Marshallia Ranch Golf Course

Environmental Management Plan

Vandenberg AFB, CA Jul 07

Marshallia Ranch Golf Course
Environmental Policy

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

MARSHALLIA RANCH

GOLF COURSE

Executive Summary

U. S. Air Force GEM Program

The U. S. Air Force Golf Course Environmental Management (GEM) program is a proactive Air Force Center for Environmental Excellence (AFCEE) initiative to foster a better understanding of the environmental challenges facing our golf courses worldwide. Armed with the support and approval of the Air Force Services Agency golf program, AFCEE's goal is to facilitate the creation of an environmentally friendly golf course facility while supporting the installation mission. AFI 32-7064 requires a GEM Plan as part of the Integrated Natural Resources Management Plan (INRMP).

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

GEM Program process

There are five steps in the GEM program process.

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

Environmental Compatibility Quotient

Actual ECQ	**66**
Potential ECQ	**83**

Final environmental challenges

The following environmental challenges were identified during the GEM Plan process:

- Invasive species
- Water supply/conservation
- Archaeological/cultural resources
- Threatened & endangered species
- Air quality
- Water quality management & watershed protection
- Coastal zone management

Where do we go from here?

The true measure of a successful GEM program is how well is it executed in the field each and every day. The installation golf and environmental staffs should continue to analyze, document, monitor, evaluate, revise, and implement changes based on lessons learned. The GEM Plan should be updated annually and revised during the next INRMP iteration update. The entire GEM process can be found on the regularly improved AFCEE GEM program website (http://www.afcee.brooks.af.mil/ec/golf/).

Analysis

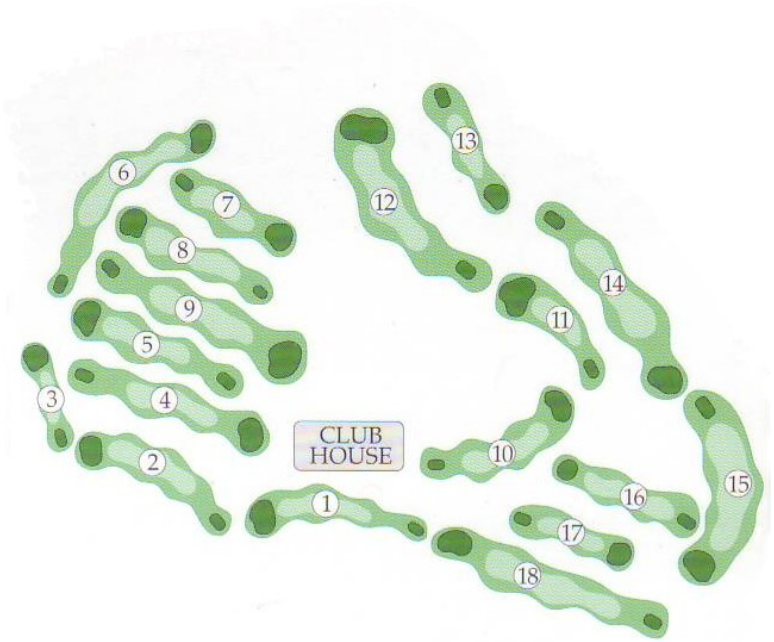
Course details

Architect		Robert Bolduc
Year constructed		1959
Climate		Coastal cool & breezy
Average annual rainfall		14 inches
Average growing season		300+ days
Winds/Prevailing Direction		NW
Total Facility Acreage		237 acres
Par		35-37-72
Yardage/Rating/Slope		Tee- Yards/Rating/Slope
		Blue- 6845/73.4/130
		White- 6388/71.1/124
		Red- 5404/66.1/111
Turfgrass	Tees-	Ryegrass
	Fairways-	Ryegrass/Kikuyu
	Greens	Poa annua/Bentgrass
	Roughs-	Kikuyugrass

Course description

Marshallia Ranch Golf Course provides a unique and rewarding recreational experience for golfers in the vicinity of the central coast of California. Rolling, droughty chaparral characterizes the landscape while the course is buffeted with stiff breezes off the Pacific Ocean, which is actually visible from one of the holes. A stern test for the average player, Marshallia Ranch features narrow fairways, wiry kikuyugrass roughs, and plenty of ice plant and thick stands of eucalyptus to punish all but the most accurate of players.

The Director of Golf is fortunate to operate one of the finest all around military golf facilities in the world. His clubhouse may be the best anywhere. His superintendent always has the course in great condition. The course has been so good over the years, Marshallia Ranch has hosted several USGA qualifiers as well as the U.S. Air Force championships. Certainly worthy of praise, the course is also one of the best values in the Air Force.



Marshallia Ranch Golf Course Aerial Photo

Determining the Baseline (ECQ)

The following is a brief compilation of some of the responses in each of the ten Environmental Compatibility Quotient (ECQ) categories obtained in an interview with the superintendent and the manager conducted during the site visit.

ECQ Categories

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

Key to checklist responses

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

ECQ Checklists

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

- As an analytical tool while compiling a Golf Course Environmental Baseline Assessment like this one.
- As a self-assessment tool for the golf course manager or superintendent.
- As an award nomination evaluation by a Golf Course Assessment Team (GCAT).

The landscape may be the only negative aspect of the clubhouse.

Interpreting the ECQ

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

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

ECQ Scoring Scale

Percent Responses Yes or Partial per Category	Level
90-100%	Advanced (Green)
70-89%	Showing progress (Yellow)
69% or less	Getting started (Red)

High quality practice facilities are conveniently located.

Maintenance wash rack utilizes a self-contained treatment system.

Overall Management Philosophy & Documentation

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Has installation environmental and golf management demonstrated that the environment is an important part of their responsibilities by initiating the GEM Planning process?	✓		
2	Has the golf course adopted and posted an Environmental Policy?			✓
3	Is the GEM Plan underway or completed, available, and updated regularly?		✓	
4	Is a map of the property highlighting identified environmental challenges available, used in the environmental management decision-making process, and is it posted for customers?		✓	
5	Are environmental challenges and their management method, target, and objective, and overall golf course GEM program goals evaluated at least annually and are they regularly communicated to employees, customers, management, and the local community?		✓	
6	Are written records of water quality monitoring activities, results, and control measures collected and readily available?	✓		
7	Is there an inventory of bird and mammal species maintained and readily available?	✓		
8	Is there a general understanding of how course management practices may positively enhance or adversely impact the environment?	✓		
9	Are the environmental impacts of pest control measures considered prior to their use as part of the course environmental management planning process?	✓		
10	Are records of pest treatments and their effectiveness maintained and used to guide future pest control decisions?	✓		
	Point totals for each column	**6**	**3**	**1**

Safety, Training, & Awareness

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are all golf course employees familiar with the GEM program and are they trained on the importance of environmental compliance with the goals and objectives of the program as it applies to their specific duties?			✓
2	Are all appropriate employees trained to be familiar with U. S. Air Force, federal, state, and OSHA regulations that apply to the storage, handling, and disposal of all chemicals potentially used on the property?	✓		
3	Are all employees aware of the potential risks to human health and the environment of chemical use, storage, and disposal?	✓		
4	All appropriate employees receive documented training on practices that may adversely impact worker health, on- and off-site water quality, and wildlife species and their habitats?		✓	
5	Is a current copy of Material Safety Data Sheets (MSDS) for all chemicals used anywhere on the golf course property maintained and readily available for use by regularly trained employees?	✓		
6	All employees receive regular, documented training on all potential OSHA issues associated with their specific duties?	✓		
7	Are all golf course pesticide applicators active participants in a respiratory and pulmonary testing program?			✓
8	Are all pesticides, fertilizers, and other chemicals stored on appropriate shelving in an approved storage facility?	✓		
9	Are golfers notified in the pro shop and on the first and tenth tees about the planned or recently completed spraying of any chemical or fertilizer that may potentially be hazardous to human health or general public safety?	✓		
10	Are key staff members trained regarding water quality and conservation issues pertinent to the course and their particular duties?	✓		
	Point totals for each column	**7**	**1**	**2**

Compliance

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are the fuel storage/delivery area and associated equipment managed in accordance with federal, state, and local regulations?	✓		
2	Are installation environmental staff members regularly consulted on pertinent course management discussions and plans?		✓	
3	Are there golf course staff meetings where environmental management issues are regularly discussed with all employees?			✓
4	Do the director of golf and the superintendent attend all internal and external ESOHCAMP in-briefings and out-briefings?			✓
5	Do the director of golf and/or the superintendent coordinate their input on the various management plans that affect or include the golf course with installation environmental staff?		✓	
6	Have all environmental challenges been physically identified and mapped to aid the golf staff's daily management efforts?		✓	
7	Has appropriate impact analysis (NEPA) been performed on all proposed actions on or affecting the golf course property?	✓		
8	Are oil containers used to collect old oil in good condition and correctly labeled?	✓		
9	Has the golf course staff assisted the installation environmental staff with the required Golf course Environmental Management Plan requirements?	✓		
10	Were there less than two major golf course facility-related findings during the last official ESOHCAMP visit?	✓		
	Point totals for each column	**5**	**3**	**2**

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 pest populations that notify management include findings into a report or guide for future use?	✓		
2	Are there written pest profiles of common pest species with a variety of potential control measures including cultural, biological, physical, and mechanical controls prior to treating the problem on the course?		✓	
3	Are there established, documented, and utilized aesthetic and functional thresholds for effective management of pests that may also reduce chemical use?		✓	
4	Is there a specially designed pesticide mixing area where all mixing is performed by appropriately trained personnel?	✓		
5	Has a current list of all pesticides and other chemicals stored or used at the golf facility recently been provided to the appropriate Fire Department(s)?			✓
6	Is there a written, readily available, and regularly updated Integrated Pest Management Plan for the entire golf course facility?	✓		
7	If personal protective equipment is required for pesticide use, storage, or handling, is it available for use by trained individuals?	✓		
8	Are written and readily available records maintained of all applications of pesticides made by certified applicators, including the following? - the quantity of each pesticide used; - the chemical or common name of the active pesticidal ingredient(s); - the pest or purpose for which the pesticide was applied; and the date and place of application.	✓		
9	Is the chemical storage structure/area well ventilated, fire resistant, and locked with access limited to select personnel?	✓		
10	Are there designated and documented "no spray" areas around pond, river, stream, or lake edges and have they been communicated to pesticide applicators?	✓		
	Point totals for each column	**7**	**2**	**1**

Pollution Prevention

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there designated and documented "minimally-maintained" or natural vegetative buffer areas around pond, river, stream, or lake edges and have they been communicated to mower operators and pesticide applicators?	✓		
2	Is there a readily available copy of the Installation Spill Plan that includes the golf course facility and is there a spill containment kit at each required location with spill containment procedures in place?	✓		
3	Does the chemical storage area have a sealed metal or concrete floor and are all liquid pesticides handled over an impermeable surface?	✓		
4	Does the chemical storage area have a lip along the edges to contain spills?	✓		
5	Are liquid products stored below dry products and are dry materials stored on appropriate pallets or shelves to keep them off the floor?	✓		
6	Do all golf facility employees regularly receive documented and approved HAZCOM and safety and health training?	✓		
7	Are grass clippings removed from equipment with compressed air instead of or prior to washing?	✓		
8	Are gasoline, motor oil, brake and transmission fluid, solvents, and other chemicals used to operate or maintain equipment and vehicles prevented from directly or indirectly entering water bodies?	✓		
9	Has the watershed in which the course resides and contributes runoff to been identified and mapped to aid the golf course staff?	✓		
10	Are appropriate quantities of fertilizers applied during weather conducive to reducing the potential for leaching and runoff?	✓		
	Point totals for each column	**10**	**0**	**0**

Conservation Practices

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

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	Are equipment wash or wastewater kept from directly entering surface water and are they recycled or allowed to filter through a vegetative area?	✓		
3	Are outdoor irrigation of non-golf course landscape areas regularly monitored and maintained for leaks and efficient performance?	✓		
4	Has the golf course staff coordinated with the installation's environmental staff on potential storm water management planning requirements?	✓		
5	Have part circle irrigation heads been installed where possible to preserve water resources and reduce maintenance while minimizing potential negative impacts to surrounding minimally maintained, natural, or water feature areas?		✓	
6	Are all water feature maintenance tasks coordinated with the installation Bird/Wildlife Aircraft Strike Hazard (BASH) officer and installation environmental management personnel?	✓		
7	Has the irrigation system been completely checked for proper water distribution in all irrigated areas and are water leaks fixed in a timely manner?	✓		
8	Are moving water bodies that pass through the golf course such as streams or creeks regularly monitored both upstream and downstream of the course for overall water quality?	✓		
9	Does the facility have an approved written and readily available Drought Management Plan if, or when irrigation restrictions may be required by the community or the installation?			✓
10	Is there a comprehensive, up to date, and readily available written Water Feature Management Plan for the entire golf course facility?	✓		
	Point totals for each column	**8**	**1**	**1**

Maintenance Practices

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is there a written, regularly updated, and readily available Golf Course Maintenance Plan?	✓		
2	Does the Maintenance Plan include individual plans such as Integrated Pest Management, Tree Management, and Hazard Communication?		✓	
3	Are green, tee, and fairway mowing heights maintained at reasonable levels that do not unduly stressing turf or requiring additional chemical inputs?	✓		
4	Are there regular procedures in place to continually improve overall course soil health such as topdressing, organic amendments, aeration, and drainage improvements?	✓		
5	Is there an up to date and readily-available map of the course's "hot spots", or those areas requiring special care or regular attention?			✓
6	Is all maintenance equipment maintained and cleaned in a manner that minimizes or eliminates the potential for spreading of pest or disease contamination?	✓		
7	Has there been a complete examination of all aspects of the golf course facility operation (including the snack bar and grill, clubhouse, pro shop, cart storage facility, and maintenance complex) for potential negative environmental impacts?	✓		
8	Is contour mowing used to conserve fuel and increase playability and aesthetics?	✓		
9	Have all playing surfaces been inventoried and mapped for potentially agronomically challenging soil types?		✓	
10	Are soil tests and/or plant tissue analysis used to determine nutritional requirements?	✓		
	Point totals for each column	**7**	**2**	**1**

Customer Relations & Education

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are the course manager and superintendent involved in an on-going and documented customer environmental management educational program?			✓
2	Is there a highly visible location at the course or clubhouse where golf course environmental management notices and informational messages are regularly posted for the education and enjoyment of customers?	✓		
3	Do the course manager and superintendent actively communicate with customers to determine their points of view?	✓		
4	Is there documented, regular communication by course management with installation civil engineering, environmental, and leadership on GEM program issues or concerns?		✓	
5	Does the golf staff regularly survey their customers on how they rate the various elements of the golf course facility?	✓		
6	Is there consistent and attractive signage around the course and grounds that would increase the awareness of the average golfer to the environmental management practices employed?			✓
7	Are there signs appropriately located to warn golfers of hazards around or near recycled or otherwise non-potable water?	✓		
8	If applicable, have areas of the course been designated "Environmentally Sensitive Zones" per USGA rules?	✓		
9	Are course staff members regularly trained on how to improve their dealings with customers?	✓		
10	Are there clinics provided to teach beginning golfers the basics of the game to include the rules as well as the environmental challenges faced by the golf staff at their facility?		✓	
	Point totals for each column	**6**	**2**	**2**

Miscellaneous Special Projects & Activities

#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there projects planned and funded for execution in the near future that would demonstrate the compatibility of the course's management methods with GEM program initiatives?	✓		
2	Are there projects planned and funded to reduce the course's potential negative environmental impacts?	✓		
3	Are there tournaments or other events planned that may educate customers on the environmental challenges faced by the golf staff?	✓		
4	Are there regular field trips hosted at the course for local students or other community groups?			✓
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	**5**	**0**	**5**

ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	6	3	1
2	Safety, Training, & Awareness	7	1	2
3	Compliance	5	3	2
4	Pesticide Use, Storage, & Handling	7	2	1
5	Pollution Prevention	10	0	0
6	Conservation Practices	5	3	2
7	Water Resources	8	1	1
8	Maintenance Practices	7	2	1
9	Customer Relations & Education	6	2	2
10	Miscellaneous Special Projects & Activities	5	0	5
	Composite point total/response percentage	**66**	**17**	**17**

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- Actual ECQ (# of "Yes") = 66 ("Getting started" - Red)

- Potential ECQ (Actual ECQ plus "Partial") = 83 ("Showing progress" - Yellow)

*** = Category requires improvement or attention**

Environmental challenges

One of the important results of the GEM process is the identification of potential environmental challenges to be addressed in the long-term GEM Planning process. After determining the relative significance and validation of each potential environmental challenge, the installation golf and environmental staffs should determine the set of final challenges that will be actively managed in the GEM Plan. Armed with the list of final environmental challenges, the golf staff should determine the best management approach that satisfies the goals of the golf facility from the course playability and customer satisfaction perspectives. Then the golf staff's preferred management approach should be coordinated with the installation's environmental staff for refinement, coordination, and approval.

Ultimately, the combined environmental and golf staff team should proceed toward finalizing the GEM Plan. The entire process can be viewed at the AFCEE GEM website (http://www.afcee.brooks.af.mil/ec/golf/).

The following potential environmental challenges were identified during the GCEBA process:

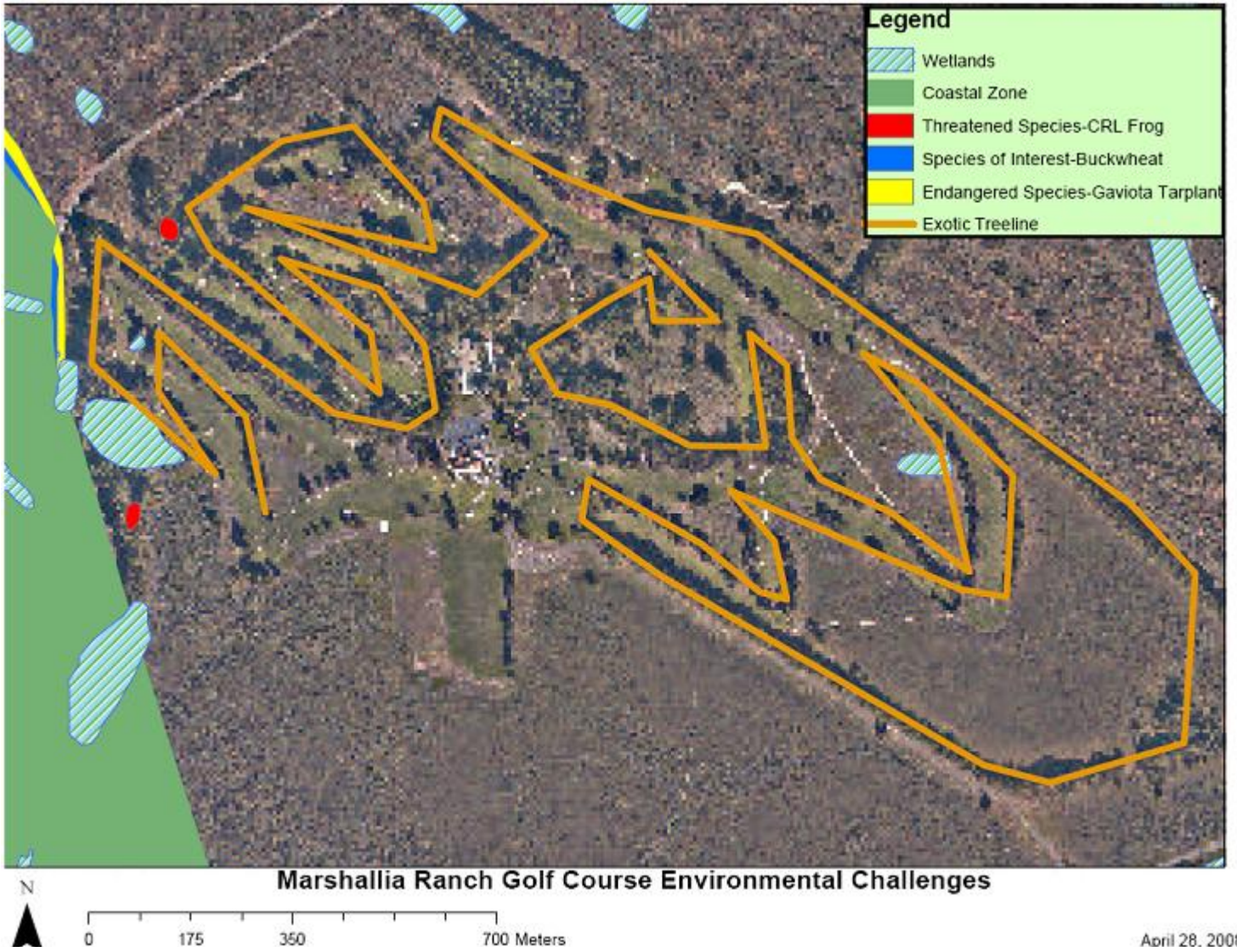
- Invasive exotic plants & animals
- Archaeological/cultural resources
- Threatened & endangered species
- Solid waste management
- Watershed protection
- Areas of Concern 111 & 112

Eucalyptus trees dominate the Marshallia Ranch landscape.

FINAL ENVIRONMENTAL CHALLENGES

The following final environmental challenges were identified during the GEM Plan process:

- Invasive species
- Water supply/conservation
- Archaeological/cultural resources
- Threatened & endangered species
- Air quality
- Water quality management & watershed protection
- Coastal zone management



Marshallia Ranch Golf Course Environmental Challenges

Ice plant is the primary groundcover in the "non-play" areas.

INVASIVE SPECIES

Like most of California, Vandenberg AFB and Marshallia Ranch Golf Course are heavily populated with Australian native eucalyptus and the ubiquitous ice plant. Other invasive exotic plants include Veldt grass, European beach grass, and pampas grass. These plants are aggressive and can overcome and replace natural ecosystems and their inhabitants.

Working with the local game warden and employing humane yet aggressive seasonal trapping, up to 50 feral pigs are removed every year from the golf course property. The descendants of fugitive farm animals have a habit of digging up the course's fine turfgrass fairways and greens foraging for food.

Accordingly, the INRMP states as a goal: "control or eradication of invasive exotics and the protection of native habitats and sensitive habitats".
According to the INRMP, "Feral pigs have sharp tusks and are known to charge aggressively, showing little fear toward humans. The behavior of feral pigs is a potential hazard to people working or enjoying recreational activities in areas frequented by these animals."

Driver/requirement

- Federal Plant Pest Act (7 USC 150aa et seq.)
- Federal Noxious Weed Act of 1974, as amended (7 USC 2801 et seq.)
- Executive Order 13112

Objective

Assist installation environmental staffers with the control and/or eradication of these undesirable species through coordinated, informed decisions.

Management Practice

- Consult with installation environmental personnel prior to adding any new plant materials.
- Continue to facilitate capture of feral pigs.
- Incorporate physical, biological, and herbicidal invasive species controls as appropriate per the Invasive Plant Species Management Plan.

Target

The golf course staff shall create and implement a written invasive species management plan prior to the next major iteration of the Integrated Natural Resources Management Plan.

Feral pigs are trapped outside the course's playing areas.

WATER SUPPLY/CONSERVATION

Water use for maintaining golf courses is the industry's most contentious issue. The central California coast – like most of the state – annually receives little to no rain. In this case, the area averages only 14 inches of annual precipitation.

Marshallia Ranch Golf Course is currently being irrigated using potable drinking water. The proposed cost increase due to regional discussions is extremely prohibitive to preserving the profit-based operation. The Marshallia Ranch staff and their commanders are justifiably anxious about the future. Water conservation is already practiced on the course by the superintendent.

Driver/requirement

- Potential mission impacts/profitability

Objective

Ensure that all irrigation is efficiently applied through the employment of technically-sound techniques and state-of-the-art equipment.

Management Practice

- Regularly inspect irrigation system for efficient operation
- Conduct irrigation audit as necessary to preserve precious water resources
- Pursue additional sources of irrigation water such as recycled or non-potable.
- Compile and implement a facility-wide Drought Management Plan.

Target

Working with the installation GEM team, complete a comprehensive analysis of potential alternative irrigation supply sources by the end of CY2009.

Chumash Indian rock art at Honda Ridge.

ARCHAEOLOGICAL/CULTURAL RESOURCES

If actions taken during the planning, environmental impact analysis, design, and construction of the recently completed maintenance complex at Marshallia Ranch are any indication, archaeological and cultural resource issues will continue to challenge the golf course staff. In fact, any extensive digging will require that a representative of local Native Americans must be present throughout the process.

According to the installation's environmental quality website, "Over 2,200 Chumash Indian archaeological sites are on Vandenberg. These include 2,000-year-old cave paintings, 80 burial grounds, shrines, and numerous remains of prehistoric villages with one dating back 9,000 years". The site continues "Additionally, all proposed construction sites must be scrupulously analyzed to ensure no archaeological sites are impacted".

In addition, the historic ranch house is directly across from the clubhouse and its requirements may affect management decisions due to its proximity.

Driver/requirement

- Archeological and Historical Preservation Act (16 U.S.C. 469)
- National Historical Preservation Act
- Native American Graves Protection and Repatriation Act

Objective

Ensure that any planned excavation work has been coordinated with installation cultural resource manager and is accordance with all installation/Native American agreements.

Management Practice

- Continue working closely with installation cultural resource manager

Target

Always have a signed AF Form 103 in-hand prior to conducting any excavations anywhere on the golf course facility property.

THREATENED & ENDANGERED SPECIES

The central California coast is home to several species receiving some protection under either federal or state law. There are 13 species of animals and 4 plants that are federally listed as either threatened or endangered to include the Gaviota tarplant, Western snowy plover, California least tern, Southwestern willow flycatcher, and Southern sea otter. There are four birds listed as species of concern including the burrowing owl, and a sparrow, blackbird, and bittern.

According to the Threatened and Endangered (T&E) Species Management Plan, "On Vandenberg AFB, bats occur in occupied and abandoned buildings, barns, under bridges, in caves, and in trees along riparian corridors. Most notable roosts found at Vandenberg AFB are: In North Vandenberg AFB Building 1341 in the Marshallia Ranch Golf Course maintenance yard (roost of over 500 Brazilian free-tailed bats).

In 2005, a large artificial roost was erected at the Marshallia Ranch Golf Course in anticipation of the demolition of Building 1341. The success of this artificial roost in attracting the Mexican free-tailed bats, that occupied Building 1341, has not been determined".

Driver/requirement

- Endangered Species Act of 1973
- California Endangered Species Act of 1970

Objective

Ensure that no golf course management practice hinders the installation's implementation of the T&E Management Plan.

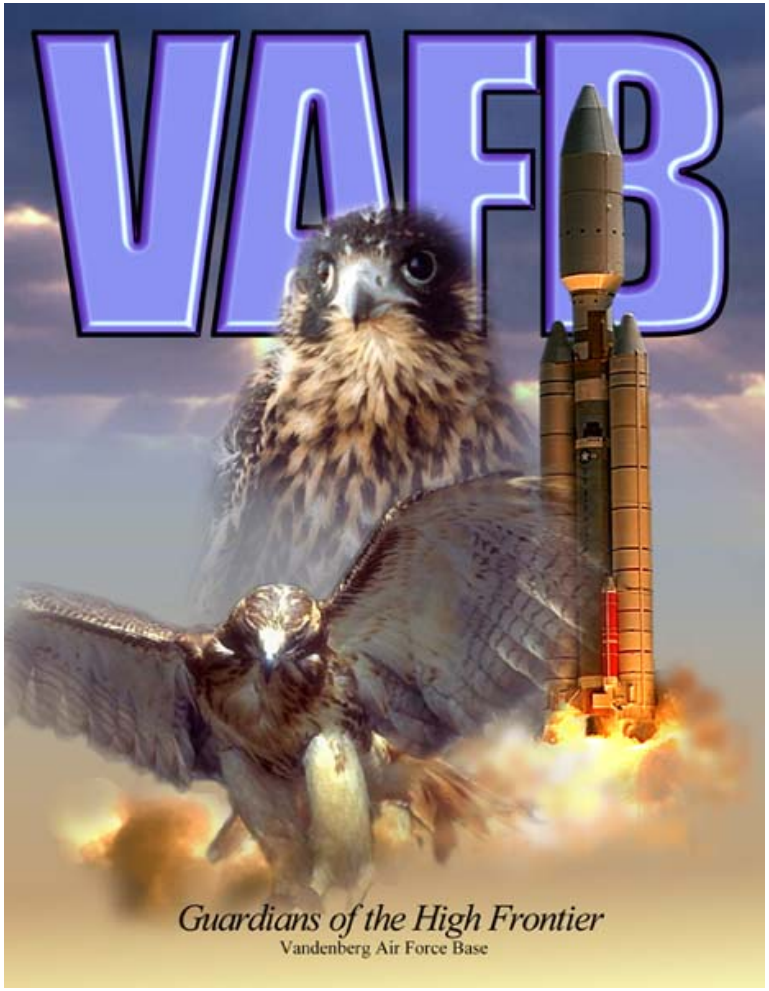
Management Approach

- Continue working closely with installation natural resource manager

Target

The golf staff shall consult at least annually with appropriate environmental staff member to determine if overall course management practices are compliant.

Over 40 plants or animals are protected under state or federal law.



Vandenberg AFB has a long-standing commitment to excellence in mission performance and environmental management.

AIR QUALITY

Vandenberg AFB is a region of non-attainment for ozone. According to the installation's environmental quality website, "The California and Santa Barbara County air quality laws that apply to Vandenberg are substantially more stringent than federal requirements and include 54 prohibitory rules administered by the Santa Barbara County Air Pollution Control District (SBCAPCD)".

The installation has participated on regional air planning initiatives resulting in conformity allowances that will accommodate the continued performance of the mission for the foreseeable future.

Driver/requirement

- Clean Air Act

Objective

Minimize or eliminate excessive emissions from golf course equipment, vehicles, and equipment care procedures.

Management Practice

- Replace older equipment when funding allows
- Encourage employees to minimize their trips on and around the course
- Ensure equipment cleaning solution containers are closed at all times
- Eliminate all aerosols from maintenance and clubhouse inventories
- Replace 2-cycle powered equipment as funding and technology allow

Target

Minimize or eliminate all excessive, potentially polluting air emissions attributable to the management of Marshallia Ranch Golf Course.

WATER QUALITY MANAGEMENT & WATERSHED PROTECTION

The Marshallia Ranch Golf Course is situated on a long ridge overlooking the San Antonio Creek where several of the protected animals and plants reside. This fact, in itself, dictates extra attention from the golf staff. Anything used on or around the golf course can potentially be washed downhill into this sensitive water resource. Stormwater management, pesticide use, fertilization practices, and use of other organic chemicals are some of the issues that must be considered at all times by the Marshallia Ranch staff.

Driver/requirement

- Section 402, Clean Water Act
- 40 CFR Part 122
- Threatened & Endangered Species Act of 1973

Objective

In direct support of the water quality/watershed protection program, the golf course staff shall coordinate all activities that could possibly be detrimental to the quality of stormwater or surface water resources with installation environmental professionals.

Management Practice

- Designate, communicate, and map established pesticide and fertilizer application buffers
- Ensure that a current SPCC Plan is available for new maintenance complex
- Regularly train the maintenance staff on water quality and stormwater issues and practices
- Utilize Vandenberg's "Discharge to Grade" program that protects water quality

Target

Establish, map and communicate all buffer zones to appropriate personnel by the end of CY2008.

All equipment wash water is treated by an on-site system.

COASTAL ZONE MANAGEMENT

The Coastal Zone Management Act (CZMA) creates a broad program based on land development controls within coastal zones, incorporating State involvement through the development of programs for comprehensive State management. The CZMA also requires Federal agencies or licensees to carry out their activities in such a way that they conform to the maximum extent practicable with a state's coastal zone management program (CWIS 2008).

Marshallia Ranch is adjacent to areas protected by the California Coastal Zone. There are no environmental challenges within the current boundaries of Marshallia Ranch, however, future expansion of ranges or facilities could be subject to the Coastal Zone Management Act.

Driver/requirement

- Coastal Zone Management Act
- California Coastal Act

Objective

Never all potentially negative impacts to the nearby sensitive coastal zone environment as a result of a golf course practice or procedure.

Management Practice

- Coordinate all maintenance practices with the potential to harm coasts with appropriate installation managers

Target

Complete comprehensive coordination prior to the end of CY2009.

"In the Curl" by Jordan Gilman.

GEM Plan goals & objectives

Goals are defined as actions or results that should be accomplished in the next year. A detailed description of these should be inserted here.

- Provide a current list of all pesticides and other chemicals stored or used at the golf facility recently been provided to the appropriate Fire Department(s)

- Regularly check all motorized golf course equipment for potentially excessive air polluting emissions in accordance with Phase II CARB rules

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

- Map the course's "hot spots", or those areas requiring special care or regular attention

- Initiate a facility-wide recycling program

- Compile and implement a native tree installation program complete with planting plan and maintenance schedule

GEM Plan best practices

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

- Trap and remove feral hogs in accordance with the law

Please see the AFCEE GEM program website (http://www.afcee.brooks.af.mil/ec/golf/) for more information.

Conclusion

The Civil Engineering Squadron's unit environmental coordinator program should provide the key oversight to assist in improving the ability of the golf and environmental staffs to work together to better support the Vandenberg AFB mission. In addition, conserving precious water supplies through the application of science, engineering, and demonstrated environmental stewardship may be the only other major issue facing the Vandenberg AFB environmental and golf staff members.

A hawk gets started on another fine day at the course.

The gallery

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

Root pruning has proved to be beneficial to turf quality and the golfing experience at Marshallia Ranch.

Feral pigs can make a mess of well-maintained turf overnight.

New maintenance complex minimizes potential environmental impacts.

Challenging golf in a beautiful setting.

Natural areas contribute greatly to the Marshallia Ranch experience.

Trees planted long ago are beginning to affect playability.

Everyone should get a chance to play this wonderful golf course.

Marshallia's pro shop may be the Air Force's best.

Wildlife abounds on the course.

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Some of the photos were provided by Al Bancroft, Marshallia Ranch superintendent and HQ AFSVA Turf specialist, Mr. Rick Boehm.

MARSHALLIA RANCH

GOLF COURSE

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