Mission

Improving Transportation Systems
Protacting The Environment

The Center for Transportation and the Environment conducts programs of research, education, technology transfer, and information services that seek to mitigate the impacts of surface transportation on the environment.

CTE serves as a national resource for addressing critical research and policy issues facing the transportation and environmental profession.
Thanks to its reauthorization in the Transportation Equity Act for the 21st Century, CTE has six more years to continue its mission of helping transportation and environmental professionals mitigate the impacts of surface transportation on the environment. Since the Center’s establishment in 1992, CTE staff have deliberately, and relentlessly, pushed the envelope to bring innovative services to transportation and environmental professionals that meet the tests of timeliness, practicality, and, above all else, quality.

I would be remiss if I did not use this year’s director’s message as an opportunity to thank my staff for six exceptional years of service in pursuit of this mission -- and to tell them that I cannot imagine addressing the challenges ahead without their continued support. Let me give you some background on the people behind the faces you will see in the CTE staff listing on page 7 of this report.

James Martin, associate director, has dedicated more than 50 percent of his professional hours at NCSU’s Institute for Transportation Research and Education (ITRE) on the overall management of CTE’s programs and finances. He plays an integral role in the administration of the Center’s research program. And he has been especially devoted to the education program, which supports our graduate research fellows and the annual summer scholars program. James’ dedication to helping undergraduate and graduate students learn more about the environmental aspects of surface transportation development has been unwavering. Thanks to his efforts many outstanding students from non-traditional disciplines are now considering careers in transportation and the environment.

Katie McDermott, technology transfer director, came to CTE after having managed the technology transfer programs for the North Carolina Local Technical Assistance Program and the Southeastern Transportation Center, two USDOT-funded activities located at ITRE. This experience, combined with her strong background in writing and video communications, helped her to launch CTE’s widely recognized series of satellite broadcasts, known as the National Teleconference Series. The broadcasts, which are now Internet simulcast, have provided transportation and environmental professionals with a unique forum for discussing the most pressing issues of the day. In addition, Katie’s dedication to organizing outstanding workshops and conferences, and producing effective print publications, such as this annual report, has contributed toward making CTE’s technology transfer program among the most progressive in the country.

Lois Widmer, information services director, has achieved a remarkable track record for turning problems into solutions and creating new services that have significantly enhanced transportation professionals’ access to the sea of information on emerging environmental research, policies, and best practices. Lois works tirelessly to promote the kinds of partnering and information technology literacy necessary to deliver value-added information to transportation and environmental professionals. Her environmental research in progress (EnvRIP) initiative, database searches and literature reviews, surveys, and online resources (including her role as Web administrator for CTE’s Web site) have made her a great asset to transportation organizations and their stakeholders nationwide. Lois’ expertise and reputation for quality work are solely responsible for several recent Federal Highway Administration project awards to CTE.
Lisa Rockwell, information specialist, has worked diligently alongside Lois in CTE’s information services program. You will likely interact with Lisa on the phone while she is completing surveys or soliciting new research project information for EnvRIP. Her quiet persistence and excellent information-gathering skills contribute greatly to this program’s success. A little known fact about Lisa is that she is an aspiring novelist (soon to be published), and we are delighted to have her creative energies with us here at CTE.

Jackie Berry-Haseeb, administrative assistant, started with CTE after its reauthorization in TEA-21 but has already become a vital member of our team. Jackie’s exceptional organizational skills, grace under pressure, and ever-present congeniality create a pleasant, efficient work environment. She is above all else an excellent navigator, helping to put customers in touch with the CTE individuals and resources they need.

Last, but certainly not least, I must bow to one of our guiding lights, Dr. Tom Larson. Tom has been a consultant to CTE for the last five years and, I am pleased to say, will remain with us through the TEA-21 years. Tom has shared with us the extraordinary wisdom gained from his distinguished professional experience, and he has put us in contact with individuals and organizations that have enabled us to continue to build a quality program over the years.

Our other guiding lights include the members of our advisory and technical committees (see pages 8-9), who keep us on course and, where necessary, help us chart “new territories” as we continue to explore exciting, creative ways to serve transportation and environmental professionals.

To you all, my deepest thanks and appreciation.

John S. Fisher, Ph.D., P.E.
Director

Financial Report

Total Annual Budget: $1.14 million

Expenditures for Year 6 (January 1, 1998 - June 30, 1999)

- Administration: 5%
- Education: 12%
- Research: 32%
- Technology Transfer/Information Services: 51%
Staff Listing

John S. Fisher, Ph.D., P.E.
Director

James B. Martin, M.C.E., P.E.
Associate Director

Lois J. Widmer, M.S.L.S.
Program Director, Information Services

Kathryn P. McDermott, M.A.
Program Director, Technology Transfer

Lisa F. Rockwell, M.S.L.S.
Information Specialist

Jacqueline Berry-Haseeb
Administrative Assistant

Thomas D. Larson, Ph.D., P.E.
Program Consultant
The Center for Transportation and the Environment was established in 1992 under the auspices of the University of North Carolina General Administration through the Intermodal Surface Transportation Efficiency Act of 1991. It is administered by North Carolina State University and is located at the Institute for Transportation Research and Education on NCSU's Centennial Campus. CTE is funded as a national university transportation center by the U.S. Department of Transportation, Research and Special Programs Administration, with full match support from the North Carolina Department of Transportation.

CTE (and ITRE) report to the Vice Chancellor's Office for Research, Outreach, and Extension. As part of ITRE, which has served the state of North Carolina and beyond for more than 20 years, CTE draws on the institutional resources of the UNC system and Duke University to carry out its programs of research, education, technology transfer, and information services. The activities of these programs are guided by two committees: the CTE Advisory Committee and the CTE Technical Committee.

The CTE Advisory Committee meets annually to discuss the Center's overall goals and objectives. The committee membership is composed of transportation and environmental professionals from the governmental, academic, and advocacy sectors.

### 1998-99 CTE Advisory Committee

- **The Honorable David McCoy**  
  (Committee Chair)  
  Secretary  
  North Carolina Department of Transportation  
  Raleigh, NC

- **Ms. Janet D'Ignazio**  
  Chief Planning and Environment Officer  
  NCDOT  
  Raleigh, NC

- **Mr. Roy Kienitz**  
  Executive Director  
  Surface Transportation Policy Project  
  Washington, DC

- **Dr. Thomas D. Larson**  
  President  
  Vision - Strategy  
  Lemont, PA

- **Dr. Russ Lea**  
  Associate Vice Chancellor for Research  
  North Carolina State University  
  Raleigh, NC

- **Dr. Jay Messer**  
  Senior Scientist  
  National Exposure Research Laboratory  
  US Environmental Protection Agency  
  Research Triangle Park, NC

- **Mr. Len Sanderson, P.E.**  
  State Highway Administrator  
  NCDOT  
  Raleigh, NC

- **Mr. Jim Shrouds**  
  Director, Office of the Natural Environment  
  Federal Highway Administration  
  US Department of Transportation  
  Washington, DC

- **Mr. Robert E. Skinner**  
  Executive Director  
  Transportation Research Board  
  National Academy of Sciences  
  Washington, DC

- **The Honorable Charles H. Thompson**  
  Transportation Secretary  
  Wisconsin Department of Transportation  
  Madison, WI  
  Chair, Committee on the Environment  
  American Association of State Highway and Transportation Officials

We would also like to acknowledge Former NC Transportation Secretary E. Norris Tolson, who chaired this committee in 1998 before leaving NCDOT in March 1999.
The **CTE Technical Committee** was formed originally to help the Center develop a research plan that conformed to the Center’s mission and reflected the highest level of integrity with regard to proposal solicitation and review, and project awards. Past CTE research projects have been conducted by UNC system and Duke University researchers. These projects have addressed critical research needs within the state of North Carolina and beyond.

As a result of North Carolina DOT’s increased match commitment to the Center following authorization of TEA-21, CTE and NCDOT have formed a joint research program, to be administered by NCDOT’s Research and Development Unit. While NCDOT will manage the solicitation of proposals, project awards will continue to be made to UNC system and Duke University researchers, and will focus on North Carolina environmental concerns that have broad national appeal. CTE Director John Fisher will serve on the project advisory committees, and CTE’s technology transfer program will become more active in promoting and disseminating the project results.

Consequently, the role of CTE’s Technical Committee will shift in focus from research to education as the Center expands its education initiative in the years ahead. The six-member committee will be called upon throughout the year to assist the director in Center activities related to undergraduate education and engineering professional development.

### 1998-99 CTE Technical Committee

- **Ms. Carol Cutshall**  
  Director, Bureau of the Environment  
  Wisconsin Department of Transportation  
  Madison, WI

- **Dr. David Robinson**  
  Deputy Branch Manager, Project Development & Environmental Analysis  
  NCDOT  
  Raleigh, NC

- **Mr. Wayne W. Kober**  
  Director, Bureau of Environmental Quality  
  Pennsylvania Department of Transportation  
  Harrisburg, PA

- **Dr. Jay Messer**  
  Senior Scientist  
  National Exposure Research Laboratory  
  US Environmental Protection Agency  
  Research Triangle Park, NC

- **Dr. John Sigmon**  
  Associate Dean  
  Nicholas School of the Environment  
  Duke University  
  Durham, NC

- **Mr. Pat Strong**  
  Head, Research & Development Unit  
  NCDOT  
  Raleigh, NC
Research
Research Program

Following its reauthorization in TEA-21, CTE forged a stronger research partnership with North Carolina DOT. NCDOT’s increased financial commitment enabled the Center to work more closely with the department’s Research and Development Unit, and Project Development and Environmental Analysis Branch. Accordingly, CTE’s research program is now a CTE/NCDOT joint initiative. NCDOT manages the proposal solicitation process and project administration. CTE’s director is a member of the NCDOT R&D technical advisory committee. And CTE’s education and technology transfer initiatives now supply the department with increased student involvement and more advanced communications and information technology resources.

Many elements of CTE’s original research program carry over into the joint program. Wetlands and water quality topics remain a primary research focus. Principal investigators from various disciplines are solicited within the University of North Carolina system and Duke University. The research projects offer tremendous experiential opportunities to students in the form of research assistantships, and many graduate students use their project work as the basis for theses and dissertations. In addition to producing traditional final project reports, principal investigators are encouraged to publish their peer-reviewed research results in professional journals for broader distribution.

CTE’s Web site will soon contain key documentation related to current and past research projects. This includes project abstracts, final reports, bibliographies of other published materials and presentations, biographical sketches of the project principal investigators, and links to related sites of interest.

Research in Progress

- Developing Guidelines for the Use of Visualization in Project Design and Public Review
  Ronald Hughes, University of North Carolina at Chapel Hill, Highway Safety Research Center

  The purpose of this project is to develop an initial set of guidelines for use by North Carolina DOT personnel in determining the most cost-effective application of advanced computer graphics (visualization) capabilities for engineering design and public interface. There is also a need to begin introducing other elements within the NCDOT to these capabilities and to anticipate the need for integration of visualization capabilities and functions across different disciplines within NCDOT. The research objectives follow: (1) identify one to three actual NCDOT design projects which are, or will be, in an appropriate stage of development to allow the research team to document the application of 3D/4D tools for design and public review; (2) work with NCDOT personnel to identify the important dimensions along which currently available 3D/4D tools should be evaluated; (3) monitor and document the use of 3D/4D capabilities during the
design and public review components of the projects selected; (4) document the specific 3D/4D tools used, hardware platform support, cost, etc.; (5) develop guidelines that can be used by the design engineer in selecting appropriate projects for the application of 3D/4D technology; and (6) document the results of each project as a “case study” with an overall section containing guidelines for use by the roadway design office et al. It is also proposed that the final report contain an update on what other state DOTs are doing in the 3D/4D area and the extent to which this form of visualization is being integrated with related efforts, such as modeling, simulation, and geographic information systems.

- **Ecological Assessment of a Wetlands Mitigation Bank in Western North Carolina**
  Kevin Moorhead, Irene Rossell, C. Reed Rossell, Jr., James W. Petranka
  University of North Carolina at Asheville, Environmental Studies Department

  This is a continuation of a previous CTE-funded project. In Phase I, the project team collected baseline data on hydrology, soils, vegetational communities, and animal populations for an NCDOT-purchased site in Graham County (aka Tulula Wetlands Mitigation Bank), that will be used to mitigate wetland losses associated with highway projects in western North Carolina. Before NCDOT acquired the site, the property had been drained in order to develop the land as a golf course. In this project (Phase II), the project team has evaluated the effectiveness of several restoration strategies across the site in order to provide a comprehensive ecological assessment of the mitigation bank. NCDOT has recently begun large-scale restoration, with plans to realign more than 3,000 linear meters of Tulula Creek. Replanting of fairways will commence in late 1999 with plans to compare natural canopy regeneration in fairways with artificial regeneration. The Tulula floodplain is an important habitat for box turtles. The constructed vernal ponds are being used to determine colonization rates, successional trends, and reproductive output of resident amphibians relative to populations in reference ponds. Additional research is focused on interactions between fish, predatory insects, and amphibians in the vernal ponds. Tulula is also being used to examine global factors that could be affecting southern Appalachian amphibians. For example, the project team is examining whether resident amphibians suffer significant embryonic mortality from increased UV-B radiation associated with the thinning of the ozone layer.

- **Effect of Light Intensity on Fish Migration with Particular Emphasis on River Herring**
  Mary Moser, University of North Carolina at Wilmington, Center for Marine Sciences Research

  Culverts are economical alternatives to bridge construction over small water bodies; however, they may be more likely to impede fish migration. Anadromous fish (i.e., those that spawn in freshwater but live the rest of their lives at sea) are very susceptible to the effects of barriers to migration. All anadromous fish populations in North Carolina, particularly river herring, are now listed by the state as endangered, vulnerable or of special concern, due in part to increasingly limited access to spawning habitat. An understanding of fish
behavior is needed in order to evaluate whether structures, such as culverts, represent barriers to migration. If culverts do represent a barrier, then research is needed to determine why fish will not enter culverts, to identify the types of culverts most likely to block fish migration, and to develop improvements to culvert design that facilitate fish passage. This project examines (1) the efficiency of upstream passage of river herring through culverts and under bridges relative to available light at mid-span; (2) the migration behavior (rate of movement, location in water column, diel timing, etc.) of river herring in culverts and under bridges relative to available light at mid-span; and (3) whether increasing light levels (via artificial lighting, reflective materials, grates, etc.) in culverts will improve upstream passage of river herring.

- **Emissions Reduction Through Better Traffic Management**
  Nagui Rouphail, Christopher Frey, North Carolina State University, Department of Civil Engineering

  Vehicle emissions of volatile organic compounds (VOCs), carbon monoxide (CO), and nitrogen oxides (NOx) depend upon many factors. Driver behaviors, such as accelerations, are affected by transportation control measures (TCMs), such as improved traffic signalization. Previous studies using second-by-second measurements have shown that emissions are dominated by short periods of rapid acceleration and other short periods of high engine load. Thus, an effective way to prevent emissions is to implement measures that reduce the frequency and duration of these high-emissions-producing events. However, a method is needed for empirical evaluation of the on-road pollution prevention potential of traffic management strategies. Accordingly, the objectives of this project are to (1) assemble, evaluate, and validate a new low-cost, on-board emissions measurement (OBEM) system; (2) investigate factors that affect the level and variability of on-road emissions using rigorous statistical methods; and (3) devise methods for designing and conducting experiments that realistically evaluate vehicle-based pollution prevention strategies.

- **Erosional Scour in Coastal Sounds of Northeastern North Carolina**
  Stanley Riggs, East Carolina University, Department of Geology

  Scour is a known and active erosional process in the shallow waters of the North Carolina coastal sounds. While the erosional effects of scour have been significant, the specific processes associated with how erosional scour occurs, its relationship to individual storm events, and details of the rates remain poorly understood. This project will use Croatan Sound, a known high-energy scour environment, as a test case to evaluate the problem and process of scour in NC coastal sounds. Two bridges crossing Croatan Sound will serve as the control sites; one bridge is presently in the design phase, and the other was built in the early 1960s. The research objectives are as follows: (1) run high-resolution seismic and ground-penetrating radar surveys and obtain an integrated network of...
30-foot vibracores across Croatan Sound; (2) utilize radiocarbon age dates to define the time framework of episodes of dramatic change (deposition and scour); (3) develop a 3D model of the historic and prehistoric record of changes during the past history of the Croatan Sound; (4) utilize the 3D model to hindcast the historical rates of scour for the past several hundred years and predict future scour for both the Croatan Sound and other coastal sounds where bridges are either planned or being built; and (5) correlate the Croatan Sound scour models to other models being developed for the NC estuarine system.

- **Evaluation of the Effectiveness of Existing NCDOT Wetland Mitigation Sites**
  
  Mark Brinson, Richard Rheinhardt, East Carolina University, Department of Biology

  Road construction by the North Carolina DOT impacts more wetland areas and classes than any other type of activity. Because mitigation (avoidance, minimization, compensation) for unavoidable impacts is required under Section 404(b) of the Clean Water Act, NCDOT must have compensatory mitigation plans approved by state and federal agencies that regulate wetlands. This project is an evaluation of the effectiveness of NCDOT mitigation sites in meeting success criteria identified in mitigation plans. The study consists of two parts: (1) a screening process in which all mitigation projects (approximately 60) will be visited and described during the first year (April 1, 1999, through June 30, 2000) and (2) a case study phase in which selected sites will be subjected to more detailed study and analysis. A major issue is the role of reference sites in the design and comparison with restoration sites. After the first year when all the sites have been visited, the project team will meet with NCDOT staff and the principal regulatory agencies to report its findings and to solicit suggestions for the second year of study (July 1, 2000, to June 30, 2001). A subset of restoration sites will be chosen for the second year of study. They may be representative of physiographic regions, wetland classes, and degree of success or failure. Case studies will be built around these sites to allow the comparison of alternative approaches to mitigation. A report to NCDOT and a workshop involving staff and regulators will be coordinated at the end of the project.

- **Functional Assessment of the Effects of Highway Causeway Construction on Wetlands: Comparison of Effects Before, During, and After Construction**
  
  Curtis Richardson and Neal Flanagan
  Duke University Wetland Center, Nicholas School of the Environment

  This study continues a previous CTE-funded project to use comparisons of previously constructed highway crossings with reference areas to develop functional assessment indicators. The primary motivation for developing functional assessment techniques is the need to predict the effects of anthropogenic alterations of wetlands to assess the spatial extent of impacts to determine mitigation requirements. Brinson and Rheinhardt (1996) advocate the use of reference...
ence wetlands to provide benchmarks for functional assessment of impacted wetlands. Nunnery and Richardson (1997) propose a functional assessment framework for wetlands that uses carefully chosen parameters as key indicators of ecosystem level functions. This project investigates the implementation of this framework to assess highway impacts on coastal wetlands. To date, pre-construction data have been collected on one wetland system, situated on the Camp Lejeune military reserve, which will be crossed by the US Highway 17 bypass of Jacksonville, NC. Simultaneous data collection has also taken place in two nearby reference wetlands. Construction phase data collection continues for all parameters measured prior to construction, allowing for statistically significant differences between the impact and control wetlands. Such differences would indicate short-term effects of highway construction. Continued monitoring beyond 2001 would allow detection of post-construction (chronic) highway impacts, and would yield a more valid measure of the true loss of wetland functions resulting from the bypass project.

**Increased Options for Weed Management in the North Carolina Wildflower Program**

Harold Coble, North Carolina State University, Department of Crop Science

NCDOT has been successful in establishing non-native wildflower species on highway rights-of-way by using methyl bromide, a broad spectrum soil fumigant effective in killing both growing plants and seeds of most plant species. Recently, the US Environmental Protection Agency issued a ban on methyl bromide manufacture and use in the United States effective in the year 2001, with use reductions scheduled before then. Furthermore, several of the replacement chemicals for methyl bromide, included on the NCDOT list of herbicides used on wildflowers, are on the USEPA list of compounds subject to regulatory action under the Food Quality Protection Act (FQPA) of 1996. As a result, these herbicides may no longer be available for use in the wildflower program. If the wildflower program is to continue, new technologies must be found to provide weed control in the establishment phase as well as the maintenance program for those beds already established. A prudent approach would be to look for new chemical means of control as well as any non-chemical technologies that may be feasible. The objectives of this study are to (1) evaluate new and existing herbicides for tolerance during establishment of species used in the NCDOT wildflower program, (2) evaluate weed control efficacy and crop safety in established wildflower plantings, and (3) investigate the potential of non-chemical means of weed management in the wildflower program. Implementation of research results will be accomplished through three products: (1) demonstration of the most promising results through large-plot field programs working cooperatively with the field technical staff, (2) a field operations manual for easy decision making relative to herbicide or other weed management choices, and (3) a scientific publication to be published in a peer-reviewed journal.

“The loss of methyl bromide will remove the major method of controlling weeds in the establishment of wildflowers on highway rights-of-way. Unless replacement technologies can be found, the NCDOT wildflower program will be in jeopardy.”

Coble, 1999
Low Maintenance Turfgrass and Cultural Management Systems Schemes for North Carolina’s Roadside

Arthur Bruneau, North Carolina State University, Department of Crop Science

Kentucky 31 tall fescue (Festuca arundinacea) is the predominant species used along roadways in the Piedmont and western regions of North Carolina.

“A new plant growth regulator, Plateau (imazapic) plus a surfactant, resulted in total suppression of tall fescue seedheads during the spring growing season.”

Bruneau, 1999

Although well adapted to these regions, tall fescue requires aggressive mowing cycles, and the annual mowing cost for NCDOT roadways is approaching $18 million. Research into the adaptability, establishment and management of alternative species and newer varieties of traditional species (as well as inexpensive plant growth regulators and herbicides) is needed to ensure that the plant materials selected will provide an economical, functional and aesthetically pleasing cover.

The objectives of this project are to (1) evaluate improved selections of tall fescue, fine fescue, centipede grass, buffalograss, zoysiagrass, and other species in the cooler regions of North Carolina, placing an emphasis on adaptability, growing height and maintenance requirements; (2) evaluate the performance of selected and improved plant species when planted in the spring, summer, and fall; (3) screen new herbicides for potential plant growth regulation; and (4) evaluate new and existing PGRs and mixtures for use on roadways in cooler regions of the state.

Occurrence of Gasoline Oxygenates in Stormwater Runoff

Robert Borden, North Carolina State University, Department of Civil Engineering

Methyl tert-butyl ether (MTBE) is commonly added to gasoline to increase octane and control air pollution. Recent research indicates that MTBE and possibly other oxygenates released from gasoline are entering drinking water supplies through stormwater runoff and ground water. This is a major concern because MTBE is very soluble, does not adsorb to sediment or biodegrade, has a very unpleasant taste and odor, and is a known animal carcinogen and suspected human carcinogen. Presently, there have been no systematic studies to identify the source(s) of MTBE and other oxygenates in stormwater runoff and their fate during transport through standard best management practices (BMPs), surface water and ground water. The long-term objective of this research is to evaluate the extent and the significance of MTBE and other oxygenates in stormwater runoff and the likely fate of these oxygenates during transport through surface and ground water systems. The first step is to determine the frequency of detection and average concentration of these compounds in runoff from different land uses and the effect of different practices on these compounds. This project will answer the following questions: (1) How frequently are oxygenates present in stormwater runoff and at what concentrations? (2) Are elevated oxygenate concentrations associated with specific land uses or management practices? and (3) Are oxygenates removed or attenuated in common surface water quality BMPs?

“Very little is known about the occurrence of MTBE in the hydrologic cycle... A good deal of circumstantial evidence suggests that MTBE is likely present in stormwater runoff and may cause significant surface and ground water quality problems.”

Borden, 1999
**Sampling and Testing of Stormwater Runoff from NC Highways**

Jy Wu, University of North Carolina at Charlotte, Department of Civil Engineering

In order for NCDOT to be compliant with the most critical parts of the National Pollution Discharge Elimination System (NPDES) requirements, a well-planned sampling and monitoring program must be developed and implemented for roadway drainage runoff. The key purpose of this study includes the development of a database from which seasonal pollutant loadings and event mean concentrations (EMCs) can be estimated for a variety of roadway surfaces and traffic volumes, and the investigation of the effectiveness of best management practices (BMPs) for highway runoff management. Specific objectives follow: (1) develop and implement a stormwater sampling program for up to 10 roadway drainage sites across the state; (2) monitor 5 to 10 storm events each quarter at the monitoring sites (this includes the collection of runoff data and composite water quality samples for each storm event); (3) develop seasonal pollutant loading factors and typical EMCs for each sampling site; and (4) evaluate the effectiveness of BMPs for highway runoff management.

**Two-Stage Evaluation of NCDOT Stream Mitigation Practices: Stage I - Synthesis of Current Stream Mitigation Practices; Stage II - Development of Criteria for Effective Mitigation**

Greg Jennings, North Carolina State University, Department of Biological and Agricultural Engineering

NCDOT is required to mitigate impacts to streams. In order to meet stream mitigation requirements, NCDOT needs to gain a thorough understanding of current, proven methods in stream restoration. In addition, NCDOT needs to develop measures of effectiveness to document stream restoration. For this project, stream restoration is defined as returning a degraded stream ecosystem to the highest level of stream potential available for the surrounding landform. This includes reestablishment of a stream channel that maintains its dimension, pattern, and profile such that over time it does not aggrade or degrade. This definition also implies that the restoration will provide the highest level of aquatic habitat and biological diversity possible. The project objectives are to (1) conduct a thorough research and review of scientific literature related to stream restoration practices, (2) develop a recommended process for stream restoration by integrating current knowledge and practices, (3) develop measures of effectiveness for use in evaluating successful stream restoration and mitigation, and (4) conduct a workshop for NCDOT and resource review agency staff to present results of the project. The final product of this research will be a report describing current, proven techniques for stream restoration and a recommended stream mitigation process for NCDOT. Before completion of this document, the draft report will be sent to NCDOT and resource agency review staff for input and agreement that the recommendations will meet existing regulatory and construction feasibility requirements.

**For More Information on the CTE/NCDOT Research Program,**
visit CTE’s Web site at www.itre.ncsu.edu/cte or contact Katie McDermott, CTE technology transfer director, kpm@unity.ncsu.edu or (919) 515-8034.
Encouraging students of diverse disciplines to consider careers in transportation and introducing an environmental awareness into traditional civil engineering curricula are the dual objectives of CTE’s education program. CTE reaches out to undergraduate and graduate students in biology, forestry, land use planning, economics, sociology, civil engineering, and other disciplines, and encourages them to examine how their collective skills may be applied to resolving environmental concerns in transportation. Students participating in CTE’s education activities are considered among the best in their field of study. They are selected through a competitive process as either CTE Graduate Research Fellows or CTE Summer Scholars.

**CTE Graduate Research Fellowship Program**

Each year CTE awards $15,000 research stipends to exceptional graduate students within UNC system schools and Duke University, whose academic pursuits demonstrate a strong interest in examining the relationship between transportation and the environment. Students use their stipends to support their work on a year-long project of their choice. Many of the students have been invited to present the results of their research at the Transportation Research Board annual meeting in Washington, DC.

**Francis B. Biasi, Duke University**
B.A., Geography and Studio Art, Clark University (Worcester, MA)  
Working toward doctoral degree in Landscape Ecology

Mr. Biasi’s research will focus on the development and use of integrated multipurpose datasets for regional conservation planning and assessment. The primary dataset that he will investigate is what he calls “ecoblocks,” which provide a new way of using transportation features to comprehensively inventory and assess the ecological diversity of a given region. Ecoblocks (or simply, blocks) are contiguous areas bounded by roads, transmission lines, and major shorelines. They represent a complete tessellation of the landscape across an entire region, thus forming the framework for a multipurpose ecological census. A variety of ecological attributes will be sampled and summarized for each block, which in turn can be rolled up into indices of biodiversity and viability. All of these block attributes can be derived through geographic information system (GIS) analyses, using widely available public datasets. By incorporating the transportation network into the ecological inventory, ecoblocks can provide a meaningful way of assessing the biodiversity of the landscape.

**Ryan S. King, Duke University**
M.S., Environmental Management, Duke University  
Working toward doctoral degree in Environment (Community Ecology)

Mr. King is involved in a CTE-funded project titled “Functional Assessment of Wetland Ecosystem Response to Highways: Before, During, and After Construction.” The research is being conducted in three tidal freshwater wetlands in Onslow County, NC, with one wetland bisected by a four-lane Highway 17 bypass around Jacksonville, NC. Data have been collected for two years, and construction of the bypass officially began in fall 1999. The goal
of Mr. King’s research is to assess the response of various biotic assemblages to construction of the bypass. He hopes to identify robust indicators of disturbance which could help managers to cost-effectively assess wetland condition for the purpose of highway-related mitigation. The product of this study will provide one of the first objective, simultaneous comparisons of functional and biological assessment approaches as well as detailed recommendations of strategies for mitigating highway-related impacts on similar wetland ecosystems. The study will provide quantitative documentation currently unavailable to state and federal wetland managers interested in developing better wetland assessment.

Jeffrey A. Masten, University of North Carolina at Chapel Hill
B.S., Business Administration (Transportation Logistics and Finance), Northeastern University, Boston, MA
Working toward master’s degree in Regional Planning

Mr. Masten has proposed a body of research that examines existing wetlands mitigation policy, North Carolina wetlands banking, and standards for basinwide or watershed wetlands restoration planning. Specifically, he proposes to evaluate fee-based and preservation wetland mitigation compensation methods in light of “no net loss” wetlands policies. His project seeks to answer the question: How can the North Carolina DOT employ a policy of wetland mitigation banking to better support its transportation mission? The project begins with a literature review and interview with local faculty and state agency officials. Mr. Masten will study existing policies that currently hinder the broad implementation and effectiveness of wetland mitigation. His research will address the essential interdependence of transportation, environmental, and land-use planning interests, and how the development of policy must reflect this.

Angela Moreland, North Carolina State University
B.S., Biology (Minor in Chemistry), Greensboro College
Working toward master’s degree in Forestry

As a native North Carolinian, Ms. Moreland has developed a deep appreciation for the state’s natural resources, and has designed her research and career interests accordingly. She is proposing to work on assessing the effects of spanned highway stream crossings in the Piedmont and mountain provinces of North Carolina. Recent developments in legislation to protect stream buffers and state waters has left gaps in the knowledge base for assessing the environmental impacts of highway improvements to Piedmont and mountain stream integrity. The issue becomes even more critical when permits are being developed by NCDOT because loss of functions cannot be definitely quantified, making environmental assessment documents and mitigation offerings subject to unsubstantiated claims by all parties. Streamside assessment techniques developed in the western United States are a mature technology with statistical designs and parameter selection well documented. Ms. Moreland will attempt to adapt these techniques to North Carolina streams for development of quantifiable methods. Her streamside work will be paired up with a biotic and abiotic assessment of in-channel functions. Ms. Moreland will study the permanent and temporary effects of spanned stream crossings on vegetation, bank morphometry, and channel morphology. The results of the study should assist in developing accurate permit applications, and establishment of mitigation relevant to known functional losses.
The CTE Summer Scholars Program brings together college students of diverse academic disciplines to explore the environmental issues related to surface transportation systems. For two weeks, the students travel to research laboratories and unique project field sites; receive hands-on training in state-of-the-art technologies, such as geographic information systems and the global positioning system; and meet decision makers shaping transportation and environmental policy for the next century.

Students consistently give this program high marks, citing it as one of the most influential events shaping their career decisions. The program also encourages students to discuss how their respective disciplines may collectively resolve transportation/environmental concerns. CTE Summer Scholars are selected competitively through a nationwide application process.

The July 1998 Summer Scholars:
- **Tania S. Boulattouf**, Civil Engineering, University of Delaware at Newark
- **John P. Cecil**, Biology, University of North Carolina at Wilmington
- **Mike Keglovits**, Environmental Studies, Allegheny College
- **Brandy Rettig**, Geography, University of Washington at Seattle
- **Bradley S. Leckert**, Civil Engineering, Louisiana State University
- **Ellen P. Micoli**, Environmental Studies, Allegheny College
- **Sara Kay Richardson**, Biology, University of Central Arkansas
- **Kendra Williamson**, Civil Engineering, North Carolina State University

Next CTE Summer Scholars Program: July 16 - 26, 2000 (To be conducted in conjunction with the Transportation Research Board's “Transportation and the Environment for the 21st Century” national conference, scheduled for July 23-26 in Pittsburgh, PA.)

“This program ranks among the top experiences I’ve ever had!... Before I came to [CTE], transportation was the farthest thing from my mind in the career category. Now that I’ve been exposed to so many exciting areas of transportation, I think that I may start looking in that direction.”

1998 Summer Scholar

“Thank you, CTE. You all went out of your way to expose me to aspects of transportation I’ve never seen before. I am very excited to see what my future job opportunities may be. No doubt this program has had a big impact on what I will ultimately choose to do.”

1998 Summer Scholar

U.S. Representative David Price (NC-4th District) visited with CTE summer scholars during their tour of Capitol Hill.
Technology Transfer
CTE defines technology transfer as follows: creating forums (print, electronic, or face to face) where transportation and environmental professionals can come together to exchange ideas on new policy issues, research and technology innovations, and best practices. CTE’s outreach is national in scope; accordingly the Center is committed to partnering and to using state-of-the-art technologies to enhance the efficiency and cost effectiveness of its technology transfer activities. CTE’s technology transfer program provides the following core services: the national teleconference series, co-sponsorship of workshops and conferences, technology transfer of CTE/NCDOT research program results, the Mobility Challenge multimedia project (which is a joint CTE technology transfer/education program initiative), and the CTE publications and videotapes clearinghouse.

National Teleconference Series

The national teleconference series was created in 1994 through CTE’s technology transfer program to provide a forum through which transportation and environmental professionals could discuss current policy issues, research and technology innovations, and best practices. CTE broadcasts four to six programs per year via satellite from its television studios at North Carolina State University. These programs are transmitted to more than 250 downlink sites throughout the U.S., Canada, and Puerto Rico. They are also available on videotape, and more than 2,000 tapes have been distributed internationally.

Live via the Internet!

The year 1998 marked the occasion of CTE’s first Internet simulcast of one of its national satellite broadcasts. With recent advancements in Web streaming technology, the Center decided in 1998 to investigate the feasibility of simulcasting its programs over the Internet. The goal was to offer audiences another means of accessing the teleconferences conveniently from their computer desktops as well as to provide additional opportunities for them to participate in the live discussion by submitting their questions and comments by email. To give its “cyber” audience a sense of belonging to a larger participant community, CTE established an online discussion group, CTEWEBCAST, to announce upcoming Web broadcasts, to provide instructions on how to participate in them, to troubleshoot technical problems, and to offer a forum by which Web audience members could interact with each other and continue to discuss the topics addressed in the Webcasts.

The first Internet simulcast of a live broadcast was conducted on November 17, 1998, for the Wildlife Ecology and Transportation program. More than 50 individuals were connected to the Webcast, in addition to those watching the program at area downlink sites. After the live program, more than 1,400 hits were recorded on CTE’s Web site, which offered complete replay of the broadcast along with downloadable copies of panelists’ presentation materials. Feedback on the quality of this new Web experience was overwhelmingly positive as one participant noted: “I was not able to catch the entire broadcast . . . as planned, but I did manage to see part of the program on the Web. I was very impressed with your use of technology and the subject matter covered. . . . I intend to...
pay close attention to the future activities of CTE. Thank you for providing this important service!” Dale Steele, Chief, Environmental Planning Branch, Caltrans.

Based on the initial success of the November 1998 Webcast, CTE now provides Internet simulcasts and Web replays of all its teleconferences. This requires the efforts of many dedicated groups, including NC State University’s Office of Video Communications Services, Office of Information Technology, and Department of Computer Science. While the Webcasts on occasion may be hindered by the technical challenges associated with merging satellite and computer-based technologies, they have clearly demonstrated their usefulness in providing the Center’s audience with increased access to the timely subject matter covered in the teleconferences. They have also inspired several special Web streaming projects that CTE will be working on next year with NCDOT and several Transportation Research Board environmental committees.

Workshops and Conferences

CTE co-sponsors workshops and conferences in keeping with the Center’s mission to mitigate the impacts of surface transportation on the environment.

On September 16-18, 1998, CTE co-sponsored with NCDOT the national conference titled Connections ’98: Transportation, Wetlands, and the Natural Environment. This event was first held in Tacoma, WA, in September 1996 under the joint sponsorship of CTE and Washington State DOT. In 1998, CTE brought the conference to New Bern, NC, one of the state’s most treasured historic riverfront communities. Nearly 300 governmental, university, corporate, and non-profit representatives attended the three-day event, which included poster sessions and technical presentations, showcasing new research and technology advancements and case studies of successful implementation processes. CTE plans to co-sponsor Connections 2001 in the Midwest.

CTE will co-sponsor the following events in 2000/2001:

- Environmental Research Needs in Transportation Conference. 2001. (Location TBA) A national conference conducted in cooperation with TRB A1F02 (Environmental Analysis in Transportation) Committee et al.
Technology Transfer of CTE/NCDOT Research Results

In early spring 1999, NCDOT awarded nearly a dozen new environmental research projects, which became designated as CTE/NCDOT joint projects. CTE’s technology transfer program will closely follow the progress made on these projects and develop opportunities to distribute the research results more widely, within North Carolina and nationally. By dedicating its resources to this joint research effort, CTE’s technology transfer program will help NCDOT engage the department and its stakeholders in an ongoing dialogue about how new research results may inform future transportation planning and project development activities. Examples of CTE’s support to NCDOT follow:

- Develop a joint research program Web site that includes project abstracts, biographical sketches of principal investigators, final project reports, bibliographies of other project articles and presentations, and links to related sites.
- Host research forums (possibly held in conjunction with NCDOT’s monthly interagency meetings) showcasing one or more CTE/NCDOT projects. Videotape and provide Web presentations of the project presentations as appropriate.
- Work closely with NCDOT’s Public Information Office and news media to increase public awareness of innovative research activities that have local appeal.

The Mobility Challenge Initiative

The Mobility Challenge: Moving Beyond Conflict is a national multimedia initiative that will present a balanced look at the evolving relationship between surface transportation development and the environment. The project will (1) chronicle the unavoidable tensions between surface transportation and environmental interests, and (2) showcase inspiring examples of partnering that represent the best combinations of engineering excellence and environmental stewardship. Over the next two years, an HDTV public television documentary, Web site, CD-ROM, book, and teachers’ guide for grades K-12 will be produced, serving a diverse audience, ranging from students to professionals, policy makers, and the general public. Since January 1998 CTE has met with key representatives from the transportation and environmental communities to introduce them to the project and give them an opportunity to participate in it. CTE is presently soliciting project underwriters. Major funding is expected to come from the automobile, freight, oil, and construction industries. In the first quarter of 2000 CTE will begin to post Mobility Challenge project information on its Web site.

CTE Publications & Videotapes Clearinghouse

The technology transfer program produces and distributes the Center’s in-house publications. These include the annual report (circulation: 337), CTE News & Notes newsletter (circulation: 2,493), and Center directory. All are available in print and on the Web. In addition, videotapes of the national teleconference series are highly requested and distributed free of charge upon request. The technology transfer program is also responsible for the dissemination of final project documentation generated by the CTE/NCDOT joint research program. Starting in January 2000, CTE will begin converting past (and present) research documentation to Web documents. During 1998-99, a total of 1,294 materials were distributed in response to 473 requests: 939 teleconference videos, 129 research reports, and 226 other (e.g., workshop materials, referrals, etc.).
Information Services
The mission of CTE’s information services program (formerly the transportation and environmental research and information services program) is to provide timely and accurate information to assist transportation and environmental professionals in making informed decisions. This is accomplished through such value-added services as database searches, literature reviews, and nationwide surveys. The information services (IS) program then distributes this information not only to the individual client requesting it but also on a global scale via CTE’s Web site and electronic discussion group as appropriate.

January 1998 - June 1999 Overview

Despite the uncertainties surrounding the proposed renewal of the ISTEA legislation in 1998, the IS program continued to emphasize timely and effective delivery of its core services and to seek opportunities to partner with the leading transportation organizations. Throughout 1998 and the first half of 1999 the program continued to develop several major projects and planned initiatives for 1999-2000:

1998 - First Half 1999
- Expand survey service
- Further develop the EnvRIP database
- Host Web sites for additional TRB A1F committees

Proposed Initiatives for 1999-2000
- Upgrade and redesign CTE Web site
- Introduce Web-searchable databases
- Create Web site for TRB A1F05
- Contract with FHWA to develop Web-searchable database for their Environmental Research Program

Since its inception in late 1995 CTE’s IS program has emphasized its mission to serve as a key information resource for state DOTs, FHWA, federal and state resource agencies, researchers, and advocacy groups. A comparison of these two pie charts demonstrates both the wide range of clients the IS program serves and the substantial growth in usage by DOTs and other federal and state agencies. During the first two full years of operation, 1996-1997, state DOTs represented 22 percent of CTE’s IS clients while FHWA and other government agencies represented 18 percent for a combined total of 40 percent of IS’ work. In contrast, the state DOT share increased to 34 percent during the 18-month period from January 1998 to June 1999, while the FHWA and other government agencies’ share remained stable at 17 percent, producing a combined total of 51 percent.
percent for these two primary client groups. Since the IS program did not pursue any marketing strategies during this latter time frame, the increase in state DOTs’ usage of the information services represents substantial repeat business from satisfied clients who rely on CTE for their information needs and have shared news of CTE’s IS services with their colleagues.

In contrast to the 51 percent growth in requests for database searches, literature reviews, and surveys that the IS program experienced between 1996 and 1997, there was no significant growth in the number of requests during 1998 and the first half of 1999. Instead, this 18-month period represented a time to stabilize and absorb the impact of the previous year’s growth, while continuing to expand the scope of such special projects as EnvRIP, the Environmental Research in Progress database, and Web site development for CTE and several TRB environmental committees. In fact, the current awareness subscription service, originally offered on a bimonthly schedule, was changed to quarterly as a means of improving the efficiency of operations while continuing to offer effective service.

Examples of bibliographies and literature reviews prepared by the IS program for conferences and committees:

- Literature Review and Synthesis on Transportation and Global Climate Change: A Summary of Greenhouse Gas Emissions Benefits from Transportation Strategies. Prepared for FHWA, August 1998. (35 copies distributed) Client feedback: “Your quality work and timely efforts have assisted our Agency on many occasions and this is just one example of your dedication and attention to detail.” J. Shrouds, FHWA.

![Annual Volume of Work by Service Category](image)

- **General Information**: questions about IS or CTE programs that usually require less than 15 minutes to answer and can be addressed by all staff members.
- **Ready Reference**: a factual or statistical question that can be addressed within two hours by consulting available reference tools.
- **Database Searches, Literature Reviews, Surveys**: an in-depth search and review of all pertinent information available on a topic. This category includes searches, literature reviews, surveys, and the subscription current awareness service. A database search or literature review can require anywhere from 4 to 60 hours to process, and a single nationwide survey can involve well over 100 hours of IS staff time.
Special Projects and Initiatives

Expand Survey Service

In late 1996 the IS program first experimented with conducting informal telephone interviews as an alternative to database searches when it was determined that no literature had been published on the subject requested by Washington State DOT. The final report of these interviews was so successful in satisfying the client’s need for critical information that the IS program recognized the value of incorporating interviews and surveys as an additional tool for addressing customers’ needs. Throughout 1997, the program conducted several more informal surveys as needed. In 1998 Washington State DOT again approached the IS program, this time with a request to manage the first phase of a formal, structured survey of all state DOTs concerning preservation as a wetlands mitigation tool. The IS program’s effort on behalf of Washington State DOT solidified the program’s reputation and brought additional requests for similar projects. The CTE IS program has achieved the status of a reliable resource, a clearinghouse for the exchange of mutually beneficial information, both by providing the more traditional database searches and literature reviews and through the innovative survey service. Requests for surveys often originate from DOTs’ review and examination of environmental policies: as they consider changes to their policies they want to benefit from the knowledge and experiences of other agencies in order to apply the best solutions.

Examples of recent survey topics:

- Environmental Initiatives Plan, database search and nationwide survey. Conducted on behalf of New York State DOT, which had a legislative mandate to establish a department-wide environmental plan in keeping with ISO 14000. Client feedback: “...I wanted to take a moment to thank you for your timely and able assistance...[CTE] is proving to be a valuable resource.” Dr. G. McVoy, NYSDOT
- Programmatic Agreements for Historic Bridges. Conducted on behalf of Washington State DOT. Client feedback: “I’m impressed with the accuracy you have with getting to the problem I’ve proposed. This information...will be well used. Thanks again for a great job!” S. Turner, WashDOT
- Practices for environmental monitoring of well water quality potentially affected by road construction. Conducted on behalf of Washington State DOT for their development of a wellhead protection policy. Client feedback: “Thanks so much! I haven’t had a chance to fully read through things yet but it looks like you collected a lot of really helpful information. Please know how much I appreciate your help!” C. Matter, Washington State DOT

Further Develop the EnvRIP Database

EnvRIP is a database for tracking environmental research in progress of interest to transportation professionals. CTE’s IS program created this resource in response to the need identified at the November 1996 Environmental Research Needs in Transportation Conference. Although the first issue of EnvRIP was published in December 1997 and distributed to all state DOTs, its scope was limited to active state DOT, NCHRP, and some university-sponsored research. With the two subsequent updates in 1998 and the planned update in 1999 the scope of EnvRIP was expanded to include a broader range of sponsors, such as other government agencies, all university transportation centers, other academic research institutes, and non-profits. Through a proactive effort the IS staff has succeeded in generating a substantial database of active environmental research. In 1998 EnvRIP was issued in multiple formats: print, Adobe AcroRead PDF (portable document...
file) on diskette, searchable database on diskette, and as a Web document. This assured broad distribution of the information. CTE had scheduled offering EnvRIP as a searchable database on the Web in 1999 and initial steps toward this goal have been taken; however, the target date for this service, which will eliminate the need for distribution of the other formats, has been revised to the first quarter of 2000.

In each subsequent update of EnvRIP, CTE identifies environmental research that has been completed since the last issue and provides a bibliographic citation to the final report. Every effort is made to assure the reliability and accuracy of all information in the database. On a regular basis, all new information is shared with the Transportation Research Board information service for possible inclusion in their TRIS database.

From the EnvRIP records CTE also generates a special report for FHWA and TRB that documents those research projects that meet the criteria of research needs statements published in TRB Circular 469, Environmental Research Needs in Transportation.

As a result of CTE’s successful development of EnvRIP, FHWA approached the IS program in late 1998 about designing and hosting a similar database on CTE’s Web server for FHWA’s Environmental Research Program projects. Negotiations continue and an initial one-year contract is anticipated to begin during the second half of 1999.

At this point CTE’s IS program has achieved, or is in the process of achieving, the three initiatives for EnvRIP established in 1997: (1) to use the EnvRIP database as a mechanism for identifying and tracking research that meets the criteria of the research needs statements published in TRB Circular 469, Environmental Research Needs in Transportation; (2) to collaborate with agencies and organizations developing similar databases, and (3) to offer Web EnvRIP, a searchable version of the database through CTE’s Web site.

Host Web Sites for Additional TRB A1F Committees

CTE has established a strong partnership with many of the TRB A1F environmental committees, most notably with the A1F02 Environmental Analysis in Transportation Committee, for which CTE has hosted and maintained a Web presence since 1997. In 1998 CTE agreed to provide the same service for the TRB A1F07 Waste Management in Transportation Committee. Realizing that not all A1F committees had Web sites as of early 1999, Dr. John Fisher, CTE’s director, proposed that CTE offer to host sites for any and all A1F committees. This invitation was accepted by the A1F05 Historic and Archeological Preservation in Transportation Committee and plans are to have its site launched for the 79th Annual TRB Meeting in January 2000. These Web sites are true partnerships in that the committee members actively participate in the selection of materials and information for their sites and assist with the formatting and preparation of the documents. Typically, the committee Web sites include directories of members and officers, newsletters, and announcements of meetings and events. The A1F07 committee is pursuing ambitious plans to videotape sessions of their midyear meeting and offer the videos through the Web site, while the A1F05 committee is exploring ways to offer dialogue and discussion through their Web site, perhaps as a chat room.

TRB Committee Web sites maintained and hosted by CTE:
- TRB A1F02 Environmental Analysis in Transportation (www.itre.ncsu.edu/cte/trb_envcom.html)
- TRB A1F05 Historic and Archeological Preservation in Transportation (proposed)
- TRB A1F07 Waste Management in Transportation (www.itre.ncsu.edu/cte/a1f07.htm)
Web-Based Information (www.itre.ncsu.edu/cte)

In addition to designing and hosting Web sites for other organizations, CTE’s IS program continues to develop the Center’s own Web site and other Internet tools in order to disseminate information as widely as possible and to market all of CTE’s programs and services. The IS program strives for relevancy, accuracy, and currency in CTE’s Web site and constantly updates information and links.

Many clients first visit CTE’s Web site to locate the information they need on upcoming programs or to review recently posted bibliographies. Often, they follow up with direct contact, perhaps via one of the many email links on the Web pages, to request further information as needed. Solutions for successful wetland mitigation, means of avoiding wildlife fragmentation and mortality, the costs and benefits of transportation control measures are examples of the most frequently requested topics. Recognizing the common need for reliable information on these subjects, the IS program now regularly publishes Web bibliographies of the latest citations on these critical topics. This Web service allows the IS staff to meet the needs of an increasing client base while maintaining the same staffing level.

The CTE Web site continues to feature:
- Online registration to all teleconferences and events sponsored by CTE
- News & Notes, the Center’s quarterly newsletter
- Research Profiles, brief reports of CTE-funded research
- IS bibliographies for teleconferences and current awareness subscribers
- Information about the Center’s research, education, and technology transfer
- Links to other Web sites reviewed and evaluated by the IS program

New features of CTE’s Web site include:
- Links to environmental training opportunities
- A section on environmental justice
- Alerts of environmental regulatory/legal actions affecting the transportation profession

In the half dozen years that the World Wide Web has existed, there has been a quantum leap in the software and technology that supports it. Web pages have become increasingly sophisticated and interactive. Content is no longer sufficient to ensure a steady audience: use of graphics, good design and overall organization have become as important as the information provided on a Web site. To stay relevant to our clients in this dynamic environment, the IS program has undertaken a complete redesign and update of CTE’s Web site. This effort, begun in June 1999, will be complemented by the purchase of a Windows NT 4.0 server that will permit the use of several specialized software packages not available for the current Unix platform. This major commitment to new hardware, operating system, and design will permit development of the key IS initiatives for 1999-2000, namely Web searchable databases, Web site for TRB A1F05 Committee, and fulfillment of the anticipated FHWA contract to develop a Web-searchable database of their Environmental Research Program projects.

“Thanks so much for the link to the document on the web [transportation control measures bibliography]! It will be very useful, as questions about studies come up here several times per year. I’ll keep the link and check it for updates. There’s no need to send the abstracts at this time, but I’m glad to know they exist.”

A. Milliken, RideArrangers Division, Denver Regional Council of Governments
Transenviro is the CTE-sponsored electronic discussion group for transportation and environmental professionals. It provides a forum for government officials, public interest groups, and people in the private sector working in the transportation and environmental fields to share information and ideas. The list provides an informal network for the exchange of news about current research, discussion of problems and solutions, requests for advice and assistance, and announcements of upcoming conferences and events.

Transenviro membership has remained steady at slightly over 400 subscribers. It continues to provide a means for rapid dissemination of information to subscribers and for rapid gathering of responses to questions subscribers post to the list. List activity increased slightly throughout 1998 and 1999.

Transenviro is moderated by CTE’s IS program in order to assure that the messages posted are appropriate and of interest to the members. The IS program staff also respond directly to many of the inquiries posted to the list.