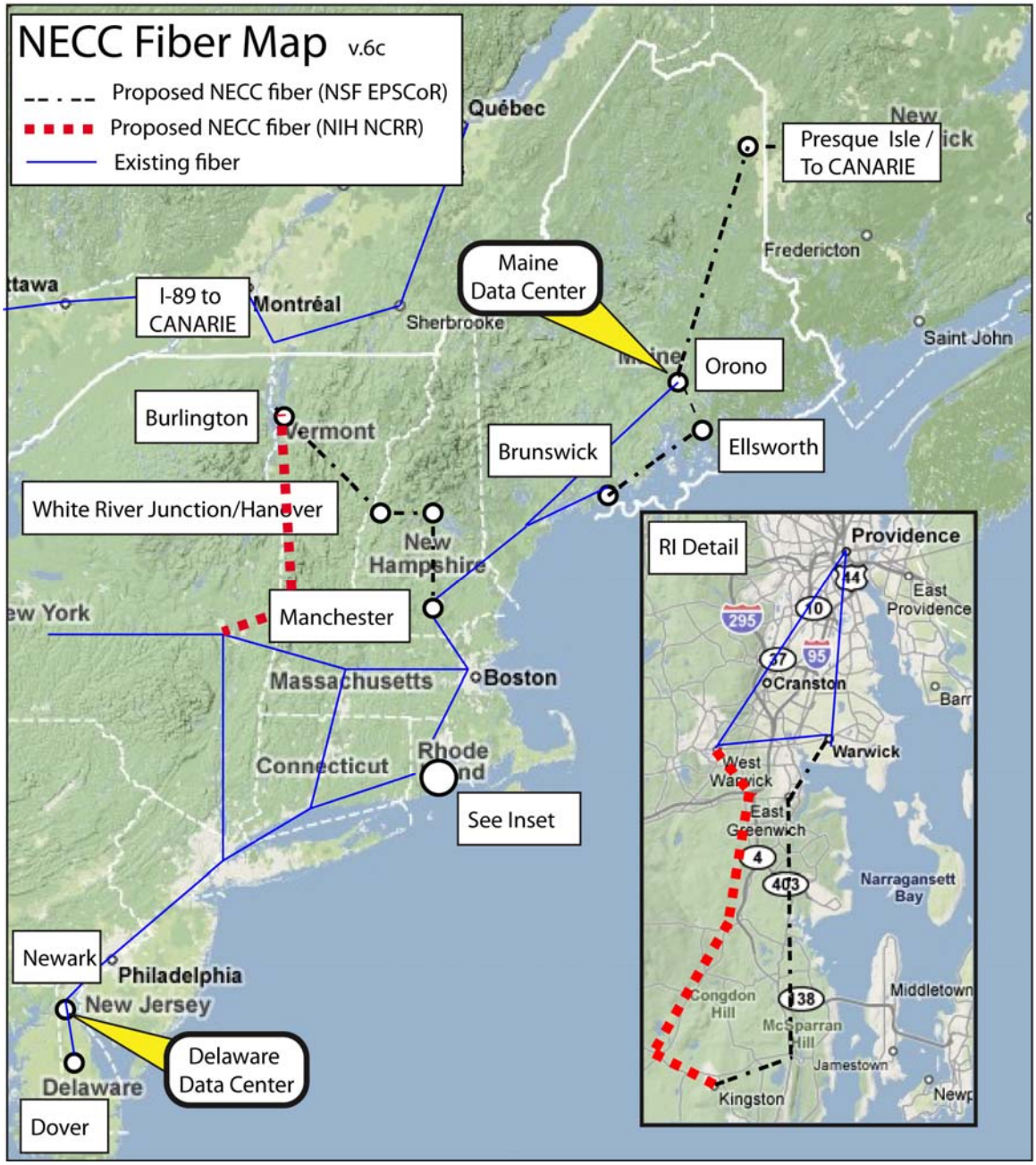
Northeast Cyberinfrastructure Consortium Funded by NSF: $14M in ARRA Funding for Region

- **Vermont** serves as the lead in a five-state consortium designed to address the “cyber-black-hole” of the Northeast:
- Coalesces efforts to form the “Northeast Cyberinfrastructure Consortium (NECC)” with **Maine, New Hampshire, Delaware and Rhode Island**.
- Efforts result in over **$14M in ARRA funds** from NSF and NIH for the region and over $3M for Vermont.



Background:

The National Science Foundation Experimental Program to Stimulate Competitive Research (NSF EPSCoR) announced in 2009 the **first ever** competition for its Research Infrastructure Improvement Program: Track-2 (RII Track-2) awards. The awards provide up to $2M per year for up to three years, "to consortia of EPSCoR jurisdictions to support innovation-enabling cyber infrastructure of regional, thematic, or technological importance."

Concurrently, the National Institutes of Health (NIH), offered funding opportunities for supplements to grants for regional cyber initiatives.

Designed to coalesce EPSCoR states and jurisdictions into consortia that would benefit mutually from funding cyberinfrastructure enabling scientific research, Vermont EPSCoR served as the lead with partner states Maine, New Hampshire, Delaware and Rhode Island to form a coalition of Northeastern EPSCoR States named the Northeast Cyberinfrastructure Consortium (NECC). **Together, the NECC was awarded over $14M from the NSF and NIH for Cyber efforts in the region. VT EPSCoR was awarded over $3M from NSF and NIH in the first-ever round of funding for these initiatives.**

The VT EPSCoR leadership team of State Director, Judith Van Houten and Associate Project Director, Kelvin Chu, worked with state and regional partners in Vermont and the Northeast beginning in 2006 to organize as a region and promote workforce development for the NECC coalition through these awards. The UVM CIO, Dr. H. David Todd, serves as a member of the Technical Committee of the NECC.

NECC Efforts in Vermont:

<u>Vermont EPSCoR Track II Fiber network</u>

The NECC project will build a dedicated fiber optic network linking UVM to research institutions in the northeast and to the Internet2 backbone. As part of the new network, two Shared Data Centers have been developed to facilitate the use of very large data sets in collaborative research projects. A pilot project to sequence the genome of the Little Skate (*Raja erinacea*) will leverage the new network and data center to promote regional research and workforce development. Also funded through Track-2 is a regional effort to determine the microbiomes of algal blooms in Lake Champlain and four other lakes in the North East using cutting edge "next generation" sequencing. This work is also funded by the NIH as part of the supplements that support cyberinfrastructure efforst of the NECC. (See below under Pilot Project for more detail.)

These American Recovery and Reinvestment Act (ARRA) funds have a direct economic impact for the region through new job creation, regional spending and workforce development in research. The fiber optic network is also funded by the NIH for enhancement of biomedical research. Leveraging of this NSF RII Track-2 award led to awards to the Vermont Genetics Network (VGN) from the National Center for Research Resources at the NIH.

As with all NSF grants, the NECC Track-2 award must address the science and engineering workforce in both numbers and diversity. NECC has created the Watershed Project, leveraged from the successful, VT Streams Project, that will engage high school students and teachers, undergraduates and faculty from the NECC states. Additionally, partnerships with Puerto Rico undergraduate students will further enhance the geographically and regionally diverse components of the coalition. The Watershed Project is led by Liza Ray, the VT EPSCoR Streams Project Coordinator.

VGN Advance Translational Research Supplement

The Vermont Genetics Network (VGN) with funding from the NIH will also support development of a regional fiber optic network through supplements to the VGN grant. This project seeks to advance translational research and workforce development through large-scale regional collaborative research. The five members of the NECC submitted concurrent supplement requests to collectively build a redundant regional network. The ARRA funds have had an immediate economic impact through the creation of new jobs within UVM. A newly hired Bio-IT Professional, Mr. Marc Farnham Rendino, will help develop the Shared Data Center in support of regional collaborative research project such as the Little Skate genome sequencing project and the microbiomes of algal blooms. Access to cyber knowledgeable personnel in support of research projects is critical in reducing the time from ideas to results in large-scale projects. In addition, increased broadband capacity in the region and biomedical workforce development will have a significant economic impact.

VGN Pilot Project Supplement

VGN was also awarded a second supplement to develop expertise in the new field of metagenomics. Dr. James Vincent, the Director of the VGN Bioinformatics Core, leads this effort. A new research faculty position within the VGN Bioinformatics Core has been established to develop skills in large scale sequencing projects for collaborative research. A metagenomics pilot project has been designed to develop these skills while leveraging regional collaborations. Blue-green algae blooms from Lake Champlain will be studied to contribute to a better understanding of why some blooms become toxic. These blooms have a detrimental impact on water quality and account for a significant economic impact

in the region. In addition to this pilot study the five members of the NECC will carry out linked metagenomic studies of algae blooms across the region. These studies will leverage the new fiber optic network and Shared Data Centers established under ARRA funding. In addition to the creation of a new faculty position the ARRA funds will contribute to the economy of the region through biomedical workforce development and advanced research capacity.

Dr. Judith Van Houten, lead NECC PI, Vermont State EPSCoR and VGN Director, is excited about the formation of this coalition of states and the expected outcomes the partnerships will deliver to the region and beyond. "The research projects will be the first of their kind in the northeast corridor enabled by new fiber connecting huge datasets previously unable to be shared due to the lack of bandwidth. The resulting collaborations and data under this holistic model will be innovative and set the stage for future scientists to build upon."

Dr. James Vincent, who leads the bioinformatics efforts for the Little Skate genome sequencing and blue-green algae metagenomics projects, described the impact of the NECC consortium. "The large scale projects being pursued by the NECC consortium would be difficult to carry out at an individual institution. Leveraging our skills and resources as a consortium produces a virtual research organization that is more than the sum of its parts. The Bioinformatics Core is excited about the research opportunities made possible by the NECC."

<u>At Present:</u>

The NECC stays in regular communication with its members through the use of Video Conferencing meetings on a bi-weekly basis. The polycom system has proven to be effective and has enabled the group to stay informed of progress and next steps for the project.

The NECC will host its first annual Regional Workshop on March 12, 2010 in Burlington, Vermont. (www.uvm.edu/EPSCoR)