potentially hazardous materials used on the property?	✓		
9	Have all aspects of the golf course property other than the course been examined for potential environmental impacts?	✓		
10	Have all employees received documented annual training that would increase their awareness of the stated installation GEM program policy and this Plan's goals and objectives?		✓	

Operations & Maintenance Checklist (continued).

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Are used oil containers in good condition, not leaking and clearly labeled?	✓		
12	Are golf course wash racks operating and maintained properly?	✓		
13	Are all golf course vehicles and equipment maintained and cleaned in a manner that would eliminate the potential for spreading of disease or other contamination?	✓		
14	Is electric motor-powered equipment or vehicles being utilized where appropriate and/or required due to air quality or other environmental concerns?	✓		
15	Are waste products such as oil, grease, tires and batteries stored and disposed of properly?	✓		
16	Are hand held GPS units to map golf course areas to assist the environmental management process?			✓
17	Are energy efficiency ratings factored into equipment purchases for use throughout the facility?	✓		
18	Has the golf facility been studied to quantify and minimize solid waste streams?	✓		
19	Are at least 90% of restaurant/snack bar facility plates, cups and utensils reusable rather than disposable?			✓
20	Is a web-based, course management tool used for every day decision-making and recordkeeping?			✓
	Totals	16	1	3

<u>Water Resource Management</u>				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are records of water quality monitoring activities, results and pollution control measures readily available and used to implement appropriate maintenance practices?		✓	
2	Are slow-release fertilizers and/or spoon-feeding techniques used to reduce the potential for runoff impacts and nutrient loading to water features?	✓		
3	Does the irrigation system use regularly calculated real-time evapotranspiration rates?		✓	
4	Is the golf course irrigation and plumbing systems regularly monitored and maintained?	✓		
5	Have low-flow water saving devices been installed wherever possible?	✓		
6	Are sterile triploid grass carp or similar fish species used to control unwanted aquatic vegetation in major water features?	✓		
7	Is there at least one project planned and funded that would minimize or eliminate a potential water quality or erosion problem?			✓
8	Are water features regularly monitored for algae, erosion and excessive aquatic plant growth?	✓		
9	Are low impact design (LID) principles such as using vegetative or drainage filters to cleanse parking lot runoff prior to leaving the property?			✓
10	Are there signs appropriately located to warn golfers of the potential hazard of drinking recycled or otherwise non-potable water?	✓		

Water Resource Management Checklist (continued).

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Are accurate flow meters used to monitor total potable and non-potable water use?	✓		
12	Has the irrigation system or its components recently been upgraded to reduce or eliminate inefficiency and overall water use?		✓	
13	Is there a map of the watershed in which the golf course property resides and location(s) of floodplains and storm water drainage that exists on the property?	✓		
14	Is the quality of the irrigation water regularly checked to determine overall quality including parameters like pH, nutrient, salt or total suspended solids?	✓		
15	Is water quality data regularly collected to establish baseline conditions and maintenance procedures for all water features on the property?	✓		
16	Is at least 75% of the water used for irrigating the golf course property from recycled or other non-potable sources?	✓		
17	Is there at least one project planned and funded that would decrease the course's dependency on potable water use?	✓		
18	Have the property's Water Quality Management Zones been identified and mapped based on industry-standard risk factors?			✓
19	Has the property's water features been studied to determine the aquatic and amphibious species population?	✓		
20	Has the property been examined for potentially significant wetlands or associated sensitive water-based habitats?	✓		
	Totals	15	2	3

<u>Conservation</u>				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is all motorized equipment maintained to minimize the potential of excessive air polluting emissions?	✓		
2	Has the entire golf course property been examined for critical habitats, species of concern and threatened or endangered species?	✓		
3	Are all manmade ponds or other large water features adequately lined to minimize or eliminate losses?			✓
4	Are employees encouraged to minimize their trips around the course to conserve on the use of fossil fuels?	✓		
5	Have efforts been made to physically connect natural areas to facilitate wildlife movement through the course property?	✓		
6	Are required operating permits current, updated and adequately maintained?	✓		
7	Are recycling containers conveniently provided for customer and employee use throughout the golf course facility?	✓		
8	Has there been a study to determine the presence of invasive species on or near the course?	✓		
9	Is there a comprehensive and readily available Drought Management Plan for the entire golf course facility?		✓	
10	Are there records maintained and readily-available documenting a 2% annual reduction in potable water use as well as a 2% reduction in overall water use?	✓		

Conservation Checklist (continued).

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Has there been a demonstrated 2% annual reduction in irrigation water use starting in FY10?	✓		
12	Are a majority of plants used on the Approved Installation Plan List and are drought-tolerant native trees, shrubs, groundcovers, or their cultivars?	✓		
13	Are there areas appropriately designated and signed as "Environmentally Sensitive Zones" per The Rules of Golf?	✓		
14	Has a comprehensive energy audit been conducted for the entire golf course facility?	✓		
15	Is there a comprehensive Energy Management Plan compiled for the entire golf course facility demonstrating a 3% annual reduction?	✓		
16	Is petroleum product use being tracked to demonstrate a minimum of 2% annual reduction?	✓		
17	Is there an inventory of bird and mammal species documented, maintained and readily available?	✓		
18	Have all damaged or degraded habitats as result of construction projects or other work on or near the course been fully restored?	✓		
19	Has the entire property been adequately examined to protect potentially existing archaeological, cultural or historical resources?	✓		
20	Is the irrigation pump station an energy efficient, variable frequency drive?	✓		
	Totals	18	1	1

<u>Pesticides & Pollution Prevention</u>				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there established, documented and communicated fertilizer and pesticide application buffer areas around water features and/or sensitive landscapes?	✓		
2	Is the pesticide mixing location and spray equipment loading area adequately covered to eliminate collection of precipitation?			✓
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 and does it have at least 150% of total storage volume secondary containment?	✓		
5	Are liquid products stored below dry products and are dry materials stored on pallets or shelves to keep them off the floor?	✓		
6	Has the least toxic pest control strategy been identified for each of the most common pests and is it always used first when an action threshold is reached?	✓		
7	Is equipment cleaned with compressed air or blowers on part of the course instead of, or prior to washing?	✓		
8	Are leachate potentials of pesticides considered in the integrated pest management process?	✓		
9	Does the fuel storage/delivery area comply with local, state, federal, or other applicable regulations?	✓		
10	Are written records maintained of all applications of pesticides to include: - the pest and treatment type (preventative/curative); - the location (specific area) of each pesticide used; - the area (SF/SM) & quantity of each pesticide used; - the chemical & common name of active ingredient(s); - the date, location, or purpose of the application?	✓		

Pesticides & Pollution Prevention Checklist (continued).

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Are all pesticide applications performed by licensed personnel and are they recorded and mapped?	✓		
12	Other than the superintendent, are there trained scouts on staff to monitor turf and plant health and pest problems?	✓		
13	Are there scouting forms utilized and are they collected and organized into a report or guide for use in future pest control decisions?			✓
14	Is there an established aesthetic or functional threshold for each of the course's most common pests that may help reduce pesticide and fertilizer inputs?	✓		
15	Are current copies of all Material Safety Data Sheets (MSDS) for all chemicals used anywhere on the golf course property maintained and readily available?	✓		
16	Are fertilizers and pesticides stored in separate facilities?	✓		
17	Is the chemical storage structure/area locked, well-ventilated and fire-resistant and is access limited to appropriate personnel?	✓		
18	Are all fertilizer applications performed by licensed or certified personnel and are they recorded and mapped to guide future actions?	✓		
19	Are golfers adequately notified in the pro shop and on the first and tenth tees about planned application of any chemical or fertilizer?	✓		
20	Are there readily-available written pest profiles for common regional pests that include potential alternative control measures?	✓		
	Totals	17	1	2



*Gator Lakes
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Water is at the heart of most of Gator Lakes' environmental challenges.

<u>Environmental Compatibility Quotient Summary</u>			
Environmental Compatibility Category	Yes	Partial	No
Planning & Compliance	13	5	2
Operations & Maintenance	16	1	3
Water Resource Management	15	2	3
Conservation	18	1	1
Pesticides & Pollution Prevention	17	1	2
Totals	79	10	11

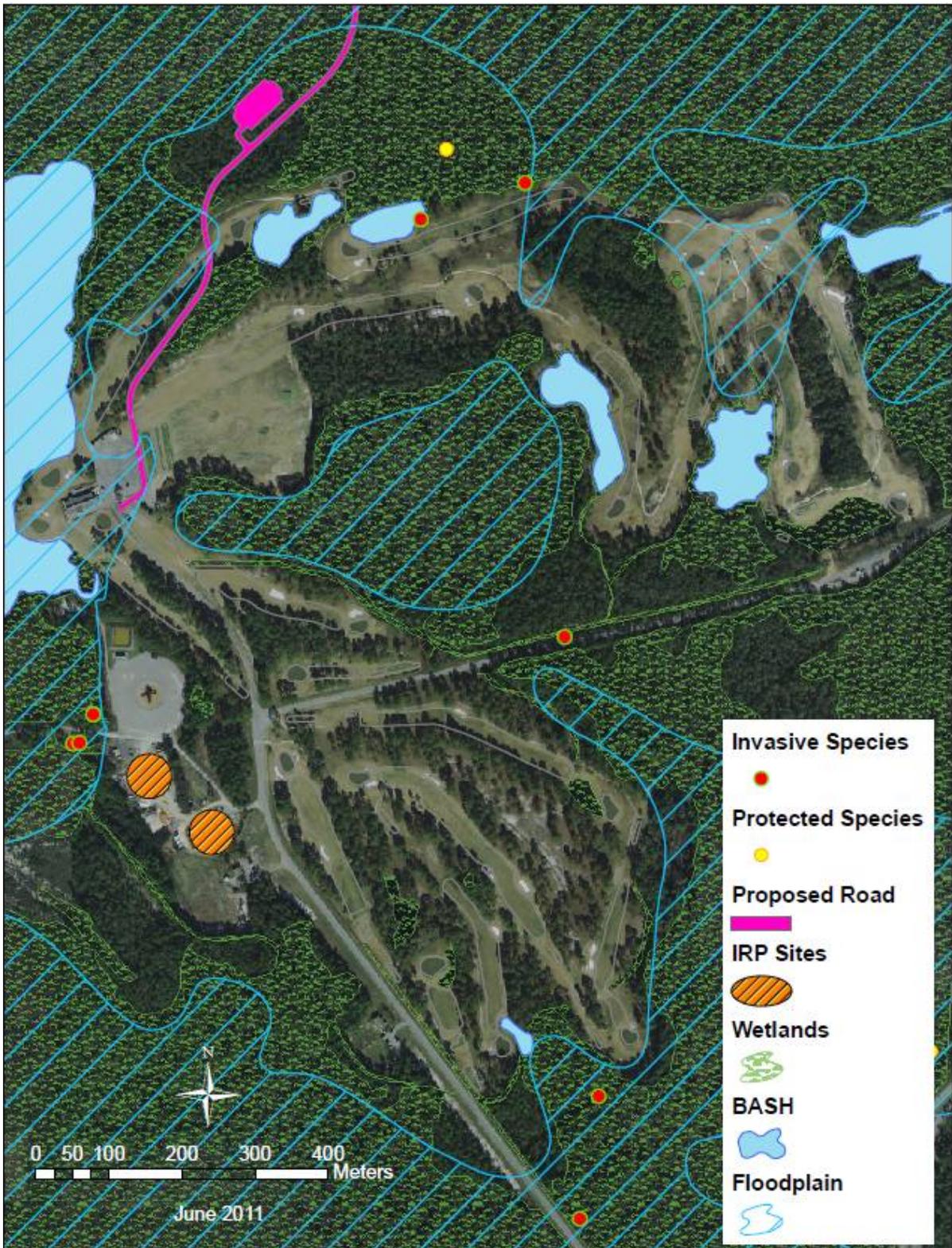
Key to checklist responses

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

June 2011 - Gator Lakes Golf Course ECQ:

- **Actual ECQ = 79, Showing progress (Yellow)**
- **Potential ECQ = 89, Showing progress (Yellow)**

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



Environmental Challenges Map

Environmental Challenges

One of the important results of the GEM process is the identification of significant environmental challenges to be addressed in the GEM Plan. Challenges are defined as “things that are bigger than the course”. Some of the reasons behind a particular challenge are important to recognize and understand. Ideally, the golf staff will address their management approach to each challenge to accomplish course and local community environmental management objectives while still attaining acceptable levels of course playability and customer satisfaction. Along with the newly established baseline, the GEM Plan consists of a map and description of the final environmental challenges and the prescribed approach to their management.



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The course has several water bodies throughout its over 200 acres.

Identified environmental challenges

The following environmental challenges were identified during the GEM process:

- Water supply
- Wetlands
- Tree management
- Invasive species
- Proposed new road project
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Protected species
- Floodplains
- Installation Restoration Program (IRP) sites
- Erosion/storm water quality



*Gator Lakes
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Minimally-maintained buffer around water features helps to protect water quality.

Assessing environmental challenges

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

DESCRIPTION

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

DRIVER/REQUIREMENT

A driver or requirement may be a local, regional, or national law, regulation, or initiative that creates the requirement to protect species, habitat, or preserve a resource such as open space or unique ecosystems.

OBJECTIVE

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

MANAGEMENT APPROACH

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

TARGET

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



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Lake to the right of the 18th is also the current source of Gator Lakes' irrigation water.

WATER SUPPLY

According to course management, "Gator Lakes Golf Course draws water out of the large lake just north of the 9th and 18th greens. This lake is fed by rainwater and surface drainage and is a tributary to the wetlands and East River. The only cost associated with the water is the power to run the pumps which turn on and off frequently (5 minutes or less) to maintain pressure in the leaking system."

Gator Lakes has recently renewed their water use permit that will ensure a supply of irrigation water until 1 Oct 20. Meanwhile, the installation is currently "competing for a project to replace the irrigation system and utilize the effluent water from the water treatment plant on base."

The General Plan sheds additional light on this topic. "Hurlburt and vicinity are in a Water Caution Area as defined by the NFWMD. Because of this, Hurlburt developed a Water Management Plan to eliminate use of water from the Floridian aquifer for landscape irrigation and other non-potable uses. Such uses of Floridian aquifer water are to be eliminated by January 31, 2005. To meet this requirement, NFWMD recommends that Hurlburt utilize reclaimed water to reduce the use of ground water for non-potable purposes."

The 25-acre Hurlburt Lake is the current source of the course's irrigation supply. There is a recommendation from engineering consultants to utilize locally produced recycled water sources for golf course irrigation use. Unfortunately, this change will require significant outlays of funds to implement. Past estimates approached \$750K for storage tank and irrigation system upgrades. Current costs may be much greater.

Driver/requirement

- Executive Order 13123, Greening the Government Through Efficient Energy Management
- Executive Order 13423, Strengthening Federal Environmental, Energy and Transportation Management
- Energy Independence & Security Act
- Energy Policy Act 2005
- Safe Drinking Water Act
- Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance

Objective

Secure adequate recycled water or other sources of irrigation quality water for the foreseeable future and continue to use other than potable water sources for irrigating any of the golf course.

Management approach

- Water only as much as the turf needs and the soils can absorb
- Compile a comprehensive Water Resource Management Plan for the entire golf course facility that includes a Drought Management Plan for the facility
- Improve efficiency by securing a new computerized irrigation system provides accurate, current water use information or greatly improve the existing system to accomplish same

Target

Immediately begin investigation into installation plans for new irrigation supply source and prepare for any management practices changes to accommodate potentially diminished quantity or quality.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

Course management needs to examine all water uses to determine efficiencies and overall needed improvements to system or practices.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

The front nine holes is home to several of these small ponds that are now jurisdictional wetlands.

WETLANDS

Approximately 70% of Hurlburt Field's 6,634 acres of land can be classified as wetlands. The golf course facility is surrounded by many of these specially managed lands including Hurlburt Lake which is the largest water body on the installation. The sustainability and protection of the Floridan aquifer is prime environmental concern for Hurlburt Field managers.

A recent wetland delineation project added to the complexity of maintaining the course. Several low-lying areas, drainage ditches and small ponds have been declared jurisdictional wetlands. This designation potentially brings constraints to course managers on which maintenance practices are appropriate and compliant. Communication with installation environmental managers is paramount.

Driver/requirement

- Clean Water Act, Section 404
- National Pollutant Discharge Elimination System (NPDES)
- Executive Order 11990, Protection of Wetlands
- AFI 32-7041, Water Quality Compliance, 10 Dec 03
- Secretary of the Air Force Order 780.1 Wetlands
- North American Wetlands Conservation Act (16 U.S.C. 4401-4414)
- Coastal Wetlands Protection Act (CWPA)

Objective

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

Management approach

- Establish, document and communicate fertilizer and pesticide application buffers to all appropriate employees or service providers
- Consult with environmental staff prior to any changes in creek bed or pond bank maintenance
- Comply with all requirements included in the approved installation SWPPP
- Ensure all spill prevention procedures and spill kits are in place and all pertinent employees are adequately trained to correctly and promptly perform required actions in an emergency situation
- Compile a comprehensive Water Resource Management Plan for the entire golf course facility
- Continue to enlist assistance to correct backflow deficiency
- Consult with installation environmental staff to ensure that golf course maintenance practices are fully compliant with complex water-related regulations

Target

Eliminate the potential for degradation of the water resources at the golf course by establishing, documenting and communicating all pesticide and fertilizer application buffers to appropriate personnel prior to the end of the CY.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

The course's newly-delineated wetlands will require increased diligence and cooperation from the golf staff.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

The trees at Gator Lakes are extremely important for definition, background, safety, wildlife habitat, aesthetics and overall enjoyment of everyone involved.

TREE MANAGEMENT

The management of native longleaf pines is a chief concern of the installation environmental staff. Several pines, most likely longleaf pines, have been identified as creating a less than ideal turf growing situation on the course. Since Hurlburt Field is a “Tree City USA” program member, there is a specific process to gain approval for removal of any trees on the installation. If permission is obtained, three trees must be planted for each tree removed. The course has several areas where additional trees can be located especially the newest nine holes. The key will be to take special care in planting the correct species in the proper places.

Driver/requirement

- Customer and employee safety
- Aesthetic improvement
- Tree-turf competition in high use play areas

Objective

Minimize health and safety risks while improving overall aesthetic quality and course playability.

Management approach

- Compile and implement a comprehensive Tree Management Plan
- Utilize native or indigenous plant materials whenever possible
- Selectively install only those species that contribute to objective while not increasing long-term maintenance requirements

Target

Complete Tree Management Plan that identifies high risk trees for pruning and removal as well as establishing a golf course-specific plant list along with an annual maintenance schedule prior to the end of FY14.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

Some trees make it difficult to grow healthy turf.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

Wet, minimally-maintained or natural portions of the course are prime establishment areas for invasive species.

INVASIVE SPECIES

With minimum expenditures, the Gator Lakes course can assist the installation's overall goal to eliminate invasive species while greatly improving their facility and the surrounding ecosystem. Reduce and control the spread of invasive, exotic plant and animal species. The INRMP has committed to "identify the most significant threats to biodiversity posed by invasive, exotic species, and develop an Invasive Species Management Plan to outline specific control procedures for these species" in its Management Goals and Objectives.

Other than mentioning wild hogs, the INRMP does not list specific species. Based on experiences in Florida, Chinese tallow, cogon grass, Japanese climbing fern, hedge privet, honeysuckle, lantana, nandina, china berry and camphor trees will be on the Hurlburt Field invasive species list.

Driver/requirement

- Federal Noxious Weed Act of 1974
- National Invasive Species Act (1996)
- Plant Protection Act (2000)
- Federal Noxious Weed Act of 1976 (7 U.S.C. 2801)
- Executive Order 13112, Invasive Species, February 3, 1999
- EO on Invasive Species (revised February 4, 1999), Source: Federal Interagency Committee for the Management of Noxious and Exotic Weeds, <http://bluegoose.arw.r9.fws.gov/FICMNEWFiles/eo.html>
- Policy on Invasive Exotic Plants, CNPS, adopted September 1996
- The Federal Interagency MOU on Noxious Weed Control, pursuant to the Federal Noxious Weed Act of 1974 (P.L. 93-629) (7 U.S.C. 2801 et seq.) as amended

Objective

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

Management approach

- Develop a installation-coordinated golf course program to minimize or eliminate the introduction of invasive or exotic plants and animal species
- Never knowingly install a listed or potentially invasive species
- Regularly inspect likely areas for invasives to establish themselves
- When possible, restore native species and habitat conditions
- Train all appropriate employees on the latest invasive species identification and control measures
- Restore disturbed areas dominated by invasive species to natural vegetation where practical and consistent with mission requirements
- Utilize native or non-invasive indigenous plant materials whenever possible

Target

Regularly assist the environmental staff with the compilation of an invasive species survey and completion of an approved plan complete an approved plan using integrative pest management techniques to contain, reduce or eliminate invasive species prior to the end of FY14.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

*Photo credit:
Vic Ramey*

The Chinese tallow, or the “Popcorn tree” is a state-wide invasive specie.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

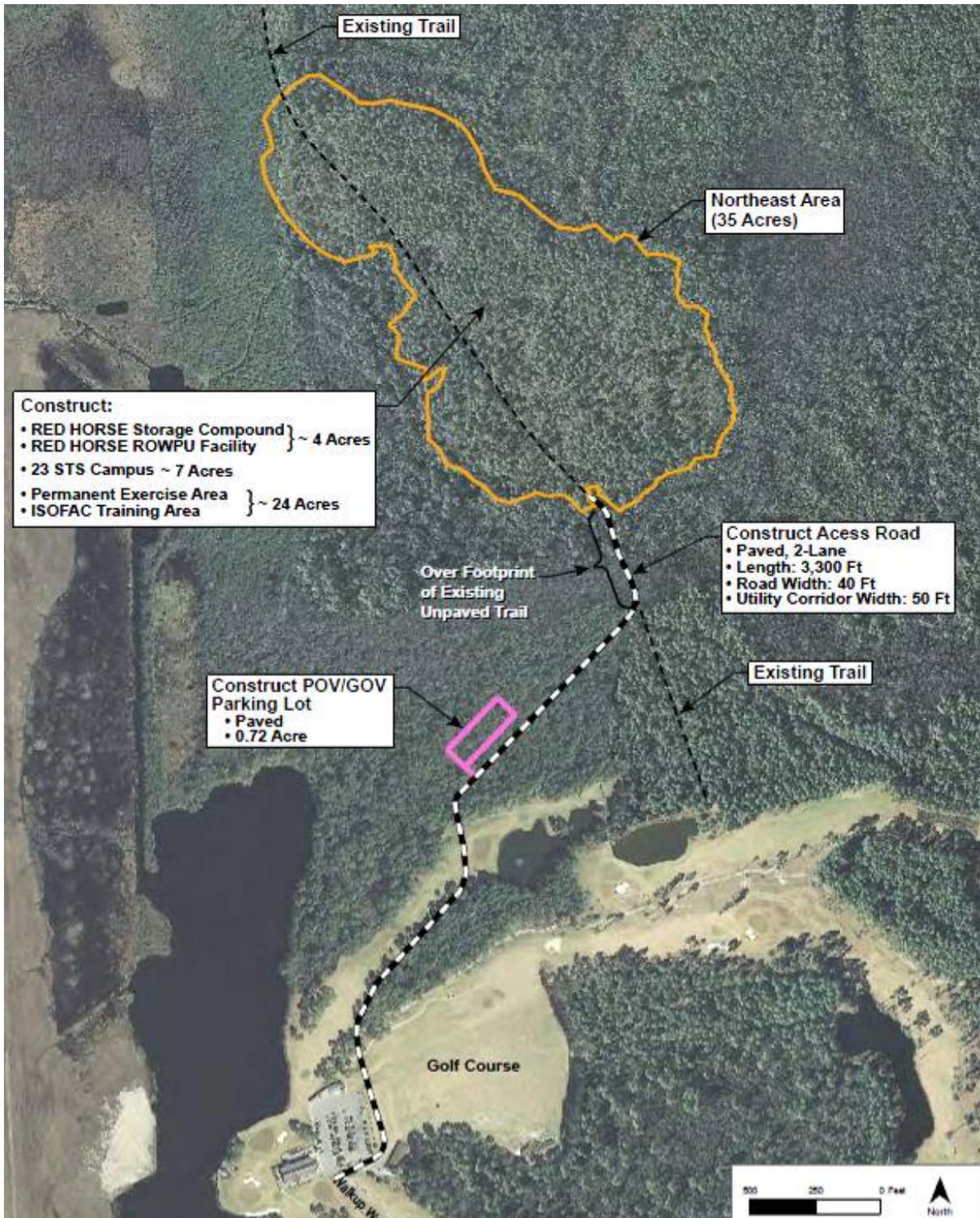
Driving range will be impacted by the proposed new road construction.

PROPOSED NEW ROAD PROJECT

There is a proposed action currently under analysis that would utilize an undeveloped area on the opposite side of the golf course. Access to this area will require construction of a new road. According to the Draft environmental analysis, “Alternative 1, the PEA/ISOFAC area, RED HORSE facilities, and STS campus would all be constructed in the Northeast (NE) Area of Hurlburt Field. The NE Area is a 35-acre, undeveloped, upland parcel located approximately 1,200 ft north of the Base golf course and approximately 1,400 ft northeast of the northern end of the airfield runway.”

The Draft EA continues with “under Alternative 2, the PEA/ISOFAC area would be constructed in the NE Area and the RED HORSE facilities and STS campus would be constructed in the area vacated by the existing PEA. The site layouts in the areas of proposed construction would be developed during the design phase of the project. Based on preliminary planning, the new PEA/ISOFAC area in the NE Area would be approximately 24 acres (same as Alternative 1). The new RED HORSE area and STS campus that would be constructed in the area vacated by the existing PEA would be approximately 4 acres and 7 acres, respectively.

As under Alternative 1, Alternative 2 would involve construction of an access road to the NE Area, construction of a POV/GOV parking lot just north of the golf course, and modifications to the golf course. All aspects of this ancillary development under Alternative 2 would be the same as under Alternative 1. No ancillary development would occur outside the area vacated by the existing PEA under Alternative 2.”



Alternative 1 (from Draft Environmental Assessment)



*Gator Lakes
Golf Course
Hurlburt Field, FL*

One of the difficult aspects of accommodating the proposed access road is getting it behind the 10th hole's teeing area and down between the 10th and 18th holes through the trees without creating a safety hazard for customers or travelers.

Driver/requirement

- Mission support

Objective

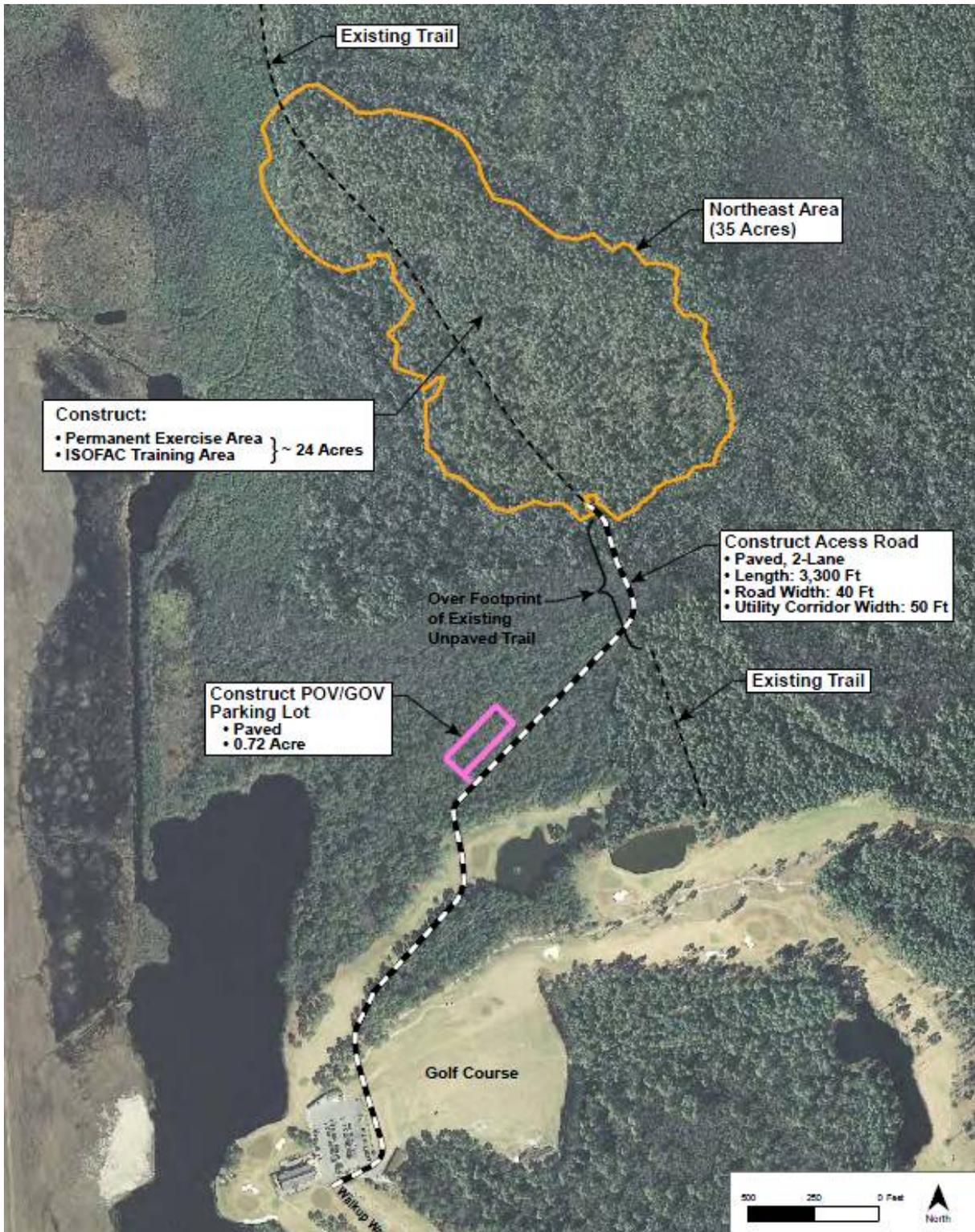
Mitigate all golf course impacts as a result of mission project requirements.

Management approach

- Ensure that the project documents include replacing facilities and a requirement to hire a qualified golf course architect to prepare construction documents
- Golf course manager and superintendent must be integral to entire golf course project process

Target

Coordinate all aspects of impact mitigation and ensure golf course facility is fully functional as soon as possible.



Alternative 2 (from Draft Environmental Assessment)



*Gator Lakes
Golf Course
Hurlburt Field, FL*

The course's numerous water features make it a perfect habitat for water fowl, alligators and most any other type of animal likely to be found on the installation.

BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH)

Nuisance wildlife species, as defined in the INRMP, include migratory birds, deer, and alligators. Each of these species can pose a threat to flying operations safety at Hurlburt Field. The INRMP discusses the installation "as temporary habitat for neotropical birds migrating to and from the Caribbean and South and Central America". The golf course can be an attractive nuisance for these and other species on the move.

In addition, the INRMP states "the Bird Hazard Working Group offers oversight and implementation of the BASH Program at Hurlburt Field. The natural resources manager at Hurlburt Field provides valuable technical information and expertise to the Bird Hazard Working Group and the installation's BASH program on bird/wildlife biology, species identification and control options. An integrated pest management strategy (discussed earlier) is utilized to manage airfields for bird and wildlife control.

Passive control measures such as landscape design, elimination of food and roost sources, turf/water management and forest management are the most permanent ways of reducing the attractiveness of airfields for bird and wildlife utilization.

Driver/requirement

- Bird/Wildlife Aircraft Strike Hazard (BASH) Plan, 91-212
- AFI 13-213, *Airfield Management*
- AFI 32-1053, *Pest Management Program*
- FAA Advisory Circular 150/5200-33A, *Hazardous Wildlife Attractants On Or Near Airports*
- AFI 91-202, The U. S. Air Force Mishap Prevention Program
- AFPAM 91-212, Bird/Wildlife Aircraft Strike Hazard (BASH) Management

Techniques

- UFC 3-260-01, Airfield and Heliport Planning and Design
- AFPD 91-2, Safety Programs

Objective

Ensure that golf course management practices do not contribute to potential BASH concerns.

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

Management approach

- Coordinate pond and stream maintenance procedures with installation environmental management staff
- Install only BASH-approved plant material listed in the installation Sustainable Landscape Development Plan
- Secure membership on BASH Working Group and attend all meetings
- Ensure minimally-maintained or non-play areas are mowed in accordance with airfield mowing criteria or on a requirement basis (7-14") wherever practicable in accordance with AFPAM 91-212

Target

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

Complete Tree Management Plan that identifies BASH-potential species and implement recommended annual maintenance schedule.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

*Photo credit:
Unknown*

The red-cockaded woodpecker is one of three listed federal species potentially found in the area.

PROTECTED SPECIES

According to the INRMP, the Southern Red Lily and Chapman's butterwort, both State of Florida threatened species, occur in the vicinity of or on the golf course grounds. A scattered population of the white-top pitcher plant, an endangered species, has been located between the golf course and the northern installation boundary.

Only three federally listed species have been discovered within or adjacent to the installation: the flatwoods salamander, bald eagle and red-cockaded woodpecker. None has ever been sighted on the course.

The General Plan also cites the eastern indigo snake and the piping plover as potentially occurring federally listed threatened species. The parrot pitcherplant is also a potential nearby resident.

Driver/requirement

- Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543)
- USAFI 32-7064, Integrated Natural Resources Management, 21 October 1996
- Air Force Policy Directive (AFPD) 32-70, Environmental Quality, 20 July 1994
- Rule 68A-27.011 of the State of Florida Wildlife Code (Chapter 68A, F.A.C.)
- Federal Species Conservation Ordinance
- 2005 Florida Statute Title XXVIII 372.072 (3) (b & c)

Objective

Never allow a management practice to negatively impact a known protected species on or near the golf course.

Management approach

- Ensure that the maintenance practices for all identified potential protected species habitats are regularly coordinated with installation environmental staff
- Contribute to the recovery of protected species by continuing to protect, restore and maintain their populations utilizing the precepts of ecosystem management

Target

Request a site assessment and review of current management practices directly from the appropriate installation environmental manager and take recommended actions immediately with complete implementation by the end of CY13.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

*Photo credit:
Wikipedia*

The flatwoods salamander.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

This excerpt from the Wetlands and 100-year floodplain map in the INRMP demonstrates the scale of the issue.

FLOODPLAINS

The INRMP describes floodplains as “generally flat, lowland areas bordering inland and coastal waters (including offshore islands) that are subject to a 1 percent or greater chance of flooding in any given year, otherwise known as the “100-year floodplain” or “installation flood elevation.” Such inland areas are a result of freshwater precipitation and/or runoff, and are generally of long duration, whereas coastal floodplains are often the result of short-duration freshwater precipitation and/or runoff as well as intense storm surges. Regions of 100-year floodplains are extensive on Hurlburt Field. As expected, there is a strong correlation between those areas mapped as wetlands and the 100-year floodplain. Consequently, most of the northwest portion of the installation and much of the northeast occur within floodplains. Some of these areas embrace the incoming, or back nine, holes at Gator Lakes Golf Course.

1 SOCES reports: “...unaware that untreated stormwater is currently being discharged directly to Gator Lake, which is a State of Florida jurisdictional wetland/water body. This is an unpermitted/illicit discharge and should elevate the urgency for the P.E. stormwater evaluation and fix. Based on review of old aerial photos and search for permit records, it appears that the expansion of the golf course parking lot in the 1980's was done without installation of the stormwater treatment system that was required under Florida Administrative Code Rule 62-25. A professional engineer (P.E.) evaluation of the site is needed first, and I expect the outcome will be recommendation for installation of a new stormwater treatment system.”

Driver/requirement

- Clean Water Act
- State pollution discharge elimination system
- National Environmental Policy Act
- 32 CFR 989

Objective

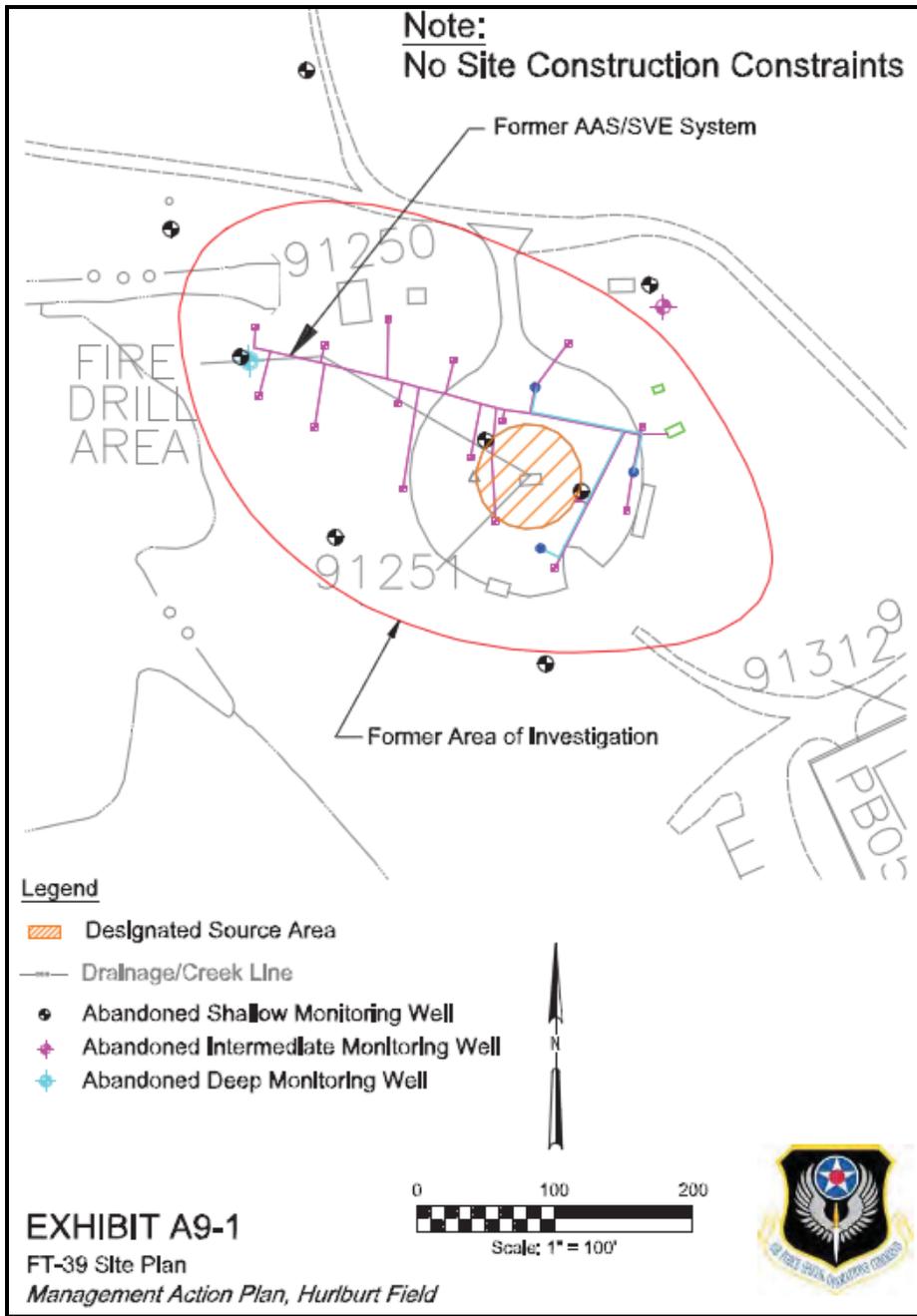
Maintain compliance with all floodplain-related laws and regulations through regular consultation with the installation environmental staff.

Management approach

- Assist with the preparation of a Finding of No Practical Alternative (FONPA) for each potentially proposed project within 100-year floodplain
- Consult with environmental staff prior to any changes or repairs to pond maintenance procedures
- Comply with all requirements included in the approved installation SWPPP
- Ensure all spill prevention procedures and spill kits are in place and all pertinent employees are adequately trained to correctly and promptly perform required actions in an emergency situation

Target

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



*Gator Lakes
Golf Course
Hurlburt Field, FL*

*Management Action
Plan excerpt.*

Fire training pit (FT-39) location plan.

INSTALLATION RESTORATION PROGRAM (IRP) SITES

Hurlburt Field has several IRP sites. The golf course property is home to at least two, Site FT-39, Fire Training Pit and Area of Concern (AOC)-135, Golf Course Maintenance. Site summaries of both areas are provided below.

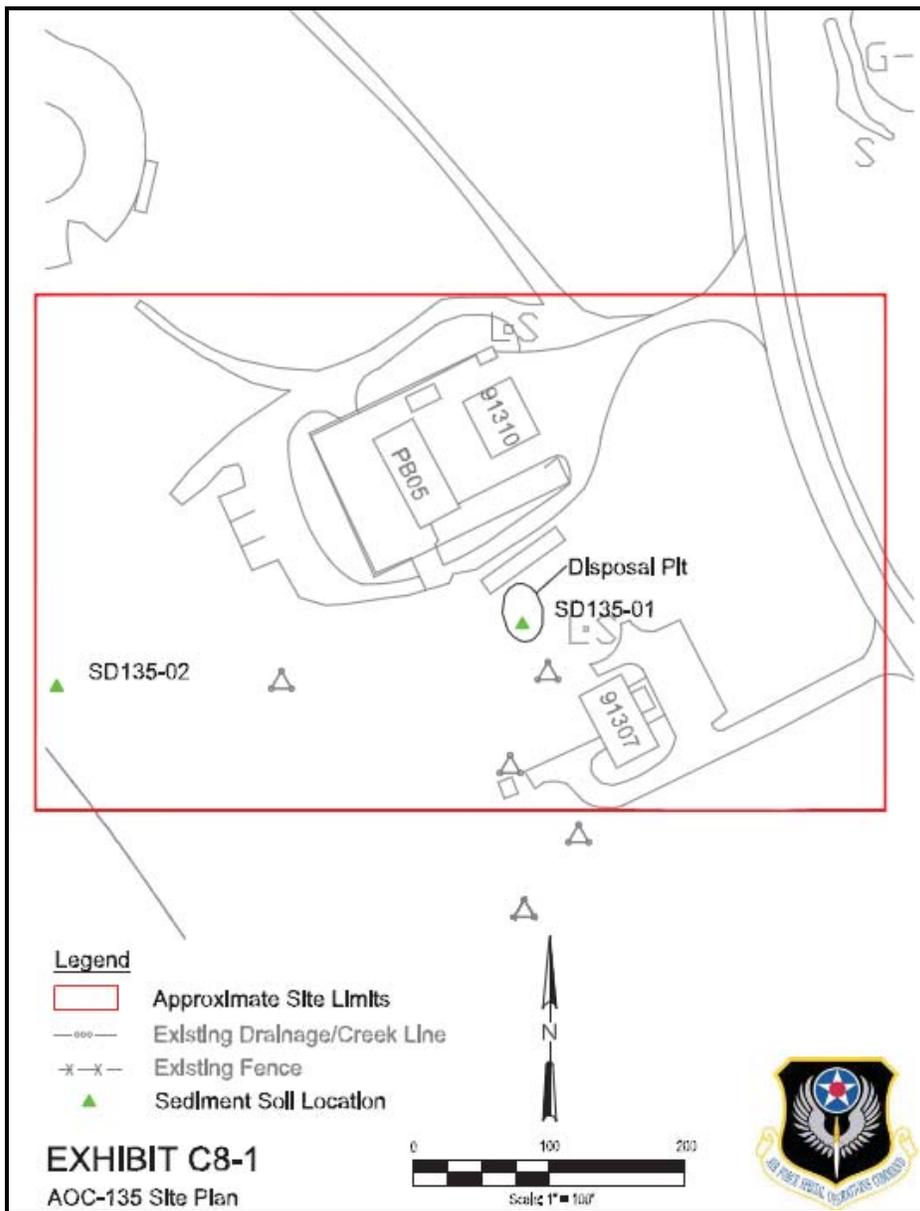
FT-39

Fire Training Pit 39, is located on Hurlburt Field east of Hurlburt Lake and west of the intersection of Independence Road and Golf Course Road. "The area was used to train fire protection personnel and for the disposal of waste fuels, oils, solvents, and contaminated fuels. Petroleum products were sprayed onto mock buildings, cars,

and planes; ignited; and extinguished by the trainees. Operation of the site began in the late 1950s and continued until 1989.

Site FT-39 is defined by a large, cleared circular concrete “bowl” filled with soil surrounded by 6-inch-high earthen berms. The burn area is approximately 50 feet in diameter with a 6-inch concrete berm along the periphery for fuel containment. The burn pad is paved and residual fuels, water, and AFFF (an extinguishing agent) flowed to an oil/water separator near the southern edge of the site.

The report states that “site closure (NFA without conditions or restrictions) was recommended in March 2005. A Corrective Action Completion Determination without controls was requested for the site and granted by FDEP in August 2005”.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

*Management Action
Plan excerpt.*

Golf Maintenance Area (AOC-135) location plan.

AOC-135

According to the provided information, “the 1.5 acre site, consisting of several buildings, is enclosed by a chain-link fence topped with barbed wire. Materials routinely used at the site include pesticides, oil, and gasoline. Two 500- gallon above ground storage tanks (ASTs), installed in 1980, are located outside the fence on the north side of the facility surrounded by an earthen berm. A concrete pad used for vehicle washing is located on the south side of the facility outside the fence. Wash water from the pad drains to a drainage ditch approximately 15 feet to the south.

On the east side of the maintenance area, outside the enclosure, is a padless drum storage area. This area has contained drums of diesel fuel and waste oil. The maintenance area has been in use since 1974. Prior to 1992, pesticides were mixed on the pad. Secondary washes of sprayer vehicles also took place on the pad and pad runoff drained into a wooded wetland south of the facility. In 1992, the operation was moved to the asphalt area inside the compound.”

The report continues with “A No Further Response Action Planned (NFRAP) letter of concurrence was received in July 1997 and serves as the Decision Document (DD).

Driver/requirement

- AFI 32-7020, The Environmental Restoration Program
- Resource Conservation Recovery Act (RCRA)
- Comprehensive Environmental Response, Compensation, and Liability Act, (CERCLA)
- Superfund Amendments and Reauthorization Act (SARA)

Objective

Ensure daily compliance with restoration program site requirements and land use controls.

Management approach

- Abide with all specified land use controls (LUCs)
- Work closely with installation restoration program manager to ensure compliance

Target

Immediately integrate restoration program manager requirements into regular maintenance practices.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

The clubhouse parking lot is the subject of the erosion and storm water quality issue.

EROSION/STORM WATER QUALITY

According to 1 SOCES reports: "...unaware that untreated storm water is currently being discharged directly to Gator Lake, which is a State of Florida jurisdictional wetland/water body. This is an unpermitted/illicit discharge and should elevate the urgency for the P.E. storm water evaluation and fix. Based on review of old aerial photos and search for permit records, it appears that the expansion of the golf course parking lot in the 1980's was done without installation of the storm water treatment system that was required under Florida Administrative Code Rule 62-25. A professional engineer (P.E.) evaluation of the site is needed first. It is expected that the outcome will be a recommendation for installation of a new storm water treatment system".

Driver/requirement

- Clean Water Act, Section 401
- Municipal Separate Storm Sewer System (MS4) Phase II storm water management requirements of the National Pollutant Discharge Elimination System (NPDES) regulations

Objective

Implement required soil erosion control measures for all construction projects and ensure they are monitored by quality assurance and environmental personnel.

Ensure that all water bodies are never subject to pollution from any golf course management practice.

Ensure that golf course management practices never diminish installation or community surface water quality especially during high precipitation events.

Management approach

- Comply with all requirements included in the approved installation SWPPP
- Implement pre-approved soil erosion control measures for all construction
- Regularly monitor erosion-prone areas
- Enlist frequent inspections by appropriate environmental personnel
- Improve all identified erosive areas with rip rap, sod or organic mulch
- Consult with installation environmental staff to ensure that golf course maintenance practices are fully compliant with complex water-related regulations
- Compile a comprehensive Water Resource Management Plan for the entire golf course facility
- Establish, document and communicate pesticide and fertilizer application buffers around all water features
- Direct floor drains to sanitary drains with oil/water separator
- Store drums on pallets
- Ensure spill response equipment is available and personnel are trained
- Cover all dumpsters
- Store materials and waste inside buildings or cabinets
- Cover wash rack and collect and regularly dispose of grass clippings properly
- Perform all repair activities under a covered area
- Cover and berm pesticide/herbicide storage and mixing areas
- Store flammables in properly located, secure cabinets
- Use drip pans under dispensing units
- Regularly perform visual inspections of the area
- Properly install adequate security fencing
- Use granulated pesticides and fertilizers
- Pesticides that are or will be listed as Toxics of Concern on the local, state, or federal level will not be used
- No pesticides or herbicides are applied to ditches or roadways
- No application takes place prior to rain events within 24 hours
- Application is performed at or below the manufacturer's suggested rate
- Low volatility carrier liquids are utilized
- Bait insecticides or rodenticides are used for building treatment
- Only trained and licensed staff applies the herbicides and pesticides

Target

Ensure that all potentially erosive construction projects are monitored by quality assurance and environmental personnel.

Comply with all erosion control guidance, measures and best management practices at all times.

Correct all potentially non-compliant water resource aspects prior to the end of CY13.

Implementation

No plan is worth the time it took to compile it if it does not generate or include active implementation in the field. The golf course management staff should use the following goals and objectives as the roadmap for their future. The GEM Plan is an example of the quality a cooperative effort can produce. Let's get something done and better take care of the environment, our community and our customers.

GEM Plan goals & objectives

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

- Ensure that all employees are familiar with the GEM Plan and regularly conduct and document their annual training that increases their awareness of the environmental policy and the GEM program goals and objectives

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

- Compile a comprehensive golf course development plan or master plan that details short-and long-term facility improvements to include a Tree Management Plan and a Water Resource Management Plan that maps Water Quality Management Zones per industry standards and includes a Drought Management Plan



*Gator Lakes
Golf Course
Hurlburt Field, FL*

The final green is adjacent to the 25-acre manmade Hurlburt Lake.



*Gator Lakes
Golf Course
Hurlburt Field, FL*

Golf in the natural environment of northwest Florida.

Conclusion

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

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

Sustainable installations are possible with a coordinated and concerted effort by all. Implement the GEM program, as it embraces continual improvement and environmental stewardship while steadfastly supporting the missions of the installation and the U.S. Air Force.

The gallery

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



Quality sign with an important message.



Agaves are inappropriate and should be removed.



Golf cart wash site is well done.



The drainage area on right is a jurisdictional wetland.



Hydraulic lift is safe, efficient and convenient.



Sprinkler does not function properly.

Civil Engineering & Force Support Squadrons



IRP site AOC-135 is nearby the maintenance complex.

Environmental & Golf Staffs



Cart paths could use some work.



Locked on-course drinking water is proper practice.



Ensure all bird boxes are coordinated with CE.



Water feature maintenance may need improvement.



Add screening to hide utility area near clubhouse.



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Technical Division
Built Infrastructure Branch**

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AFCEE/TDB, 2261 Hughes Ave, Suite 155, Lackland AFB, TX 78236-9853

Please visit our Golf Course Environmental Management Program website:
<http://www.afcee.lackland.af.mil/gem>