

**Selecting Indicators of Ecological Integrity:
Phase 2 in Vital Sign Monitoring Plan Development for the Northeast
Temperate Network.**

Submitted to:
Northeast Temperate Network Office, Marsh-Billings-Rockefeller NHP
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GENERAL INFORMATION:

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INTRODUCTION

The purpose of this proposal is to extend and amend the original scope of work for the National Park Service's Vital Signs Monitoring Program for the Northeast Temperate Network (NETN) specifically as it relates to completing Phase 2. The original proposal extends to May 30 2004. This proposal amends that proposal to extend to Sept. 30, 2004, and requests additional funds to increase the participation of staff and faculty at SUNY ESF to implement the workload envisioned between January 1, 2004 and Sept. 30, 2004.

The primary objectives of Phase 2 that still remain are: 1) develop conceptual models of each park, highlighting the major ecosystems found in each Park. These models will be an extension of the pilot set of ecosystem models that have already been completed for a selected set of potential indicators (Pine-Hemlock-Hardwood System, Vernal Pools, Jefferson Salamander), 2) determine the suite of indicators (vital signs) that may be appropriate for each park, from landscapes to species and ecological processes. Emphasis will be placed on ecological systems that are found in each park and cataloguing the conservation status (global and state rarity) of ecological communities within those systems using the Natural Heritage ranking system, 3) define park-specific ecological monitoring objectives, 4) prioritize and select the indicators to cover the multiple scales of biological diversity across the parks, 5) where ecological systems, communities, or species are indicators, help develop ecological integrity ranking criteria for each of them, using Natural Heritage methodology, and 6) identify stressors that may impact the integrity of the suite of indicators at each park.

NATIONAL PARK SERVICE SUBSTANTIAL INVOLVEMENT

The NPS will be substantially involved in this project by working closely with the cooperator to draft and develop Vital Signs for the Northeast Temperate Network. The NETN staff will act as managing editor the development of the 3-phase monitoring plan and ensure that all national I&M guidelines are followed throughout this project. The NETN staff will provide all background information related to park legislation, park monitoring programs, and other natural resource information to the cooperator as necessary. The NETN staff will facilitate and document peer review of the final reports generated from this project and integrate the deliverables from this project into the larger NETN monitoring plan. The NETN will provide all spatial and tabular data related to park natural resource and natural resource issues to the cooperator as necessary. The NETN staff will work with the cooperator to draft all final reports associated with this project.

SCOPE OF WORK – JAN. 1, 2004 – SEPT. 30, 2004

Our goal is to develop a monitoring program that measures the ecological condition or integrity of park resources in the Northeast Temperate Network Vital Signs Monitoring Program of the National Park Service. We propose to develop indicators (vital signs) of both ecological condition and of ecological stressors across the full spectrum of biodiversity, from landscapes to species. We also propose to apply measures of these indicators and measures in tiers, with a subset of attributes and measures used to assign an initial ecological integrity rank - the Tier 1 indicators and/or measures (Tier 1 indicators may be more amenable to use during inventory stages), followed by a more extended set of measures that will measure ecological condition and stressors of those attributes - the Tier 2 indicators and/or measures. We develop a sequence of steps, including

- a) Review and evaluation of park resources at multiple scales of biodiversity, from landscapes to species, as well as the ecological processes associated with them, in order to assess potential indicators needed at the park and regional levels.
- b) Evaluation of all species, communities and ecosystems listed for each park, in terms of their conservation status (G1-G5, S1-S5) and the ecological integrity rank (A-D) of the occurrences of each type in the park,
- c) Development of pilot conceptual models for park ecosystems, showing the major ecosystems types, the constraints on their distribution, their ecological interactions and

disturbance regimes. Models will also be used to highlight potential indicators of ecological integrity, and identify how natural and anthropogenic stressors and threats may affect ecological integrity,

- d) Listing and prioritizing indicators for each park (indicators may range from landscape to ecosystems, communities and species, and include ecological processes), based in part on the degree to which indicators, among others, are based on cost-effectiveness, are anticipatory, sensitive, reflect management activities, and may already be in use by others.
- e) Providing all necessary materials and participating in a Vital Signs Selection workshop where subject matter experts convene to prioritize monitoring indicators.
- f) Piloting the approach in a specific park or area showing how indicators can be measured, including for those communities and ecological systems that are selected as indicators, and,
- g) Providing methodological guidelines for the development of measures for each indicator and their sampling needs. Our deliverables would provide a detailed conceptual framework as to how a monitoring program can be established in the network of parks, with a pilot demonstration from at least one park.

DESCRIPTION OF FINAL DELIVERABLES and TIMELINE

1) March 31, 2004 –

- Complete park conceptual models, showing the major ecological systems, constraints on their distribution, interactions, and disturbance regimes.
- Summary of conservation status of species, community and system types in each park at both state and global levels, where sufficient inventory has been completed to make this feasible.
- Compilation of possible indicators for each park (including landscape properties, systems, communities, species, and ecological processes), for both Tier 1 and Tier 2 indicators.
- Pilot study completed to rank element occurrences of systems and communities for each park based on range-wide ranks of the Tier 1 measures of ecological integrity, as these also relate to NatureServe methodology for ranking ecological integrity.
- Complete planning to facilitate Vital Signs Indicator Selection workshop for 3 workgroups (terrestrial, wetland, and intertidal systems)
 - Prepare all necessary information for workgroups including but not limited to;
 - Conceptual models for each park
 - list and extent of ecological systems within each park
 - list of potential vital signs with selection criteria and justifications for each indicator, including relevance of Tier 1 and Tier 2 approaches
 - help integrate materials on aquatic indicators so that 4 workgroups can be established (terrestrial, wetland, aquatic, and intertidal systems).
 - Select and invite participants to workshop

2) May 30, 2004 –

- Facilitate Vital Signs Selection workshop where 4 workgroups (terrestrial, wetland, aquatic, and intertidal systems) will meet to review potential list of indicators for the NETN parks.
- Compile comments on selection criteria for Tier 1 and Tier 2 indicators, the conceptual models and their relevance for these indicators (where needed), and screening of the measures for each indicator for their effectiveness.
- Provide recommendations/proposal for a pilot study on whether some form of quantitative modeling is needed to determine the suitability of the Tier 1 and Tier 2 measures and the indicators.
- Application of indicators methodology (probably Tier 1 indicators only) to the occurrences of systems and communities in each park that have been mapped through the NPS Vegetation Mapping program.

3) July 30, 2004

- Complete and submit workgroup summaries to identify vital signs (Tier 1 and Tier 2 indicators) for each park
- Provide recommended list of vital signs with justifications for those that were selected and those that were not.
- Initiate a pilot study to test some aspects of indicators using a modeling approach, if recommended.
- Assist in preparation of NETN parks meeting to be held in August to present the Vital Signs to the NETN parks, Board of Directors and Technical Steering Committee for final review and approval

3) September 15, 2004 –

- Submit draft final report including all materials generated from this project to be included in the NETN Phase 2 report.
- Participate in the NETN park meeting to present Vital Signs
- Revise vital signs based on input of park staff, technical steering committee, and board of directors.
- Continuation of development of Tier 1 and Tier 2 measures selection criteria based on identified priority indicators, the conceptual models of these indicators (where needed), and screening of the measures for each indicator for their effectiveness. This may involve quantitative modeling of the measures and the indicators to determine their suitability.
- A summary of various sampling designs that can effectively monitor the selected indicators.
- If undertake, review of pilot study that tests the effectiveness of the indicators as measures of ecological integrity for a selected area or park.

Status reports of this project indicating progress made since the last invoice period will be submitted to the NETN and GLNF-CESU staff during each invoice period.

All final reports and deliverables will be submitted electronically to the GLNF-CESU upon project completion.

Proposed Budget
to National Park Service - Great Lakes Northern Forest -
Cooperative Ecosystem Studies Unit
Selecting Indicators of Ecological Integrity: Phase 2 in Vital Sign Monitoring
Plan Development for the Northeast Temperate Network

January 15, 2004- June 1, 2005

NPS-Gibbs-Vital Signs-Phase II:04q1:n 1-22-04

Category	Total
PI: J. Gibbs, 5% AY (Sabbatical through 8/31/04)	4,593
5 Weeks Summer Salary	7,874
CoPI: B. Underwood, 5% AY	0
2- Postdoctoral Associate, 100%; 1-25% Summer	45,000
1-GIS Tech - 2 weeks	1,900
Total Salaries	59,367
Fringe Benefits:	
State IFR Rate: 40.31%	1,851
Non-Std- RF - 34%	15,946
Non-Std- Summer - 17%	1,339
	19,136
Total Salaries and Benefits	78,503
Travel	1,000
Supplies	100
Subcontract-NatureServe	11,203
Senior Ecologist (4 wks)	5,033
Benefits	2,766
Indirect costs	3,404
Total Direct Costs	90,806
Indirect Costs, 15% TDC	13,621
Total Request	104,427