Air Force Center for Environmental Excellence

Cypress Lakes Golf Course
Environmental Baseline Assessment
Travis AFB, California Aug 03

Executive Summary

U. S. AIR FORCE GEM PROGRAM GOALS

The U. S. Air Force Golf Course Environmental Management (GEM) program is a proactive Air Force Center for Environmental Excellence (AFCEE) initiative to foster a better understanding of the environmental challenges facing our golf courses worldwide. Armed with the support and approval of the Air Force Services Agency golf program, AFCEE's goal is to facilitate the creation of an environmentally friendly golf course facility while supporting the mission.

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

GEM PROGRAM PROCESS

There are five steps in the GEM program process.

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

This report is the result of the analysis step.

CYPRESS LAKES GOLF COURSE TRAVIS AFB, CALIFORNIA ENVIRONMENTAL CHALLENGES

The following environmental challenges were identified during the GCEBA process:

- Groundwater/aquifer protection
- Air quality
- Invasive exotics/noxious weeds
- Water conservation

Further information on the environmental challenges at Cypress Lakes Golf Course can be found in the Conclusion of this Golf Course Environmental Baseline Assessment.

WHERE DO WE GO FROM HERE?

The golf course staff should determine their preferred management approach for the challenges above in context with their ongoing goals of providing the best golfing experience for the money. They should then coordinate these practices with the installation environmental staff to ensure their compatibility with installation wide natural resources and environmental goals and objectives followed by implementation.

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Introduction

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

The ultimate intent of the program is to provide a foolproof, customer-driven management tool that will free up course managers and superintendents to devote more of their efforts to caring for their customers and the course. Properly designed and implemented, the GEM Plan will keep the facility in compliance with the ever-changing environmental rules and regulations while providing a vital recreational opportunity for the installation.

A sand bunker guards one of the greens at Cypress Lakes Golf Course.

Water use and water quality receive special attention in California.

Goal of the GEM Program

The goal of the U. S. Air Force GEM program is to facilitate the creation of an environmentally friendly golf course facility for its customers while supporting the installation mission. The Air Force Center for Environmental Excellence (AFCEE) is dedicated to helping to identify ways that more rounds can be played on better-conditioned courses while minimizing or eliminating negative impacts to the environment. In most cases, the U. S. Air Force's golf courses are being managed compatibly with the environment. The GEM program is the vehicle to document our successes while communicating directly with the golfers, our commanders, and the local community.

Clubhouse is well sited among towering eucalyptus trees.

Program Process

Implementation is the most important phase of any initiative where practices and procedures are examined and may undergo significant change. This is especially true of the GEM Plan process. The specifics for the GEM Plan components and directions for their completion are delineated on AFCEE's Golf Course Environmental Management web site listed inside the back cover of this report.

The GEM Program is derived from many diverse environmental regimes such as the National Environmental Policy Act, the Environmental Compliance Assessment and Management Program, and the ISO 14000 environmental management system. The primary tenets of the GEM Program are to minimize or eliminate potential negative environmental impacts, attain and maintain daily compliance with all appropriate regulations, and constantly examine our processes on all aspects of golf course management to achieve the highest standards of environmental excellence. There are five basic steps in the implementation of the GEM Program process:

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

Localized dry spots due to faulty sprinkler operation or design or varying soil conditions complicate the superintendent's job during extended dry periods.

Cypress Lakes offers little to no topographic relief over its 200+ acres.

Analysis

Experienced environmental managers realize the importance of assembling all of the data relevant to a problem prior to determining its best solution. Analysis is the first and most important task of the golf course environmental baseline assessment (GCEBA) and the GCEBA is the initial step in the process of creating an ecosystem-based Golf Course Environmental Management (GEM) Plan. Properly completing the GCEBA is paramount to the long-term compatibility of an installation's golf course management practices with the GEM Program, and more importantly, the U. S. Air Force's natural resource and environmental management goals and objectives.

GCEBA COMPONENTS

The GCEBA is comprised of the following components:

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

Good food served with a smile is all a customer needs.

Documentation

It is not enough just to know how to create a successful golf course environmental management program. There has to be a written record of 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 be a comprehensive report with a map that will assist in the daily management of the course while providing a convenient vehicle to communicate to our customers the environmental issues that challenge us on our golf course and our plans to deal with them. In order to reach the environmental stewardship goals set by the U. S. Air Force, we must consistently employ only those management practices that minimize or eliminate potential negative impacts to the environment.

GEM PLAN COMPONENTS

The GEM Plan will be comprised of the following components:

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

Implementation

Positive and decisive action is the only true measure of the success of a GEM Program. By implementing new practices, whether to knowingly improve the course's role in the environmental stewardship of the installation or to just try new ideas to determine their value, will the golf staff and golfers benefit. The Cypress Lakes staff should adopt the GEM Program Environmental Policy and immediately begin finding ways to minimize or eliminate any and all negative impacts to the environment.

Evaluation

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

Revision

The very nature of a superior GEM program implies that all documents be regularly maintained to represent the most current conditions. U. S. Air Force golf course managers and superintendents should be constantly looking for ways to improve their environmental stewardship. Acting on lessons learned is right behind initial implementation as the most important aspect of a successful GEM Program. The GEM Plan should be kept as current as possible at all times. Ideally, it should be completely updated at least every three years.

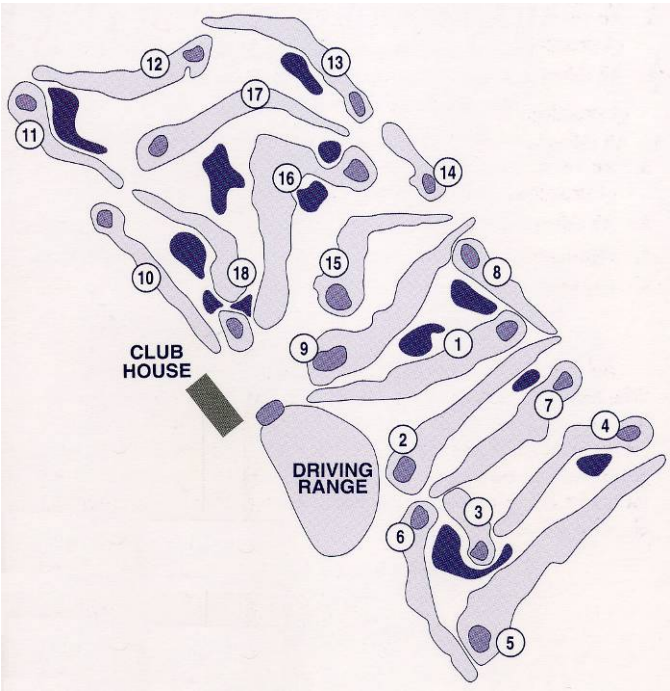
Covered patio is a popular spot to revisit the round.

Attractive entry gate starts the experience off right.

Course Specific Analysis

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

- Course description
- Course details
- Miscellaneous facilities review



Cypress Lakes Golf Course routing map.

Course description

Travis AFB's Cypress Lakes Golf Course is a unique U. S. Air Force in many ways. The 206-acre course is located approximately four miles off the main installation property and is completely surrounded by agricultural land uses. Even more significant, Travis AFB's drinking water supply is pumped from the property. Like many military courses, Cypress Lakes was constructed in phases with the "back" nine first in 1960 and the "front" in 1961. Seemingly, very little soil was moved during construction with the exception of excavating the many water features that serve as hazards as well as flood control devices.

Course details

Architect		Civil Engineering (?)
Year constructed		1960/1961
Climate		Humid w/ high rainfall
Average annual rainfall		17-20 inches
Winds/Prevailing Direction		Southwest/North
Total Facility Acreage		206
Par		36-35-71
Yardage/Rating/Slope		Champion- 6873/72.7/125
		Regular- 6505/70.9/121
		Forward- 5785/73.0/120
Turfgrass	Tees	Bentgrass
	Fairways	Per. ryegrass/Bentgrass
	Greens	Per. ryegrass /Bentgrass
	Roughs	Dallasgrass/clover

Cypress Lakes Golf Course, Travis AFB, California

Miscellaneous Facility Review

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

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

Orderly and attractive, the shop is adequately stocked with goods.

Function rather than form describes Cypress Lakes' clubhouse.

Clubhouse

Cypress Lake's clubhouse was constructed in a familiar U. S. Air Force style about the same time as the course. "Early 1960's CMU" describes the architectural style. Completely functional, yet starting to show its age, The Director of Golf would surely appreciate a new facility in the near future. The pro shop and facility administrative offices are in one wing while the snack bar and dining area comprise the other. Both are clean and attractive components of a good golf operation. Regardless of the facility, Joyce and her staff manage to glean an outstanding measure of value as evidenced by their bevy of satisfied regular customers.

The driving range is conveniently located adjacent to the 1st tee.

Practice areas

Cypress Lakes Golf Course practice opportunities begin with a 13-acre driving range with both turfgrass and "turf" mats for use by the customer. A large practice putting green

While not attractive, one would be hard pressed to significantly improve on the functional adequacy of Cypress Lakes' pesticide mixing and storage areas.

Pesticide mixing and storage

The superintendent and his staff maintain one of the best pesticide mixing and storage areas in the U. S. Air Force.

Cart barn is a large "Butler" building.

Cart barn

The cart barn is made up of two separate metal buildings installed over time in a highly visible location near the 10th tee and the clubhouse. Little to no attempts have been taken to buffer or screen the utilitarian facilities from the view of customers.

High quality site amenity groups are located at most teeing areas.

Infrastructure

This section examines important elements of a quality golf course that are difficult to group into another category. Cart paths are in fair to good condition. The parking lots are in good condition and seem to be of sufficient size to satisfy the regular demands of customers. Landscape development attempts have been relatively unsuccessful and should only be continued with a professional landscape architect's input where appropriate. There is a site amenity group near most teeing areas and the course signage is satisfactory.

Maintenance complex

The maintenance complex is a conglomeration of old, derelict buildings. Fortunately, the entire area is scheduled for an upgrade in FY04. A highlight of the complex is a high-tech, expensive wash water treatment and recycling unit that almost totally eliminates the potential for negative environmental impacts.

The main facility for the maintenance operation is in dire need of replacement.

Mechanic's area is Spartan, yet serviceable.

The superintendent makes due in his "office".

Environmental Compatibility Quotient Checklists

The following is a brief compilation of some of the observations in each of the ten Environmental Compatibility Quotient (ECQ) categories during the site visit.

ECQ Categories

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

Only a few holes suffer from a lack of visual definition from the tee.

ECQ Checklists

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

- As an analytical tool while compiling a Golf Course Environmental Baseline Assessment like this one.
- As a self-assessment tool for the golf course manager or superintendent.

As an award nomination evaluation by a Golf Course Assessment Team (GCAT).

Groundwater is protected by engineered containment measures.

Key to checklist responses

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

Determining the Environmental Compatibility Quotient

The ECQ compiled for an installation's course is a snapshot of the overall performance and compliance with the GEM Plan. There are two ways to use the ECQ checklists to determine the status or quality of the environmental management program: determining the actual and potential environmental compatibility quotients.

- **Actual ECQ-** the total percentage of "Yes" responses for all ten checklists.
- **Potential ECQ-** the total percentage of "Yes" responses plus the total percentage of "Partial" responses for all ten checklists.

ECQ Scoring Scale

Percent Responses Yes or Partial per Category	Level
93-100%	Advanced
83-92%	Getting there
73-82%	Showing progress
63-72%	Early stages
Less than 62%	Just started

Overall Management Philosophy & Documentation

U.S. Air Force GEM program goals

- Enhance the installation ecologically and economically
- Demonstrate that the golf course is managed with consideration for the unique conditions of the ecosystem of which it is a part
- Document management practices to promote more widespread understanding and appreciation for environmentally sound golf course facilities
- Share information on the environmental opportunities and constraints of your golf facility with your customers, the golfers

Observations

- Condensing number of managed environmental documents to fit in one binder should prove more efficient
- Implement planned improvements to all aspects of the golf facility management
- Utilize installation environmental management geographic information system and civil engineering digital aerial photographs for mapping requirements
- Complete and maintain the golf course maintenance plan

Snack bar dining area affords the best potential for sharing info.

Information abounds while access and utility are questionable.

Overall Management Philosophy & Documentation

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

Safety, Training, & Awareness

U.S. Air Force GEM program goals

- Educate all employees on the benefits of an ecosystem based golf course environmental management program
- Store and handle all potentially harmful products to minimize employee exposure
- Regularly train employees on the potential health hazards associated with their duties
- Involve entire staff in ensuring a safe golfing opportunity for their customers

Accessible, up to date, and easy to use describes MSDSs at Cypress Lakes' golf course maintenance complex.

Signage could be improved to protect customers and employees alike.

Observations

- Demonstrate genuine concern for player health and safety through documented actions
- Consistent lack of funding hinders training plans
- Enlist installation environmental staff to regularly conduct in-house training

Safety, Training, & Awareness

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

Compliance

U.S. Air Force GEM program goals

- Integrate management practices with appropriate regulatory requirements and procedures
- Guarantee safe, healthy, and enjoyable experience for golfers while ensuring long-term operation of the facility
- Utilize installation expertise regularly on all matters dealing with bird aircraft strike hazards, regulators, impact analysis, and cleanup

Electric carts are the only type used at Cypress Lakes G.C.

Fully compliant material storage is standard operation procedure.

Observations

- Assemble all information into one comprehensive document
- Attempt to do more than what is required
- Fueling stations are good examples of appropriate practices
- Continue to ensure ECAMP results are outstanding
- Establish and nurture quality relationships with installation staff to assist with identified environmental challenges
- Air quality concerns will continue to grow as the installation is in non-attainment status for ozone and maintenance for carbon monoxide

Compliance

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is fuel storage/delivery managed in accordance with federal, state, and local regulations?	✓		
2	Are installation environmental staff members included in on-going course management discussions and plans at regularly scheduled meetings?			✓
3	Are there regularly scheduled staff meetings to discuss environmental management issues?	✓		
4	Does the director of golf and the superintendent attend ECAMP in-briefings and out-briefings?			✓
5	Does the director of golf and/or the superintendent coordinate with installation environmental staff on the various management plans that affect or include the golf course?		✓	
6	Have all necessary permits been updated and their requirements satisfied in a timely manner?	✓		
7	Has appropriate impact analysis (NEPA) been performed on all proposed actions on or affecting the golf course property?	✓		
8	Are containers used to store used oil in good condition, not leaking, and clearly labeled?	✓		
9	Are oil/water separators operating properly and correctly maintained?	✓		
10	Are projects planned and funded for the next year that would increase the compatibility of the course's management methods with the environment?	✓		
	Point totals for each column - Response percentage	**7**	**1**	**2**

Pesticide Use, Storage, & Handling

U.S. Air Force GEM program goals

- Ensure that all chemicals will be used, stored, and handled in appropriate manner at all times
- Compile and utilize an Integrated Pest Management approach to caring for the entire golf facility
- Licensed pest applicators will be strongly encouraged to attend personal safety training and health monitoring programs

Super Joe Goldbronn ensures his material storage is fully compliant.

A brand new spraying unit is almost ready for duty.

Observations

- Excellent storage and mixing facilities will ensure spills and equipment cleaning will have minimal impacts
- Minimalist approach to pesticide application by Superintendent Joe Goldbronn eliminates most potential negative impacts
- New maintenance complex should innately improve environmental stewardship at Cypress Lakes
-

Pesticide Use, Storage, & Handling

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

Pollution Prevention

U.S. Air Force GEM program goals

- Employ practices that eliminate or avoid the potential for polluting the environment
- Guarantee that the golf course facility will not allow chemicals, fertilizers, detergents, or petroleum products they use to migrate outside their property boundaries
- Create and utilize a comprehensive pollution prevention plan for all aspects of the golf course and its facilities

Appropriate collection, temporary storage, and eventual recycling are important functions of all golf maintenance operations.

Drinking water wells on the course serve the entire installation.

Observations

- Further reduce solid waste streams from clubhouse operations
- Decrease or eliminate the use of slow release fertilizers to protect the drinking water aquifer below the course
- Regularly provide training for all employees on the specifics of pollution prevention and how they can help
- Ensure there are no spills that may pollute the groundwater

Pollution Prevention

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there designated "no-mow" areas and established "no spray zones" and buffer areas around pond, river, stream, or lake edges and have they been communicated to mower operators and technicians?	✓		
2	A spill containment kit is readily available and spill containment procedures are in place?	✓		
3	Does the chemical storage area have a sealed metal or concrete floor and are all pesticides handled over an impermeable surface?	✓		
4	Does the chemical storage area have a lip along the edges to contain spills?	✓		
5	Are liquid products stored below dry products and are dry materials stored on pallets or shelves to keep them off the floor?	✓		
6	Has the Installation Spill Plan been amended to include the golf course facility?	✓		
7	Are grass clippings blown off equipment with compressed air instead of or prior to washing?	✓		
8	Are gasoline, motor oil, brake and transmission fluid, solvents, and other chemicals used to operate or maintain equipment and vehicles prevented from directly or indirectly entering water bodies?	✓		
9	Does the fuel storage and delivery area comply with local, state, and federal regulations?	✓		
10	Are slow-release fertilizers used to reduce the negative potential for runoff?	✓		
	Point totals for each column - Response percentage	**10**	**0**	**0**

Conservation Practices

U.S. Air Force GEM program goals

- Use natural resources efficiently while respecting their long term value to the local community and the mission of the USAF
- Provide important greenspace benefits
- Closely monitor and manage water use to prevent unnecessary depletion of installation or local water resources

Condition of the soil in non-irrigated roughs is irrefutable evidence that it rarely rains in the interior valleys of California.

"If you build it, they will come."

Observations

- Incorporate contour mowing procedures
- Increase communication with customer on conservation practices that are already in place
- Continue building relationships with installation natural resources manager and other environmental professionals
- Consider incorporating larger buffer areas around water features
- Provide detailed input to the scheduled update of installation integrated natural resources management plan (INRMP)

Conservation Practices

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

Water Resources

U.S. Air Force GEM program goals

- Minimize or eliminate potentially negative environmental impacts to all on- or off-site water resources
- Preserve water resources by using only those quantities required to maintain quality playing surfaces
- Ensure that any maintenance practices on or near water features are coordinated with appropriate personnel prior to taking action

Several of the water features suffer from lack of depth, algae, rampant vegetation, and poor water quality

Irrigation pump house is almost hidden by trees and fencing.

Observations

- Ensure new drinking water wells and new maintenance complex are compatible with all state and federal laws dealing with wellhead protection
- Water feature maintenance is a mixed bag due to their dual functions as hazards and flood control
- Superintendent Goldbronn's water use contingency plan one of the first observed
- Continue to search for ways to minimize water use while still maintaining quality playing conditions

Water Resources

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are water features regularly monitored for algae, erosion, excessive aquatic plant growth, fish kills, and sedimentation?	✓		
2	Wash and wastewater is kept from making direct contact with surface water and is recycled or allowed to filter through a vegetative area when cleaning and maintaining equipment?	✓		
3	Outdoor irrigation of non-golf course areas and indoor plumbing are regularly monitored and maintained for leaks?	✓		
4	Has the golf course staff been provided with stormwater management planning requirements from the installation's environmental staff?	✓		
5	Have part circle irrigation heads been installed where possible to preserve water resources and reduce maintenance while minimizing potential negative impacts to surrounding natural areas?	✓		
6	Are all water feature maintenance tasks coordinated with the installation natural resource manager and bird/wildlife aircraft strike hazard officer?		✓	
7	Has the irrigation system been completely checked for proper water distribution in all irrigated areas and are water leaks fixed in a timely manner?	✓		
8	Are the parking lots for customers and employees at least partially constructed with permeable surfaces and are they drained through an area of turfgrass or vegetation prior to discharge into a water feature?			✓
9	Does the facility have a Drought Management Plan written, ready, and available when, or if, irrigation restrictions may be instituted?	✓		
10	Are water quality problems immediately reported to supervisors or regulatory agencies (if required) for appropriate action?	✓		
	Point totals for each column - Response percentage	**8**	**1**	**1**

Maintenance Practices

U.S. Air Force GEM program goals

- Integrate the concept of ecosystem management into all course management decisions and practices
- Employ the principles of integrated pest management
- Document all activities for future reference
- Constantly examine management practices to look for improvements
- Insist on a well-trained staff

Overall, the course is maintained to a high level of playability.

Limit "spot" treatment with Roundup to low visibility areas.

Observations

- Increased training and involvement of staff on integrated pest management procedures
- Compile written pest profiles of common pest species
- Improve water hazard care to eliminate unwanted vegetation while improving aesthetics and habitat
- Begin mapping "hot spots" to improve efficiency and playability
- Secure funds to improve tree management and care

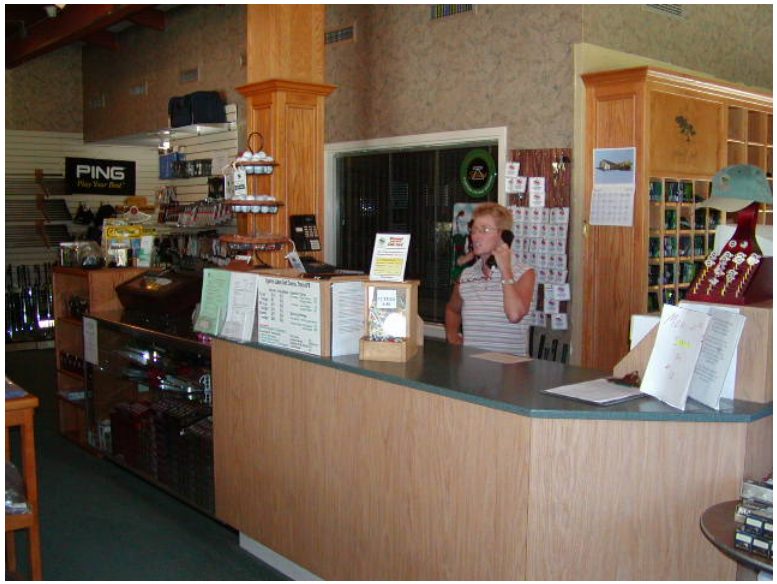
Maintenance Practices

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is contour mowing used to conserve fuel and increase playability and aesthetics?	✓		
2	Are there designated non-maintained or minimally maintained buffers around core wildlife habitats?	✓		
3	Are green, tee, and fairway mowing heights maintained at reasonable levels without continually stressing turf or maximizing chemical inputs?	✓		
4	Are there regular procedures in place to continually improve soil health such as organic amendments, aeration, and drainage?	✓		
5	Is there a map of the course's "hot spots" requiring special care or regular attention?			✓
6	Is all maintenance equipment maintained and cleaned in a manner that eliminates the potential for spreading of contamination?	✓		
7	Has there been a complete examination for potential negative environmental impacts of all aspects of the operation including snack bar/grill, clubhouse, pro shop, and maintenance complex?	✓		
8	Are trees and other vegetation on the course maintained to encourage positive airflow and sunlight penetration to improve cultural conditions for the turfgrass as well as to minimize pesticide inputs?	✓		
9	Have all playing surfaces been inventoried and mapped for soil types including soil structure, nutrient levels, organic content, compaction, and water infiltration?			✓
10	Are soil tests and plant tissue analysis used to determine nutritional requirements?		✓	
	Point totals for each column - Response percentage	**7**	**1**	**2**

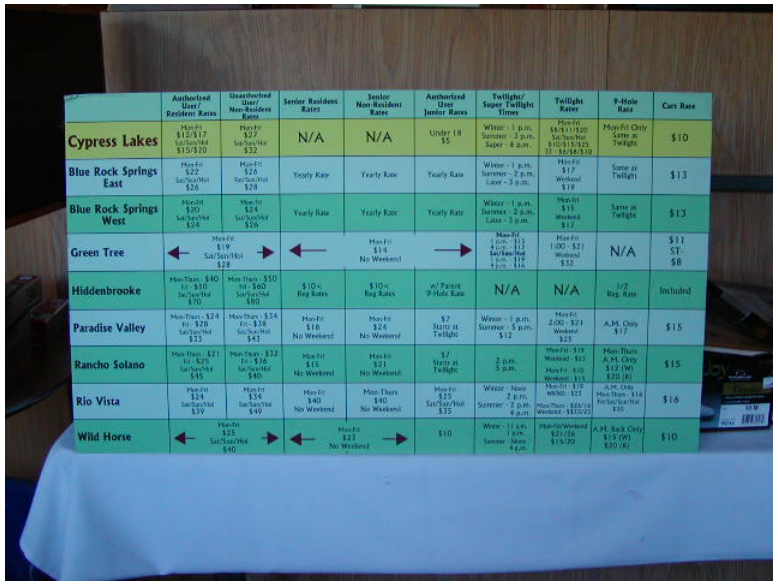
Customer Relations & Education

U.S. Air Force GEM program goals

- Ensure that the customer knows that their opinions count and will be acknowledged, assessed, and acted upon
- Educate the customers about the benefits of environmentally responsible golf course management and the future of the game and the environment
- Enlist customer support and assistance on caring for the course and its facilities as well as GEM Plan goals



Pro shop offers numerous opportunities to educate and enlighten.



	Authorized User/ Resident Rates	Unauthorized User/ Non-Resident Rates	Senior Resident Rates	Senior Non-Resident Rates	Authorized User Junior Rates	Twilight/ Super Twilight Times	Twilight Rates	9-Hole Rate	Cart Rate
Cypress Lakes	Mon-Fri $12/$17 Sat/Sun/Hol $15/$20	Mon-Fri $27 Sat/Sun/Hol $32	N/A	N/A	Under 18 $5	Winter - 1 p.m. Summer - 3 p.m. Super - 6 p.m.	Mon-Fri $8/$11/$20 Sat/Sun/Hol $10/$15/$25 ST - $6/$8/$10	Mon-Fri Only Same as Twilight	$10
Blue Rock Springs East	Mon-Fri $22 Sat/Sun/Hol $26	Mon-Fri $26 Sat/Sun/Hol $28	Yearly Rate	Yearly Rate	Yearly Rate	Winter - 1 p.m. Summer - 2 p.m. Later - 3 p.m.	Mon-Fri $17 Weekend $19	Same as Twilight	$13
Blue Rock Springs West	Mon-Fri $20 Sat/Sun/Hol $24	Mon-Fri $24 Sat/Sun/Hol $26	Yearly Rate	Yearly Rate	Yearly Rate	Winter - 1 p.m. Summer - 2 p.m. Later - 3 p.m.	Mon-Fri $15 Weekend $17	Same as Twilight	$13
Green Tree	← Mon-Fri $19 Sat/Sun/Hol $28 →		← Mon-Fri $14 No Weekend →			Mon-Fri 1 p.m. - $13 Sat/Sun/Hol 1 p.m. - $14 4 p.m. - $16	Mon-Fri 1:00 - $21 Weekend $32	N/A	$11 ST- $8
Hiddenbrooke	Mon-Thurs - $40 Fri - $50 Sat/Sun/Hol $70	Mon-Thurs - $50 Fri - $60 Sat/Sun/Hol $80	$10< Reg Rates	$10< Reg Rates	w/ Parent 9-Hole Rate	N/A	N/A	1/2 Reg. Rate	Included
Paradise Valley	Mon-Thurs - $24 Fri - $28 Sat/Sun/Hol $33	Mon-Thurs - $34 Fri - $38 Sat/Sun/Hol $43	Mon-Fri $18 No Weekend	Mon-Fri $26 No Weekend	$7 Starts at Twilight	Winter - 1 p.m. Summer - 5 p.m. $12	Mon-Fri 2:00 - $21 Weekend $25	A.M. Only $17	$15
Rancho Solano	Mon-Thurs - $21 Fri - $25 Sat/Sun/Hol $45	Mon-Thurs - $32 Fri - $36 Sat/Sun/Hol $40	Mon-Fri $15 No Weekend	Mon-Fri $21 No Weekend	$7 Starts at Twilight	2 p.m. 5 p.m.	Mon-Fri - $19 Weekend - $23 Mon-Fri - $10 Weekend - $13	Mon-Thurs A.M. Only $12 (W) $20 (R)	$15
Rio Vista	Mon-Fri $24 Sat/Sun/Hol $39	Mon-Fri $34 Sat/Sun/Hol $49	Mon-Fri $40 No Weekend	Mon-Thurs $40 No Weekend	Mon-Fri $25 Sat/Sun/Hol $35	Winter - Noon - 2 p.m. Summer - 2 p.m. 6 p.m.	Mon-Fri - $19 WEND - $23 Mon-Thurs - $20/18 Weekend - $23/21	A.M. Only Mon-Thurs - $16 Fri/Sat/Sun/Hol $30	$16
Wild Horse	← Mon-Fri $25 Sat/Sun/Hol $40 →		← Mon-Fri $23 No Weekend →		$10	Winter - 11 a.m. 1 p.m. Summer - Noon 4 p.m.	Mon-Fri/Weekend $21/26 $15/20	A.M. Back Only $15 (W) $20 (R)	$10

Comparative cost chart is a great tool for convincing customers of the inherent value of the U. S. Air Force golfing experience.

Observations

- Continue efforts to solicit customer opinions and concerns
- Create a location to communicate environmental management goals and maintenance plan in either or both the pro shop and snack bar wings of the clubhouse
- Step up staff efforts to involve installation youth through rules and instruction clinics

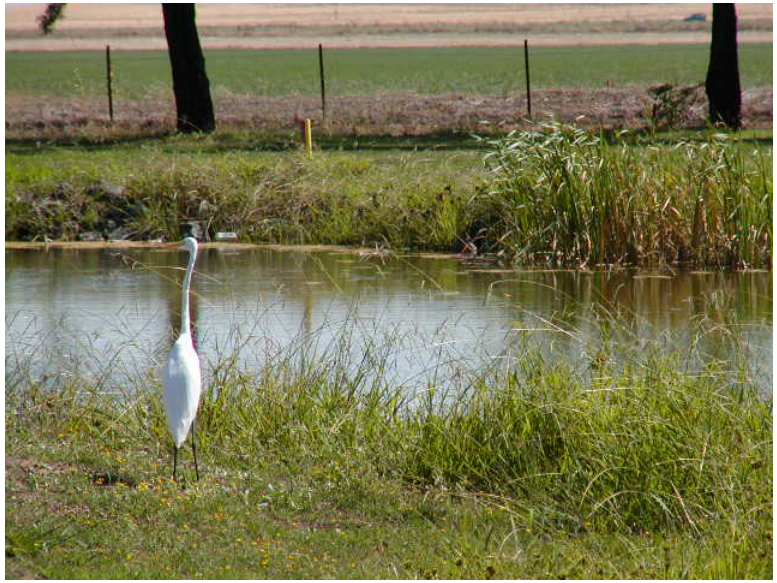
Customer Relations & Education

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

Miscellaneous Special Projects & Activities

U.S. Air Force GEM program goals

- Educate the local community about the benefits of an environmentally responsible golf course management approach is for the future of the game and the environment
- Reach out to school children to raise their awareness and appreciation for the game of golf and the GEM Plan principles
- Further the great game of golf at all times in as many ways as possible



Cypress Lakes has amenities that should be of interest to local students.

Continue to improve facility through highly planned projects.

Observations

- Conduct field trips at the course for local school children
- Enlist the assistance of local city and county officials on golf course environmental planning initiatives
- Initiate Earth Day environmental awareness golf tournament
- Educate customers about the benefits of an environmentally friendly golf course
- Need to demonstrate dedication to “growing” the great game of golf to young airmen, other installation non-golfers, and youth

Miscellaneous Special Projects & Activities

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there projects planned and funded for the next year that would communicate the compatibility of the course's management methods with protection of the environment?	✓		
2	Are there projects planned and funded to reduce the course's potential negative environmental impacts?	✓		
3	Are there tournaments planned that may increase awareness of the facility's specific environmental-challenges?			✓
4	Are there regular field trips for local students or other local community groups hosted at the course?	✓		
5	Are there projects planned to eliminate or minimize a potential erosion problem?	✓		
6	Does the course have a native tree installation program complete with planting plan and maintenance schedule?			✓
7	Are any of the local schools or universities involved in educational or research activities at your course?			✓
8	Are there special facility-wide recycling programs underway?	✓		
9	Is your course an active participant in the USAF Golf Environmental Management Program?	✓		
10	Has your facility been nominated by your MAJCOM for the golf course environmental management award in the last 3 years?			✓
	Point totals for each column	**6**	**0**	**4**

ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	5	4	1
2	Safety, Training, & Awareness	7	2	1
3	Compliance	7	1	2
4	Pesticide Use, Storage, & Handling	5	2	3
5	Pollution Prevention	10	0	0
6	Conservation Practices	9	1	0
7	Water Resources	8	1	1
8	Maintenance Practices	7	1	2
9	Customer Relations & Education	4	2	4
10	Miscellaneous Special Projects & Activities	6	0	4
	Composite points & response percentage	**68**	**14**	**18**

GCEBA Results

Σ Cypress Lakes Golf Course, Travis AFB, California

- Actual ECQ (# of "Yes") 68 = "Early stages"

- Potential ECQ (Actual ECQ plus "Partial") = 82 "Showing progress"

Conclusion

The Director of Golf and her staff seem to make the most of a less than perfect situation at Cypress Lakes. Since the course is located away from the installation and is surrounded by relatively low population and farmland, “walk-on” customers tend to be rare. The course is adequately routed and attractively maintained. Concessions to top-notch maintenance practices due to ongoing budget constraints are easily observed although the course is highly playable and fun for the average Cypress Lakes customer. Marketing attempts have met with some success but more aggressive campaigns may need to be waged to garner a larger share of the young airmen and civilians from the Travis AFB cantonment area itself.

Significant improvements to the course could be made with relatively minimal expense if a master plan of the proposed projects were to be compiled to direct the inevitably long-term effort.

Areas needing improvement

The ECQ Summary on the previous page highlights the following areas for relative improvement at Travis AFB:

- Overall Management Philosophy & Documentation
- Pesticide Use, Storage, & Handling
- Customer Relations & Education

The gallery

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

Site of new maintenance complex is within the existing fence.

Irrigation pump house interior.

Tee shot landing areas can be greatly improved over time with a plan.

Wear areas take a long time to heal unless special measures are taken.

Wash area and water treatment and recycling station is state of the art.

This is the best facility among the many in the maintenance complex.

Some of the water features barely have any water.

The greens at Cypress Lakes play a lot better than some of them look.

Large amounts of debris have no place on a golf course.

Environmental challenges

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

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

The following environmental challenges were identified during the GCEBA process at Cypress Lakes Golf Course, Travis AFB, CA:

- Groundwater/aquifer protection
- Air quality
- Invasive exotics/noxious weeds
- Water conservation

GROUNDWATER/AQUIFER PROTECTION

The Cypress Lakes Golf Course is home to several pumping stations that provide mission-supporting and life-sustaining drinking water for the entire installation. Travis AFB civil engineers are in the process of adding at least two new wells that will increase the pumping capacity while adding important alternatives to installation contingency planning. Protecting this vital resource from contamination from golf course management practices is paramount. To this end, Cypress Lakes has one of the most modern pollution prevention tools in their recycling wash rack. Complete examination of all aspects of this potentially paralyzing environmental challenge should be undertaken to ensure that in no way will the operation of the golf course jeopardize this groundwater resource.

Recycling/treatment plant protects groundwater resource.

AIR QUALITY

Travis AFB is in the Yolo-Solano Air Quality Management District managed from offices in Davis, CA. This region is non-attainment status for ozone and is in maintenance status for carbon monoxide. The region is projected to be in non-attainment for the 8-hour ozone measuring method coming soon from our friends at the EPA. Cypress Lakes Golf Course's maintenance complex must secure a P-166-95a permit to operate their non-retail gasoline storage and dispensing facility. Integral parts of the permit are daily, quarterly, and yearly emission limits for volatile organic compounds (VOCs). In addition, they are limited to an annual gasoline-pumping limit of 12,000 gallons. Since air quality concerns are a nation-wide concern and a specialty in California, steps to address unnecessary emission sources should be taken. Also, the state of California is studying the emissions of small engines to determine appropriate controls. Most, if not all, of the golf course maintenance equipment will be subject to these laws in the making.

INVASIVE EXOTICS/NOXIOUS WEEDS

The California Native Plant Society defines an invasive exotic plant, of which are several of the state's listed noxious weeds, as "a plant which is able to proliferate and aggressively alter or displace indigenous biological communities". One of the plants that has proliferated in the non-irrigated areas of the course is yellow star thistle. It is unsure if steps should be taken to attempt to control this endemic species, as extreme measures are needed to even begin to hinder its germination and spreading.

Yellow star thistle thrives in the droughty non-irrigated outer roughs.

WATER CONSERVATION

Travis AFB is a low rainfall region where every drop of water must be wisely used. The entire region relies on groundwater that is largely a result of detaining snowmelt off nearby mountain peaks. Cypress Lakes Golf Course obtains its water for irrigation purposes from Lake Berryessa through a contract with the Solano Irrigation District. Generally, the course utilizes every acre-foot purchased. In the early 1990's, the course was using 334 acre-feet per year. Superintendent Joe Goldbronn published a Water Contingency Plan for the course that delineated four increasingly restrictive measures that could be taken by the course to save water. Up to 30% savings could be realized in a "normal" year.

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Air Force Center for Environmental Excellence
Technical Directorate
Natural Infrastructure Division

For additional assistance or more information, please contact:
U.S. Air Force GEM Program Manager– 210-536-3719 - DSN 240-3719
AFCEE/TDN, 3300 Sidney Brooks, San Antonio, TX 78235-5112

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