

SERDP's 
SEMP

Ecosystem Management Project

Expenditure Questions



- Initial funding cycle
 - First funds authorized: May-June 1999
 - Initial contracts awarded: July-Sept 1999
 - Renewals typically 12 months later
- Biological research cycle
 - Field season for most is March-October
 - Use funds from pervious calendar year
- University billing cycle
 - Requires 2-6 months *after* work task to bill
 - Government needs 20-45 days to verify and process

Conclusion:

US Gov't fiscal year and "Research year" are offset by 9-12 mo

- Advance renewal date
 - Done for CS1114B (Krzysik) in CY 2000+
 - Could be done for CS1114A (DeBusk)
 - Not as relevant for Gov't Labs
- Receive SERDP funds sooner in year
- Accelerate researcher's schedules
- Speed up university billing cycle
- Reduce Government processing/approval time
 - Depends on current progress reports

Outline



- SEMP Objectives and Organization
- SEMP Framework
- Status of Activities
 - Research
 - Monitoring
 - Repository
- FY2001 and Future Plans

Technical Advisory Committee for SEMP



- Dr. Mary Barber, Ecological Society of America, SAB Member
- Mr. Peter Boice, Director of Conservation Programs, Deputy Undersecretary for Defense, Environmental Security, TTAWG Member
- Dr. Roger Dahlman, Program Manager, U.S. Department of Energy, TTAWG Member
- Dr. Mark Fenn, U.S. Department of Agriculture, Forest Service
- Dr. Penny Firth, National Science Foundation
- Dr. John Hall, The Nature Conservancy
- Mr. Richard McWhite, Natural Resources Chief, Eglin Air Force Base
- Dr. Doug Ripley, Headquarters, Air Force, TTAWG Member
- Dr. James Spotila, Drexel University
- Dr. J. Whitfield Gibbons, Savannah River Ecology Lab and University of Georgia

Purpose of SEMP



- **To Address Knowledge Gaps Related to Ecosystem Management on Military Lands**
- **To Design and Test a Long-Term Baseline Monitoring Program on DOD Lands**
- **To Infuse Outcomes into DOD Ecosystem Management Processes and Practices**
- **To Provide a Model for Similar Regional Programs (in other regions) where Military Installations Provide a Resource Base**

Key Properties and Processes

(Form the Basis for SEMP Research)



- Those for which fundamental understanding is required to ensure goals of sustainability can be met
 - Hydrologic flux and storage
 - Biological productivity
 - Biogeochemical cycling and storage
 - Decomposition
 - Maintenance of biological diversity

(Christensen, N.L. et. al. 1996. The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management. Ecological Applications 6(3):665-691.)

Criteria for Indicators

- Are easily measurable
- Are sensitive to stresses of system
- Respond to stress in a predictable manner
- Signify an impending change in key characteristics of the ecological system
- Experience changes that can be averted by management actions
- Together with the full suite of indicators, provide a measure of coverage of the key gradients across the ecological systems (e.g., soils, vegetation types, temperature, etc.)
- Have a known response to natural disturbances and changes over time
- Have low variability in response

Emphasis of SEMP

<p>PHASE I 1999 - 2001 <u>DESIGN</u></p>	<p>PHASE II 2002 - 2005 <u>ADAPT</u></p>	<p>PHASE III 2006 - <u>MAINTAIN</u></p>
<p>Extended design, implementation and documentation</p>	<p>Adaptation based on: a) initial monitoring results b) SEMP research results c) land management experience</p>	<p>Long-term maintenance and technology upgrades</p>



Dr. V. Dale

Indicators of Ecological Change



Dr. W. DeBusk

**Determination of Indicators of
Ecological Change**



Dr. T. Krzysik

**Development of Ecological Indicator
Guilds for Land Management**



Mr. C. Garten, Jr.

**Disturbance of Soil Organic Matter and
Nitrogen Dynamics: Implications for
Soil and Water Quality**



Dr. B. Collins

**Thresholds of Disturbance: Land
Mgmt Effects on Vegetation and
Nitrogen Dynamics**

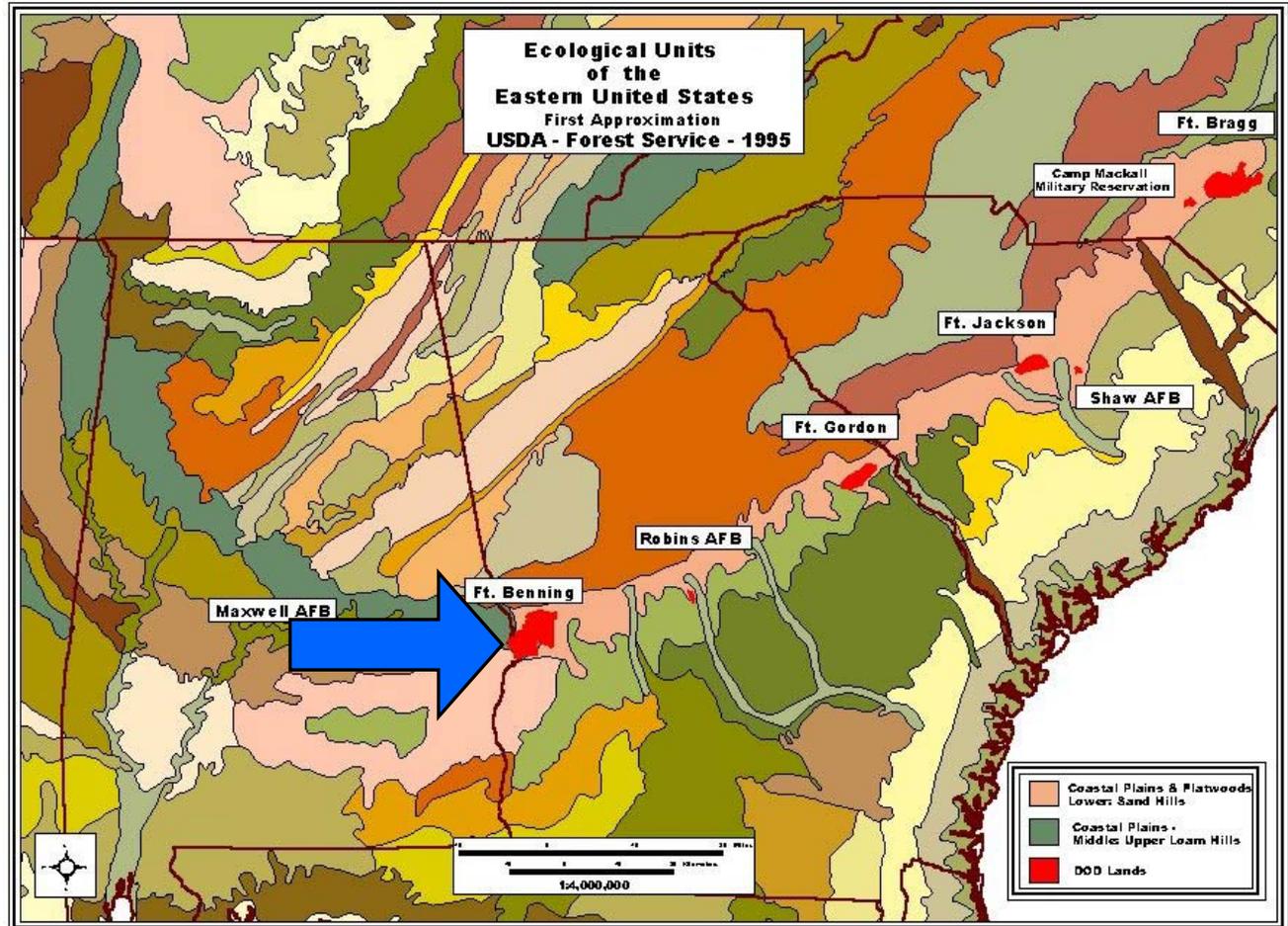
Southeastern Ecosystem Focus Desired

Fort Benning Volunteers to Host the Project

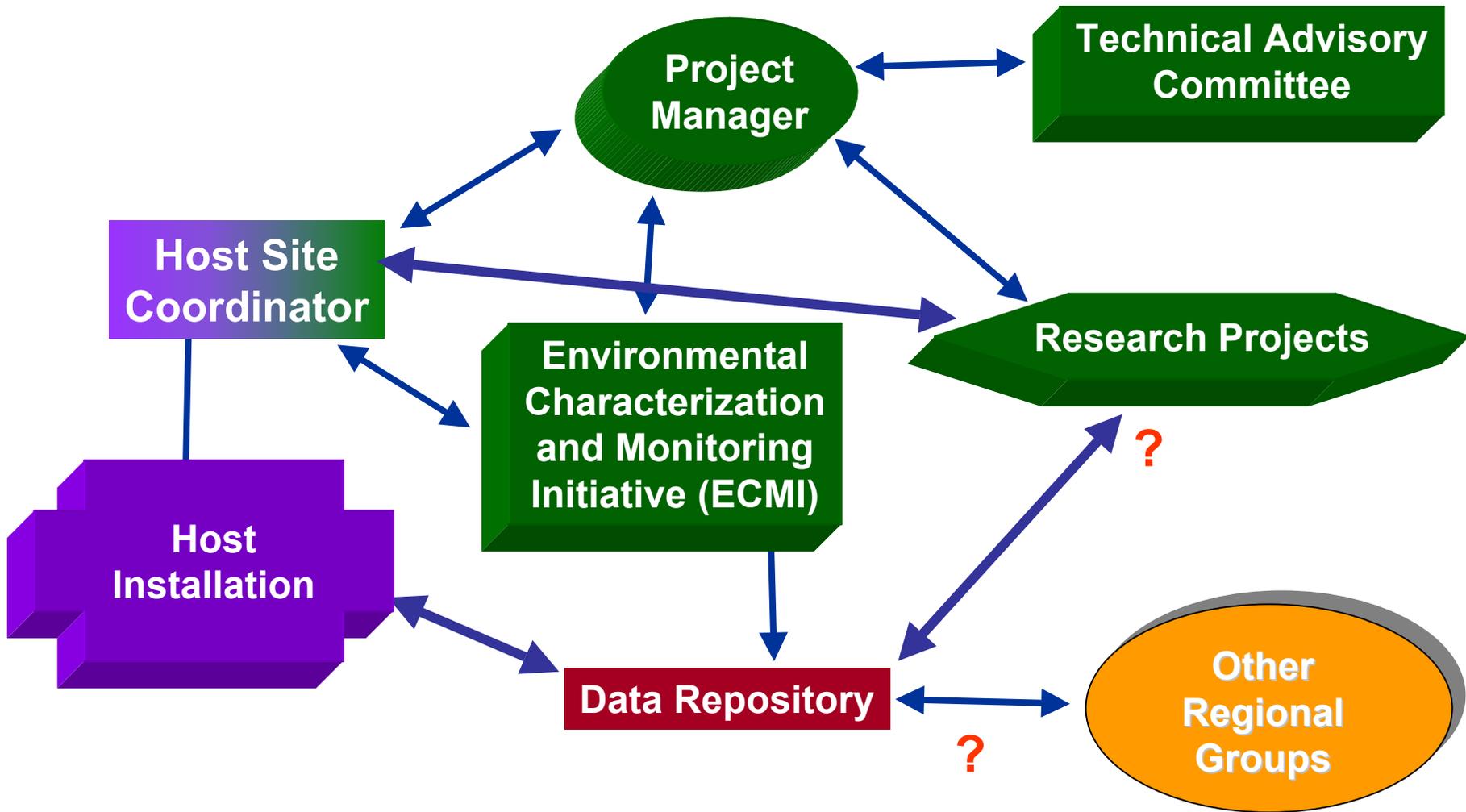
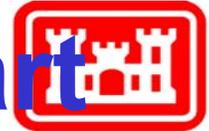
Ft. Benning spans two major systems: Sand Hills and Coastal Plain

Both support many DOD facilities

Excellent opportunity to extend knowledge to other sites

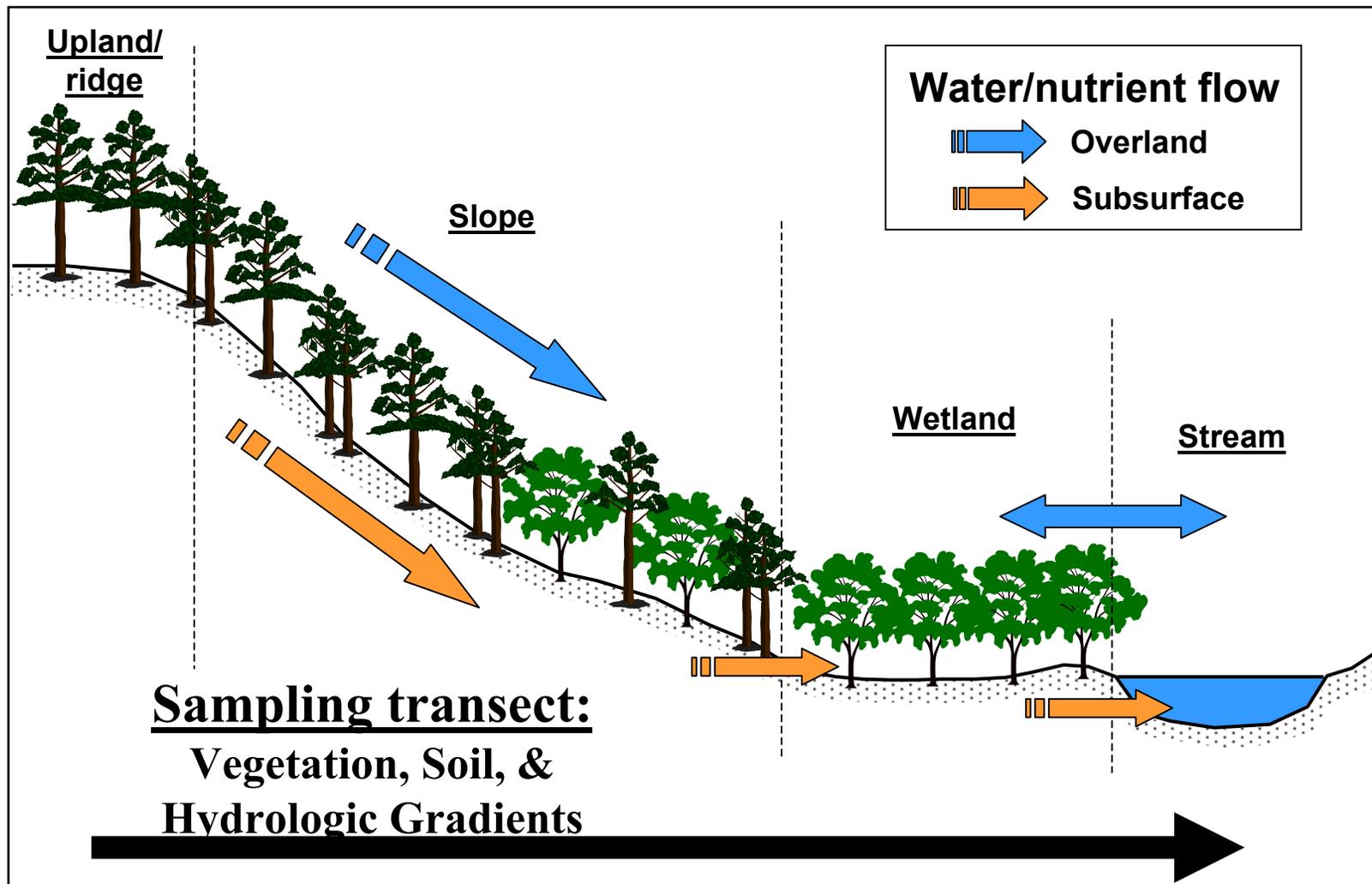


SEMP Organization Chart



- University of Florida (and Purdue University) - DeBusk
 - Monthly data collection visits-hydrologic parameters
 - Hillslope Hydrology - 2 sub-watersheds studied
 - Biogeochemical sampling at 300 sites
 - Analysis of soil chemistry and microbiology

Determination of Indicators of Ecological Change: University of Florida (and Purdue University)



Brief Summary of FY2000 Research Accomplishments

- CERL/Embry-Riddle - Krzysik and Balbach
 - Conducted intraproject “workshop” of all PIs
 - Examined developmental instability, including photosynthetic responses
 - Surveyed terrestrial invertebrates and fishes
 - Installed 36 lysimeters and 6 slope profilometer arrays
 - Examined bacterial and fungal diversity at these sites

Development of Ecological Indicator Guilds for Land Management



US Army Corps
of Engineers®

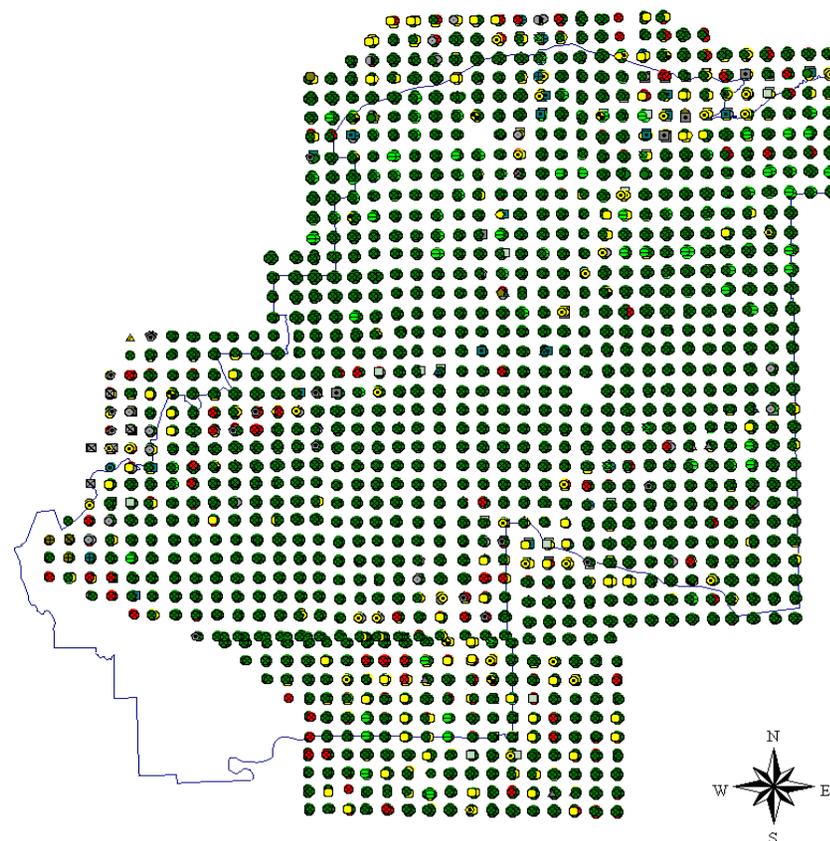


Installing a lysimeter
in a moderately-used
training area

- Oak Ridge National Laboratory - Dale
 - Corrected and completed 1827 forest cover map
 - Processed storm-affected stream samples
 - Resampled benthic invertebrates in 6 streams
 - Analyzing understory vegetation and soil microbiology from plots established in different disturbance types
 - Utilizing alternate statistical analyses appropriate to multivariate systems

- **Historical Trends at Ft. Benning**
- **Based on 1827 Federal land survey maps**
- **Each corner of each 202 ac lot had a corner tree and 4 witness trees recorded by common name**
- **4108 trees recorded**
- **Equate to ~34 modern species**
- **Created digital GIS model**
- **Will be used for a vegetation baseline for SEMP comparisons**

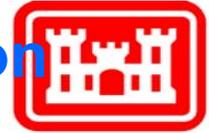
Ft. Benning 1827 Vegetation Map



Brief Summary of FY2000 Research Accomplishments

- University of Georgia (SREL) – Collins
 - First year research efforts concentrated on identifying sites,
 - Conducted baseline vegetation survey
 - Sampled soil texture to determine if selected sites were accurately categorized
 - Conducted disturbance survey to determine the pre-treatment impact of land use in each site
 - Upland mixed pine-hardwood sites subjected to prescribed burning during winter 1999-2000 were chosen
 - Three of these sites are dominated by oaks.
 - Remaining 29 sites comprise a gradient of pine dominance.

Thresholds of Disturbance: Land Management Effects on Vegetation and Nitrogen Dynamics



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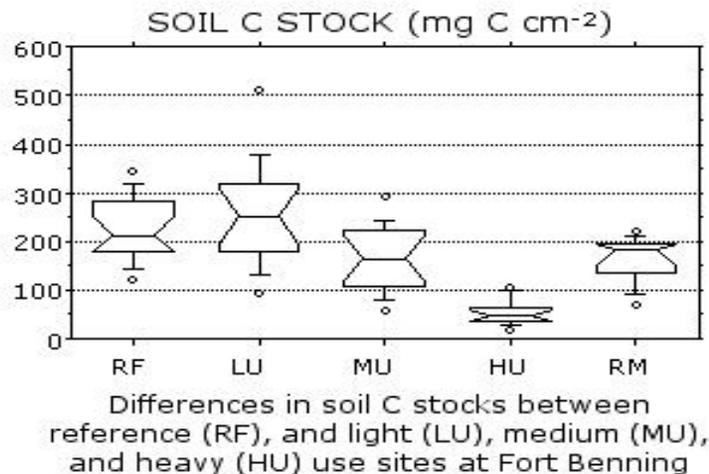
Threshold of disturbance intensity and frequency beyond which upland ecosystems cannot sustain the combined disturbance of land use practices for military training and forest management (thinning, burning).

- **Oak Ridge National Laboratory – Garten**
 - Analyzed soil samples from 40 sites under 5 land covers; correlated with V. Dale's study
 - Emphasis on:
 - C:N ratios
 - Particulate organic matter
 - N mineralization potential
 - Soil aggregate stability
 - LU/LC correlation will require measure of military use/impact



Disturbance of Soil Organic Matter and Nitrogen Dynamics: Implications for Soil and Water Quality*

- The goal of this project is to determine effects of disturbance and land use on soil quality, thresholds to the potential for recovery of soil quality, and site-wide analysis of soil carbon (C) and nitrogen (N) dynamics as they affect soil quality and nonpoint sources of N loading to surface water drainages at Fort Benning, GA

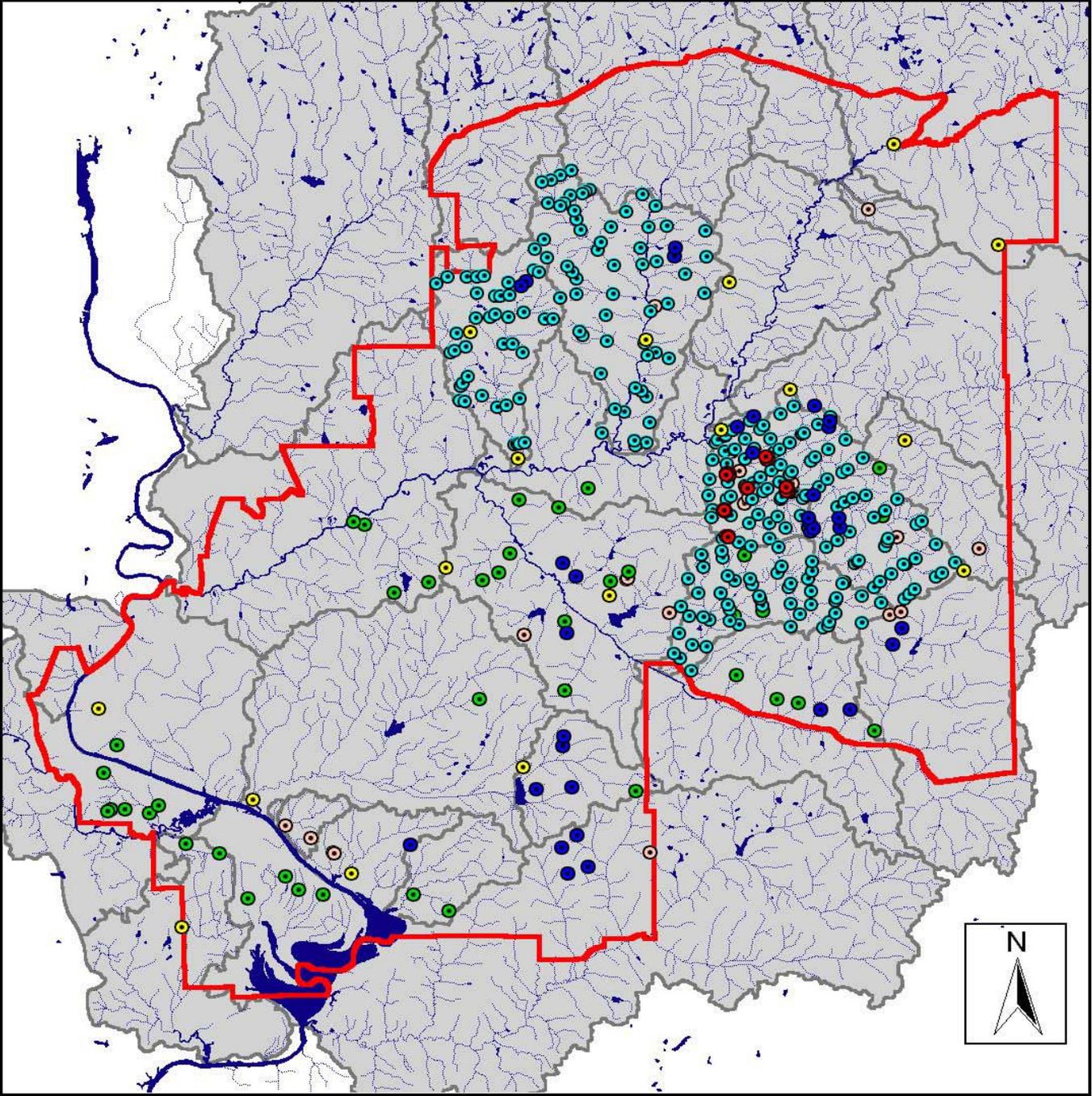
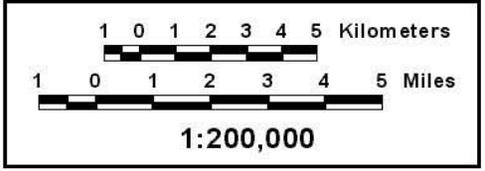


- Soil organic matter (soil organic C) and N dynamics, along with soil texture and structure, are important determinants of soil quality (i.e., the ability of a soil to function in its natural condition or the suitability of soil for a particular use).
- Studies along disturbance gradients at Fort Benning indicated a decline in soil C stocks (and soil C/N ratios) with increasing levels of military disturbance as well as some recovery at remediated (RM) sites.

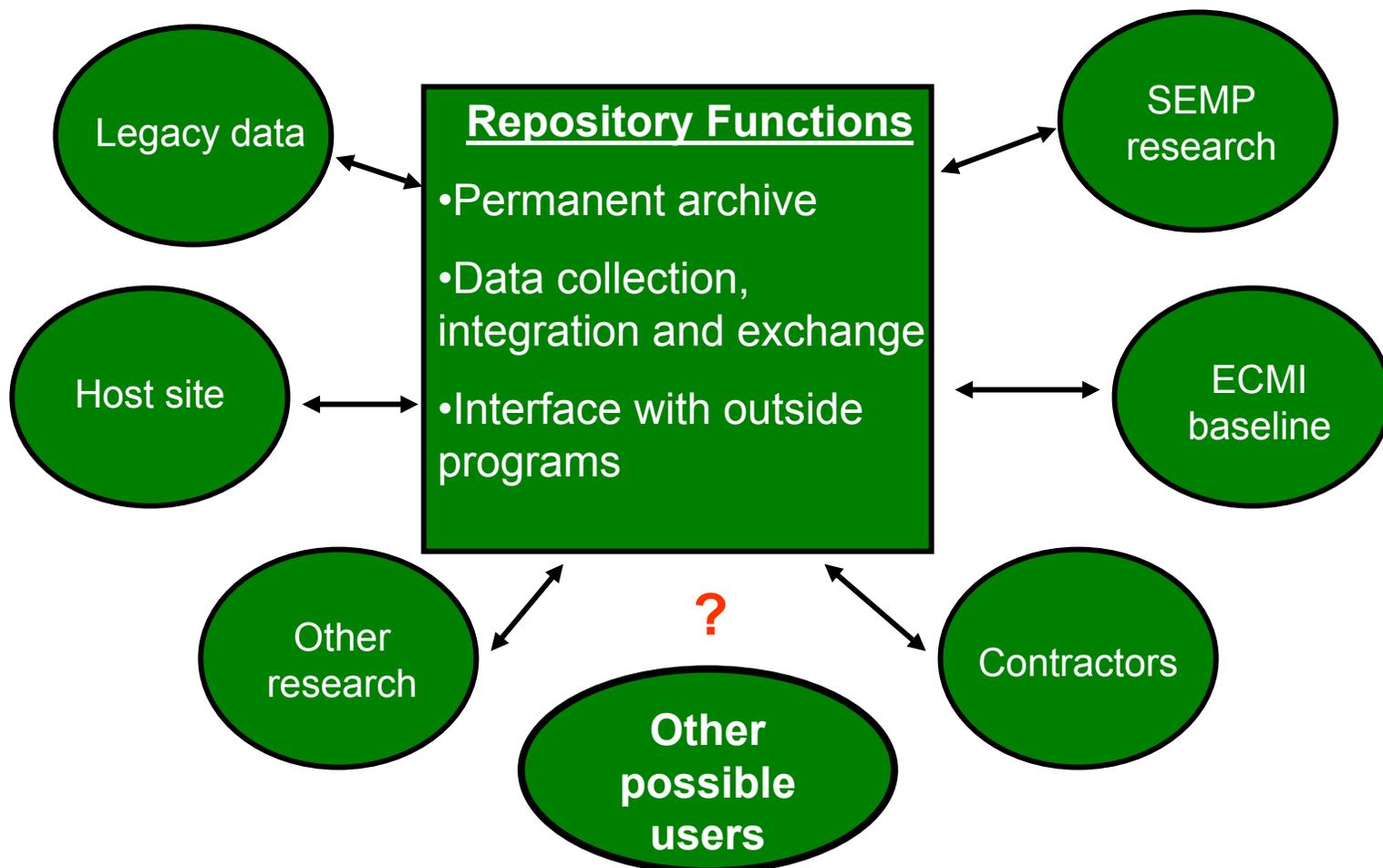
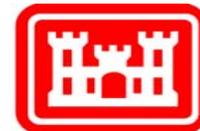
*Investigators: C.T. Garten, Jr. (gartenctjr@ornl.gov) and T.L. Ashwood
Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN

SEMP Field Site Locations Fort Benning, GA

- SEMP Research Sites**
- CERL
 - ECMI
 - ORNL2
 - ORNL1
 - SREL
 - UFLG
- Current as of 09NOV00



Data Management



New Initiatives for FY01



- **Initiation of Ecoregional Planning and Technology Sharing in the Fall Line Ecoregion**
- **Initial Planning and Prototype Report Generation from the Monitoring and Research Data being Deposited into the Repository**
- **Focus will expand to include better understanding of installation management actions so that modeling for management purposes may be at a level of detail more parallel to the environmental data generated**

Along the Fall Line Workshop



- Savannah River Ecology Lab (SREL) Hosted this Workshop
- Held March 6-7, 2001
- 50+ persons from 30+ installations and groups
- Focus of Meeting
 - Share ecosystem management approaches and technologies among participating land managers
 - Explore potential for shared ecoregional planning along the fall line
- Informal groups created to follow up on needs and interests

SEMP Website



US Army Corps
of Engineers

<http://www.denix.osd.mil/SEMP>

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