

## Sustaining Military Training Capabilities

### Fort Future: Solutions For Installation Transformation

### Problem

The Department of Defense Senior Readiness Oversight Council has expressed concern that numerous external pressures (encroachment) are impacting the military services' ability to maintain force readiness. Encroachment is defined by the committee as "Any outside activity, law, or pressure that affects the ability of military forces to train to doctrinal standards or to perform the mission assigned to the installation" (MG Van Antwerp, *Federal Facilities Environmental Journal*, Summer 2001). Issues of concern include urban growth around installations, legislation protecting on-post habitat, use of national airspace, and the pressures from special interest and stakeholder groups.

The ability to use dedicated lands, seas, and airspace to maintain mission readiness is being impacted by dynamic social and land use changes all across the world. Therefore it has become very important to (1) identify key measures that can indicate when an installation or range might lose training/testing opportunities, (2) monitor for those changes in the surrounding areas, (3) predict risks to training and testing associated with projected land use development patterns and other pressures, and (4) develop opportunities to mitigate these risks.

The Sustainability, Encroachment, and Room to Maneuver (SERM) program provides technologies and data to help services and installations protect the sustainability of DoD's critical existing capabilities and assets.

While pressures to limit training and testing increase because of encroachment factors, larger areas are required to support to changing weapon systems and doctrine. Finding adequate training and testing areas is challenging because:

- Weapons fire farther
- Vehicles travel faster
- Reduction in total number of bases and ranges.
- Transformation and evolution of units, mission, and doctrine
- Increasing environmental laws protecting (excluding from use) on-post resources.

The combination of encroachment impacts and increased space demands for training and testing complicate service and installation planning requirements. Fort Future tools and data will help DoD address these planning requirements.



**Increasing urbanization around Camp Pendleton has constrained military activities**

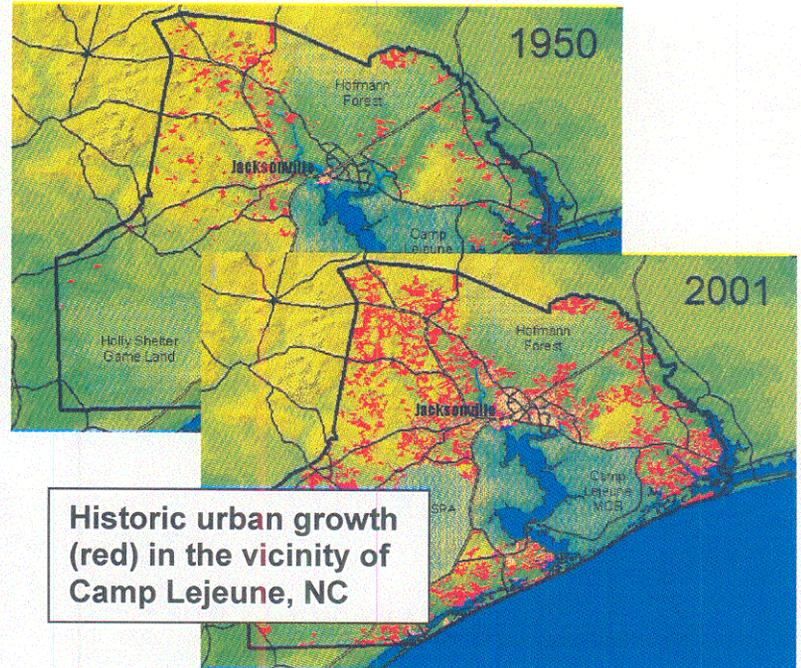
## Approach

### Assess and Compare Risks

Many different external factors can affect the mission activities of military installations. This effort examines external factors (stressors) that might impact mission operations to identify the highest-risk issues, and to examine how these issues compare across groups of installations. Factors considered include:

- |                    |                     |
|--------------------|---------------------|
| Air quality        | Air space           |
| Noise Issues       | Energy Availability |
| Energy Security    | Radio Frequency     |
| Urban Development  | Ecosystem           |
| Goals/Trends       | Species Protection  |
| Water Availability | Water Quality       |
| Water Security     | Socio-Economic      |
| Transportation     | Stakeholder Issues  |

Each factor is evaluated for selected groups of installations (by service, mission types, and region) and assigned a high, medium, or low risk relative to the group.



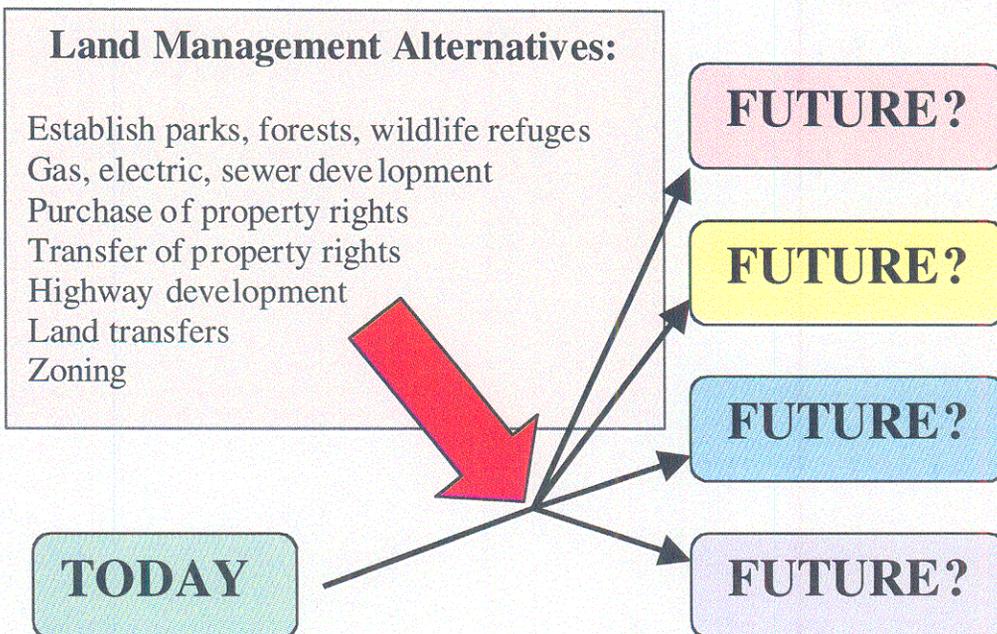
Historic urban growth (red) in the vicinity of Camp Lejeune, NC

### Conduct Trend Analyses

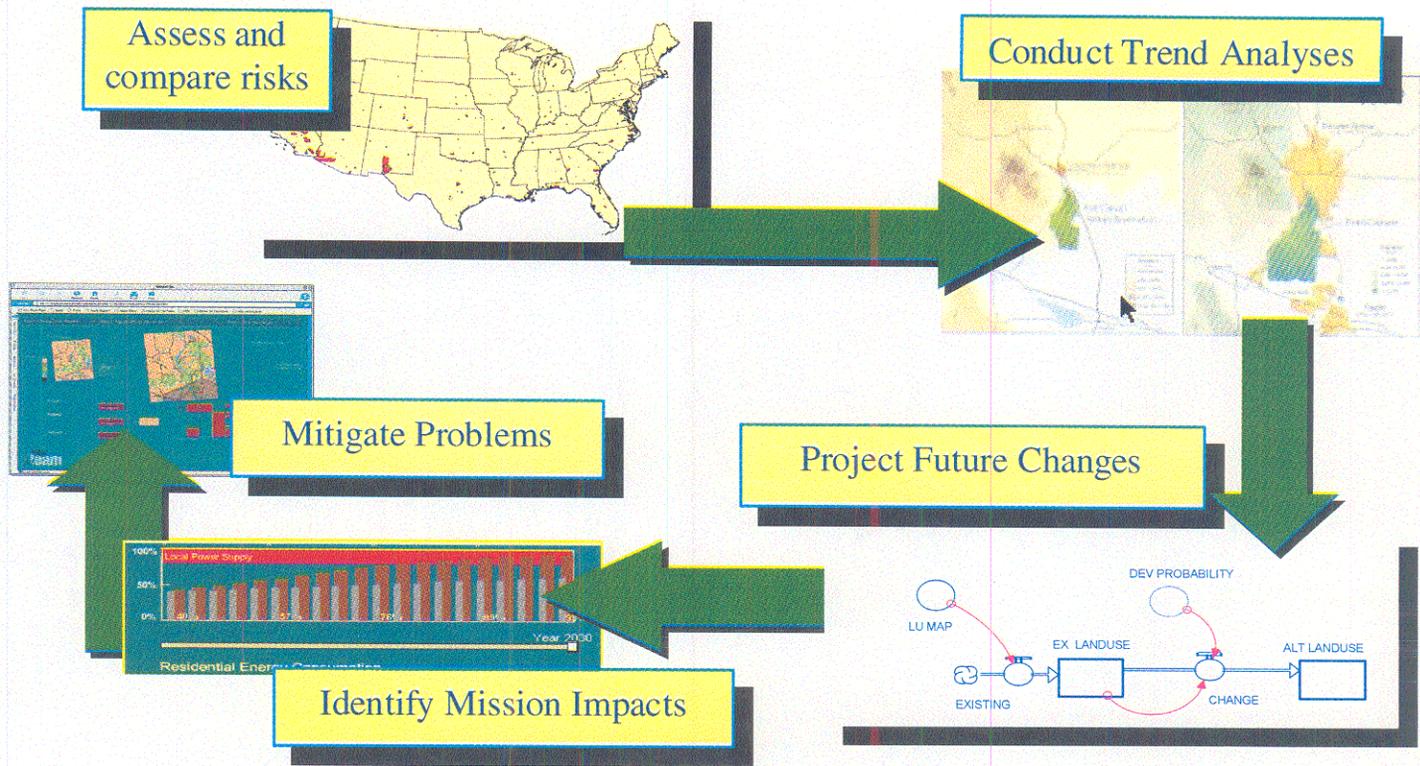
A trends analysis of regional risk is an analysis of landscape changes in the region/vicinity of one or several military installations. Trends are drawn from the analysis of historic land use and land cover maps, satellite images, and other sources.

### Project Future Changes

Once historic trends are understood, we project future land use changes based on alternatives that result from the spatial and dynamic interaction between economic, ecological, social, and control systems in the region. This work is accomplished using spatially explicit land modeling capabilities, including the Land use Evolution and impact Assessment Model (LEAM) to describe projected land-use changes across a landscape (inside and outside the installation fence line) over specified time frames.



Projecting Future Land use Patterns With LEAM



## SERM Solutions

### Assess and Compare Risks

Conduct national- and regional-scale analyses of risks to installation training/testing capabilities with respect to resource constraints and ecologic, economic, social, military, and agronomic factors.

### Conduct Trend Analyses

Collect and portray historic and current trends in risk factors.

### Project Future Changes

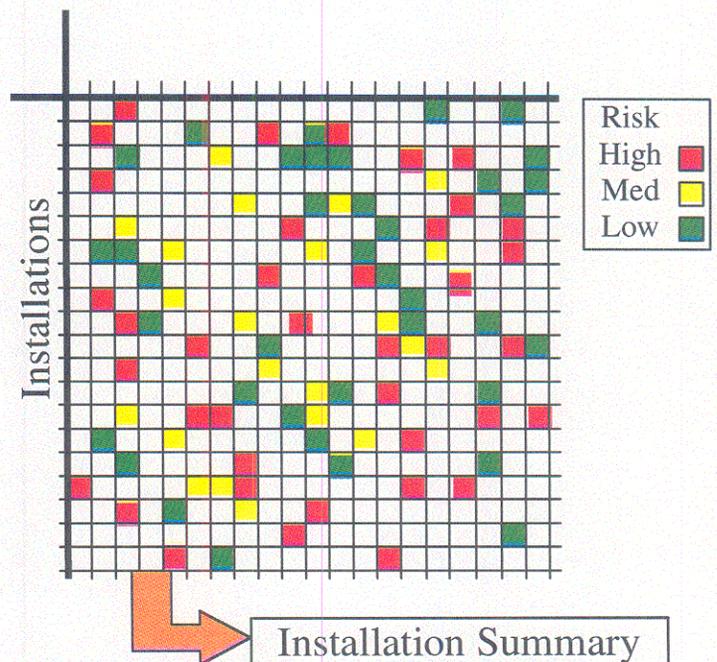
Simulate urban growth patterns in response to alternative regional investments in transportation and utilities and strategic changes in management and ownership of land and property rights.

### Identify Impacts to Mission

Evaluate 10-, 20-, 30-, 40-, and 50-year urban growth projects with respect to military installation opportunities to test and train.

### Mitigate Potential Problems

Working with local stakeholders, develop and test alternative location of highways and access points, develop utilities, create new parks, forests, and natural areas, and potential purchase or exchange of property rights.



## Identify Impacts on Training/Testing

Once future land use patterns are predicted, analyses of the impact of these patterns on the military mission possibilities are conducted. For example, as urban growth progresses, the on-post areas that generate blast noise may significantly decrease (see figure). Similarly, the impact of the urban patterns with respect to anticipated restrictions based on the following must be analyzed:

- Habitat (TES)
- Dust, smokes, and obscurants
- Radio and television frequency
- Air space for airfield operation
- Blast and small arms noise
- Community interaction
- City and aircraft lights.

To accomplish the analysis of urbanization with respect to the restrictions on training and testing, a combination of existing and emerging simulation models are used. Existing models include:

- GSSHA – for hydrology and water quality
- BNOISE – for blast noise analysis
- SARNAM – For small arms noise



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**SERM is part of  
Fort Future, a  
technology suite  
to help units and  
installations plan  
for future  
requirements**

**For more information:**

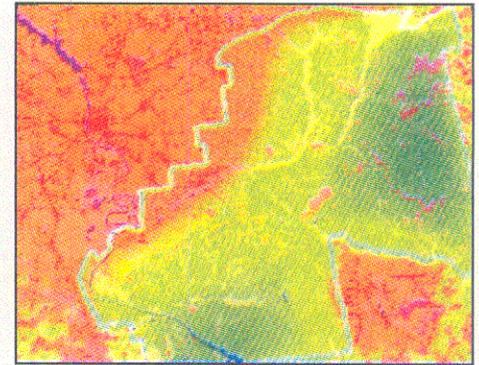
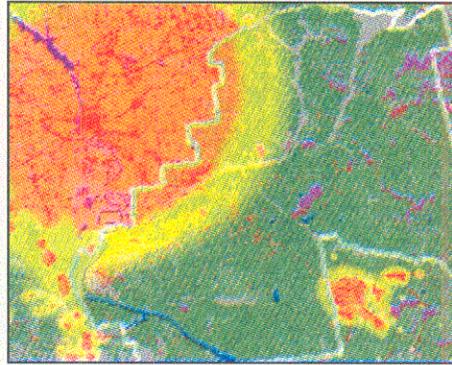
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**View of projected urban growth around Fort Benning showing increase (yellow and orange) in on-post areas where activities may generate noise**

## Develop Mitigation Plans

When impacts on military installation training are understood, alternative future plans must be developed and tested. At the multiple-decade scale, long-term mitigation options can include a number of options including:

- Changes in property right ownership
- Development of parks, wildlife areas, forests
- Location of major highways and access
- Development of utility grids.

Relevant SERM products include a database on mitigation approaches, guidance, and options for regions across the nation.

## Benefits

Urban encroachment and other factors can have significant and permanent implications on opportunities to test and train, but is a decades-long process of change that is easy to overlook in installation planning. SERM provides tools and approaches to help answer these types of questions:

- Which installations are the most at-risk from exogenous factors?
- How will a planned new range or range-use impact installation neighbors?
- What land use change is predicted in the region of the installation over the next 50 years?
- How will this affect military operation capacity?
- How will the protected species habitat change?
- What strategic land ownership and land-use changes will improve the military's ability to train in the future?