

# SIRRA

## Sustainable Installations Regional Resource Assessment

ERDC/CERL TN-03-3

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### Problem

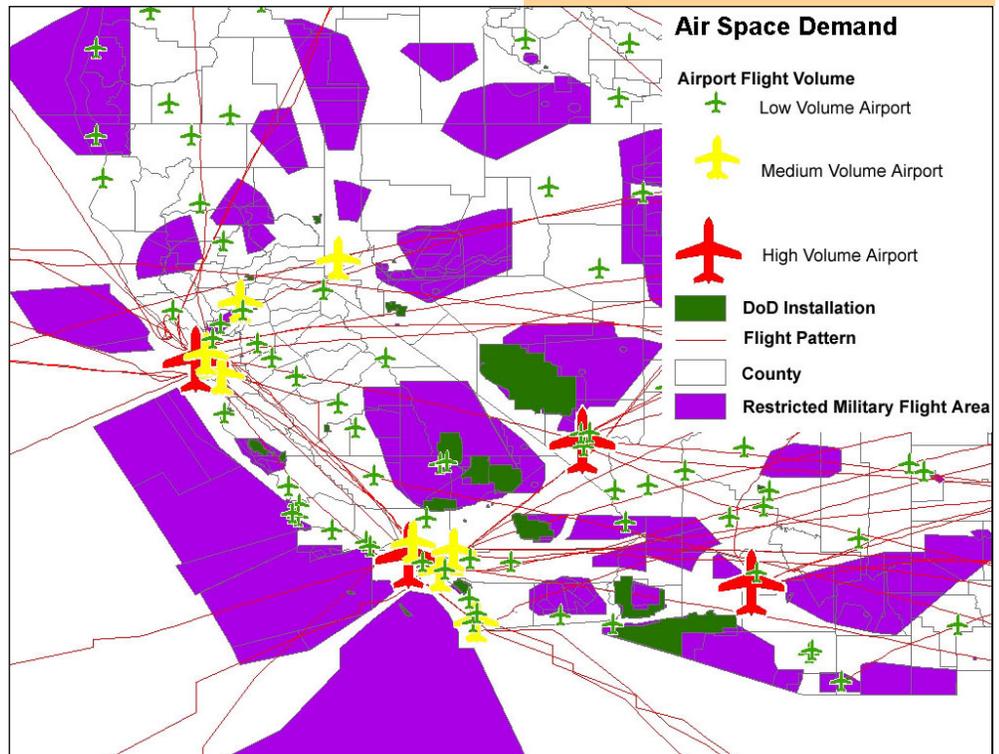
One of the key concerns for DoD installations is their ability to sustain, and sometimes change or expand, their mission activities. Optimal use of installations in the face of changing missions, closures, and realignments, requires an understanding of each installation's capabilities. Regional competition for land, transportation, energy, water, and other resources may put an installation's ability to perform essential activities at risk. It is critical that we understand those factors that impact an installation's ability to maintain its mission.

The Sustainable Installations Regional Resource Assessment (SIRRA) methodology

provides relative risk rating indicators for ten sustainability issues: (1) air, (2) energy, (3) urban development, (4) threatened and endangered species (TES), (5) locational issues, (6) water, (7) economic issues, (8) quality of life, (9) infrastructure, and (10) security. Indicators are measurable aspects of a system that can be used to quantify the state or condition of that system. An effective installation indicator provides information about the ability of the installation to train and maintain its mission.

Military installations provide many benefits to their local region in terms of economic impact and natural resources. They provide large payrolls that boost local economies, and they often provide protection of TES habitat. Installations can often find themselves in competition for scarce regional resources, such as land for growth, water supply, air space, and

### Air Congestion in the Southwest.

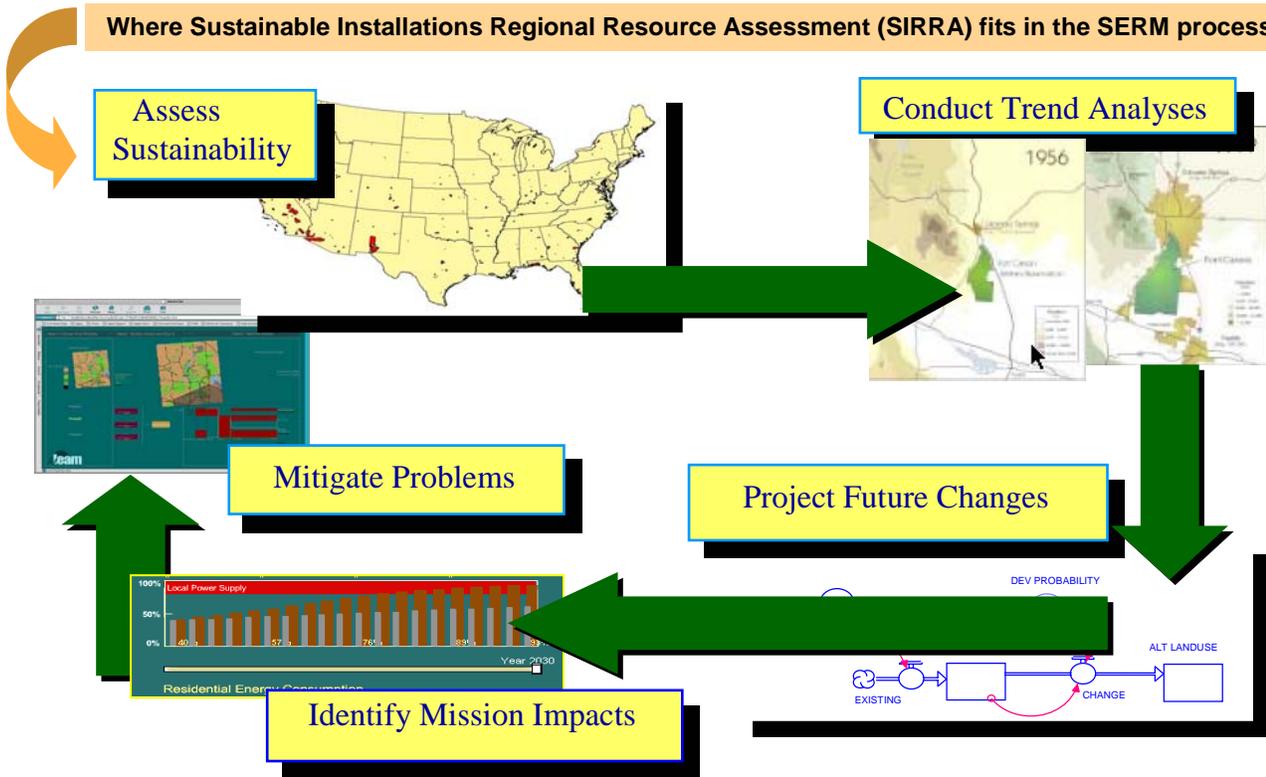


frequency bandwidth. Installation, local, and regional planners must make decisions collaboratively to avoid or mitigate long-term mission constraints. The SIRRA tool can inform planning and decisionmaking at the national scale to maximize installation sustainability.

### Background

Over the last several decades, the population and amount of developed land around most U.S. cities and military installations have grown significantly. Meanwhile, military ranges and training lands have remained undeveloped and have become "islands of biodiversity" as population centers expanded up to or near installation boundaries, and as residential development grew into more remote and previously rural areas. Economic expansion, some probably driven by the installation's economic impact in the local area, spurred

**Where Sustainable Installations Regional Resource Assessment (SIRRA) fits in the SERM process.**



development of new suburban communities near Department of Defense (DOD) installations. Many installations are now at the fringe or in the midst of large urbanized or urbanizing areas. The combination of environmental laws and nearby urban development has created significant pressures to alter land use practices on military installations. These pressures are termed “encroachment,” which is a general descriptor for the many issues that limit the military use of land-, air-, and sea-space.

Encroachment issues become stressors to installation sustainability and/or threats to stationing. Stationing may also be affected by restrictions due to air and water quality standards, erosion control requirements, and restrictions on wetland impacts.

**Approach**

The SIRRA methodology is a process of characterizing installations based on a set of risks or stressors. The process uses a broad set of indicators covering the range of issues that affect Army installations. The sustainability ratings are used to express the relative ranking of installations using single measures, or groups of

measures, that define a stress. This standardized approach allows the use of national-level data to evaluate regional aspects of the installation setting. This evaluation provides a heightened awareness of long-term issues that could threaten mission sustainment.

The SIRRA tool utilizes existing science and measurement-based national data sources. Though the sustainability ratings are a snapshot in time, the data sources are updated regularly by their proponent e.g., census data is updated every 10 years by the U.S. Census Bureau. This data is organized and analyzed, and used to create national GIS coverages.

Sustainability ratings are being developed in several different ways. National regulatory targets exist for some indicators. Examples include U.S. Environmental Protection Agency’s (EPA’s) six criteria air pollutants that comprise the air quality indicator, the U.S. Geological Survey (USGS) 100 year flood zone designation, and Federal Emergency Management Agency (FEMA) designated seismic zones. Other data sources require statistical manipulation and evaluation based on the research literature. Quality of life indicators are examples of these.

| SIRRA Matrix  |  |
|---|--|
| Issue   | Indicators   |
| <b>Air Sustainability</b>                                     | Criteria Pollutant Non-Attainment<br>Noise Complaints  |
| <b>Energy Sustainability</b>                                  | Electrical Source (Grid generation)<br>NAG Price Variability<br>Petroleum Price Variability<br>NAG Imports<br>Petroleum Imports<br>Electrical Price Structure (Dereg)            |
| <b>Urban Development</b>                                      | Regional Population Density<br>Incr. Regional Growth Rate<br>Regional Population Growth<br>Regional Land Urbanization<br>State Smart Growth Plans<br>Joint Land Use Study (JLUS) |
| <b>Threatened and Endangered Species (TES) Sustainability</b> | TES Species Listed<br>Ecological Resiliency<br>Critical Habitat<br>"TES on Post" in State<br>Biological Opinions   |
| <b>Locational Sustainability</b>                              | Federally Declared Floods<br>Flood Damage<br>Seismic Zones<br>Weather-related damage<br>Federally declared disasters   |
| <b>Water Sustainability</b>                                   | Level of Development<br>Ground Water Depletion<br>Flood Risk<br>Low Flow Sensitivity<br>Species at Risk<br>Water Quality   |
| <b>Economic Sustainability</b>                                | DoD Local Employment<br>Job Availability/unemployment<br>Housing Affordability (was COL)<br>Poverty  |
| <b>Quality of Life (QOL) Sustainability</b>                   | Crime Rate<br>Housing Availability<br>Rental Availability<br>Healthcare Availability<br>Educational Attainment<br>Commute Times  |
| <b>Infrastructure Sustainability</b>                          | Capacity of Commercial Airports<br>Airport Suitability-C5<br>Airport Suitability-C141<br>Railroad Capacity<br>Proximity to Interstate<br>Roadway Congestion<br>Traffic Volume    |
| <b>Security</b>   | Air Space Demand<br>Net Metering<br>Sole-Source Aquifer<br>Proximity to MSA  |

Numeric ratings, reasoning, and actual data are also available for each risk rating. The SIRRA web-based data assessment tool allows users to select a red/amber/green depiction of high/medium/low sustainability risk for summary presentations.

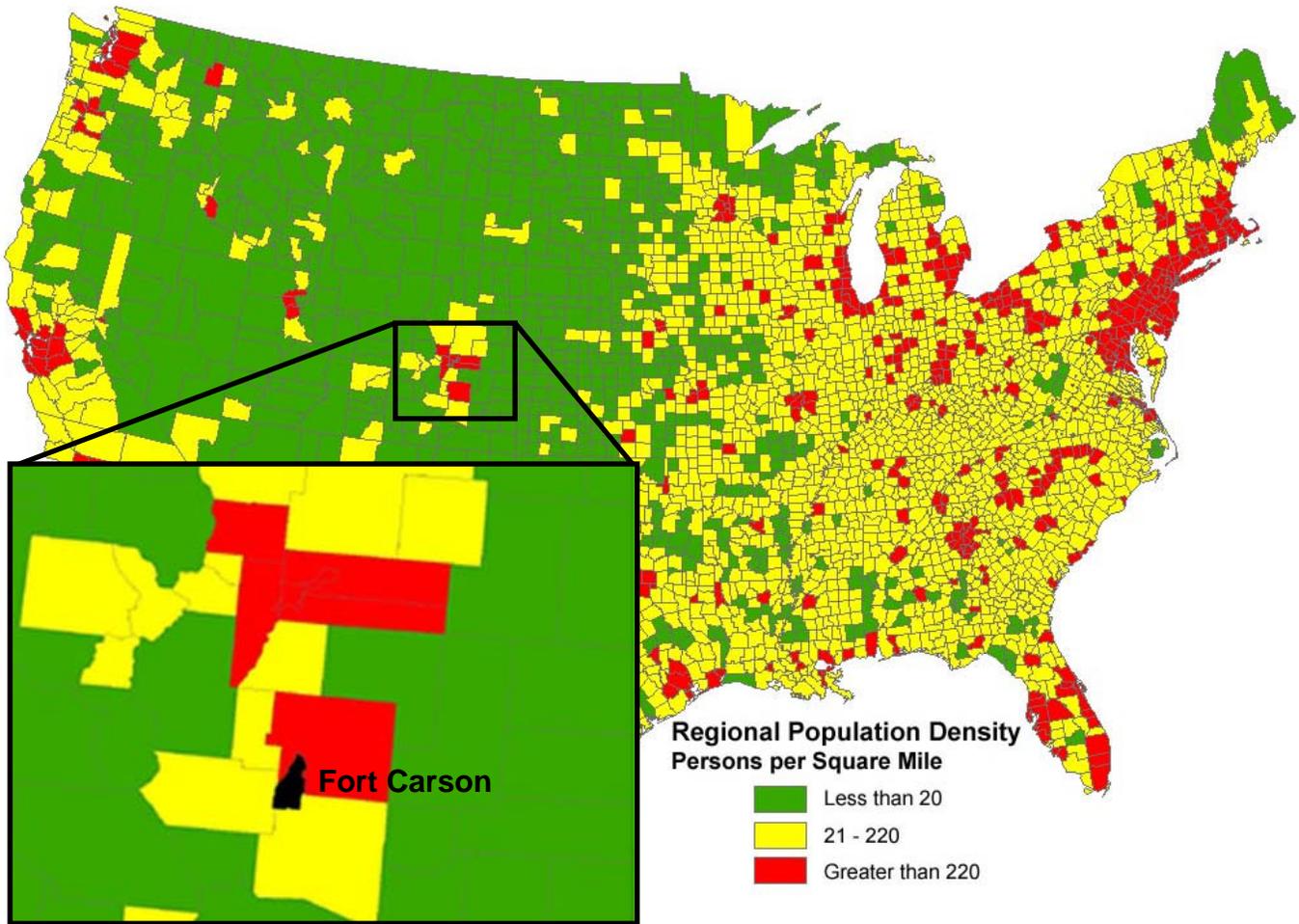
## Application

There are multiple applications for SIRRA including support for installation sustainability planning, regional planning, stationing changes, force transformation, and base realignment and closure decisions. SIRRA is associated with the Fort Future initiative, a technology suite designed to help installations and units plan for future requirements. These efforts include modeling/simulation and rating tools to help facility planners and designers develop more sustainable projects.

The SIRRA tool was used by the U.S. Army Corps of Engineers in collaboration with the Center for Army Analysis in 2002 to review installation sustainability, in the context of the stationing of forces under Army Transformation. This evaluation was one of many inputs used to rate 19 CONUS installations. Efforts in 2003 are developing sustainability ratings for over 200 CONUS DOD installations. Conceptualized computer tools are being developed to include a GIS display of risk and a simplified user interface for installation risk queries. An expert review methodology is being used to validate the SIRRA approach, methodology, and application.

This work is leveraging resources with other ERDC-CERL research projects, including those that evaluate the environmental aspects of risk assessment, that tier required databases, and that develop common tools. "Enhanced Firing Range Design, Control and Maintenance Risk Factors" is one such project, an Army Research, Development, Testing, and Evaluation (RDT&E) work unit directed at range-specific risk. Efforts are also being coordinated with the Army Environmental Command's Environmental Regulatory Climate Model (ERCM) tool and the Center for Army Analysis.





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