

# USAG BAVARIA

**Protect the Environment.**  
**Support the Mission.**  
**Sustain the Future.**



**USAG Bavaria**  
[www.bavaria.army.mil/environmental/](http://www.bavaria.army.mil/environmental/)





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# FOREWORD

The foundation of environmental protection on military training lands was laid by Executive Order 11991 "Environmental Impact Statements", signed by President Jimmy Carter on May 24, 1977. Since then, the Army has become an outstanding steward for the environment.

In the early phase, emphasis was put on eliminating immediate environmental risks such as cleaning up hazardous substance spills and erosion control. In the mid 1980s, environmental funds were "fenced", meaning that money was set aside exclusively for environmental projects. Thus the strategy could be changed from simply putting out fires to a more coordinated approach. Goals and projects then included energy conservation, waste reduction, in-compliance storage and disposal of hazardous substances (e.g. used oil), rehabilitation of landfills, erosion control, as well as identification and cleanup of contaminated sites.

After the U.S. Army signed the Supplement to the NATO Status (SOFA), which went into effect in 1998, legal requirements with regard to contaminated sites, threatened and endangered species, and cultural resources increased considerably.

A few years later, additional responsibility was transferred to the U.S. Army, as the Federal Republic of Germany nominated the Grafenwoehr and Hohenfels Training Areas as

"Special Areas of Conservation" (SAC) under the European Bird and Habitats Directives, also called NATURA 2000.

Since 2009, the garrison's environmental program has met the international standard ISO 14001 "Environmental Management Systems."

A combined team effort of garrison organizations, military leaders, and host nation authorities is necessary to protect and improve the environment. In recognition of this team spirit, the USAG Bavaria environmental program has received several awards and recognitions on Installation Management Command Europe, U.S. Army and Department of Defense level, and the environmental award of the local county of Neustadt/Waldnaab.

The ultimate goal of the USAG Bavaria's environmental program is to ensure military training requirements are met, while at the same time protecting the environment for future generations. The intent of the program is to make environmental protection and planning easy by providing all required environmental facilities, wherever a need arises.



Mark A. Colbrook  
Colonel, USA  
Commanding



**"THE ENVIRONMENTAL PROGRAM HELPS SOLDIERS TO CONDUCT MILITARY TRAINING IN COMPLIANCE WITH ENVIRONMENTAL LAWS WHILE MINIMIZING THE IMPACT ON THE MILITARY MISSION."**

Planting a tree for Earth Day



# ABOUT US

The U.S. Army Garrison (USAG) Bavaria, headquartered in Grafenwoehr, provides service to U.S. Army installations in **Grafenwoehr Training Area** including Tower Barracks and Rose Barracks, **Hohenfels Training Area**, and **Artillery Kaserne and Sheridan Barracks** in Garmisch-Partenkirchen. USAG Bavaria is the largest training complex of the U.S. Armed Forces in Europe, with approximately 35,500 community members.

Environmental management on USAG Bavaria installations is the responsibility of the **Directorate of Public Works (DPW)**, specifically the Utilities Branch and the Environmental Division. The **Utilities Branch** oversees, energy saving, and waste reduction programs. The **Environmental Division** oversees hazardous waste management, environmental monitoring and remediation, natural resources conservation, cultural resources preservation, environmental training, and public awareness.

Environmental and utilities staff is the **point of contact** for environmental questions for commanders of military units, German authorities, military and civilian personnel, U.S. Family members, contractors, and host nation representatives. Both offices work closely with other Army organizations and the German Federal Forestry Service to accomplish their mission.



## Support the military mission and ensure sustainability

The Garrison follows the Army's sustainability vision with a systematic approach to the **triple bottom line** of **mission, environment, and community**. Military use has priority on USAG Bavaria installations, but that does not have to come at a cost to the environment. Responsible stewardship of natural resources on military training installations is an essential part of the military mission. Our role is to ensure the USAG Bavaria community complies with all necessary environmental requirements while receiving the best training and living opportunities.

# ENVIRONMENTAL MANAGEMENT SYSTEM

The tool used by USAG Bavaria to manage the environmental program is the Environmental Management System (EMS), which follows the globally recognized standard ISO 14001. The standard was selected by the U.S. Department of the Army in the early 2000s.

It provides guidelines and checklists for managing the environmental risks associated with an organization's activities, products, and services.

EMS applies to all units and agencies working for, or on behalf of, USAG Bavaria and the Joint Multinational Training Command, to include host and tenant organizations, contractors, and residents.

After an introductory period of about three years, USAG Bavaria first met the standard in 2009 and has since passed all external audits to conform to the standard.

## Legal responsibility

The U.S. Army in Europe follows numerous laws to support the military mission and ensure sustainability:

- U.S. laws
- German laws
- Nato Status of Forces Agreement
- EU directives and regulations
- U.S. Army and Department of Defense regulations

These laws are combined into one document, the Final Governing Standards. When multiple laws apply, the more stringent standard is used.

## The USAG Bavaria EMS helps us to:

- Accomplish our goal of supporting the military mission and ensuring sustainability;
- Demonstrate our commitment to the environment internally and externally;
- Stay in compliance with legal and regulatory environmental requirements;
- Integrate environmental protection in business processes;
- Reduce the environmental impacts of our business and military operations.

## Environmental aspects of USAG Bavaria

In ISO-language, activities or services of an organization that can have an impact on the environment are called "environmental aspects."

The "environmental aspects" of military operations in the training areas and daily work and life in the communities are:

Hazardous substances, asbestos, radon, POL (petroleum, oil, and lubricants), PCBs (polychlorinated biphenyl), medical waste, solid waste, drinking water and waste water, air emission, noise pollution, cultural resources, and natural resources.



The ISO 14001 standard is based on the methodology known as Plan-Do-Check-Act. The above cycle shows how this methodology is applied to reduce the risks of handling hazardous materials in daily operations.



# SUPPORT THE MISSION

## Hazardous substances - handling and facilities



*The garrison provides a supportive military training environment by offering up-to-date infrastructure, professional environmental training and guidance, as well as emergency response to environmental problems.*

### Hazardous substances handling

Use of hazardous substances is inherent to the operation and maintenance of military vehicles. In most cases, hazardous substances used within the training areas are POL (petroleum, oil, and lubricants), oil filters, aerosol cans, antifreeze, and batteries (dry cell, lithium). USAG Bavaria's goal is to minimize hazards to human health and the environment caused by these substances. This goal is pursued by properly handling and disposing of hazardous substances and reducing their use through inventory controls, shelf-life extension, product reuse, and "green" substitutions.

### Facilities

Our various facilities help Soldiers stay in compliance with legal requirements and minimize environmental impacts or risks of military training activities.

**Refueling sites** enable safe refueling of military vehicles throughout the training areas. In addition, there are six mobile refueling sites in Hohenfels Training Area for use during maneuvers. Refueling and maintenance activities are performed on designated areas that are provided with a special surface sealing and are connected to oil/water separators. These facilities considerably reduce the potential for soil and groundwater contamination and still enable Soldiers to train in a realistic environment.

A network of more than **300 hazardous waste accumulation points** in Grafenwoehr and Hohenfels training areas and a hazardous waste removal contract make it easy for Soldiers to protect the environment and fulfill their military mission.

Washing military vehicles returning from training in muddy areas is a water-consuming process. USAG Bavaria operates closed-system **wash racks** in all of their installations to minimize the use of fresh water and the generation of waste water. In Hohenfels Training Area, disposal costs for sludge resulting from wash rack operations are kept low by using a treatment system to reduce the oil content of wash rack sludge.



Closed-system washrack in Hohenfels Training Area



Mobile refueling site in Hohenfels Training Area



Hazardous waste accumulation point - exterior



Hazardous waste accumulation point - interior



# SUPPORT THE MISSION

## Environmental support and guidance

### Evaluation of training scenarios

Setting up special training scenarios like water purification plants or decontamination sites, refueling points, tank ditches, combat outposts, or tactical operations centers may have an impact on the environment. In coordination with Integrated Training Area Management (ITAM), the garrison environmental staff provide guidance and support to military planners to prevent impacts on the environment and check dig permits for potential negative effects of military training scenarios on natural and cultural resources.

### Environmental review of projects

Whether constructing new buildings or upgrading existing ones, the garrison ensures that training infrastructure is built to the highest standards for Soldiers and the environment. Through the environmental review process, professional staff evaluate the environmental impact of

construction projects and coordinate between project stakeholders, planners, and authorities. Environmental staff provide data on natural and cultural resources like endangered species, geology, soil, and groundwater, as well as information about historical use, presence of hazardous substances, and building or site contamination. Our guidance ensures that the construction process has the biggest benefit for military training with as little impact on the environment as possible.

### Spill prevention and response

Soldiers receive guidance on how to prevent spills and respond if a spill does happen. As a member of the USAG Bavaria spill response team, the Environmental Division helps with clean-up procedures and the disposal of contaminated soil. A trailer-mounted mobile oil/water separator allows recovery of large quantities of oil spilled into a body of water in a short period of time.

### Environmental consulting

Environmental training classes, handbooks, operating procedures, and guidelines developed by garrison environmental staff are the main source of information for tenant and training units to obtain knowledge about applicable host nation and U.S. environmental requirements. Each unit or organization handling hazardous substances appoints an Environmental Officer (EO) as a primary point of contact, who ensures that all personnel involved in handling, storage, and disposal of hazardous material and waste receive training before assuming work duties. The Environmental Division is in close contact with EOs and conducts courtesy on-site visits and periodic inspections of facilities where hazardous substances are used or stored to assist in proper handling and disposal of these substances.

### Environmental officer award

Annually, the Garrison Commander presents an award to the best Environmental Officer to recognize motivation and dedication to protecting the environment.





# SUPPORT THE MISSION

## Geographic information system

### Planning tool

The garrison in close cooperation with the Sustainable Range Program has developed an elaborate geographic information system (GIS) for various applications. It is a powerful tool that provides the basis for decision-making and processing of information.

The application is used to inform customers, optimize conservation actions, plan projects, and assess the environmental impact of construction.

The Environmental Division uses GIS to plan and manage conservation actions like putting up bat and bird boxes.

Because GIS is a great tool to visualize different scenarios, environmental staff use it to develop environmental projects like the Green Classroom on Rose Barracks.

### Construction project support

A GIS application containing data about vegetation, biotopes, and threatened and endangered species is one of our most important tools to assess the environmental impact of construction projects. This information is used during initial design phases and later on, during the environmental review process. Other valuable geographic information available to project planners is on archaeological monuments, groundwater wells (including measured values on a variety of water quality parameters), soil, groundwater distance, and wetlands.

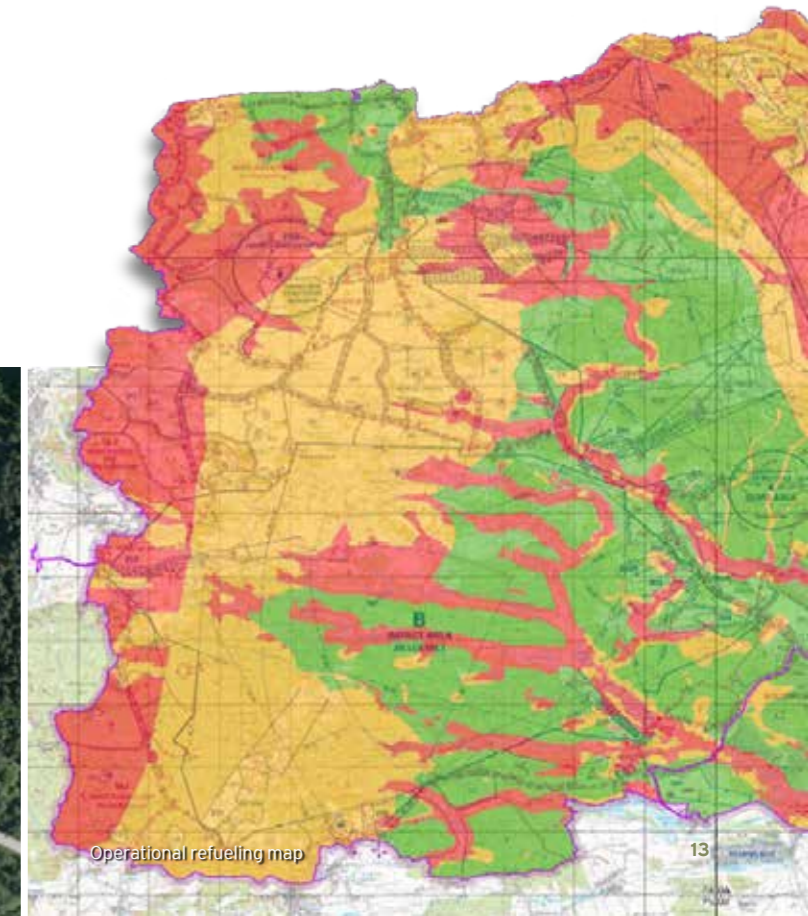
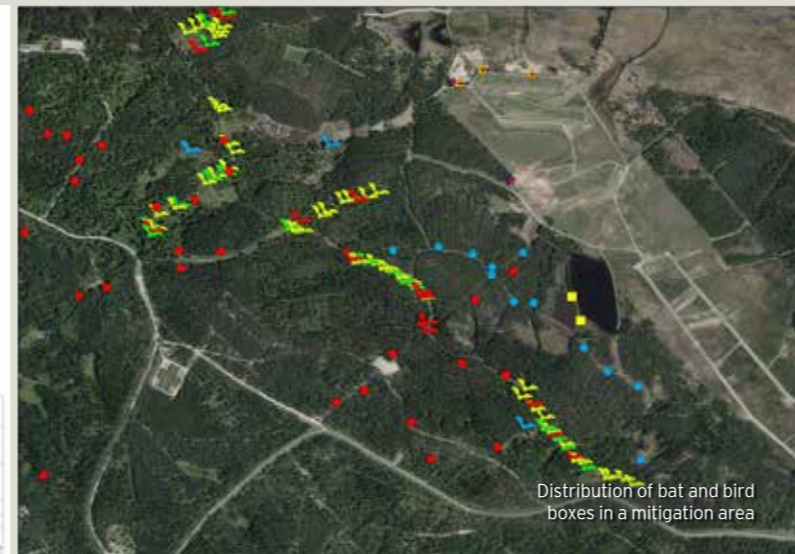
### Geographic information system, a useful tool

Geography is part of our everyday world. A geographic information system connects maps and data and helps us understand what is happening in geographic space. It lets us combine different geographic topics ("layers") so we can visualize, analyze, and interpret data. We can portrait data in many different ways on one map.

### Customer information

Maps are required to show the Soldiers where they can safely refuel their vehicles, do maintenance, store hazardous substances, or dispose of hazardous waste.

Training scenarios for refueling operations in the field are based on the Operational Refueling Map. It shows areas with high, medium, and low risk for groundwater contamination.





# PROTECT LAND, AIR, AND WATER

## Pollution prevention

The garrison is committed to protecting the environment and ensuring a safe place for Soldiers and their Families to work, train, and live. In order to achieve that commitment, we work to prevent pollution of air, water, and land through waste management programs such as recycling, conserving energy, managing hazardous waste, education, monitoring, remediation, and continuous evaluation of environmental aspects.

### Pollution prevention program

USAG Bavaria is involved not only in the control of ongoing activities and operations, but also works on new solutions. The primary focus of our pollution prevention program, known as P2, is to reduce impacts on the environment by:

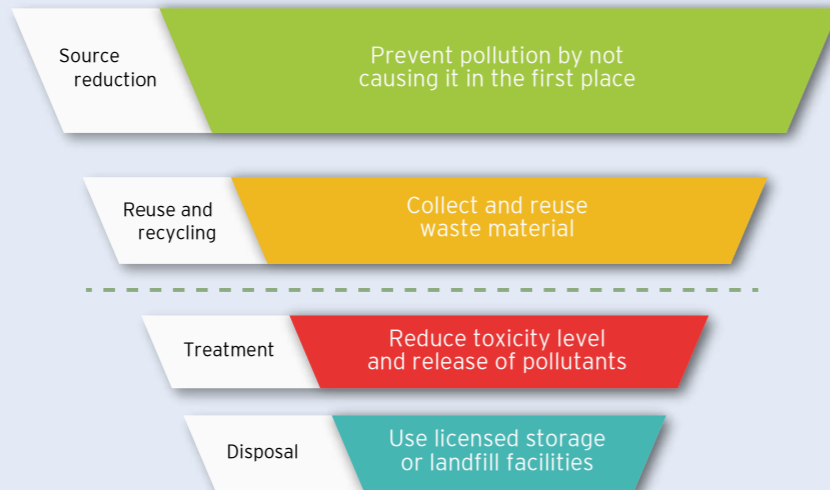
- Using environmentally friendly processes, equipment or materials (e.g. water-based paints);
- Reusing materials (e.g. partially loaded dry sweep);
- Recycling materials, where possible.

The goal of P2 is to avoid contamination from the beginning through awareness and public participation.

Further examples of pollution prevention projects completed within USAG Bavaria are a hazardous materials re-use center, bulk dispensing units in motor pools, electric vehicles, kitchen waste dehydrators, and replacement of ozone depleting substances in refrigeration equipment.

### Hazardous substances in buildings

There are numerous programs to remove hazardous substances like asbestos, radon, and lead-based paint from buildings and other facilities where people live and work. An example is the environmental data information system (EDIS), a database to keep track of the presence of building contaminants and the urgency of their removal within USAG Bavaria installations.





# PROTECT LAND, AIR, AND WATER

## Recycling and household hazardous waste

### Net Zero initiative

In 2011, the Army pushed ahead with an initiative called Net Zero, striving to eliminate, as much as possible, a community's impact on the environment in regard to waste, energy, and water.

USAG Bavaria was chosen as a pilot installation for Net Zero waste program, aiming to produce zero landfill through waste reduction and converting waste streams into alternative energy sources.

### SORT (separate or recycle trash)

Since the 1980s, the garrison has established a comprehensive SORT program for environmentally safe and sound disposal of waste from our military installations. It offers collections from a number of conveniently located collection points or from curbside, where everyday household waste like plastic material, metal cans, glass, cardboard, and paper can be disposed of for recycling. Bulky items such as furniture, tires, appliances, other electric/electronic waste, scrap wood, and metals are collected at centrally located recycling yards.

Recycling conserves natural resources such as timber, water, and minerals, prevents pollution, reduces the need to produce new goods from raw materials, and saves energy.

### Waste manager

Each installation has a waste manager, who provides information about proper handling of waste and is the point of contact for military units, garrison organizations, Soldiers, Family members, and employees for all questions concerning the SORT program.

### Household hazardous waste and electronic waste

Particular waste streams like household hazardous waste and electronic waste, also called e-waste, require special attention. Collection points for household hazardous waste and e-waste are located on all USAG Bavaria installations.

Household hazardous substances are dangerous to life, health, or the environment because they contain

certain hazardous ingredients. They include items such as household cleaners, air fresheners, oil and oil filters, antifreeze, thermometers, batteries, paints, etc. and must be properly segregated from household waste.

Electronic or e-waste refers to any electric or electronic device no longer wanted for use. E-waste includes items like televisions, cell phones, kitchen appliances, light bulbs, power tools, and electronic toys. E-waste may contain toxic substances like lead, mercury, and cadmium.

**"THE GOAL OF THE PROGRAM IS TO AVOID GENERATION OF TRASH IN THE FIRST PLACE AND, WHERE THIS IS NOT POSSIBLE, SIGNIFICANTLY REDUCE THE AMOUNT OF WASTE THROUGH RECYCLING."**

Wilhelm Zinnbauer, Waste Manager, Rose Barracks





# PROTECT LAND, AIR, AND WATER

## Renewable energies and energy savings

### Net Zero energy

The Army's vision is to appropriately manage natural resources with a Net Zero strategy. Energy security and sustainability are operationally necessary and financially prudent. A Net Zero energy installation (NZEI) is an installation that produces as much renewable energy on site as it consumes over the course of a year. USAG Bavaria moves towards net zero via a dynamic and ongoing awareness campaign, the combined use of on-site renewable energy and energy efficiency technologies and infrastructure, and the application of flexible, energy efficient design standards and policies. Concurrently, USAG Bavaria will progressively benefit from cost savings,

energy security and resilience, climate protection, and recognition as the Outside the Continental United States (OCOUS) leader in developing a portfolio strategy for a Net Zero energy installation.

### Projects

The garrison is modernizing infrastructure to increase energy and water efficiency and improving the development and use of renewable and alternative energy to reduce energy consumption.

The garrison energy managers have completed projects to improve the efficiency of heating systems and replaced

fossil fuels, a finite resource, with renewable sources. A great example of reducing energy consumption is the wood chip heating plant at Hohenfels which is cheaper than heating oil plants and reduces CO2 emissions by 90 percent.

In recent years, **photovoltaic panels** were installed on many roofs on Tower Barracks, Rose Barracks, and Camp Nainhof. They are a clean, renewable source of energy and help reduce our electric utility bill.

Another great example to reduce our dependence on fossil fuels are **electric cars** used by our in-house fleet to cover short distances.

**“WE ARE CREATING A CULTURE THAT RECOGNIZES THE VALUE OF SUSTAINABILITY MEASURED NOT JUST IN TERMS OF FINANCIAL BENEFITS, BUT BENEFITS TO MAINTAINING MISSION CAPABILITY, QUALITY OF LIFE, RELATIONSHIPS WITH LOCAL COMMUNITIES, AND THE PRESERVATION OF OPTIONS FOR THE ARMY’S FUTURE.”**

Katherine Hammack,  
Assistant Secretary of the Army



Solar panels on building 91, Camp Nainhof



LED street lighting



Teaching energy awareness at schools on Tower Barracks



Electric cars used by our in-house fleet on Rose Barracks



# PROTECT LAND, AIR, AND WATER

## Monitoring and remediation

### Risk avoidance and minimization

Without sufficient diligence, military training poses a risk to the environment. If not handled with care, contaminants may seep into the ground and endanger ground and drinking water. The Army has established a remediation and monitoring program to identify and remediate environmental contamination from former and current U.S. Army activities. The two components of the program are:

- Surface and groundwater monitoring program - to identify, evaluate, assess, and prevent potential risks to water protection areas in the immediate vicinity of the training area.
- Remediation program - to clean up polluted soil and groundwater, and to prevent migration of pollutants.

### Groundwater monitoring

The most important value of this program is the protection of our vital drinking water resources and drinking water protection zones located in the immediate vicinity to Grafenwoehr Training Area. In recent decades, the number of groundwater monitoring wells has been continuously increasing to currently more than 300 in Grafenwoehr Training Area and around a dozen in Hohenfels Training Area. Most of the groundwater monitoring wells are sampled at least once a year. They are located between potential upstream emission sources, like a vehicle maintenance area where water endangering substances are used, and downstream receptors. The tested parameters depend on the type of hazardous material used in the up-stream area and the historical use.

If any contaminants are detected in the groundwater monitoring wells, proper remedial action is taken to prevent spread of the pollution or clean up the site.

### Surface water monitoring

Environmental personnel routinely test surface water quality of lakes and creeks that have been identified in coordination with the local Water Board to be representative and appropriate for monitoring. Annual water and sediment samples are taken at selected water points to determine the water quality over a long-term basis. The quality of the surface water is determined by measuring electric conductivity, temperature, pH-value, oxygen content, turbidity, and other characteristics. Additionally, fish samples from are taken and analyzed every seven years. Water monitoring stations are installed at all major creeks that flow out of the training area to collect data about the quality and quantity of surface water. This helps to protect water resources in off post communities.

### Remediation program

To identify contamination caused by military operations during World War II, the garrison evaluated historical aerial views, researched files, and interviewed contemporaries. Data gathered from those studies are used for project planning and other purposes. Possible contamination through subsequent military training operations is identified by testing soil and water on a regular or as-needed basis.

During the last three decades, USAG Bavaria has identified several contaminated sites within the Grafenwoehr and Hohenfels training areas. These sites are either cleaned or monitored through the environmental remediation program. Environmental remediation removes pollution or contaminants from soil, groundwater, sediment, or surface water. Depending on the contaminants and the severity of the pollution, there are a number of remediation methods that might be applied.





# CONSERVE NATURAL RESOURCES

## Environmental setting



Despite a paltry 50 kilometers between the two training areas Hohenfels and Grafenwoehr, their respective topography, landscapes, and environmental settings are quite different because of the underlying geology.

### Grafenwoehr Training Area

Grafenwoehr Training Area with a total area of approximately 230 square kilometers is the primary firing range complex of the Joint Multinational Training Command (JMTC), containing limited heavy and light maneuver training areas. Mission objectives include tactical training for field artillery, engineer and infantry support units, common training like navigation and training skills, as well as marksmanship instruction. The primary natural resources needed for the military mission is an area of uninhabited open land that provides realistic training conditions.

Located in the Upper Palatinate Hills, Grafenwoehr Training Area is characterized by an enormous diversity of different types of landscapes varying from the rugged, rocky regions of the Jurassic zone in the west, to the gentle hills, plains, creek valleys and their floodplains, forests, bogs, and heaths in the sandy soils of the Weiden basin in the east.

The nutrient-poor bogs and heath land complexes are of high ecological significance, providing a multitude of habitats for rare, threatened, and endangered plant and animal species. It is because of these scarcely inhabited bogs that the area near Grafenwoehr was recommended to the Royal Bavarian Department of War in 1904 for establishing a military training area.

Other rare and endangered biotope types include nutrient-poor sand meadows, mat-grass grasslands, as well as smaller forested areas of high ecological importance including white moss-pine forests, alder-floodplain forests, and moor edge forests.

### Stepping stone for endangered bird species

Since the last decades of the 20th century, Grafenwoehr Training Area has become a stepping stone for bird species, which are extremely rare in Bavaria, such as black stork (*Ciconia nigra*), osprey (*Pandion haliaetus*), white-tailed eagle (*Haliaeetus albicilla*), and most recently, common crane (*Grus grus*).



Impact area A in Grafenwoehr Training Area



Allseed  
(*Radiola linoides*)



Spoonleaf sundew  
(*Drosera intermedia*)



Common crane  
(*Grus grus*)



# CONSERVE NATURAL RESOURCES

## Environmental setting



Open terrain in Hohenfels Training Area

### Hohenfels Training Area

Hohenfels Training Area is characterized by the typical karst landscape of the Upper Palatinate Jurassic (limestone) Formation. It has a rich structural diversity with a mosaic of dolomite hilltops, narrow valleys, and many caves; but provides low fertility and scarce water.

The most striking and noticeable difference between the Hohenfels Training Area and the outside landscape is the existence of large open areas that lack any intensive agriculture. The dry, open grazing land serves as a training platform for troops deploying to various combat theaters.

About 58 percent of the 160 square kilometer training area is covered with forested vegetation communities, mainly consisting of Scotch pine (*Pinus sylvestris*), European beech (*Fagus sylvatica*), and Norway spruce (*Picea abies*) in multiple variations. There are many ecologically important areas like mature beech stands on hilltops, pine woodlands on semi-dry turfs, as well as thermophilic fringes and beech covers with orchids in the ground layer.

The non-forested portions are covered with open grasslands whose composition depends on soils, nutrients, frequency of grazing, and type of military training. Both forested and open lands provide habitat for a multitude of threatened and endangered plant species, as well as several different animal communities. This ecological quality is enhanced by the unusual richness of additional landscape structures such as rocks, caves, ponds, orchards, small groups of trees, and hedges.

### EU LIFE+ Project

The U.S. Army works in close cooperation with the European Union (EU), host nation authorities, the German Federal Forestry Service, and nature protection non-governmental organizations (NGOs) to support a EU LIFE+ project focused on saving the only reproducing population of the greater horseshoe bat (*Rhinolophus ferrumequinum*) in Germany. The colony was found at the northern border of Hohenfels Training Area in 1992 and has been able to survive and flourish in this particular area, because it provides excellent foraging grounds due to military training.



Greater horseshoe bat  
(*Rhinolophus ferrumequinum*)



Carlina thistle  
(*Carlina acaulis*)



Owl fly  
(*Libelloides coccajus*)



Cross gentian  
(*Gentiana cruciata*)



# CONSERVE NATURAL RESOURCES

## Biodiversity and European "NATURA 2000" network



### High ecological value and biodiversity

The USAG Bavaria training areas are unique refuges for many animal and plant species. Ecological surveys conducted over the course of two decades came up with more than 3,000 different plant and animal species - for each site. More than 900 of these species are legally protected and some are extremely rare, like the greater horseshoe bat (*Rhinolophus ferrumequinum*) and the European lynx (*Lynx lynx*). Military training areas support high biodiversity, which is the variety of different kinds of plants and animals in an environment, because:

- They are large, uninhabited areas;
- They are continuous areas that are not fragmented by highways;
- There is very limited use of fertilizers and pesticides because of a lack of farming activity;
- Military training causes small land disturbances creating diverse patterns of habitats and stages of succession.

In many cases, continuation of military training is the best way to protect these species and their habitats. Numerous habitat structures are created by military use or, unlike the "standard cultivated landscape", were preserved due to the area being off-limits to agricultural use and the public.

### European Natura 2000 network

In the early 2000s, Germany reported roughly 90 percent of Grafenwoehr and Hohenfels training areas as protected Natura 2000 sites. This leads to special approval requirements for construction projects and training area maintenance. We coordinate with the German Forestry Service and the host nation nature conservation board to mitigate impacts and conserve valuable natural resources, while eliminating potential project delays and supporting the military mission.

### Natura 2000

Natura 2000 is a European Union-wide network of rare natural habitats and core breeding and resting sites for threatened species. Its goal is the conservation of endangered species and habitats that are listed under both the European Birds Directive and the Habitats Directive.



Scarce swallowtail  
(*Iphiclides podalirius*)



Wild cat  
(*Felis sylvestris*)



Black stork  
(*Ciconia nigra*)



Crested newt  
(*Triturus cristatus*)



Large white-faced damselfly nymph  
(*Leucorrhinia pectoralis*)



# CONSERVE NATURAL RESOURCES

## Conservation management

### Mitigation projects

The European Union and host nation legislation require mitigation to make up for environmental impacts caused by construction projects or other activities. We work closely with local authorities, range operations, and the German Federal Forestry Service to coordinate and execute mitigation projects for preserving threatened and endangered species and enhancing their habitats.

Samples of such projects are:

- Maintaining limestone meadows and heathlands;
- Converting coniferous forests into mixed forests;
- Planting fruit orchards to protect legacy fruit tree cultivars from becoming extinct;
- Constructing fish passages in creeks;

- Restoring hibernating and roosting places for bats;
- Creating and restoring spawning habitats for endangered amphibian species;
- Constructing nesting aids for osprey, black stork, and other bird species.

### Eco-account

Projects completed in addition to mitigation requirements are credited to an eco-account, established by the USAG Bavaria and formally kept by the German Federal Forestry Office in accordance with §16 of the German Nature Protection Law (Bundesnaturschutzgesetz - BNatSchG).

Areas maintained in this account are readily available for legally required compensation of negative natural resources impacts in case of urgent construction projects.

### Erosion control

Until the late 1990s, heavy military training created severe erosion problems and siltation of rivers and creeks. Special renaturation measures, such as ground decompaction and reseeded, were used.

Water retention basins were built to reduce the flow of stormwater runoff and to filter out silt and other pollutants. Due to successful erosion control measures and monitoring, erosion has not been an issue in recent years.





# CONSERVE NATURAL RESOURCES

## Habitat types and their residents

*Due to ongoing military training, USAG Bavaria installations have a rich and diverse habitat structure. Grasslands, rock ledges, heath, wetlands, bogs, forests, and water bodies are just a few of the habitats found there, and each habitat supports a unique biological community of plant and animal species. To provide the most benefit to these species, many of the habitats need to be managed by practices like mowing, water level monitoring, invasive species removal, shrub removal, and grazing.*

### Open lands

Military training primarily takes place on open land, which is characterized by various types of grasslands. Many of these grasslands are dry, semi-dry, and nutrient poor. Depending on the type of underlying rocks, ecologists differentiate between limestone grasslands and sand grasslands, which are both very nutrient-poor.

These specialized grasslands occur in abundance within the USAG Bavaria training areas but are severely endangered elsewhere due to agricultural use.

### Limestone or calcareous grasslands

Limestone or calcareous grasslands with typical short, hardy grasses and herbs occur on the Jurassic rocks in Hohenfels Training Area and in the western part of Grafenwoehr Training Area. They are an important habitat for insects, particularly butterflies, as well as a number of rare orchids.

Historically, grazing kept these grasslands free from shrubs and trees. Today, habitat maintenance includes mowing and removal of shrubs and trees, using manual labor when needed. In Hohenfels Training Area, sheep and goat grazing is still used to manage grasslands.

### Rock ledges

Limestone rock formations occur throughout Hohenfels Training Area and the western part of Grafenwoehr Training Area. Their characteristic vegetation, the rock ledge grassland, grows mainly on sun-exposed dolomite rocks. Here, the soils are shallow and extreme temperature fluctuations prevail. Vegetation is sparse due to the extreme habitat conditions. Typical plants are annuals or succulents like white or yellow stonecrop plants.

Burnt-tip orchid  
(*Orchis ustulata*)



Black-veined white  
(*Aporia crataegi*)



Wallpepper  
(*Sedum acre*)



Pasque flower  
(*Pulsatilla pratensis*)



# CONSERVE NATURAL RESOURCES

## Habitat types and their residents

### Sand or siliceous grasslands

Sand or siliceous grasslands dominate the eastern part of Grafenwoehr Training Area. However, they are not found in Hohenfels Training Area. They are characterized by clumps of vegetation interspersed with areas of open ground. Species found here include heathers, mosses, lichens, solitary bees, and wasps.

These grasslands provide harsh living conditions. No fertilizers are applied, so the soil is nutrient poor and military vehicle operations damage grass cover and expose soil. Pioneer plant and animal species thrive here that are adapted to these dry, warm microclimates of the nutrient-poor grasslands.

Shrub invasion is a threat to this habitat. If an area is not used or managed on a regular basis, shrub growth spreads, choking out rare species.

### Heathlands

Heathland develops on dry to moderately moist sandy soil. This habitat would turn to forest without fires and mechanical disturbances caused by military training and management practices such as shrub and tree removal. Heaths do not have a rich diversity of plant species and are characterized by dwarf shrubs such as heather (*Calluna vulgaris*) and Scotch broom (*Cytisus scoparius*).



Heather  
(*Calluna vulgaris*)



Sand lizard  
(*Lacerta agilis*)



Maiden pink  
(*Dianthus deltoides*)



Cowberry  
(*Vaccinium vitis-idaea*)



Ground beetle  
(*Carabus nitens*)



Heathland on sandy soil in Grafenwoehr Training Area



# CONSERVE NATURAL RESOURCES

## Habitat types and their residents

### Wet meadows

Permanently wet grassland can be found in the central and eastern parts of Grafenwoehr Training Area. Wet meadows develop in areas with a high groundwater table along ponds or creeks and are characterized by the presence of sedges and reeds. Wetlands play a critical role in filtering pollutants from water and preventing flooding by absorbing rain water. They are important habitats for waterfowl and other ground-breeding birds like the whinchat.

### Bogs

Bogs are characterized by spongy peat deposits, acidic waters, and a thick carpet of sphagnum moss. Large bogs can be found in the central and eastern parts of Grafenwoehr Training Area. One of the most significant bogs in Northern Bavaria is called "Röthelweihermoor" and is found in the southeast of Grafenwoehr Training Area.

Bog habitats are seldom found outside of Grafenwoehr Training Area due to former draining for farmland creation and peat harvesting. Peat, spongy material formed by the partial decomposition of plant matter, was historically harvested for fuel to heat homes. Bogs play a critical role in greenhouse gas absorption. Sphagnum moss absorbs carbon dioxide from the air and stores it indefinitely.

When bogs are drained, this greenhouse gas is re-released into the atmosphere. Species specifically adapted to bogs are on the decline throughout Germany due to the loss of this habitat.

Birds that are found here are common crane (*Grus grus*) and common snipe (*Gallinago gallinago*).

### "Röthelweiher" Pond

In the 15th century, the creek flowing through Röthelweihermoor was dammed and a huge man-made lake was created to cultivate carp - a valuable merchandise at that time. In 1776, the dam broke and caused catastrophic flooding of downstream settlements. It was never completely restored, leaving only a small lake in place.



Excerpt from a map from 1684

Banded darter  
(*Sympetrum pedemontanum*)



Whinchat  
(*Saxicola rubetra*)



Purple marshlocks  
(*Potentilla palustris*)



Bog with cotton grass in Grafenwoehr Training Area



Dusky large blue  
(*Maculinea nausithous*)



# CONSERVE NATURAL RESOURCES

## Habitat types and their residents

### Forest lands

About 55 percent of the USAG Bavaria training areas are covered with forests of various compositions. These forests are managed by the German Federal Forestry Service. The variety of forests within the USAG Bavaria training areas are just as diverse as their geology and landscapes.

The dominant forest type is the pine forest characterized by Scots pines (*Pinus sylvestris*), which thrive in dry, sun-exposed areas with low nutrient demands. Their understory is either similar to semi-dry, nutrient-poor grassland or consists of a dense herbaceous plant layer.

Near-natural beech forest communities can be found in Hohenfels Training Area and the western part of Grafenwoehr Training Area. The lady's slipper orchid (*Cypripedium calceolus*) is one of the orchid species flowering in beech forests in spring.

Monoculture spruce forests were planted in areas with better soils during the last century because of their fast growth and high economic value. However, they do not have a very high ecological value.

### Forest-to-open land edges

This habitat is a blend of both open land and forest characteristics. It is composed of grasses, herbs, shrubs, and small trees. Natural forest edges are richly structured habitats with a higher plant and animal diversity than either grasslands or forests. They offer a large variety of wildlife food like berries, seeds, grasses, and insects as well as nesting cover and protection from weather and predators. The transition from open lands to forests in the USAG training areas is more natural than in agricultural landscapes and is rarely found outside the training areas.

### Riparian forests

Floodplain forests and riparian forests grow along the creeks and rivers. Moist forests and swamp forests primarily occur in the immediate vicinity of standing water bodies, creeks, and rivers. They buffer non-point source pollution from adjacent land, reduce bank erosion, protect aquatic environments, enhance wildlife, and increase biodiversity. Only few of these forests are left outside of USAG Bavaria training areas because they were cut to provide land for agricultural purposes.

Fly agaric  
(*Amanita muscaria*)



Ladyslipper orchid  
(*Cypripedium calceolus*)



Red deer  
(*Cervus elaphus*)



Pygmy owl  
(*Glaucidium passerinum*)



# CONSERVE NATURAL RESOURCES

## Habitat types and their residents

### Creeks and rivers

Thumbach Creek and Frankenohe Creek are the main waterways within **Grafenwoehr Training Area** along with several creeks and ditches. During the last century, some were straightened or channelized to control flooding or drain wetlands, but projects have been completed lately to restore their meandering paths and reconnect them with their floodplains. They are in very good ecological condition compared to waterways outside the training area.

**Hohenfels Training Area** is very dry due to its geology. It is a karst, or limestone based, landscape that is slowly eroded by rainwater creating caves, sinkholes, and underground streams. Groundwater seeps into and through the ground. Because of this, there are only a few small waterways and one natural spring called Kühbrunn. Lauterach Creek borders Hohenfels Training Area on the northern side and Forellenbach Creek forms the southeastern border.

### Ponds

All the ponds and pond chains within Grafenwoehr and Hohenfels training areas were man-made for raising fish

or utilizing waterpower (mills, sawmills, or iron ore hammer mills). Near-natural vegetation, such as sedge reeds, willow shrubs, swamp forests, or bog areas can be found along ponds. The ponds are often colonized by abundant floating-leaf and submersed vegetation, which are home to the larvae of a variety of species of amphibians, dragonflies, and other insects.

### Small temporary water bodies

This type of waterbody includes puddles, vehicle tracks, and pools. They form in areas where rainwater collects in compacted soil depressions made by heavy equipment use or military maneuver operations. These puddles are used by two very specialized amphibians for reproduction, the endangered yellow-bellied toad (*Bombina variegata*) and the natterjack toad (*Bufo calamita*). They are so-called "pioneer species" that colonize their habitat within a relatively short time and quickly start reproducing before the temporary water puddles dry out. Hohenfels and Grafenwoehr training areas are home to the largest yellow-bellied toad populations in Bavaria.



Wood sandpiper  
(*Tringa glareola*)



Amanda's blue (*Polyommatus amandus*) and  
Mazarine blue (*Polyommatus semiargus*)



Yellow-bellied toad  
(*Bombina variegata*)





# PRESERVE CULTURAL RESOURCES

## History of the three locations

All three installations were originally established by the German Army and have been in constant use by the U.S. Army after World War II.

### Grafenwoehr Training Area

Grafenwoehr Training Area was established in 1910 for the 3rd Royal Bavarian Army Corps. The surroundings of the town of Grafenwoehr were selected because the area was sparsely populated, suitable for the requirements of artillery, and close to the Corps' headquarters in Nuremberg. The training area originally covered approximately 9,100 hectares. In the late 1930s, it was expanded extensively by 14,310 hectares and the "Lager Altneuhaus", today known as South Camp Vilseck, or Rose Barracks, was constructed.

Both times, especially during the expansion, numerous villages were abandoned and thousands of people were displaced. After World War II, the U.S. Army reorganized Grafenwoehr Training Area and established it as a multi-use training area. Since then, it has flourished as a military training ground for Soldiers from all over the world. It is home to the 7th Army Joint Multinational Training Command, as well as the headquarters for USAG Bavaria.

### Hohenfels Training Area

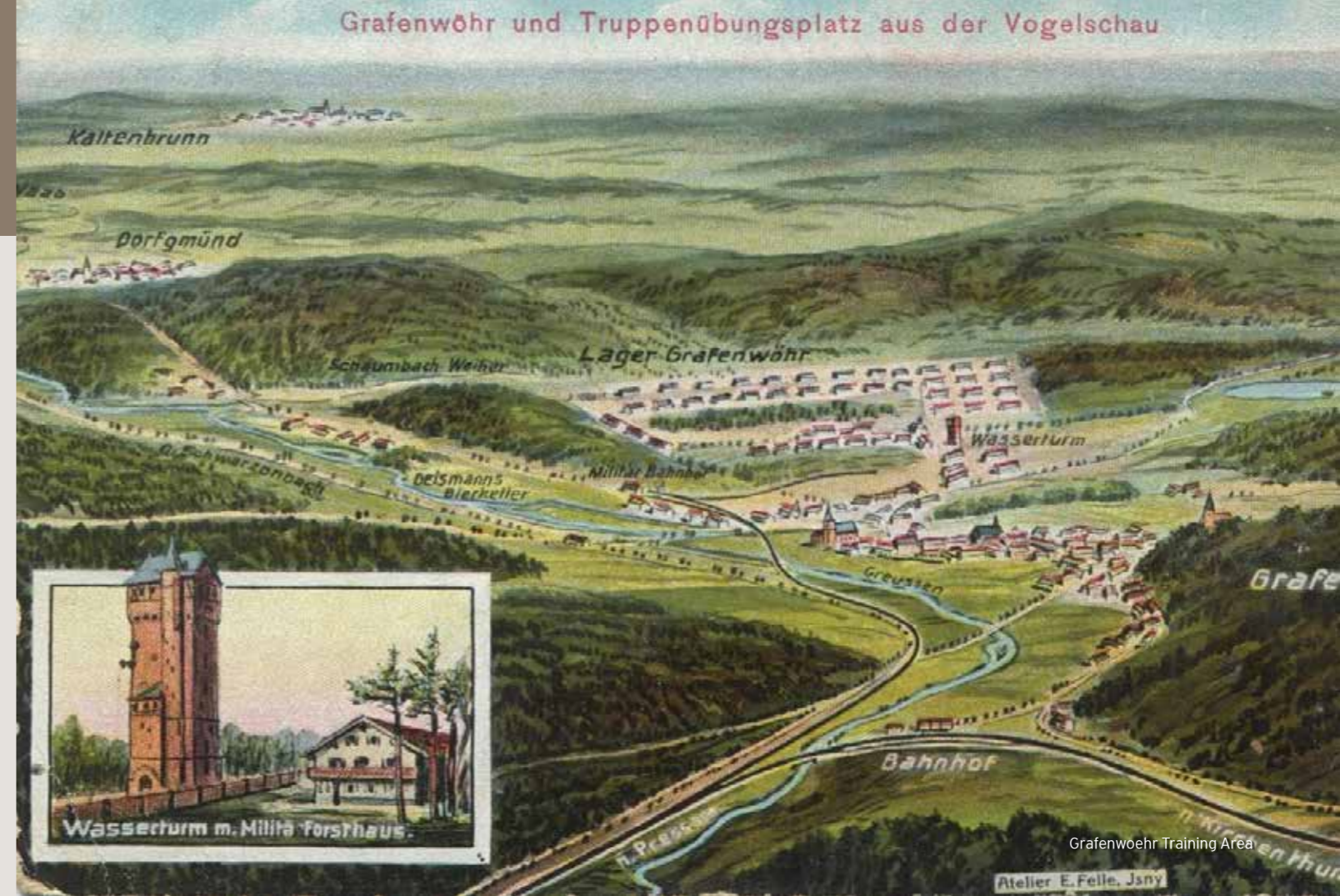
Hohenfels Training Area was designated in 1937 for use as a training area for the German Armed Forces. Training began in April of 1939 on a much smaller area than today's training area. After 1945, the U.S. Army resumed usage of the training area. The training area's size was expanded to approximately

16,000 hectares in 1951. Thousands of people had to leave their homes and were displaced. Today, Hohenfels is home to the Joint Multinational Readiness Center.

### Sheridan Barracks and Artillery Kaserne in Garmisch-Partenkirchen

Sheridan Barracks and Artillery Kaserne in Garmisch-Partenkirchen were constructed between 1936 and 1938 as "Ritter von Epp Kaserne" and "Artillerie Kaserne" to house the 98th and 99th "Gebirgsjäger-Regiments", and the 79th Gebirgs-Artillerie Regiment of the German Wehrmacht.

The U.S. Army occupied the Garmisch installations in 1945 and used the existing buildings primarily for housing and administration. In 1993, the George C. Marshall European Center for Security Studies was established at Sheridan Barracks. It is a unique institute for the U.S. Department of Defense and German Ministry of Defense security and defense studies.





# PRESERVE CULTURAL RESOURCES

## Building monuments and historic villages

### Coordination with host nation

USAG Bavaria is located in an area with a long cultural history dating back to the Stone Age. Therefore, there are many archaeological, cultural, or historic objects on the grounds of its installations. If there is the possibility of military training or future construction projects impacting archaeological or cultural/historic objects, host nation authorities must be notified through the Cultural Resources Program Manager. The Directorate of Public Works Environmental Division manages USAG Bavaria's cultural resources program and coordinates between proponents of construction, training activities, and host nation authorities to ensure compliance with archaeological resources and building monument protection laws and requirements.

### Historic village structures

When Grafenwoehr and Hohenfels training areas were established, local villages had to be abandoned and several hundred families lost their homes. There are more than 100 abandoned settlements on Hohenfels and Grafenwoehr

training areas and their former village centers are now officially listed as archaeological sites. Building foundations, cellars, ruins of chapels, orchards, cemeteries, and former mining areas are the only witnesses of former village life.

These areas are off-limits to training troops and vehicle traffic. Some of these structures are being preserved for future generations.

### Building monuments

There are eight officially listed historic building monuments within USAG Bavaria. These monuments include the Water Tower and Forsthaus on Tower Barracks, as well as the church, chapel, and castle of the former village of Lutzmannstein, the church of the former village of Kirchenödendhart, and the cemetery for Polish people in Hohenfels Training Area, as well as the "Villa" in Osterfelderstraße Housing Area in Garmisch. In addition, several pre-World War II "historic facilities and buildings" exist at Grafenwoehr and Garmisch that are not officially listed but are respected as cultural resources. These are the prisoner of war cemetery, the Langenbruck cemetery, Bleidorn tower, Wolf Hunter's Chapel, and the Feustel vault.

### Orchards and old fruit tree varieties

Just like building structures, former fruit orchards are remnants of the old settlements. Many of the fruit varieties found in these orchards have disappeared outside of the training areas. In recent years, hundreds of fruit trees were planted within the scope of environmental projects to conserve these heirloom varieties for future generations.

Former orchards and building structures provide habitats for endangered species. Cavities in the old fruit trees are homes for owls, hornets, and bats.



Renovated church of Schmidheim in Hohenfels Training Area



Historic village of Lutzmannstein in Hohenfels Training Area



Historic orchard in Grafenwoehr Training Area



Hopfeno Hopfenohe church in Grafenwoehr Training Area



# ENVIRONMENTAL OUTREACH AND AWARENESS

*The intent of the environmental awareness and outreach program is to improve the garrison's environmental performance and increase public awareness of the program. The three activity categories environmental competence training, environmental awareness, and outreach are geared towards different target groups and audiences.*

## Competence training

Soldiers and USAG Bavaria employees whose work has an impact on the environment benefit from a comprehensive environmental training program. Training courses and on-site assistance visits cover all environmental topics such as handling hazardous materials, disposing of hazardous wastes, preventing and responding to spills, handling asbestos, etc.

## Environmental awareness

Garrison public affairs officers, energy managers, waste managers, and environmental staff provide a range of activities to instill a sense of environmental awareness and behavioral changes in garrison staff and community members. Our awareness efforts include newspaper articles, radio interviews on the American Forces Network, Facebook posts, and public address systems.

Environmental Division and Utilities staff participate in a variety of community events such as exhibits and information expositions. Annual Earth Day activities range from supporting events at schools, participating in Kinderfests, and assisting with projects like constructing raised garden beds, building bat houses, and the like. Professional staff members visit schools to teach children a variety of topics like energy conservation and recycling, as well as specifics about local wildlife species such as bats, beavers, and birds.

## Outreach

The garrison hosts environmental tours and field trips through the training areas to inform Army and host nation stakeholders, local community members, politicians, non-governmental organizations, and other interested parties about the environmental program. In coordination with the Sustainable Range Program, there is a vivid exchange of information with foreign nation militaries and organizations to further excel in sustainably managing training lands.

## Environmental resources and facilities

In order to help connect military community members with the local environment, there are nature trails at the Wild B.O.A.R Outdoor Recreation Center on Tower Barracks and at the Friendship Lodge at Camp Nainhof, Hohenfels, as well

as a green classroom located next to the Commissary and PX on Rose Barracks. These facilities are intended to spark interest for nature and make learning more fascinating and interactive.

Guided tours for groups through all three facilities can be requested by contacting the Environmental Division.

## Social media

Check out the USAG Bavaria home page and our Facebook sites to get current information on the environmental program and environmental tips during the various seasons of the year.

[www.bavaria.army.mil/environmental](http://www.bavaria.army.mil/environmental)  
[facebook.com/USAGGEnvironmental](https://facebook.com/USAGGEnvironmental)  
[facebook.com/USAGBavariaNetZeroRecycling](https://facebook.com/USAGBavariaNetZeroRecycling)



French Army visiting Hohenfels Training Area



Safety fair on Tower Barracks



Opening of nature trail and green classroom on Camp Nainhof



Member of Bavarian state parliament visiting Grafenwoehr Training Area



# OUR PARTNERS

## Partnering

Partnering is an essential tool for effectively managing the USAG Bavaria's environmental program ranging from mission support, pollution prevention and remediation, to wildlife protection and habitat improvement. Team spirit between all divisions of the Directorate of Public Works, other garrison organizations, Army organizations, and military leaders has helped to pool scarce resources, promote consistent mutual efforts to resolve common problems and missions, and avoid unnecessary duplication of effort.

Great support is also provided by host nation governments, public organizations, local authorities, local communities, and other partners.

## U.S. Army

- ITAM - Integrated Training Area Management
- U.S. Army Materiel Command
- U.S. Army Corps of Engineers

## Host nation

- Host nation authorities like the German Federal Agency for Real Estate Management (BiMA), German Federal Forestry Office (Bundesforst), County and District Nature Protection Authorities (Untere und Höhere Naturschutzbehörden), and the Local Water Board (Wasserwirtschaftsamt)

- Universities of Bayreuth and Erlangen
- Non-governmental organizations like Landesbund für Vogelschutz (bird and nature protection), Bund Naturschutz (environmental protection), and Imkereiverein Weiden (bee keepers)

## Awards and recognitions

Our team spirit is one reason why USAG Bavaria has received several U.S. Secretary of Defense, U.S. Army, and IMCOM-E level environmental and energy conservation awards and recognitions.

The County of Neustadt/Waldnaab has presented the garrison with the Environmental Award, a special recognition from the host nation, for its outstanding environmental program and environmental awareness and outreach activities.

The most recent award was the Secretary of the Army Energy and Water Management Individual Award for Energy Efficiency / Energy Management.

# IMPRESSUM

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Garmisch Military Community  
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### Opening hours

Mon-Fri, 7:30 a.m. - 4 p.m.  
Closed on U.S. and German Holidays

## Internet

[www.bavaria.army.mil/environmental](http://www.bavaria.army.mil/environmental)  
[facebook.com/USAGGEnvironmental](https://facebook.com/USAGGEnvironmental)  
[facebook.com/USAGBavariaNetZeroRecycling](https://facebook.com/USAGBavariaNetZeroRecycling)

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## Thanks

Thanks are extended to all garrison personnel contributing to the success of the USAG Bavaria environmental program.

Special thanks go to Mr. Manfred Rieck, Chief, Environmental Division, who has led the environmental program of Grafenwoehr Training Area for more than 30 years and of USAG Bavaria since 2013, when former USAGs Grafenwoehr, Hohenfels, and Garmisch were consolidated.

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**“WE MUST PROTECT THE  
FORESTS, RANGE LANDS, FISH,  
WILDLIFE, AND OTHER  
NATURAL RESOURCES  
ENTRUSTED TO OUR CARE.  
THOUGH PRIORITY MUST BE  
GIVEN TO MILITARY MISSIONS,  
WE MUST USE AND MAINTAIN  
ARMY LAND AND NATURAL  
RESOURCES IN A MANNER THAT  
ASSURES ITS PRESERVATION  
AND AVAILABILITY FOR FUTURE  
GENERATIONS.”**

General Wickham, U.S. Army Chief of Staff  
to General Otis, Commander in Chief,  
USAREUR, 1986



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