alternative has the potential to impact these basins. Impacts would be fully mitigated by implementation of the above-listed mitigation measures for each alternative. Springs located in each alternative would be fully protected and, in most cases, restored to natural conditions by removal of non-native and invasive plant life. Cumulative Impacts to springs and other surface waters are expected to be insignificant and may even contribute to a positive impact, as more springs and surface waters are restored and receive protection by private and governmental agencies.

4.5 Biological Resources

The ROI for biological resources is the Mojave Desert, which encompasses the study area.

The proposed action and alternatives would have substantial impacts on vegetation and wildlife through the loss of individuals and viable communities, the loss of food sources, the loss of access to water resources, the disruption of travel corridors and nesting areas for wildlife, and increased dust and erosion.

Impacts on vegetation and wildlife could be considered significant if any of the following occurred:

- Loss of individuals or populations of a federal or state listed endangered or threatened species or its habitat;
- Loss of critical and/or declining wildlife habitat that is sensitive or rare in the region in question, such as riparian woodlands, wetlands, cliff face formations, and surface water sources;
- Substantial loss of populations or habitat of a species that is a federal candidate, is federally proposed for listing, is a California species of special concern, is on the CNPS Inventory List 1B or 2, is a BLM sensitive species, is regionally rare, or is otherwise so sensitive as to jeopardize the continued existence of the species in the region;
- Loss or long-term disruption of a major wildlife movement corridor;
- Loss of at least 5 percent of undisturbed habitat(s) encompassing a contiguous bio-geographic region, such as that found in a single valley, mountain range, or coastline;
- Substantial loss of natural vegetation that is slow to recover;
- Substantial loss of species or community diversity in natural vegetation and wildlife habitat; and/or
- Incompatibility with the WMP land management proposals.

The definition of "substantial" is dependent on the species in question. Much of the discussion of impacts to the desert tortoise and Lane Mountain milk-vetch are covered

in greater depth by the *Biological Assessment For the Proposed Addition of Maneuver Training Land at Fort Irwin, CA,* completed in 2003 (Volume II, Appendix B). The contents of that document are incorporated herein by reference.

Summary of Potential Direct and Indirect Impacts

Mounted Training

Mounted training maneuvers are mechanized exercises practiced by troops using tracked and wheeled vehicles. Heavy machinery for earth moving activities and other construction is also utilized in mounted training. Damage to the environment from mounted military training includes trampling and elimination of vegetation, soil compaction, soil erosion, and habitat alteration. Most damage to vegetation occurs from off-road wheeled and tracked vehicles. Direct impacts from vehicles includes damage to foliage, reduction in the overall shrub and ground cover, damage to the root systems and seedlings of plants, loss of plants, and/or alteration of community composition and structure (USACERL 1997). These impacts may ultimately affect the vigor, survival, and reproduction of a plant and/or the community.

Indirect impacts on vegetation include the alteration of soil or habitat in which it occurs. Direct impacts to soil from mounted training include compaction and mixing of soil horizons. Soil compaction from military vehicles can be extensive and is a function of the intensity of vehicle use, vehicle weight, and tire or track contact pressure. Mixing of soil horizons results from excavation of trenches with machinery and disturbance of the top layers of soil from high vehicle use. Soil compaction and disturbance increase erosion. Changes in soil structure and composition can reduce germination, growth, and reproduction in native plants and may alter species composition and community structure (USACERL 1997).

The main, indirect effect from military movements is the creation of fugitive dust. Movement of tracked and wheeled vehicles would increase immediate fugitive dust and emissions that can have adverse physiological effects on plants and wildlife species (Sharifi *et al.* 1997, Farmer 1993, Eveling 1969, Eller 1977, Thompson *et al.* 1984). Rains remove dust during the growing season. Coatings of dust on leaves can be considered permanent in heavily used areas adjacent to roadways. As much as 97 percent of creosote bush can be damaged in highly disturbed portions of Fort Irwin, and all plants have slower growth rates than undisturbed shrubs (Sharifi *et al.* 1997). Adverse impacts to native vegetation from mounted training are significant.

Mounted training may have direct and indirect impacts on wildlife. Potential impacts from direct contact with vehicles, machinery, and soldiers may include behavioral disruptions, injury, or death. Behavioral disruptions are likely to be the most common impact to wildlife. Behavioral responses of wildlife to increased human presence and activity may include temporary or permanent displacement, nest and den abandonment, and avoidance (USACERL 1997). Increased human activity within the expansion area would result in the displacement of some wildlife species. Some species are elusive, such as mountain lions and raptors, and tend to avoid areas of human activity and disturbance. Subsequent establishment of these animals may not occur.

Indirect impacts to vegetation and wildlife within the off-limits areas may result from training activities occurring in the vicinity. Indirect impacts to vegetation may include increased dust and erosion in the vicinity. Indirect impacts to wildlife may include the displacement of species or individuals from the immediate vicinity, disruption of wildlife movement between resource areas, and disturbance of foraging. Off-limits areas include springs, dry lakebeds, and conservation areas, such as those established for desert tortoise and Lane Mountain milk-vetch. See Figure 4.5-1 for a graphical depiction of the effects of maneuver intensity on vegetation.

4.5.1 Alternative I: East/West

4.5.1.1 Impacts

4.5.1.1.1 Vegetation

Plant Communities

Within this alternative, there are approximately 100 acres of desert sink scrub community. Creosote bush scrub community has a total coverage of approximately 104,770 acres. Desert wash scrub has a total coverage of approximately 6,120 acres. Joshua tree woodland covers approximately 3,690 acres. Mojave mixed woody scrub covers approximately 5,580 acres. Saltbush creosote bush transition covers approximately 3,340 acres. Saltbush scrub covers approximately 164,410 acres. Unvegetated areas make up approximately 1,870 acres.

The Fort Irwin ITAM Program has established a vegetation monitoring program, Land Condition Trend Analysis (LCTA), for military training areas on Fort Irwin. Individual LCTA plots are located throughout Fort Irwin, and data for these plots are collected and used by the ITAM Program for long-term and ongoing studies. The average vegetation cover of perennial grasses and shrubs in each of the plots is measured using the line intercept method. The LCTA vegetation cover data represents multiple plant communities located across varying geological layers, soil types, and elevations. The data represented here is a generalization of the average vegetation cover for creosote bush scrub plant communities on Fort Irwin. Based on field data measured for the development of the plant community map, some plant communities in Superior Valley have higher shrub diversity and cover (Charlton 2002).

A difficulty in evaluating the potential impacts of maneuver training activities on native vegetation and habitat is the characterization and quantification of maneuver training. Maneuver training is a complex interaction of events, participants, and equipment that is highly dynamic, both spatially and temporally. It is discussed in Section 2 and in detail in Volume II, Appendix F (Figure 3.3-2: Maneuver Intensity). Impacts to the native vegetation would vary, depending on the intensity, location, and timing of military training activities.

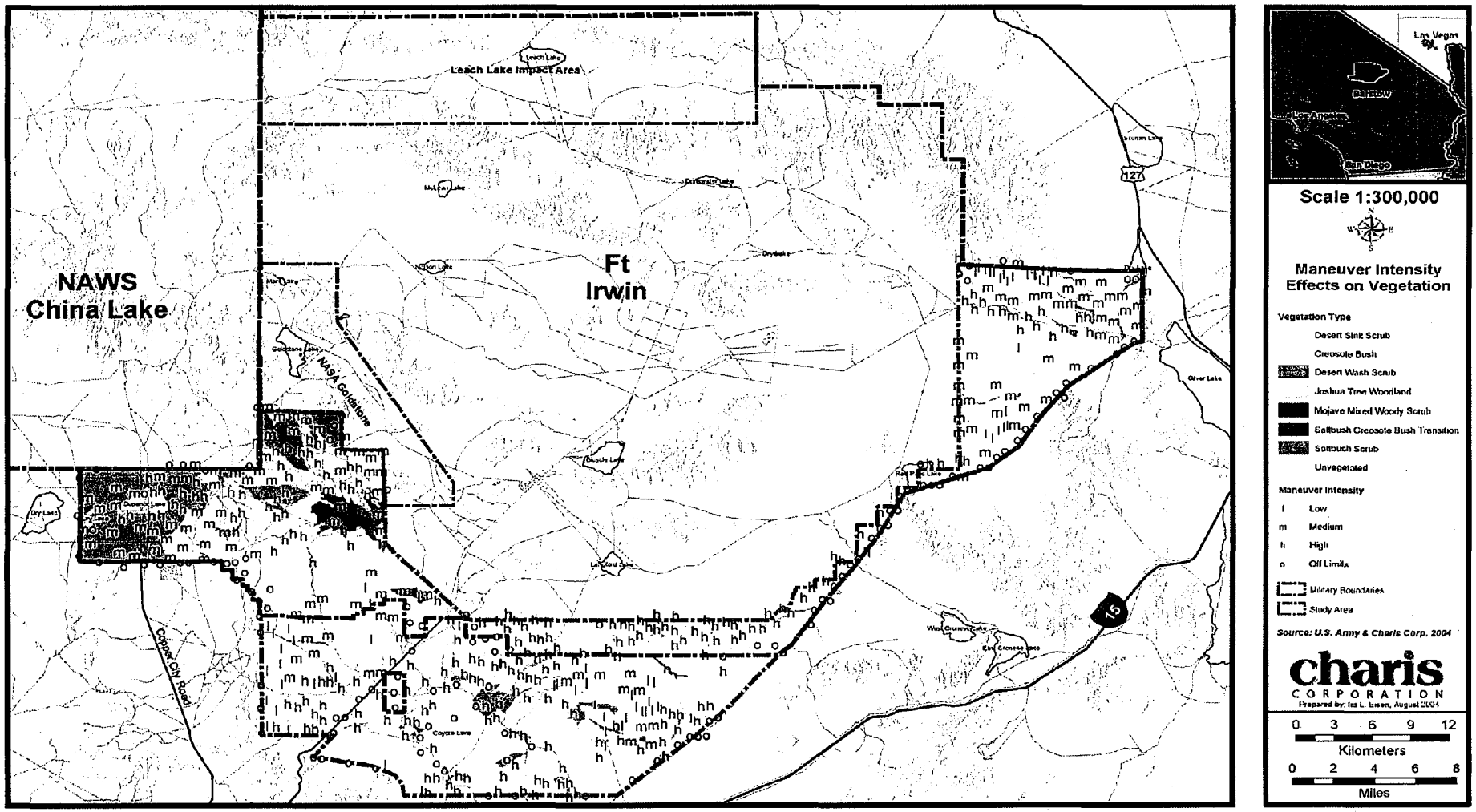

Figure 4.5-1: Maneuver Intensity Effects on Vegetation

The LCTA plots located in the expansion area and in off-limits areas of Fort Irwin were considered to be undisturbed. These plots were used as a baseline to compare with those located in areas that have been, or are currently, affected by military training. An inherent weakness in these estimates is that baseline information for Fort Irwin prior to training was not recorded and is not available. Part of the difficulty in estimating the loss of shrub cover is that training maneuvers in the area have been occurring on an intermittent basis since 1942, and pre-disturbance conditions were never quantified.

The following is a summary of preliminary data collected by the ITAM Program. Average vegetation cover for LCTA plots located in off-limits areas is approximately 13 percent. The average vegetation cover for LCTA plots located in the withdrawn area is approximately 14 percent. An average vegetation cover of approximately 15 percent was determined to be a reasonable estimate of undisturbed native vegetation on Fort Irwin and in the vicinity. The LCTA plots located in low-use areas have an average shrub cover of approximately 7 percent, a 52 percent decrease from those that are undisturbed. The LCTA plots located in medium-use areas have an average shrub cover of approximately 5 percent, a 65 percent decrease from undisturbed. High-use areas were assumed to have little or no shrub cover, a decrease of up to 100 percent from undisturbed. Most vegetation cover figures refer to shrub cover. Annual cover was analyzed separately. Also, during dry years no annual vegetation could be measured. Fort Irwin does not have high, exotic, weedy, annual cover in heavily disturbed areas. Past grazing practices resulted in high levels of red-stem filaree (*Erodium cicutarium*) on lightly to moderately disturbed areas. Very little annual vegetation occurs in heavily disturbed sandy areas. A worst-case scenario was used in estimating the expected loss of vegetation cover.

The effects of the proposed action on native vegetation and habitat are expected to be similar to the effects of military activities on vegetation and habitat located within the current training areas. The average vegetation cover in the maneuver expansion area may be reduced by up to 52 percent in low-use areas, up to 65 percent in medium-use areas, and up to 100 percent or complete elimination in high-use areas.

Association descriptions are found in Volume II, Appendix D. The estimated disturbance by vegetation community is shown in Table 4.5.1. Much of Paradise Valley, Eastgate, and the UTM 90 Area are creosote bush scrub. Much of Superior Valley contains deep, stabilized sand fields that contain saltbush and Joshua Tree Woodland, which is habitat to many sensitive wildlife species. A vegetation map of plant communities within the Study Area, and maneuver intensity, can be found in Figure 4.5-1.

Table 4.5-1 Disturbance to Vegetation, by Community

VEGETATION	DISTURBANCE	ACRES
Creosote bush scrub	High	41,412
Creosote bush scrub	Med	43,657
Creosote bush scrub	Low	6,310
Creosote bush scrub	Off	13,408
Total creosote bush scrub		**104,787**

VEGETATION	DISTURBANCE	ACRES
Desert sink scrub	Med	34
Desert sink scrub	Off	64
Total desert sink scrub		**98**
Desert wash scrub	High	4,356
Desert wash scrub	Med	1,264
Desert wash scrub	Low	236
Desert wash scrub	Off	261
Total desert wash scrub		**6,117**
Joshua tree woodland scrub	High	2,582
Joshua tree woodland scrub	Med	1,086
Joshua tree woodland scrub	Off	18
Total Joshua tree woodland		**3,686**
Mojave mixed woody scrub	High	1,681
Mojave mixed woody scrub	Med	2,605
Mojave mixed woody scrub	Low	262
Mojave mixed woody scrub	Off	1,032
Total Mojave mixed woody scrub		**5,580**
Saltbush-creosote bush transition	High	1,618
Saltbush-creosote bush transition	Med	1,714
Saltbush-creosote bush transition	Off	12
Total Saltbush-creosote transition		**3,344**
Saltbush scrub	High	2,235
Saltbush scrub	Med	13,708
Saltbush scrub	Low	2
Saltbush scrub	Off	469
Total saltbush scrub		**16,414**
Un-vegetated	High	83
Un-vegetated	Med	62
Un-vegetated	Off	1,732
Total un-vegetated		**1,877**
	Total	**141,903**

Invasive non-native plants

Military training activities and operations conducted within the expansion area would increase the potential for the introduction and establishment of invasive plant species.

Large-scale disturbances can lead to changes in vegetation communities over time. Invasive plant species, weedy annual grasses and forbs pose a threat to native desert vegetation. Disturbance by vehicle, foot, and/or equipment furthers the dispersal and establishment of non-native plants along roads and other areas. Invasion by non-native grasses is particularly problematic, as they are capable of effective competition with native species for space, water, light, nutrients, and survival. The successful establishment of non-native grasses can choke out native vegetation and eventually dominate large areas.

An increase in weedy annual grasses raises the potential for fire, by increasing the density and flammability of available fuel sources. Grasses are substantially more flammable and establish in denser populations than woody and non-woody native desert vegetation. Desert scrub vegetation is not normally dense enough to carry a fire for an appreciable distance beyond its origin. However, if weedy, non-native grasses and forbs become well established, fires will have the potential of spreading farther. An increase in wildfire further encourages establishment of grasses, as they are quicker and more capable of re-establishment after fire. If it becomes established in the maneuver expansion area, non-native grassland vegetation could potentially expand into, and displace, native desert shrub communities in adjacent areas.

Wildfires

The potential for wildfires in the maneuver expansion area would increase from implementation of the proposed action in this alternative. An increase in activity and use of equipment in the area increases the potential for fires. Fires can kill wildlife and vegetation and accelerate the conversion of shrub habitats into non-native annual grasslands, which in turn, promote more frequent fires (personal communication with Matt Brooks 1999).

Sensitive Plant Species

The **Barstow woolly sunflower** (FSOC, BLM-S, List 1B) has not been documented within Alternative I. A population is located in Coolgardie Mesa, a few miles south of the alternative. Impacts to the Barstow woolly sunflower are not expected.

Ten populations of **Clokey's cryptantha** (List 1B) have been identified within the proposed maneuver expansion area, Fort Irwin, and NAWS China Lake (BLM 2002w). Four of these populations, or portions thereof, are located within the western parcel of this alternative. One population is located within a planned high-use area. Direct impacts to this population, primarily trampling and potential elimination, would likely result from mounted and dismounted traffic. Another population that encompasses a relatively large geographic area is located in the Paradise Mountain Range and falls primarily within planned medium-use and low-use areas. A small portion of this population reaches into the planned high-use area. Direct impacts to this population would result primarily from foot traffic through Paradise Mountain foothills and would likely include trampling and partial elimination of the population. Two relatively smaller populations are located on the perimeters of this alternative. One spans the southern boundary of the alternative and is located within an area designated as Off-Limits, for LMMV conservation. Direct impacts to this population are not expected. The other

within the alternative. Impacts to the Mohave ground squirrel are considered significant. The management of Mohave ground squirrel is discussed in the Fort Irwin INRMP. Continued research on populations within Fort Irwin, primarily on NASA Goldstone, will be monitored. In the future, surveys will be added in Superior Valley. Other sensitive species will be managed according to the Sikes Act. Each species is addressed in the Fort Irwin INRMP.

4.5.1.2 Mitigation

4.5.1.2.1 Vegetation

Invasive Non-Native Plants

The NTC and Fort Irwin INRMP (NTC 2004) and Pest Management Plan have been developed in part to comply with Executive Order 13112 (EO 1999), Invasive Species and the Federal Noxious Weed Act of 1974 (Public Law 93-629). The INRMP and Pest Management Plan include current management prescriptions for invasive species and have been expanded to include natural resource management programs for the newly acquired lands. Adherence to management prescriptions during training will likely reduce the potential of introducing non-native invasive species, but will not likely eliminate the potential entirely.

Wildfires

The INRMP includes fire management prescriptions and has been expanded to include natural resource management programs and fire management for the newly acquired lands. Fire management on Fort Irwin consists of rapid response and the effective control of fires. Prescribed burning is not a viable option for ecosystem management in the Mojave Desert ecosystem because fires are extremely rare in desert ecosystems and many shrub species are killed by fire. Adherence to fire safety measures during training in the expansion area will reduce, but not completely eliminate, the potential for fires.

Sensitive Species

Two conservation areas are proposed primarily to protect **Lane Mountain milk-vetch**: the NTC-Gemini Conservation Area and the East Paradise Conservation Area. The proposed NTC-Gemini Conservation area is directly adjacent to the southern boundary of Army-permitted NASA Goldstone Complex and encompasses an area of approximately 2,470 acres. This area was chosen as a conservation area because its location makes it easy to protect from military training maneuvers.

The second proposed conservation area is the East Paradise Conservation Area. This area is located in the southwestern portion of the alternative and encompasses approximately 4,300 acres. It is surrounded by private and BLM-managed land. This area was chosen because it lies adjacent to the BLM proposed West Paradise Lane Mountain Milk-vetch Conservation Area ACEC (Charis 2003a). This provides continuity of management, for the benefit of the species, running from the BLM-managed land to DA-managed land. Conservation areas will be off-limits to all training activities. Conservation area boundaries will be fenced and marked with signs and material that

are visible day and night. For locations of Lane Mountain milk-vetch conservation areas, see Figure 4.5-2 Conservation Areas, or Figure 2.1-1 Projected Maneuver Intensity, in which conservation areas are designated as off-limits.

In subsequent meetings with the USFWS, the Army has committed to creating a "no-dig" zone on 3,700 acres of the Brinkman Wash-Montana Mine occurrence of the Lane Mountain milk-vetch. These areas have management standards set out in the in BO, with the understanding that slight changes may occur dependent on conservation needs. These standards are as follows:

- No mechanized training will be allowed;
- No ground-disturbing activities will be allowed; however, communication sites and other necessary tracking or monitoring equipment, including environmental monitoring equipment, may be sited in such areas;
- No off-road travel will be permitted at any time;
- Road use will be limited to existing roads in the area only. No new routes will be established unless the Army requires them to enhance its ability to manage the areas;
- Certain roads may stay open to vehicle travel to allow access for observer controllers, biologists from the Department of Public Works, other biological researchers, range control, spectrum managers, communications and related specialists, and military police;
- Aircraft and helicopters will be permitted to fly over the conservation areas, subject to airspace restrictions; however, no landing will be allowed;
- The boundaries of the conservation areas will be fenced and marked at appropriate intervals with siber stakes. Siber stakes are made of light and heat reflective material and are visible day and night. Tetrahedrons will be used to block all roads leading into the conservation areas to prevent straying of unauthorized Army vehicles from the training area. On certain roads, the placement of the tetrahedrons will allow access by authorized vehicles but clearly indicate that a conservation area is being entered; and
- Conservation area boundaries will be marked with signs indicating the boundary of the military reservation or conservation area; the signs wil indicate that entry by vehicles is not allowed (USFWS 2004).

Proposed mitigation will greatly reduce the adverse affects of military training on the Lane Mountain milk-vetch. However, even with the implementation of the proposed mitigation measures, loss of Lane Mountain milk-vetch individuals and habitat is expected, and is considered a significant impact. The creation of the East Paradise Conservation Area will also benefit **Clokey's cryptantha.**

4.5.1.2.2 Wildlife

Sensitive Species

Desert Tortoise

The following mitigation measures have been developed in conjunction with the USFWS and are considered reasonable and prudent:

- Creation of 3,000 acres of desert tortoise and LMMV conservation areas;
- Relocation of desert tortoise from within the expansion area to sites approved by USFWS;
- Construction of desert tortoise-proof fencing;
- Funding for implementation of BLM road closures and rehabitation;
- Purchase of grazing allotments in the Mojave Desert, to reduce competition for resources;
- Funding support for a desert tortoise management team;
- Assist in controlling limiting factor control; and
- Assistance and/or funding for adaptive management, monitoring and research, and land management.

Conservation Areas

Four conservation areas are proposed for the protection of desert tortoise: the UTM 90 Conservation Area East, The UTM 90 Conservation Area West, the UTM 90 Conservation Area Spur, and the Two Square Mile Conservation Area (Figure 4.5-2). Three of the proposed conservation areas are located in the UTM 90 Area, and all four conservation areas occur within the Superior-Cronese CHU. These desert tortoise conservation areas represent small preserves that will contribute to the adaptive management being developed by the working group to help with tortoise recovery. The UTM 90 Conservation Area East is in the southeast corner of the UTM 90 Area; the UTM 90 Conservation Area West is in the southwest corner of the UTM 90 Area; and the UTM 90 Conservation Area Spur is east of Fort Irwin Road on the southern boundary of the installation. The combined acreage of the UTM 90 Conservation East and West areas is approximately 3,370 acres. The UTM 90 Conservation Area Spur is approximately 900 acres. Conservation areas will be off-limits to all training activities. Conservation area boundaries will be fenced and marked with signs and material that are visible day and night to military personnel.

The UTM 90 Conservation Area East is located on the Fort Irwin Study Site (FISS) for desert tortoise and on additional parcels of land added to Fort Irwin by the Congressional land withdrawal. The location of this conservation area will allow continued operation of the FISS and preserve the surrounding desert tortoise habitat. The UTM 90 Conservation

Area West is in an area where surveys indicated a relatively higher density of desert tortoise than elsewhere in the project area. This area also has a higher than normal presence of wildlife and bird species due to the presence of Jack Springs, a nearby perennial water source just outside the boundary of Fort Irwin.

This conservation area will create a buffer zone between the maneuver training area and the adjacent BLM-managed land that also contains a relatively high density of desert tortoises. The UTM 90 Conservation Area Spur is surrounded on three sides by BLM-managed land and the proposed Superior-Cronese DWMA. The Two Square Mile Conservation Area is located on a 2 square mile parcel of land that lies about 4 miles south of Fort Irwin, between Fort Irwin Road and Coyote Lake. A medium density of desert tortoise is present in areas lacking obvious evidence of human disturbance at this location. Approximate desert tortoise densities can be seen in the following table.

Table 4.5-4: Desert Tortoise Density Levels 2002-2003

Number of Desert Tortoises	Density Designation
0-1 per square km	Low
2-9 per square km	Medium
10-17 per square km	High

In addition to the conservation acres described above, a 500-meter wide buffer zone will run along the eastern boundary of Fort Irwin, adjacent to the Boulder Utility Corridor (Corridor D), pursuant to the *Fort Irwin Military Lands Withdrawal Act of 2001* (PL 107-107). The buffer zone is primarily intended to protect the utilities in the corridor. However, because it will be designated as off-limits to training maneuvers, the buffer zone will also serve as a desert tortoise conservation area. Two conservation areas proposed for the protection of Lane Mountain milk-vetch, the NTC-Gemini and the East Paradise Conservation Areas, are either occupied desert tortoise habitat or are within designated desert tortoise critical habitat. These conservation areas will also benefit the desert tortoise. The NTC-Gemini Conservation Area does not have a history of high desert tortoise populations, therefore tortoises would not be relocated there.

Relocation Plan

The current procedure on Fort Irwin, and what is anticipated to be required in the expansion areas, is that upon discovery of a tortoise in harm's way, the Army unit or vehicle stops and calls the DPW to remove the tortoise to a safe area. This measure may reduce the number of injuries or deaths to tortoises from training activities, but is not adequate to protect the tortoise population.

Due to the relatively high densities of desert tortoise in the UTM 90 Area, the DA proposes to remove tortoises from this area and relocate them to areas south of the Installation or other areas identified by the working group and the USFWS as acceptable locations. This measure is expected to reduce significantly the impact that could result from training in this area. Relocation of desert tortoises would include

several pre-training sweeps in the spring and fall to locate and remove tortoises. Sweeps will be employed to increase the efficiency of the capture and to add additional protection for the desert tortoise. This mitigation measure wouldo include analysis and study of the particular areas that are proposed to receive desert tortoises, studies of the receiving populations, and studies of the tortoises to be relocated.

At present, the relocation plan will not address desert tortoise eggs and juveniles. A reasonable effort will be conducted to remove all age classes of desert tortoise. More details will be addressed in the relocation plan being developed by the working group.

Presently, the healthy desert tortoise populations on the southern slope of the Coyote Hills and UTM 90 Area represent the densest known healthy population in the central Mojave Desert. This is partially due to their isolation from well-traveled vehicle routes. The movement of these populations closer to disturbed areas could have significant consequences to their health. Such populations may become more susceptible to URTD due to increased threats and other unknown factors that spread the disease. These issues will be dealt with in the relocation plan.

Desert Tortoise-Proof Fencing

The installation of desert tortoise-proof fencing is also proposed as mitigation. Fencing will be used both for the purpose of excluding animals from maneuver training areas and preventing relocated tortoises from returning to areas that are used for training. Desert tortoise-proof fencing will be installed along the southern boundary of Fort Irwin. It will begin at the intersection of Fort Irwin Road and run southeast along the boundary of the UTM 90 Conservation Area West, then east along the southern boundary of Fort Irwin until it reaches the intersection of the beginning of the UTM 90 Conservation Area East, and then northeast until the fence meets the 500-meter buffer zone. Certain areas will not be fenced along this east-west boundary due to terrain or inaccessibility to both desert tortoises and to military vehicles. Fencing will also be installed to protect the UTM 90 Conservation Areas East and West. This fence will be a combination fence, composed of desert tortoise-proof fencing on the lower portion and barbed wire on the upper portion. All fencing will be marked so that it is visible day and night by military personnel.

Lakebeds Off-Limits

All dry lakebeds in the project area will be designated off-limits to training maneuvers. There will also be a buffer zone around the lakebeds of 25 meters where ground disturbing activity and OHV use will not be permitted. This limitation is to reduce the amount of dust that might be generated by preserving the hardpan surface of the dry lakes. Travel will be allowed on existing dirt roads. Dry lakebeds occupy approximately 1,700 acres of desert tortoise critical habitat within the alternative.

Proposed mitigation will greatly reduce the adverse affects of military training on desert tortoise. However, even with implementation of the proposed mitigation measures, loss of desert tortoise individuals and habitat is expected and is considered a significant impact.

Other Sensitive Wildlife Species

Bats

Human disturbance to potential roosting sites may be virtually eliminated by designating mines and caves throughout the alternative, and steep cliff areas in the Avawatz Mountains, off-limits to all training activities. Placing cave gates over the entrances of mines and caves that are currently occupied or provide potential roosting and/or hibernating sites will eliminate humans from entering them, but will allow bats access. The implementation of these mitigation measures, could reduce the impacts from training to less than significant.

Mohave Ground Squirrel

The creation of conservation areas and the purchase of mitigation lands for desert tortoise and Lane Mountain milk-vetch will also benefit the Mohave ground squirrel, where the ranges overlap.

Mojave Fringe-toed Lizard

Creation of the 500-meter utility buffer zone and UTM 90 Conservation Area East will benefit and protect Mojave fringe-toed lizard habitat.

Birds

As most sensitive bird species are located in and around springs, all springs will be set off-limits to entry. Therefore the impact is less than significant.

4.5.2 Alternative II: Eastgate/South

4.5.2.1 Impacts

4.5.2.1.1 Vegetation

Plant Communities

Within the alternative, there are approximately 3,800 acres (or a total coverage) of desert sink scrub community. Creosote bush scrub community has a total coverage of approximately 134,190 acres. Desert wash scrub has a total coverage of approximately 4,140 acres. Mojave mixed woody scrub has a total coverage of approximately 710 acres. Saltbush creosote bush transition has approximately 150 acres, and saltbush scrub has approximately 4,020 acres. As discussed in Section 4.5.1.1, the average vegetation cover in the expansion area may be reduced by up to 52 percent in low-use areas, up to 65 percent in medium-use areas, and up to 100 percent, or complete elimination, in high-use areas, as a result of military training maneuvers.

Invasive, Non-Native Plants and Wildfires

Impacts from invasive, non-native plants and wildfires, from implementation of this alternative, would be the same as described in Alternative I.

Sensitive Plants

would be off-limits to all training activities. Approximately half of the known Fort Irwin Lane Mountain milk-vetch plants occur with the conservation area.

The Brinkman Wash/ Montana Mine population encompasses a total of approximately 5,500 acres, of which, approximately 4,360 acres (80 percent) is located within the alternative. The remainder of this population is located within the former boundary of Fort Irwin. Approximately 2,650 acres, or 48 percent of this population, occurs within planned high-use areas, while approximately 1,710 acres, or 31 percent of this population, occurs within planned Medium-Use areas. One acre of this population occurs within a proposed conservation area that would be off-limits to all training activities.

The NTC-Gemini population encompasses a total of approximately 1,280 acres and is located entirely within the former boundary of Fort Irwin. Approximately 100 percent of this population occurs within a proposed conservation area that would be off-limits to all training activities.

Table 4.5-2: Lane Mountain Milk-vetch Habitat

POPULATION	ACRES OF HABITAT	ACRES OF HABITAT WITHIN MANEUVER AREAS[1] OF FORT IRWIN	% OF HABITAT AFFECTED BY ARMY MANEUVERS (PERCENT OF TOTAL)
Brinkman Wash/ Montana Mine	5,499	H = 2,634 M = 986 L/ND = 1878 OL = 1	5,498 (99%)
Coolgardie Mesa	9,779	Not located on Fort Irwin	0 (0%)
NTC-Gemini	1,283	OL = 1,283	0 (0%)
Paradise Valley	4,796	H = 684 M = 287 OL = 3,634 (A portion of the OL acreage is not located on Fort Irwin.)	971 (20%)
TOTAL	**21,357**	**H = 3,336 M = 1,994 L = 0 OL = 4,918**	**5,330 (25%)**

[1] *H = HIGH-USE; M = MEDIUM-USE; L=LOW-USE; OL = OFF-LIMITS; ND = NO DIG.*

Potential direct impacts from mounted and dismounted training maneuvers include killing or damaging individual LMMV plants through direct contact with wheeled and tracked vehicles, construction, digging, earth-moving activities, temporary bivouacs, helicopter landings, and the movement of foot-soldiers. Potential indirect impacts from

5. Selection of Preferred Alternative

The analyses presented in Section 4 form the basis for the recommendation to select Alternative I (East/West) as a preferred alternative for use as training land by the NTC and Fort Irwin. Table 5.1-1 evaluates training mission requirements against the suitability of each alternative to meet the training objective.

Alternative I represents the culmination of considerable compromises by DA and DOI, relative to previously proposed alternatives (e.g., 1996 DEIS). Prior to the negotiations and impact analysis contained herein, the Army's preferred alternative was Alternative IV, as it presented the best variety of training scenarios for use by rotational troops and best met the goal of the land expansion by adding the amount of acreage closest to that identified in the LURS. After evaluation of the effects, in particular the effects to the Paradise Valley and Coyote Basin populations of desert tortoise, the Army changed its preferred alternative to Alternative I, as the environmentally preferable alternative of the two. Alternatives III (Eastgate) and V (Eastgate/UTM 90) are less disruptive to the natural and cultural resource systems; however, both rated poorly with regard to meeting critical training mission requirements. Alternative II provides more land, but does not provide the type of land that the Army requires to train as it primarily consists of gently sloping bajadas, open areas, and dry lakes. Militarily, such an area has little value for training. Additionally, Alternative II would directly impact the densest areas of desert tortoise that are present in the UTM 90 Area and south of Fort Irwin along the eastern side of Fort Irwin Road.

Alternative I presents challenges regarding dust loading potential for neighboring NASA Goldstone. The NTC and Fort Irwin continue to work with NASA to arrive at mutually agreeable mitigation efforts to reduce the impacts associated with tank trails routed through, or adjacent to, NASA and from the maneuvers planned to the southwest of the sensitive antennas and other communication equipment used at the NASA facility. Another concern expressed by NASA included the radio frequencies used during training at the NTC and the possible interference with those used in their operations. Alternative I also presents challenges regarding noise, petroleum spills, emergency response, road maintenance, and traffic control for neighboring NASA Goldstone. Ongoing meetings have been conducted to identify all issues and to resolve them to the satisfaction of both parties. To this end a working group has been formed to resolve issues. As of December 2004, all issues had been addressed. The Army and NASA are currently working on permit revisions and/or MOU.

In conclusion, for the reasons stated in this SFEIS and based on analysis of the Army's requirements, Alternative I was chosen as the Army's preferred alternative.

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Table 5.1-1: Evaluation of Alternatives

CRITERIA	ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III	ALTERNATIVE IV	ALTERNATIVE V	ALTERNATIVE VI
Adheres to Army Training Doctrine—"Train as you fight"	Good—effectiveness limited by requiring multiple crossings of Fort Irwin Road	Poor	Poor - area provides some realism by pushing staging areas back to a distance farther than present	Good—effectiveness limited by requiring multiple crossings of Fort Irwin Road	Poor - area provides some realism by pushing staging areas back to a distance farther than present	Poor—current land availability forces units to train in a compressed area
Amount of useable maneuver area	Excellent	Good - however, most land is unsuitable for force-on-force training due to lack of variations in terrain and presence of the Alvord Mountains and Coyote Dry Lake	Poor	Excellent	Poor	Poor - the amount of land presently available for training is inadequate to meet the needs of the NTC
Terrain variation supports multiple training scenarios	Excellent—includes mountainous, rolling, and flat terrain	Poor	Poor	Excellent	Poor	Good
Minimizes the amount of use of a single piece of land	Excellent	Good—maneuver options limited by Alvord Mountains	Poor	Excellent	Poor	Poor—units must utilize the same piece of land several times in order to accomplish their training goals
Allows units to train using doctrinal distances	Good	Good	Poor	Good	Poor	Poor—current capacity does not allow soldiers to utilize their military vehicles to their full capacities
Airspace utilization	Good	Good	Good	Good	Good	Good