



***Sunrise Vista Golf Course***  
**Environmental Baseline Assessment**  
**Nellis AFB, Nevada      May 02**



## 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.

### SUNRISE VISTA GOLF COURSE NELLIS AFB, NEVADA ENVIRONMENTAL CHALLENGES

The following environmental challenges were identified during the GCEBA process:

- Ecosystem management
- Invasive exotics
- Water use
- Water quality management
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Threatened & endangered species

Further information on the environmental challenges at Sunrise Vista 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.



*Attractive and affordable golf is Sunrise Vista's primary attribute.*



*F-16 model reminds golfers of the real mission at Nellis AFB.*

## 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.



*One would be hard pressed to find a better climate for golf.*

## 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 will be delineated in AFCEE's ***Golf and the Environment, Guidelines for the 21<sup>st</sup> Century***.

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



*The natural landscape of Las Vegas features creosote and saltbush.*



## 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

## 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 Sunrise Vista 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.

## 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
- Maintenance facility evaluation
- Miscellaneous facilities examination



*Quality golf instruction is also available at Sunrise Vista.*



*Minimal grade changes and quality turf typify Sunrise Vista's 36 holes.*

### Course description

Located in the hot and dry Mojave Desert, Nellis AFB's Sunrise Vista Golf Course provides customer-pleasing golf in the sunny Las Vegas Valley. With roughly 260 acres of golf course, customers at the 36-hole facility keep the manager and his staff hopping year round. The golf course features enjoyable design with some of the best all around turf in the Air Force.

The superintendent works miracles as the course's quality far outpaces his budget to do such a great job. The average Las Vegas course needs about \$100K per hole for maintenance whereas Sunrise Vista's budget averages less than \$40K.



## Sunrise Vista Golf Course

## Course details

Architect		Not provided
Year constructed		Not provided
Climate		Hot, dry, windy
Average annual rainfall		4 inches
Average growing season		Approx. 300 days per year
Winds/Prevailing Direction		Northeast/Southwest
Total Facility Acreage		260
Par		36-36-72 & 36-36-72
Yardage/Rating/Slope		Phantom/Thunderbird
		Blue- 6946/72.5/123
		White- 6474/70.2/118
		Gold- 6074/67.7/115
		Red- 5863/74.2/121
		Eagle/Falcon
		Blue- 7051/71.7/115
		White- 6558/69.7/112
		Gold- 5611/66.3/105
		Red- 5444/70.3/113
Turfgrass	Tees	Tifway 419 Bermudagrass
	Fairways	Tifway 419/Com.Bermuda
	Greens	Tifdwarf 328 Bermuda
	Roughs	Common Bermudagrass



*Water features and quality maintenance create positive golfing experience for all levels of golfers at Nellis AFB's Sunrise Vista G. C.*

## Miscellaneous Facility Review

Although the course is primary to the enjoyment and eventual return of most of Sunrise Vista' customers, the support facilities play a huge role in 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



*Formal entry to clubhouse is attractively appointed.*



*Snack bar does good business for breakfast and lunch.*

## Clubhouse

The clubhouse functions well although it could be improved with a facelift on the inside combined with a little more room. Since Air Force golfers usually come to play the course rather than hang out in the pro shop or snack bar, the clubhouse will probably suffice for many years to come.



*Chipping area is well located and nicely maintained.*

## Practice areas

Sunrise Vista Golf Course is blessed with an outstanding driving range, an accommodating short game practice area and two practice putting greens. This assembly comprises one of the Air Force's best practice areas. About the only improvement could be a dome and high volume air conditioning over the facilities to encourage higher use.



*It is hard to beat segregation and full containment.*

## Pesticide mixing and storage

Sunrise Vista Superintendent Bill Fielder is blessed with having two full time assistants to help him with the nearly 300 acres of turf maintenance. Mr. Fielder has a fine pesticide area as well. Segregated, properly labeled and shelved pesticides are the norm. The more hazardous liquid materials are stored with full containment to further reduce the risk of pollution to water bodies. Of course, only licensed applicators are used to spray any of the controlled pesticide substances.



*Sunrise Vista boasts over 170 golf carts.*

## **Cart barn**

The cart barn is adequately sized, neatly organized, and highly functional. Electric golf carts are used exclusively for efficiency at Sunrise Vista Golf Course. With 170 units, the course can run both courses full and still have fully charged carts available.



*Irrigation pump house has been recently upgraded.*

## **Infrastructure**

This section examines important elements of a quality golf course that are difficult to group into another category. Cart paths are in good to fair condition. The parking lots are in fair condition and seems large enough to satisfy the regular demands of Sunrise Vista' customers. Landscape development attempts have been marginally successful. There is a site amenity group near most teeing areas. Overall, the course signage is adequate.

## Maintenance complex

The maintenance complex is well organized, clean, and functional. Ample space for equipment, parking, storage, and administrative areas are available for a professionally run operation.



*Safe, high quality hydraulic lift eases the chore of maintaining the expensive mowing equipment.*



*Well-designed spaces allow for clean and orderly equipment storage.*



*Low rainfall climate allows for some equipment to be stored outside.*

## 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
- Course Playability
- Pollution Prevention
- Conservation Practices
- Aesthetics & Naturality
- Maintenance Practices
- Customer Relations & Education
- Miscellaneous Special Projects & Activities

## 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).



*Model Thunderbird and exemplary landscape start latest addition.*



*Water use is the primary concern in the Las Vegas area.*

## 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.

### Key to checklist responses

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

### ECQ Scoring Scale

<u>Percent Responses Yes or Partial per Category</u>	<u>Level</u>
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

- Stellar example of quality coordination and team work with installation environmental staff
- Need to compile and document actions already taken to create “continuity” document
- 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
- Need to secure computer hardware and software upgrades to increase overall efficiency and provide high speed internet access
- New clubhouse interior should be appointed with a location to present environmental information to customers



*An experienced and savvy superintendent can grow quality turf in any climate, no matter how difficult.*

<b>Overall Management Philosophy &amp; Documentation</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Has management demonstrated that the environment is an important part of their responsibilities by initiating the GEM Planning process?	✓		
2	Has the golf course adopted and posted an Environmental Policy?	✓		
3	Is the GEM Plan underway or completed, available, and updated regularly?		✓	
4	Is a map of the property highlighting 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 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?	✓		
	<b>Point totals for each column</b>	<b>7</b>	<b>2</b>	<b>1</b>

## 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



*Employee safety is serious business at Sunrise Vista.*



*Locate a place to share environmental information with the customer.*

### Observations

- Expanded training for all employees a must to completely realize GEM goals
- Ensure employee's health is prime consideration
- Demonstrate genuine concern for player health and safety through actions
- Consider using AFCEE for on-site golf course environmental management training
- Lack of funding hinders training plans
- Business tempo and training scheduling makes it difficult to involve much of the staff at one time

<b>Safety, Training, &amp; Awareness</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	All employees are familiar with the GEM 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	All 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	The chemical storage structure/area is locked, well-ventilated, fire proof, and access is limited to select personnel?	✓		
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?		✓	
	<b>Point totals for each column - Response percentage</b>	<b>6</b>	<b>3</b>	<b>1</b>

# 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



*Exemplary fueling station design and maintenance.*



*Probably the most readily available MSDSs in the U. S. Air Force.*

## Observations

- Assemble all documents in one place
- Do more than what is required
- Inconsistent interpretations of compliance actions among installation, MAJCOM, and ECAMP evaluators confuses and confounds
- Ensure ECAMP results are outstanding
- Relationship with installation environmental and engineering staff is exemplary

<b>Compliance</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
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	Are MSDSs readily available for all required substances?	✓		
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 written and readily available records maintained of all applications of pesticides made by certified applicators, including the following? <ul style="list-style-type: none"> <li>- the quantity of each pesticide used</li> <li>- the chemical or common name of the active pesticidal ingredient(s) (not the product name)</li> <li>- the pest or purpose for which the pesticide was applied</li> <li>--the date and place of application.</li> </ul>	✓		
	<b>Point totals for each column - Response percentage</b>	<b>8</b>	<b>1</b>	<b>1</b>

## Course Playability

### U.S. Air Force GEM program goals

- Create desirable playing conditions through the utilization of sound, ecosystem based environmental management practices
- To daily offer an enjoyable and challenging yet fair golfing experience for all levels of golfers
- Establish an open, courteous, and friendly relationship between the course manager, the superintendent, and the customer to maintain enthusiasm and interest



*Turf quality at Sunrise Vista rivals local “high dollar” resorts.*



*Green size and speed, bunker sand, and overall design of the course all are ideal for the average golfer enjoyment.*

### Observations

- Improve challenge while maintaining equitable playing conditions for all levels of golfers
- Maximize variety in course set-up by including a diversity of challenging pin placements and numerous tee locations
- Continue focusing maintenance efforts on in-appropriate play areas of the course
- Increase contour mowing for greater definition of fairway landing areas

<b>Course Playability</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Pin placements and tee markers are regularly moved to minimize the impacts of play while increasing the enjoyment and diversity of the experience of the customer?	✓		
2	Course has sufficient number of tees to satisfy need of all types of golfers and their individual talent levels?	✓		
3	At least 75% of the greens are proportionally sized for the average length of approach shot for required all levels of golfers?	✓		
4	The speed of the greens is appropriate to their contours and size?	✓		
5	Fairway width and turf quality is sufficient for equitable challenges to all levels of golfers?	✓		
6	Roughs are regularly maintained to produce an equitable challenge to all levels of golfers?	✓		
7	Course conditioning and maintenance practices do not contribute to extending average playing times?	✓		
8	Extraneous fairway bunkers have been eliminated or converted to grass bunkers to help speed play?	✓		
9	Is bunker sand of appropriate quality and consistency?	✓		
10	Is proper drainage maintained near at least 95% of all greens and tees?	✓		
	<b>Point totals for each column - Response percentage</b>	<b>10</b>	<b>0</b>	<b>0</b>

## 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



*Turf is closely mowed right up to edge of pond bank.*



*Chemical containers are triple rinsed and disposed of properly.*

### Observations

- Further reduce solid waste streams from clubhouse operations
- Increase the use of slow release fertilizers
- Regularly provide training for all employees on the specifics of pollution prevention and how they can help
- Although pesticide facility is functional, consider purchasing state of the art facility and relocating nearby maintenance complex
- Completely cover fueling area rather than just the tanks

<b>Pollution Prevention</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are there designated "no-mow" areas and established "no spray zones" and buffer areas around pond, 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	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?		✓	
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?	✓		
	<b>Point totals for each column - Response percentage</b>	<b>7</b>	<b>2</b>	<b>1</b>

## 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



*Burrowing owls take advantage of most any type of shelter nature or man may provide.*



*“Natural” area is more of a weed seed nursery*

### 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 through the manager, Jim Hickey’s innovative GEMC (Golf Course Environmental Management Committee) idea
- Provide detailed input to the scheduled update of installation integrated natural resources management plan (INRMP)

<b>Conservation Practices</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are all motorized golf course equipment checked regularly for excessive air polluting emissions?			✓
2	Has the irrigation system been completely checked for proper water distribution in all irrigated areas and are water leaks fixed in a timely manner?	✓		
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	Have part circle irrigation heads been installed where possible to save water resources?	✓		
7	Are employees encouraged to minimize their trips around the course to conserve on the use of fossil fuels?			✓
8	Does the snack bar utilize reusable plates and silverware for use by customers throughout the facility's operating hours?		✓	
9	Have all potential 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?	✓		
<b>Point totals for each column - Response percentage</b>		<b>5</b>	<b>3</b>	<b>2</b>

## Aesthetics & Naturality

### U.S. Air Force GEM program goals

- Create and maintain an attractive golf course facility that requires minimal outside chemical or fertilizer inputs
- Utilize native or indigenous plant materials exclusively
- Consider every aspect of the golf course facility as a positive contributor to the overall satisfaction of the customer



*An excellent example of landscape development dollars well spent.*



*Low water plant materials add distinctive forms and color to the overall golfing experience.*

### Observations

- Enlist environmental staff to determine how the golf course staff can assist in the removal of invasive exotics that dominate the landscape
- Increase number and variety of new native trees added to course every year
- Funds needed to expand landscape improvements to selected areas on the course should be programmed for the near future

<b>Aesthetics &amp; Naturality</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Is the area near the clubhouse attractively landscaped and maintained?	✓		
2	Is there an appropriately located and attractive facility sign and has the on course signage been designed and maintained attractively?	✓		
3	Does the course seem to be part of the natural landscape and overall contours?	✓		
4	Are pest-resistant and drought-tolerant native trees, shrubs, groundcovers, or their cultivars used in landscaped areas?	✓		
5	Are there "targeted", highly visible areas where flowering annuals or perennials are appropriately maintained?	✓		
6	Are the relative numbers of the prominent deciduous, evergreen, and flowering golf course trees balanced and at least 75% native species?			✓
7	Are the maintenance facility and the course's miscellaneous "outbuildings" maintained sufficiently and/or screened from view?	✓		
8	Is there an attractive and well-maintained site amenity group (bench, washer, etc.) at least 75% of the tees?	✓		
9	Do the driving range, practice areas, and parking areas present a positive image?	✓		
10	Is the cart barn integrated into the overall landscape plan of the course or the area in which it is located?	✓		
	<b>Point totals for each column - Response percentage</b>	<b>9</b>	<b>0</b>	<b>1</b>

## 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



*New course combines great cart path detail with questionable mowing patterns.*



*Turf quality means the most to golfers and Sunrise Vista's turf is about as good as it gets.*

### 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
- Increase number of trained scouts on the maintenance staff

<b>Maintenance Practices</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
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	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?			✓
7	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?		✓	
8	Are there established and documented aesthetic and functional thresholds for insects, fungal diseases, and weeds for all managed areas to precisely and effectively manage pest populations and reduce chemical 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?	✓		
	<b>Point totals for each column - Response percentage</b>	<b>4</b>	<b>2</b>	<b>4</b>

## 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



*The bogeys stop here.*



*Great day at the course begins at the putting green next between the clubhouse and then first tee.*

### Observations

- Efforts to solicit customer opinions and concerns are a great example for all U. S. Air Force golf facilities
- Create a location to communicate environmental management goals and maintenance plan in the new clubhouse
- Continue to involve installation youth through rules and instruction clinics

<b>Customer Relations &amp; Education</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are the course manager and superintendent involved in a 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	Are there warning signs posted near parking lots to make highly sensitive individuals aware of the potential danger to their health and are all state posting requirements being met?			✓
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?	✓		
	<b>Point totals for each column</b>	<b>7</b>	<b>0</b>	<b>3</b>

## 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



*Burrowing owls and golf are relatively compatible.*



*Signs at each tee on the Thunderbird course involve and inform golfers with one of the many important missions at Nellis AFB.*

### 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

<b>Miscellaneous Special Projects &amp; Activities</b>				
<b>#</b>	<b>Environmental Compatibility Indicator</b>	<b>Yes</b>	<b>Partial</b>	<b>No</b>
1	Are there projects planned and funded for the 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 fundraising tournaments planned that may provide for future environmentally-related projects?			✓
4	Are there regular field trips for local students or other local community groups hosted at the course?			✓
5	Are there projects planned to eliminate or minimize a potential erosion problem?	✓		
6	Does the course have a native tree installation program complete with planting plan and maintenance schedule?			✓
7	Are any of the local schools or universities involved in educational or research activities at your course?			✓
8	Are there special facility-wide recycling programs underway?	✓		
9	Is your course an active participant in the USAF Golf Environmental Management Program?	✓		
10	Has your facility been nominated by your MAJCOM for the golf course environmental management award in the last 3 years?			✓
	<b>Point totals for each column</b>	<b>3</b>	<b>1</b>	<b>6</b>

## ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	7	2	1
2	Safety, Training, & Awareness	6	3	1
3	Compliance	8	1	1
4	Course Playability	10	0	0
5	Pollution Prevention	7	2	1
6	Conservation Practices	5	3	2
7	Aesthetics & Naturality	9	0	1
8	Maintenance Practices	4	2	4
9	Customer Relations and Education	7	0	3
10	Miscellaneous Special Projects & Activities	3	1	6
	<b>Composite points &amp; response percentage</b>	<b>66</b>	<b>14</b>	<b>20</b>

## GCEBA Results

Σ Sunrise Vista Golf Course, Nellis AFB, NV

- Actual ECQ (# of “Yes”) = 66 “Early Stages”

- Potential ECQ (Actual ECQ plus “Partial”) = 80 “Showing Progress”



*Like most Air Force courses, Nellis' could use more topographic relief and a few natural hazards.*

## Conclusion

Sunrise Vista Golf Course fulfills its purpose by providing quality recreational opportunities for its customers in the Las Vegas Valley. The course's 36 holes challenge all levels of players while minimizing highly specific maintenance from the superintendent's crew of 26. There are very few pressing environmental issues other than water use and protection of the flying mission through coordination of all activities with the installation BASH office. The manager should be proud of the job his maintenance staff does under existing budget constraints. Sunrise Vista Golf Course is a fine facility with great turf and is a lot of fun for the Nellis AFB customers.

## Areas needing improvement

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

- Conservation Practices
- Maintenance Practices
- Miscellaneous Special Projects & Activities

## 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.



*Salt cedars were one of the first species to prove reliable in the low desert. Unfortunately, they are invasive Chinese native species.*



*Excellent example of integrating form and function into the landscape.*



*Turf only thrives where it receives regular irrigation.*



*Improper construction traps water within the cart path.*



*Bridge is ready for replacement or repair.*



*Subtly contoured greens make putting an equitable challenge.*



*Detailed improvements add interest and quality to teeing ground.*



*Unique design approach integrates the cart path and drainage.*



*Course really only lacks topographic relief to be called great.*



*Recycling business neighbor is source of debris and headaches.*



*Good example of proper material storage.*



*"Natural" area is rife with weeds and lost balls.*



*Manicured pond bank may contribute to presence of algae.*

## 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 Sunrise Vista Golf Course, Nellis AFB, NV:

- Ecosystem management
- Invasive exotics
- Water use
- Water quality management
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Threatened & endangered species

## ECOSYSTEM MANAGEMENT

Nellis AFB subscribes to a goal-driven program and philosophy for managing natural and cultural resources on the installation. According to the INRMP, "ecosystem management considers the environment as a complex system functioning as a whole, ..." The natural resources managers are serious in their quest for "ecosystem integrity". So much so, that they believe that "any project which interferes with natural processes is undesirable and avoided whenever possible." It would behoove the golf course staff to comply with and coordinate every action they plan to take in order to stay out of potential hot water.

## INVASIVE EXOTICS

The Sunrise Vista Golf Course grounds are home to at least one species that qualifies as an invasive exotic: the tamarisk or salt cedar. This plant is an introduced species that has had a great effect on Nellis AFB native plant communities. The salt cedar is an aggressive colonizer especially where regular moisture is available, either through access to shallow groundwater or irrigation spray. They generally grow closely together in dense groups precluding the establishment of more desirable native species.



*Small trees at planting time make little to no impact for several years.*

## WATER USE

Nestled in the northeastern portion of the Las Vegas Valley, Nellis AFB only receives an average of 10 cm or around 4 inches of precipitation per year. Groundwater supplies approximately 29% of the installation's water. Any plant material save for the unbelievably tough and relative few high desert natives, must be irrigated to survive. Sunrise Vista Golf Course, with its 36 holes of quality turf must be the primary user of available water resources. According to the golf staff, Sunrise Vista uses 400 acre/feet per year. The course also receives 1-2 acre/feet of recycled water from installation pump and treat sites. Every attempt should be made to conserve water on the course. Any in-play trees should be low water varieties, preferably native to the area. Any landscape treatments should adhere to the Air Force Landscape Design Guide's xeriscape design guidance.

## WATER QUALITY MANAGEMENT

Although the INRMP state there is little chance of runoff discharge of pesticides, herbicides, and fertilizers due to low rainfall, high turf absorption, and high evapotranspiration rates, it goes on to state "the area of the Base with the greatest potential for generating excessive runoff is the golf course". The golf staff should consult the Storm-water Pollution Prevention Plan to determine pertinent issues.

Accordingly, turf buffers, no mow, and no spray zones should be established around all Sunrise Vista water bodies and all pertinent golf course staff should be trained concerning water quality issues. Slow release fertilizers should be used whenever possible. No pesticides should be applied when potentially severe rainfalls are predicted or expected.



*Irrigation system maintenance is a year round chore.*



*A burrowing owl peers out from cooling shade in drainage ditch bank.*

### **BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH)**

Since the course abuts the end of the runway at Nellis AFB, bird or wildlife aircraft strikes attributable to golf course management practices should be a significant concern. Although there is a BASH committee at Nellis AFB, no final plan had been made available at the time of the installation visit. The INRMP did not indicate that the golf course has been identified as a potential BASH problem.

### **THREATENED & ENDANGERED SPECIES**

The installation-provided 1998 Integrated Natural Resources Management Plan documents two plant species and five animal species that are variously listed that have been observed on Nellis AFB. The list includes Las Vegas bearpoppy, Las Vegas buckwheat, desert tortoise, burrowing owl, chuckwalla, phainopepla, and banded Gila monster. Any of the animal species could possibly be observed on the golf course grounds. Burrowing owls were observed 30-40 yards past the red tees in the desert on the right on Eagle hole #7, Phantom #2, and somewhere along the main drainage ditch on the Thunderbird nine. Bat species surveys will be conducted at the golf course ponds for three nights in June and three nights in August.



*Sulfur burner lowers pH of irrigation water to fight calcareous soils.*

## Bibliography

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

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

*Nellis AFB Plan 126-4, Integrated Natural Resources Management Plan*, Nellis AFB, NV, 2001, 99 CES/CEV



*Air Force Center for Environmental Excellence*



For additional assistance or more information, please contact:

**Air Force Center for Environmental Excellence**  
**Conservation and Planning Directorate**

**U.S. Air Force GEM Program Manager – 210-536-3719 DSN 240-3719**  
**AFCEE/ECE, 3300 Sidney Brooks, San Antonio, TX 78235-5112**

Or visit our Golf Course Environmental Management Program webpage:  
**<http://www.afcee.brooks.af.mil/ec/golf/>**