

SIRRA

Sustainable Installations Regional Resource Assessment

ERDC/CERL TN-03-3

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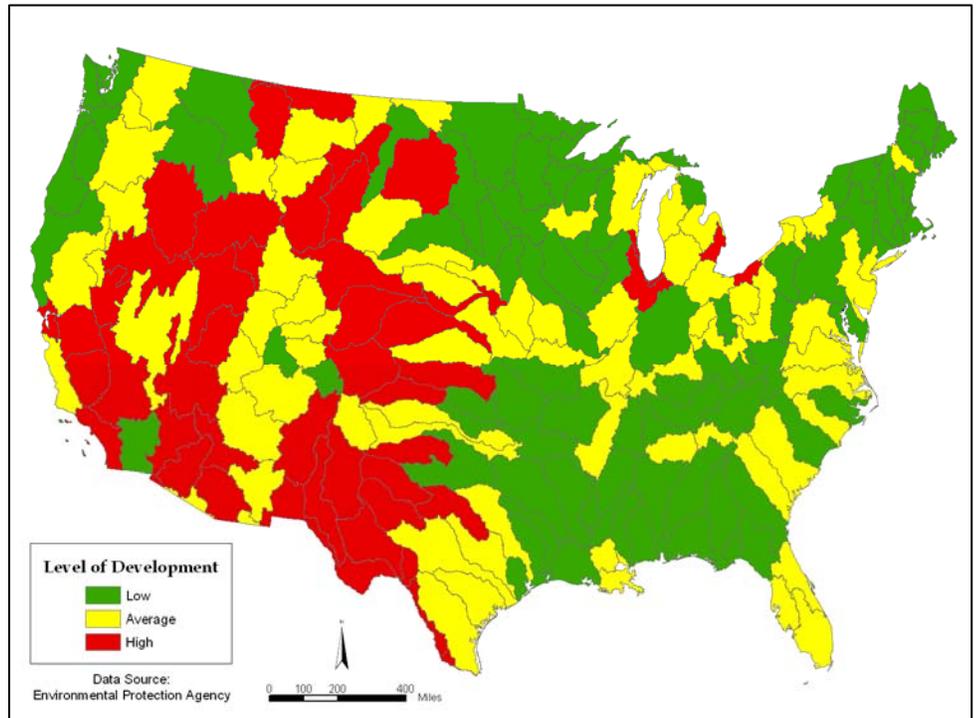
Problem

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 vulnerability for ten sustainability issues: (1) air quality, (2) airspace, (3) energy, (4) urban development, (5) threatened and endangered species (TES), (6) locational issues, (7) water, (8) economic issues, (9) quality of life, and (10) transportation. Indicators are measurable aspects of a system that can be used to quantify the state or condition of that system. An effective regional indicator provides information about the impact of the surrounding region on an installation's ability 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

Ratio of water withdrawal to mean annual unregulated streamflow.

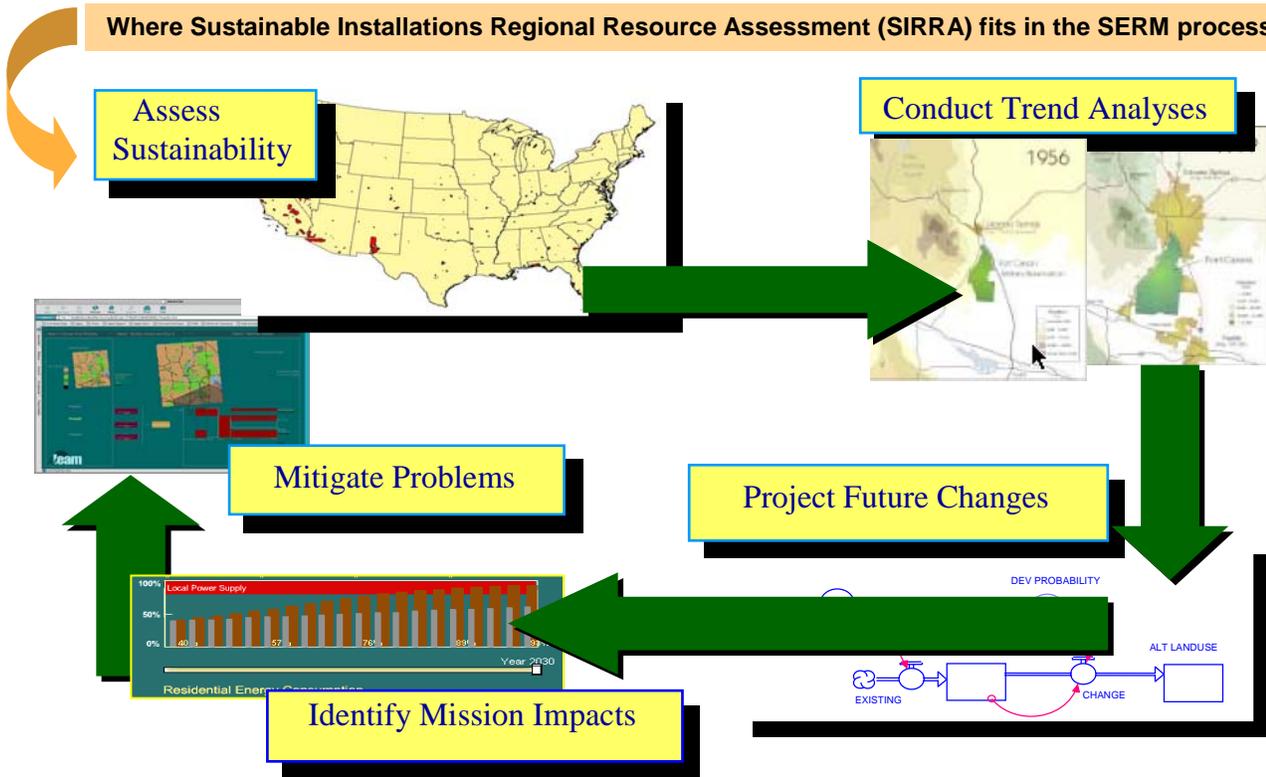


frequency bandwidth. Installation, local, and regional planners must make decisions collaboratively to avoid or mitigate long-term mission constraints. The SIRRA tool can inform planning and decisionmaking at the national scale to maximize installation sustainability.

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 approach characterizes regions surrounding installations based on a set of risks or stressors. The process uses a broad set of indicators covering the range of issues that affect DoD 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., criteria pollutant non-attainment data is updated annually by the U.S. Environmental Protection Agency (EPA). This data is organized and analyzed, and used to create national GIS coverages.

Sustainability ratings were developed in several different ways. National regulatory targets exist for some indicators. Examples include the U.S. EPA’s six criteria air pollutants that comprise the air quality indicator, the U.S. Fish and Wildlife Agency’s species at risk designation, and Federal Emergency Management Agency (FEMA) designated seismic zones. Other data sources require statistical analysis or evaluation based on the research literature. Quality of life indicators are examples of these.

Issue	Indicators
Air Sustainability	Criteria Pollutant Non-Attainment Noise Sensitivity
Airspace Sustainability	SUA, Fighter Range SUA, Bomber Range Terminal Airspace MTR, Fighter Range MTR, Bomber Range
Energy Sustainability	Electrical Grid Congestion Electrical Reserve Margin Renewable Energy - Wind Renewable Energy - Solar Renewable Energy - Biomass Electrical Price Structure (Dereg) Net metering
Urban Development	Regional Population Density Increasing Regional Growth Rate Regional Population Growth Regional Land Urbanization State Smart Growth Plans Joint Land Use Study (JLUS) Proximity to MSA
Threatened and Endangered Species (TES) Sustainability	ESA Listed and Proposed Species ESA Candidate Species TES Richness & TES Hotspots
Locational Sustainability	Federally Declared Floods Seismic Zones Weather-Related Damage Federally Declared Disasters Tornadoes
Water Sustainability	Level of Development Ground Water Depletion Flood Risk Low Flow Sensitivity Water Quality
Economic Sustainability	DoD Local Employment Job Availability/Unemployment Housing Affordability Poverty Avg Hsg Value of New Construction Housing Permits Issued
Quality of Life (QOL) Sustainability	Crime Rate Housing & Rental Availability Healthcare Availability Educational Attainment Commute Times
Transportation Sustainability	Capacity of Commercial Airports Airport Suitability-C5 Airport Suitability-C141 Railroad Capacity Proximity to Interstate Roadway Congestion Traffic Volume

Numeric ratings, reasoning, and actual data are also available for each vulnerability rating. The SIRRA web-based tool allows users to select a red/amber/green depiction of high/medium/low sustainability risk for summary presentations. A five tiered rating system has been developed but is not yet included on the web-based tool.

Application

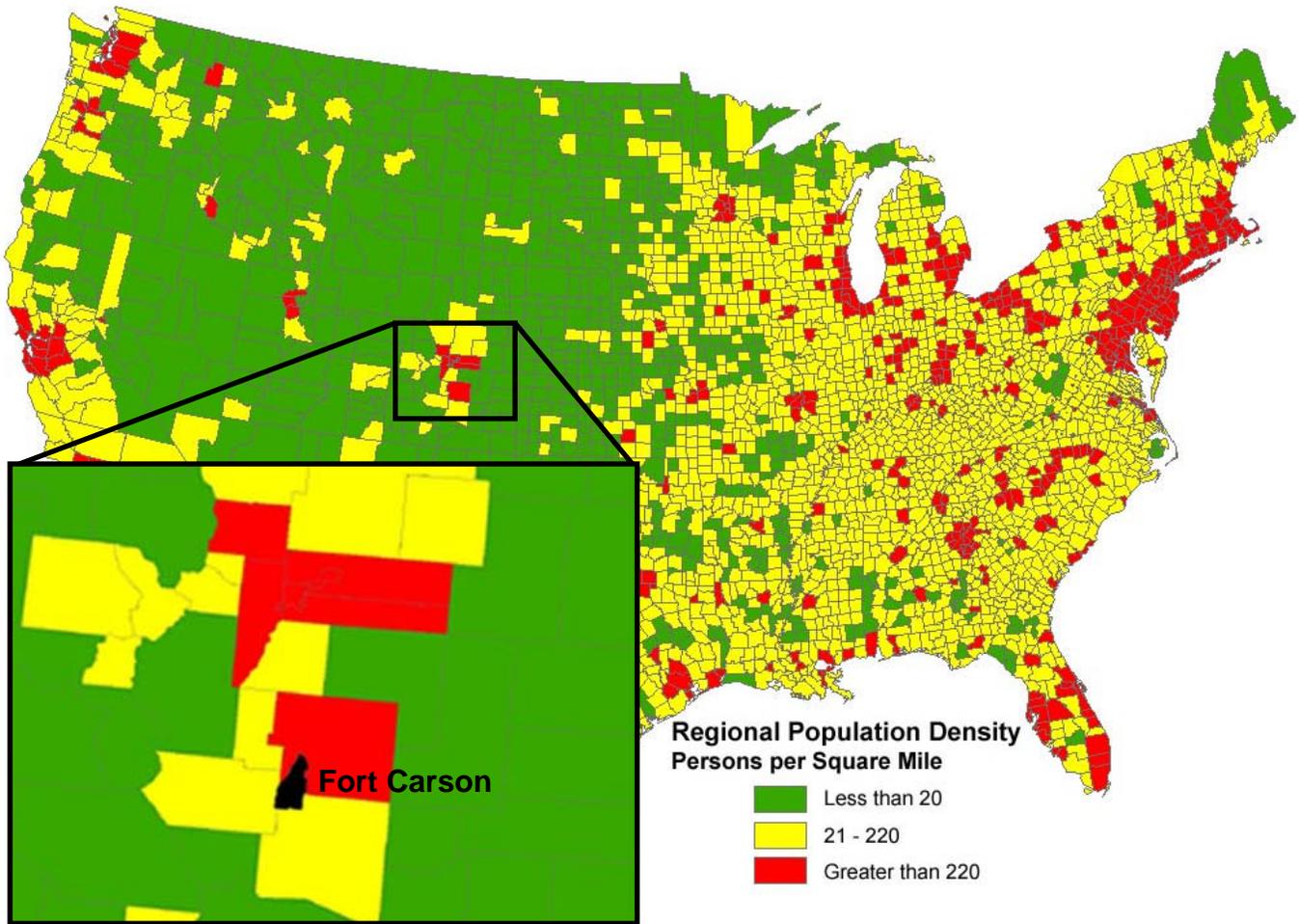
There are multiple applications for SIRRA including support for installation sustainability planning, regional planning, stationing changes, force transformation, and base realignment and closure decisions. SIRRA was developed under The Strategic Environmental Research and Development Program (SERDP). Additional funding includes Army RDT&E under the Fort Future initiative, a technology suite designed to help installations and units plan for future requirements. SIRRA was recognized as one in a suite of tools as 2006 SERDP Project of the Year.

Specialized SIRRA applications include the ability to conduct sustainability analyses on a watershed basis, evaluating 309 DoD installations to produce rank-order results prioritizing for more detailed analyses, and assessing encroachment indicators in the regions containing 500 Department of Defense Testing and Training Ranges in support of the OSD 320/366 Report to Congress. These applications are documented in ERDC/CERL Technical Reports.

The SIRRA tool was used to provide auditable data for the Army stationing analysis for BRAC 2005. SIRRA was also used to evaluate an existing installation's ability to absorb additional forces, and to evaluate a region's capability of supporting a new installation. SIRRA output was presented at the Fort Stewart modularity master planning charrette and at Installation Sustainability Planning charrettes.

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. The "Strategic Sustainability Assessment" is one such project, initiated by the Army Environmental Policy Institute and directed at predicting future sustainability impacts.





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Contacts

U.S. Army Engineer Research and Development Center
Construction Engineering Research Laboratory

Elisabeth Jenicek
Phone: (217) 373-7238
e-mail: Elisabeth.M.Jenicek@erdc.usace.army.mil

William Goran, Director of Special Projects
Phone: (217) 373-6735
e-mail: William.D.Goran@erdc.usace.army.mil

Web-based Analysis Tool: <http://ff.cecer.army.mil/ff/sirra.do>
SERM: <http://www.cecer.army.mil/KD/SERM>