



***Windy Trails Golf Course
Environmental Management (GEM) Plan
Altus AFB, OK***



March 2009



San Antonio, Texas



***Windy Trails Golf Course
Environmental Management
Policy***

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

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Executive Summary

U. S. Air Force GEM Program

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

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

GEM Program process

There are five steps in the GEM program process.

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

Environmental Compatibility Quotient (ECQ) scores

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

- **Actual ECQ = 62**
- **Potential ECQ = 79**

Potential or Final environmental challenges

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

- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Wetlands
- Water quality
- DASR/RAPCON project
- Installation Restoration Program site
- Migratory birds

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/>).



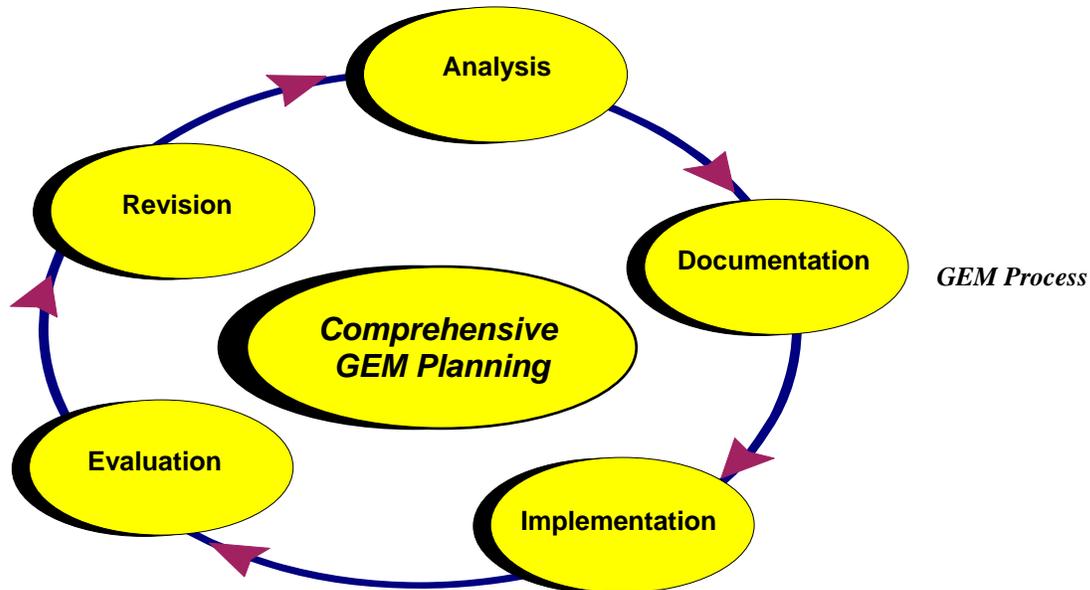
*Windy Trails
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Windy Trails Golf Course clubhouse.

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

The GEM Initiative

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



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

GEM Process

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

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

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

Analysis

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

GCEBA COMPONENTS

The GCEBA is comprised of the following components:

- Site visit, interviews, and data collection
- Course specific analysis
- Miscellaneous facility review
- Environmental compatibility quotient checklists
- Identification of potential environmental management challenges
- Summary report

Documentation

It is not enough just to know how to create a successful golf course environmental management program. There must be a written record documenting existing site data, maintenance practices, pesticide applications, and other historical golf course activities. By documenting what we know, we will be able to determine how to make better decisions in the future. The completed GEM Plan will assist in the daily management of the course while providing a convenient vehicle to communicate to the community and customers alike the environmental issues that challenge golf course managers as well as their plans to deal with them. In order to reach established environmental stewardship goals the golf course staff must consistently employ only those management practices that minimize or eliminate potential negative impacts to the environment.



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A little something for everyone is available in the pro shop.

U.S. AIR FORCE GEM PLAN COMPONENTS

The GEM Plan will be comprised of the following components:

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

Implementation

Positive and decisive action is the only true measure of the success of the GEM Plan. By implementing new practices, whether to knowingly improve the course's role in the environmental stewardship of the installation or to just try new ideas to determine their value, will the golf staff and golfers benefit. The installation golf staff should consider adopting the GEM Initiative process and establish an environmental policy that minimizes or eliminates any and all potential negative environmental impacts.

Evaluation

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

Revision

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

Course Specific Analysis

One of the most pragmatic and enjoyable tasks in the baseline assessment portion of the GEM process is the course specific analysis. From a general description of the course to the details of the course's history and makeup to the various observations on course playability, aesthetics, and style of management, the course specific analysis sets the stage for the rest of the GEM Plan report.



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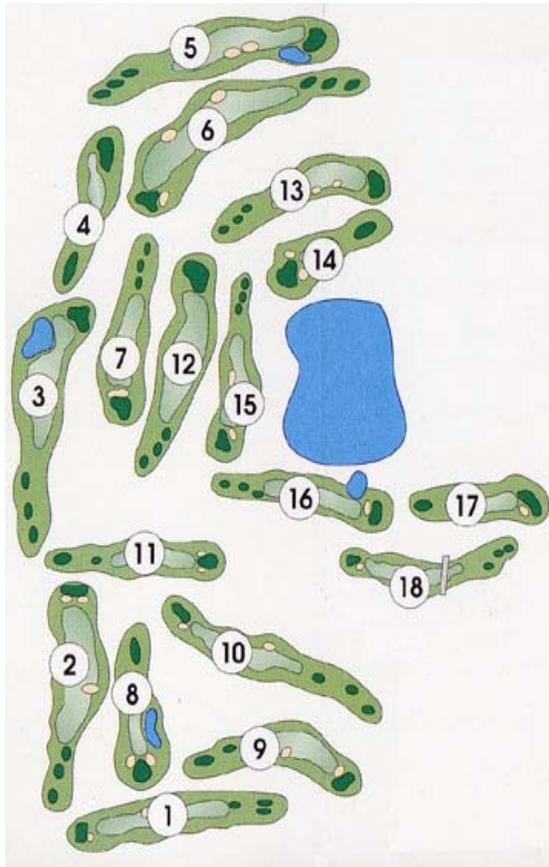
Jackrabbits are among the most common critters observed during a round.

Course Description

Altus AFB's Windy Trails Golf Course provides a quality recreational opportunity for its customers despite being handicapped with relatively featureless land, poor soils, and a severely limited plant palette. The western Oklahoma climate is just not conducive to the type of rolling, verdant fairways flanked by self-sustaining and stately forests that we all desire on our golf courses. There are two things that contribute positively overall to the experience at Altus' golf facility – an incessant wind usually much stronger than a breeze and an abundant supply of friendly people. The newest nine holes are split between the two sides and cause a little mental discomfort while contributing greatly to the facility.



**Windy Trails Golf Course Aerial Photo
Altus AFB, OK**



*Windy Trails
Golf Course
Altus AFB, OK*

Windy Trails Layout Map

Course Details

Architect	Unknown/Niva Engineers
Year constructed	1960/1997
Climate	Droughty and windy
Average annual precipitation	6-8 inches
Average growing season	210 days per year
Elevation	1360' ASL
Prevailing wind direction	North/South
Total facility area	227 acres
Total actively maintained area	128 acres
Par	36-36-72
Yardage/Rating/Slope	Blue- 6963/72.8/120 White- 6334/69.7/118 Silver- 5772/67.4/111 Red- 5382/71.7/122
Turfgrass	Common Bermudagrass
Tees-	Common Bermudagrass
Fairways-	Penncross/Cato-Crenshaw
Greens	Common Bermuda/mix
Roughs-	Potable drinking water
Irrigation source	

Environmental Compatibility Quotient (ECQ) Checklists

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

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

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

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

Determining the Environmental Compatibility Quotient (ECQ)

The ECQ compiled for an installation's course is a snapshot of the overall performance and compliance with the GEM Plan. There are two measures obtained as a result of using the ECQ checklists to determine the status or quality of the environmental management program: 1) determining the actual and; 2) potential environmental compatibility quotients.

- **Actual ECQ-** the total percentage of "Yes" responses for all ten checklists. This number represents the current level of the golf course management practice compatibility with the environment
- **Potential ECQ-** the total percentage of "Yes" responses plus the total percentage of "Partial" responses for all ten checklists. Maybe the most significant measure; the potential ECQ represents a level of compatibility that could be reached by finalizing or fully implementing a particular practice or procedure.

ECQ Scoring Scale

Percent Responses Yes
or Partial per Category Level

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

The following ECQ checklists are a record of the interview conducted with Windy Trails Golf Course manager and superintendent during the Altus AFB, OK visit.

<u>Planning & Compliance</u>				
#	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 Tree Management Plan complete with planting plan and maintenance schedule?			✓
7	Is there a written and regularly updated Integrated Pest Management Plan for the entire golf course property?	✓		
8	Is there a map of the course's "hot spots" or specific 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 improvements to the facility?		✓	
10	Is there at least one project planned and funded for the next year that would increase the compatibility of the course's management program with comprehensive GEM planning goals and objectives?	✓		

Planning & Compliance Checklist (continued).

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Have all employees been familiarized with the GEM Plan and are they trained regularly on the importance of environmental performance and compliance with its goals and objectives?		✓	
12	Are environmental management issues regularly discussed during staff meetings?			✓
13	Are the actual amounts of each pesticide or fertilizer on the facility available in writing for every application over the last year?	✓		
14	Has the facility attained full certification in the Audubon Cooperative Sanctuary Program or similar industry-recognized environmental management program?			✓
15	Are employees trained in their native language on the benefits of minimizing potential negative impacts?	✓		
16	Are comprehensive written records maintained to measure and document the environmental compatibility of the entire facility's management practices?	✓		
17	Are there documented functional and aesthetic thresholds integrated into pest control decisions?	✓		
18	Is there a written comprehensive Water Resources Management Plan that delineates the care of each of the course's water features?			✓
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 the maintenance activities and their performance been examined to determine the potential to negatively impact an identified environmental challenge?	✓		
Totals		9	5	6

<u>Operations & Maintenance</u>				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is there a written, regularly updated and comprehensive Turfgrass Management Plan for each type of turf and playing area?	✓		
2	Are there designated natural or minimally maintained buffers around sensitive landforms or features and/or core wildlife habitats?	✓		
3	Are green, tee, and fairway mowing heights maintained at levels that do not excessively stress important playing surfaces?	✓		
4	Are aeration, topdressing and 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 and map?		✓	
7	Is there at least one project planned and funded for the next year that would improve the course's protection of the environment?	✓		
8	Are all appropriate employees trained to be familiar with (national, federal, state, and OSHA) regulations that apply to storage and handling of potentially hazardous materials used on the property?	✓		
9	Has there been an examination of all aspects of the operation for potential negative impacts for the snack bar/restaurant, clubhouse, pro shop, pesticide mixing and storage facilities, fuel storage and delivery areas, and maintenance complex?	✓		
10	Have all employees received documented training that would increase their awareness of environmental stewardship goals and objectives?	✓		

Operations & Maintenance Checklist (continued).

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Are containers used to store used oil for equipment maintenance in good condition, not leaking, and clearly labeled?	✓		
12	Are oil/water separators and/or golf course wash racks operating properly and correctly maintained?			✓
13	Are all golf course vehicles and equipment maintained and cleaned in a manner that eliminates the potential for spreading of disease or other contamination?		✓	
14	Are biodiesel and/or ethanol products utilized everywhere they may be appropriate?			✓
15	Are waste products such as oil, grease, tires, and batteries stored in a covered container and disposed of properly off site?	✓		
16	Does the superintendent use hand held GPS units to assist in GIS mapping of the golf course areas?			✓
17	Are energy efficiency ratings factored into equipment purchases for use throughout the facility?	✓		
18	Has the entire facility been studied to quantify solid waste streams to identify functions that produce the greatest quantities?		✓	
19	Are at least 90% plates, cups, and utensils in use by the restaurant/snack bar facility reusable rather than disposable?	✓		
20	Does course management utilize a web-based golf course planning tool for every day decision-making and recordkeeping?			✓
	Totals	13	3	4

<u>Water Resource Management</u>				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are written records of water quality monitoring activities, results, and pollution control measures readily available?	✓		
2	Where appropriate, are slow-release fertilizers and/or spoon-feeding techniques used to reduce the potential for runoff impacts and nutrient loading to water quality?	✓		
3	Does the irrigation system operate using computerized controllers based on real-time evapotranspiration rates?		✓	
4	Are the golf course sprinklers and outdoor irrigation of non-golf course areas and indoor plumbing regularly monitored and maintained for proper distribution and leaks?	✓		
5	Have low-flow water saving devices been installed wherever possible?	✓		
6	Is at least 65% of the irrigation water for the golf course property recycled or non-potable?			✓
7	Are there projects planned and funded that may eliminate or minimize a potential water quality or erosion problem?	✓		
8	Are water features regularly monitored for algae, erosion, excessive aquatic plant growth, eutrophication, and sedimentation?	✓		
9	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 there flow meters for monitoring total 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 or nutrient, salt or total suspended solid parameters?	✓		
15	Is water quality data regularly collected to establish baseline conditions and maintenance procedures for all water features on the property?	✓		
16	Are settling ponds and/or detention ponds used to effectively remove sediments and pollutants from entering important water features?			✓
17	Are biological processes such as the addition of grass carp or white amur used to control unwanted aquatic vegetation in major water features?	✓		
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	14	3	3

<u>Conservation</u>				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is all motorized equipment maintained for efficient operation that would minimize the potential of creating excessive air polluting emissions?	✓		
2	Has the entire golf course property been examined for critical habitats, state species of concern, and threatened or endangered species?	✓		
3	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 connect natural areas to facilitate wildlife movement through the course property by returning an area to its natural state or revising maintenance procedures?	✓		
6	Have all necessary permits been secured and are they updated and their requirements satisfied in a timely manner?	✓		
7	Are recycling containers conveniently provided for customer and employee use throughout the golf course facility?	✓		
8	Has there been a study to determine the presence of invasive exotic species on or near the course?	✓		
9	Is there a comprehensive and readily available Drought Management Plan for the entire golf course facility?		✓	
10	Is there at least one project planned and funded that may minimize or eliminate the course's potential negative environmental impacts?		✓	

Conservation Checklist (continued).

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Does management harvest storm water to supplement irrigation water supplies for use anywhere on the golf course facility grounds?			✓
12	Are at least 85% of plants used in landscaped areas drought-tolerant native trees, shrubs, groundcovers, or their cultivars?	✓		
13	Are there signs posted to highlight key habitats or have appropriate areas been designated "Environmentally Sensitive Zones" per The Rules of Golf?	✓		
14	Has a comprehensive energy audit been conducted for the entire golf course facility?		✓	
15	Are all employees trained to understand that poor management practices may adversely impact worker and environmental health and welfare?	✓		
16	Is there an inventory of bird and mammal species documented, maintained, and readily available?	✓		
17	Are food, shelter, and nesting attributes of plant species for landscape development considered during the design/selection process?		✓	
18	Have all damaged or degraded habitats due to construction or maintenance of the course been fully restored?	✓		
19	Has the entire property been examined for archaeological, cultural, or historical resources?	✓		
20	Is the irrigation pump station a variable speed model for energy efficiency?	✓		
Totals		14	4	2

<u>Pesticides & Pollution Prevention</u>				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there established, documented and communicated minimally maintained and fertilizer and pesticide application buffer areas around water features or sensitive landscapes?	✓		
2	Is the equipment wash rack adequately covered to minimize or 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 at a designated wash rack where pollution prevention measures are employed?	✓		
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 playing area) of each pesticide used; - the area (SF/SM) and quantity of each pesticide used; - the chemical or common name of the active ingredient(s); - the date, location, or purpose of the application?	✓		

Pesticides & Pollution Prevention Checklist (continued).

#	Environmental Compatibility Indicator	Yes	Partial	No
11	Are all pesticide applications recorded and mapped to guide future pest control decisions?		✓	
12	Other than the head 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 IPMIS being used to track activities including surveillance and biological, cultural, mechanical, and chemical controls?			✓
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	Is there a regularly updated Water Pollution Abatement Plan readily available for the golf course property?			✓
19	Are golfers adequately notified in the pro shop and on the first and tenth tees about the day's planned or recently completed spraying of any chemical or fertilizer?	✓		
20	Are there written pest profiles for common regional pests along with alternative potential control measures readily available?			✓
	Totals	12	2	6



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Failed elements of the current 16th hole complicate maintenance, aesthetics and playability..

<u>Environmental Compatibility Quotient Summary</u>			
Environmental Compatibility Category	Yes	Partial	No
Planning & Compliance	9	5	6
Operations & Maintenance	13	3	4
Water Resource Management	14	3	3
Conservation	14	4	2
Pesticides & Pollution Prevention	12	2	6
Totals	62	17	21

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

March 2009 - Windy Trails Golf Course ECQ:

- **Actual ECQ = 62**
- **Potential ECQ = 79**

<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 for consideration in the GEM Plan. Along with the newly established baseline, the GEM Plan consists of a map and description of the final environmental challenges and the prescribed approach to their management. In addition, the GEM Plan includes a comprehensive list of future environmental management goals and objectives and a course-specific set of best practices.

The following environmental challenges were identified during the GCEBA process:

- Nesting migratory birds
- Installation Restoration Program sites
- Potential airfield expansion
- Wetlands
- Bird/Wildlife Aircraft Strike Hazard (BASH)

The following environmental challenges were identified during the GEM process:

- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Wetlands
- Water quality
- DASR/RAPCON project
- Installation Restoration Program sites
- Migratory birds



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Employee safety is a high priority.

Assessing environmental challenges

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

DESCRIPTION

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

DRIVER/REQUIREMENT

Challenges are defined as “things that are bigger than the course”. Some of the reasons behind why a particular issue becomes a challenge are important to recognize and understand. A driver or requirement may be a local, regional, or national law, regulation, or initiative that creates the requirement to protect species, habitat, or preserve a resource such as open space or unique ecosystems.

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 inside front cover), 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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Windy Trails’ “natural” areas vary with the amount of precipitation.



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Canada geese are the leading BASH concern at Altus AFB.

BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH)

The airfields and their environs at Altus AFB provide favorable habitat for feeding, loafing, breeding, and roosting of both indigenous and over-wintering bird populations, thus creating the potential for bird-aircraft strikes. Compounding this problem is the fact that Altus AFB is located along the Mid-Continental Flyway for migratory birds. Some of the species creating a hazard in this area include: cattle egrets, hawks, kites, quails, and cranes. In addition to the bird species, mammals such as rabbits, hares, and occasionally coyotes that wander into the area can be strike hazards as well. The adopted BASH Plan establishes implementation procedures and actions that can be taken to minimize the potential of aircraft bird strikes. Such measures include eliminating broad-leaf weeds, maintaining grass heights to between 7 and 14 inches, removing perch sites and brushy or forested areas, reducing or eliminating standing water, planting non-seeding grasses or mowing before seed heads develop, and scheduling aircraft flying hours to avoid peak bird flying times.

97 AMW/SE has the responsibility to implement the approved BASH Plan. The BASH Plan also establishes the Bird Hazard Working Group (BHWG) composed of representatives of flight safety, civil engineering, airfield management/base operations, air traffic control, operations, and other concerned organizations. The current BASH Plan can be found in Chapter 9: Operational Component Plans.

Windy Trails is located in relative close proximity to the airfield at Altus AFB. The actual runways are much farther removed yet are still within sight of the golf course facility. Golf managers must be cognizant of the potential hazard to the flying missions on their installation from golf course maintenance practices. Each and every action that could possibly contribute to the increase of birds and wildlife on the

golf course must be coordinated with the environmental and flying safety offices prior to their implementation.

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
- 3RD Wing Instruction 91-212
- AFD 91-2, Safety Programs

Objective

Ensure that golf course management practices contribute to the overall elimination of potential BASH concerns.

Management approach

- 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
- Secure membership on BASH Working Group and regularly attend meetings
- Continue to assist installation airfield and environmental managers with BASH concerns on the golf course
- Continue to coordinate with installation natural resources manager, airfield management, and contracted USDA personnel
- Establish buffers and coordinate with contracted maintenance personnel for mowing and trimming practices along banks of water features
- Comply with depredation permit at all times
- Eliminate all unnecessary vegetation around water bodies

Target

Initiate consultation immediately and regularly thereafter to ensure compliance with airfield management and BASH criteria and assess, identify and eliminate 25% of the BASH conditions on the course prior to the next iteration of the natural resources management plan.



*Windy Trails
Golf Course
Altus AFB, OK*

The golf course pond is an integral part of the golfing experience.

WETLANDS

Design and construction of golf courses is a specialized business. Successful projects are a result of expertise and diligence in both design and construction. Field decisions can overcome difficulties to improve the process for the owner/developer. In the case of the recent addition to Windy Trails GC, some details were not dealt with prior their construction, and now, long-term maintenance and management. One of these is the basin to the left of the 3rd fairway. This area is wet or at least moist nearly year round. Vegetation typical of wetlands is beginning to establish themselves on banks and in the shallow, ever changing shoreline. Eventually, this area will be officially designated as a wetlands, greatly affecting how the golf staff can maintain it. Action should be taken to ensure that if this water hazard is a desirable component of the golf course, that it be properly graded to minimize the potential for emergent vegetation. Also, willow trees are just beginning to get large enough to be a removal problem. If these trees are undesirable as a long-term playability component at Windy Trails GC, then action should be taken soon.

Driver/requirement

- Clean Water Act, Section 404
- National Pollutant Discharge Elimination System (NPDES)
- Executive Order 11990, Protection of Wetlands

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 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
- 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

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 year.

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

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

Correct all potentially non-compliant wetlands related aspects prior to the end of CY 2009.



*Windy Trails
Golf Course
Altus AFB, OK*

Cart path system needs a lot of work.



*Windy Trails
Golf Course
Altus AFB, OK*

One of many water features, this is the irrigation supply lake.

WATER QUALITY

One of the primary concerns of golf course managers is the relative high quality of water on their property. The quality of the irrigation water used on push up greens greatly affects their overall care. Windy Trails is blessed with ample water resources that both improve the playability of the course while providing sufficient quantity for irrigation use. Keeping the waters pristine is a function of the daily care and maintenance of the turfed areas – especially those near ponds and drainages.

Driver/requirement

- Clean Water Act, Section 401
- National Pollutant Discharge Elimination System
- Safe Drinking Water Act
- Federal Water Pollution Control Act of 1977 (Clean Water Act), as amended (33 U.S.C. 1251-1376)

Objective

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

Management approach

- Floor drains are directed to sanitary drains with oil water separator
- All material and waste stored inside buildings or cabinets
- Covered wash rack with grass cuttings trap
- Tanks are double walled
- Repair activities are performed under a covered area
- Covered & bermed pesticide/herbicide storage and mixing area
- Flammables stored in secure cabinets
- Drip pans under dispensing units

- Site personnel perform visual inspections of the area
- Security fencing installed
- Operational protocol understood by employees
- Spill response equipment is available
- Drip pans under dispensing units
- Consult with installation environmental staff to ensure that golf course maintenance practices are fully compliant with complex water-related regulations
- Compile a comprehensive Water Resource Management Plan for the entire golf course facility
- Continue to enlist assistance to correct backflow deficiency
- Establish, document and communicate pesticide and fertilizer application buffers around all water features
- Establish and document appropriate pesticide and fertilizer application setbacks or buffers around monitoring wells

Target

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

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

Correct all potentially non-compliant water resource aspects prior to the end of CY 2010.



*Windy Trails
Golf Course
Altus AFB, OK*

Wash rack is poorly designed and is a maintenance nightmare.



The proposed DASR/RAPCON facility site plan clearly depicts the project's impacts to the golf course.

MISSION PROJECT REQUIREMENT IMPACTS

The Altus AFB mission and its requirements are the highest priority for each and every resident or employee. Installation commanders have secured funding for a military construction project – the DASR/RAPCON. As a result of the project, the golf course will lose the entire 17th hole to include teeing area, green and irrigation and approximately 200 yards of the 18th hole to include teeing areas, fairway and irrigation. Initial direction of the proposed solution compounded the course's already poor routing creating additional distance between holes for walkers while increasing risk for all golfers. The suggested solution improves circulation flow by building a new green to be used for the 16th hole and utilizes existing 16th green and uses the same existing teeing area and layout as the initial direction for the 18th hole. Diligent, in-kind replacement for displaced golf course amenities used during development of suggested solution that stays within the costs as delineated by the 1391.

Driver/requirement

- Mission support
- National Environmental Policy Act
- AFI 32-7060, Environmental Impact Analysis Process

Objective

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

Management approach

- Utilize suggested concept plan for new design direction in the Request for Proposal
- Ensure that the RFP includes requirement to hire a qualified golf course architect to prepare construction documents
- The selected golf architect shall provide a list of recommended golf course

builders for the A-E to procure cost proposals for the construction

- The selected golf architect should be utilized during construction for golf course-specific Title II duties to ensure quality performance by the selected golf course builder
- 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.



This concept plan is one possible solution to rerouting the displaced holes while maintaining a vital golf course for the Airmen of Altus AFB.



*Windy Trails
Golf Course
Altus AFB, OK y*

Explosives storage is not far removed from the 7th hole.

INSTALLATION RESTORATION PROGRAM (IRP) SITE

There is one active installation restoration program (IRP) site on the golf course property. Unfortunately, it is located just short of the landing area on the first hole not far removed from the clubhouse. The site has been designated SWMU 01 and is the location of the former fire protection training area. Plans are to excavate and dispose of the dioxin/furan-contaminated surface soil at an off-Base licensed facility. This will necessitate action from the golf staff as to protect customers from the proposed restoration action and associated equipment while still functioning as a golf course. Care should be given as to how the action is conducted as well as how the area will be restored as the first fairway at Windy Trails Golf Course.

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

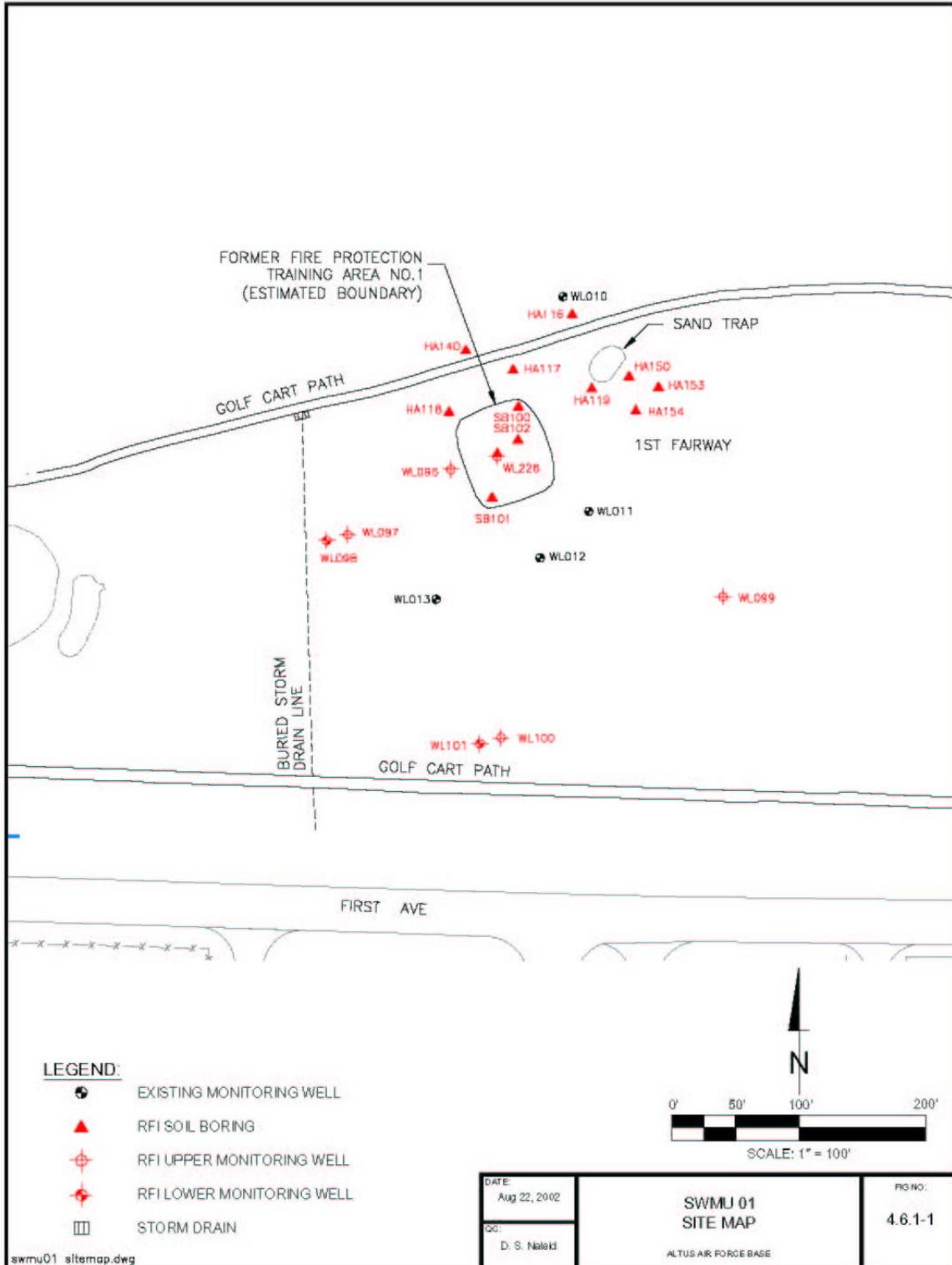
Ensure daily compliance with restoration program site requirements.

Management approach

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

Target

Immediately integrate specified land use controls into regular maintenance practices.





*Windy Trails
Golf Course
Altus AFB, OK y*

Photo by Peter A. Weber

The Mississippi kite is a wonderful small to medium sized raptor with a passion for protecting its nesting sites.

MIGRATORY BIRDS

The Integrated Natural Resources Management Plan (INRMP) indicates that the Mississippi kite has become a problem at the golf course as they dive at golfers and maintenance workers during nesting season. Mississippi kites are migratory birds (south to Brazil/Argentina) that return annually to where they were born. The pest management and environmental staffs coordinate efforts to gain what results in limited relief for Windy Trails Golf Course customers. According to the INRMP, harassment (noise, etc.) of birds while they are building nests is acceptable. Once eggs have been laid, they can be removed from nests and relocated to another nest. The parents get aggressive after eggs have been laid and fledglings emerge. Fledglings can be removed and taken to a rehabilitator. Bottom line is the long-term issue - the birds return to where they were born.

Driver/requirement

- Migratory Bird Treaty Act, as amended (16 U.S.C. 703 et. seq.)
- Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, January 10, 2001
- Migratory Bird Conservation Act

Objective

To discourage bird activity by destroying nests prior to eggs being laid (Empty Nest Policy). Ensure that golf course management practices consider the protection of all migratory birds and their habitats.

Management approach

- Discourage nest construction
- Employ harassment/hazing techniques to move protected bird species
- Use approved irritants as applicable
- Utilize the depredation permit as the last option
- Work closely with installation environmental staff to document presence of migratory birds such as the Mississippi kite and follow all provided maintenance guidelines

Target

Plan to monitor kite nest building according to recommended timeframes per the natural resource manager's guidance and remove all observed nests immediately. Immediately begin migratory bird management consultation with the installation environmental staff.



*Windy Trails
Golf Course
Altus AFB, OK*

Nesting migratory birds can be an issue for customers and employees alike.

Implementation

Setting goals and objectives is an important step in the implementation of an installation's GEM Plan. Implementation is the single best evidence that the installation GEM team is working well together in their task of supporting the mission.

GEM Plan goals & objectives

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

- Compile and post a map of the property highlighting environmental challenges
- Assemble a map of the courses hot spots or specific areas that require special care or attention
- Request an comprehensive energy audit for the entire golf course facility and begin implementation where greatest values are identified
- Take action to separately store fertilizers and pesticides

Objectives are defined as actions or results that are desired to be accomplished prior to the next INRMP update in 2015.

- Compile a comprehensive Golf Course Development Plan that includes plans for tree management complete with planting plan and maintenance schedule, drought management
- Secure funding for correcting design deficiencies of existing wash rack
- Identify and implement a plan to use available recycled water for at least 65% of expected irrigation needs
- Create and utilize a systematic approach to scouting as part of the Integrated Pest Management Plan to include standardized forms and use of IMPMIS tool

GEM Plan best practices

Best practices are defined as any action, method, practice, or result that has proven its value and worth over time. The GEM program has been designed to create a body of scientific data to share with all U.S. Air Force installation golf and environmental staff members.

- Pesticide use reduction processes in place and constantly being improved
- Using more earth-friendly fertilizer products
- Moved from gasoline to electric golf carts

Conclusion

Although the journey to improve Windy Trails Golf Course to the desired condition by the golf staff for their customers is a steep and heavily graveled one, it is worthy of the effort. Recreational opportunities afforded by Air Force golf courses in the form of fresh air and an attractive, safe place to launch a few Rock Flights when the feeling comes over an Airman or employee is hard to quantify. With an established goal and a workable implementation plan, improvements can become a reality. The current golf staff members are a good start. Let's finish the job they have started so well.

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.



Small practice area has been a safety concern.



Pro shop is small yet still fills customer needs.



Fuel tank near the cart storage facility.



Pond and accoutrements at the 16th are in poor condition.



Snacks are self-serve in the clubhouse.



Tree stumps affect aesthetics and playability.



Malfunctioning wash rack has never performed well.



Drinking water supply operation is in clubhouse.



Water quality monitoring wells are a necessary intrusion.



Education is key to protecting employees and customers.



Undesirable elms are the dominant tree species.



Early spring offers little contrast for players.

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