

**The Status of
and
Future Directions for
the Pennsylvania Task Force on**

DIRT AND GRAVEL ROADS

1997 Status Report

Task Force Participants

Department of Environmental Protection

DCNR-Bureau of Forestry

Fish and Boat Commission

Game Commission

PA Association of Township Supervisors

PA Council-Trout Unlimited

PA County Conservation Districts

PA Environmental Defense Foundation

PA House and Senate Staffs

Penelec Power Company

Pennzoil Products

PennDOT

US Fish and Wildlife Service

US Forest Service

ACKNOWLEDGEMENTS

Special appreciation is extended to Wayne W. Kober, Director of PennDOT's Bureau of Environmental Quality and Chairman of the Task Force on Dirt and Gravel Roads, for his dedication to the principle that full and open involvement of everyone associated with the issue of pollution prevention will result in the most appropriate long term solutions. His support and encouragement sustained the interests and enhanced the efforts of all members. With Wayne's guidance, we moved from being a group of "concerned" individuals to a working operations unit focused on the challenges ahead.

Thank you, Wayne!

The members of the Task Force

THE AUTHORS

Kevin Abbey, B.S. Zoology, University of Michigan; M.A. English Language & Literature, Central Michigan. Kevin's involvement with the Task Force began with his position as Director of the Transportation Committee in the Pennsylvania Senate. Now a transportation consultant, he is grateful for the educational experience bestowed by the Task Force members.

Woodrow "Woody" Colbert, B.S. Agriculture and Biological Sciences, Penn State University. A former township laborer with a lifelong dedication to practical and affordable solutions to environmental land management problems, Woody is the behind-the-scenes worker who assembled the information for Task Force volunteers and humbly reports here on their efforts. Currently on loan from PennDOT's Bureau of Environmental Quality to the State Conservation Commission, he is putting his experience with conservation agencies and land management/maintenance companies to work in the ongoing implementation of the new Section 9106 - Dirt and Gravel Road Maintenance program.

Report designed by McCormick, Taylor & Associates, Inc.

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Pennsylvania's dirt and gravel roads are here to stay.

Although many people perceive of dirt and gravel roads as a nuisance — relics of a slower-paced time in our history just waiting to be paved — the facts show these roads are important links in Pennsylvania's overall transportation network. Covering more than 27,000 miles throughout the Commonwealth, dirt and gravel roads provide vital access for Pennsylvania's major industries — agriculture, mining, forestry, and tourism — while weaving the fabric of rural community life for over 3.6 million residents. Paved roads and highways carry high maintenance costs. Local municipalities and state agencies — with jurisdiction over more than 90% of the state's dirt and gravel roads — can ill afford to pave dirt roads and then adequately maintain them.

Rivers and the
Inhabitants of the
watry Element were
made for wise men
to contemplate, and
fools to pass by.

Isaak Walton, *The Compleat Angler*, 1653



According to the DEP, non-point source runoff is responsible for 88% of all impaired stream miles in Pennsylvania

Given their dual purpose of carrying low traffic volumes yet accommodating high weight loads, dirt and gravel roads are ideally suited for their job: low maintenance pathways to Pennsylvania's remote areas.

Low maintenance does not, however, mean no maintenance.

If not properly cared for, dirt and gravel roads can become the source of sediment-laden runoff which finds its way into streams and adjacent waterways, choking off the insect populations and ruining the aquatic habitat that supports trout and other fish. Fugitive dust from dirt roads is a serious human health hazard. Long known as a cause of allergies, dust (and its companion particulate matter) have been shown in a preponderance of recent epi-

demiological studies to contribute to lung disease and precipitate thousands of respiratory-related early deaths each year.

Poorly maintained dirt roads become "dust & sediment factories" — ready, willing and able polluters. Known as "nonpoint-source" pollution, owing to numerous sources stemming from locations which are not readily identifiable, this "poison run-off" (according to a 1996 National Geographic article on the subject) accounts for up to 80% of the degradation of U.S. waters." The Environmental Protection Agency cites nonpoint source pollution as the most common cause of stream habitat damage in our nation's forests. According to the DEP, non-point source runoff is responsible for 88% of all impaired stream miles in Pennsylvania. Curbing this problem is now a national goal.



TASK FORCE FORMATION

Appreciation for the form and function of the state's unpaved roads has become the domain of the Task Force on Dirt and Gravel Roads. In response to concerns voiced by Pennsylvania Trout (a Council of Trout Unlimited) about sediment pollution in the state's watersheds, the Task Force was created in 1993 as an informal amalgam of:

- *state agencies (PennDOT, Department of Environmental Protection, Department of Conservation and Natural Resources);*
- *sportsmen as represented by Pennsylvania Trout and Pennsylvania's Federation of Sportsmen's Clubs;*
- *environmental resource agencies (Fish & Boat Commission, Game Commission, U.S. Forest Service, U.S. Fish and Wildlife, County Conservation Districts);*
- *local government (PA State Association of Township Supervisors);*
- *private companies (Pennzoil, Penelec);*
- *Penn State University researchers and training specialists;*
- *legislative staff;*
- *and citizen environmental groups (PA Environmental Defense Foundation, Audubon Society, Chesapeake Bay Foundation, etc.).*



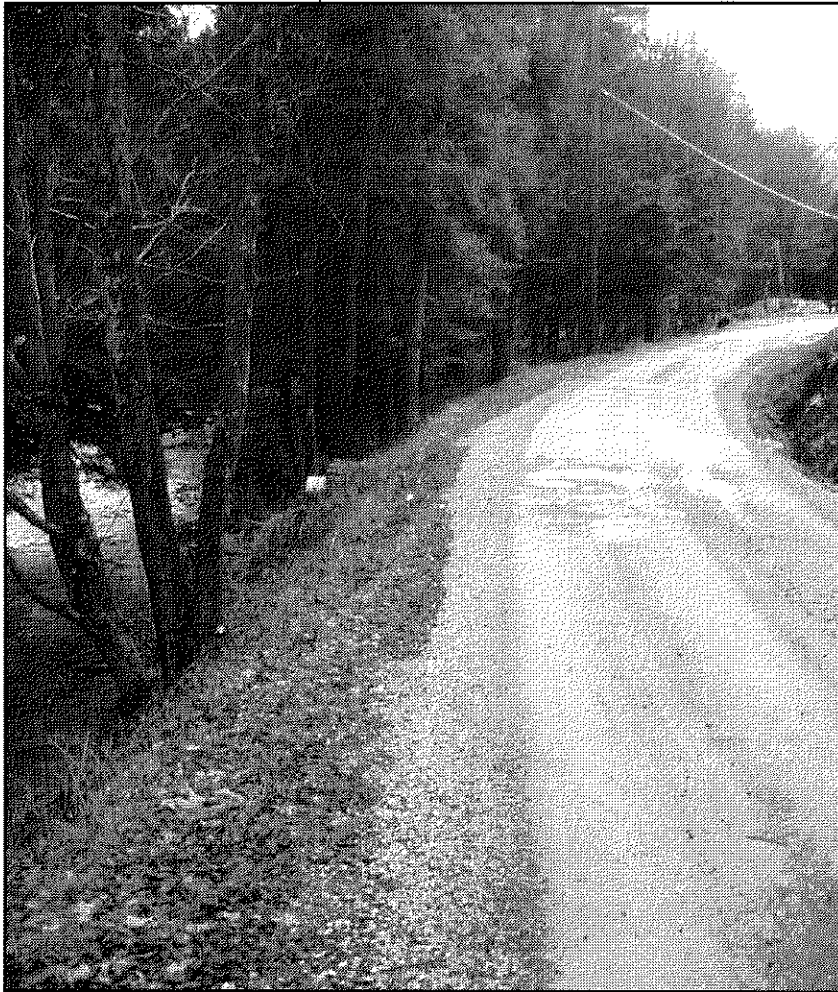
The Task Force on Dirt and Gravel Roads adopted the following purpose: ascertain the adverse effects of unpaved road drainage, identify its causes, and help develop corrective actions.

From its creation, the Task Force was charged with a multi-faceted mission. The group was not only directed to recognize and promote the value of unpaved roads in Pennsylvania's overall transportation scheme, it was also charged with finding ways to reduce the erosion, sedimentation and other pollution occurring along these rural roadways. Five (5) initial action steps were identified in 1993 that guided the work efforts of the Task Force:

- 1. Work groups be formed to produce a program or action plan to resolve the dirt and gravel road pollution issue;*
- 2. Education and training be considered a critical component of the action plan;*
- 3. Problem pollution areas be identified;*
- 4. Training in equipment operation for municipal forces be an integral component of the plan; and*
- 5. Improved communication related to the availability of Environmental Enhancement funds (under ISTEA) be incorporated into the plan.*

Working from this roster, the Task Force adopted the following purpose:

- ascertain the adverse effects of unpaved road drainage,*
- identify its causes, and*
- help develop corrective actions.*



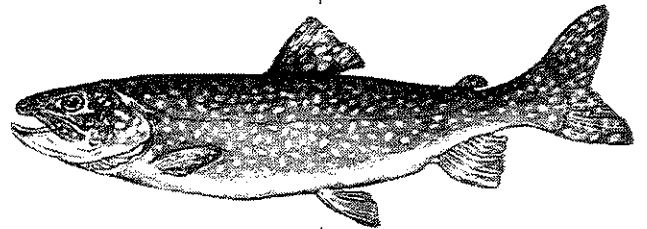
TASK FORCE HISTORY

In order to understand a stream, one must see the connection between what is natural and what man-made. It is not an overstatement to assert that Pennsylvania Trout was the instigator, the inspirational force behind the Task Force. In particular, special recognition must go to the late James "Bud" Byron, Pennsylvania Trout's tireless champion of watershed protection and the driving force behind creation of the Task Force. Bud Byron brought the problem of sediment pollution from dirt and gravel roads in the state's premier trout streams to the attention of government officials and advocated that a "no-nonsense" working group tackle the issue. Although prompted to action by Pennsylvania Trout's passion for protecting habitat for wild trout populations, members of the Task Force already shared a commitment to the health and vitality of Pennsylvania streams. To understand the devotion Task Force members bring to their work, a person needs to understand the importance attributed to sport fishing waterways and drinking water suppliers known as Special Protection Waters.



From the very beginning, the state's protected waters — those designated as "Exceptional Value" or "High Quality"— were identified as a special area of concern for the Task Force. It is well documented that of all the major sport fish, "trout need the coldest, cleanest, clearest water, the most pristine habitat." According to Joe McGurrin, resource director of Trout Unlimited, "When you have trouble in the environment, trout are the first to go. But when trout are where they ought to be, all is right with the world." ("Trout" National Geographic, April, 1996). In the pursuit of trout, people often find something elusive in themselves — a sense of connectedness. It is these, often intangible, connections between the world as we find it and the environment we make of it that are at the heart of sportfishing.

For members of the Task Force, the beauty of a stream cannot be contemplated without reference to its context in the environment. At the heart of environmentally sound thinking is the recognition that the maintenance of the road and the health of the stream are connected. Pete Raffle of Trout Unlimited may have put it best when he said simply, "to save a trout stream, you have to protect its watershed." When it only takes the touch of a hand on the hydraulic control of a road grader to



"When you have trouble in the environment, trout are the first to go. But when trout are where they ought to be, all is right with the world."

"Trout", National Geographic, April 1996

To save a stream you have to protect its watershed. It takes only the touch of a hand on the hydraulic control of a road grader to determine whether mud is discharged into or away from the stream.

determine whether mud is routed into the stream or discharged through a living vegetative filter, the conviction to make the right decision should be based on an understanding of the stream and its place in the environment. This understanding prompted one Task Force member to comment: "Good maintenance is good for the environment." That statement, in a nutshell, could serve as the motto of this group. In the 12 months since the Task Force's last status report, a great deal of activity has occurred and much more can be expected in the future.

TASK FORCE ORGANIZATION

From that starting point in 1993, PennDOT's Bureau of Environmental Quality (BEQ) assumed leadership of the group and handled the administration of its meetings. Topic areas and individual work assignments were divided amongst the member agencies according to interests and expertise.

With only minor streamlining from its original composition, the following five (5) specific work groups guide the technical work efforts of the Task Force and structure its deliberations:

- *SCOPE OF PROBLEM: Dr. Ed Bellis, Chairman Environmental Committee, PA Trout;*
- *ROAD MAINTENANCE PRACTICES: Gary Hoffman, P.E., PennDOT Chief Engineer;*
- *MONITORING & EVALUATION: David Spotts, Environmental Services, PA Fish & Boat Commission;*
- *EDUCATION & TRAINING: James Wheeler, Director of Member Services, Pennsylvania State Association of Township Supervisors;*
- *RESEARCH: Dr. Paul Tikalsky, Pennsylvania State University.*



Accomplishments

DIRT AND GRAVEL ROAD LEGISLATION ENACTED

After a number of unsuccessful attempts, the General Assembly, on April 17, 1997, approved the Transportation Revenue Bill, House Bill 67 as amended. Governor Ridge promptly signed the measure into law as Act 3 of 1997. This new legislation generates over \$400 million per year for transportation investments in highway/bridge construction and improved road maintenance. Included in the law is a new Section 9106 of the Motor Vehicle Code creating a \$5 million annual, non-lapsing appropriation earmarked for "Dirt & Gravel Road Maintenance." This appropriation, targeted for environmentally sound maintenance of the Commonwealth's unpaved roads, has been a high priority of the Dirt and Gravel Road Task Force since the group's inception.

Sponsored by State Senator J. Doyle Corman (R-34), the new program carries a statement of purpose "to fund environmentally sound maintenance (via) streamlined appropriation to the county level (which) enables local officials to establish fiscal and environmental controls." Members of the Task Force were instrumental in helping Senator Corman identify the necessary priorities to structure an efficient program:

- *Address previously identified pollution "trouble spots" first;*
- *Pay special attention to "dirt and gravel roads within waters protected as Exceptional Value or High Quality Waters of the Commonwealth";*
- *Require simplified, non-bureaucratic procedure for delivering money to local entities responsible for dirt and gravel roads;*
- *Create local decision-making body with a sound environmental background to ensure the program's commitment to quality.*

The new program is unique. To achieve its streamlined purpose and bypass state level bureaucracy,

In April 1997, the General Assembly showed great foresight and leadership by including a new section, 9106, in the Vehicle Code. It creates an annual \$5,000,000 non-lapsing appropriation earmarked to prevent pollution by environmentally sound maintenance of dirt and gravel roads.




The idea is to empower local people, familiar with local conditions and of local environmental problems, by making them aware of low cost solutions, locally available funding, and local monitoring.

the bulk of the new funding is directed to the State Conservation Commission as a "pass through" agency. Created by Pennsylvania's Conservation District Law more than 50 years ago (P.L. 217 of 1945 as amended), the Commission's purpose is "to provide for the conservation of the soil, water, and related resources of this Commonwealth... and protect and promote the health, safety and general welfare of the people (of the Commonwealth)." Under Section 9106, the Conservation Commission will administer and apportion the moneys based on written criteria to be enacted for

insure that the maximum funding for pollution prevention is received at the local level, a 2% limit is imposed on the Commission for all administrative expenses. In turn, the Commission distributes funding for local road projects to County Conservation Districts (CCDs) which may only retain a maximum 10% for administration.

At the local level, CCDs will create Quality Assurance Boards (QABs) to define and administer a local grant program for local municipalities and/or state agencies with jurisdiction over dirt & gravel roads. Each four-member QAB is to be made up of a nonvoting chairman appointed by the Conservation District and three voting members appointed (one each) by the U.S. Natural Resource

Your Conservation District Anytown, PA		1234 5-6/789
		January 1 19 98
Pay to the order of	Best Township	\$ 18,000.00
	<u>Eighteen Thousand</u>	<u>00/100</u> Dollars
		
For	Road Conservation Assistance	County Conservation District
123456789 00987654321 1234		

the prevention of dust and sediment pollution. An important consideration in the Commission's allocation criteria is the total miles of dirt and gravel roads within watersheds protected as Exceptional Value or High Quality Waters (as of November 1996). To

Conservation Service, the Pennsylvania Fish & Boat Commission, and the County Conservation District. The idea is to empower local people with environmental resource backgrounds who are familiar with local conditions. It is the local Quality Assurance

ACCOMPLISHMENTS

Board's responsibility to insure that environmentally sound maintenance projects are carried out based on written state policy yet determined by local priorities and monitored by local citizens.

The emphasis on local control in government decision-making is a long-standing principle for Corman. A veteran of county government and a fiscal conservative, Corman believes government is most efficient when you have local control unfettered by the state's clumsy centralized bureaucracy. The joining of local control and environmental common sense promises an exciting marriage which is already attracting a good deal of attention.

Of special note to local government, the law emphasizes a "streamlined appropriation" and "a minimal amount of procedural paperwork." Municipalities may submit a grant application "not to exceed one page" with "minimal handwritten information" to the local QAB for funding consideration. The legislation provides a unique opportunity for local decision-making about local pollution problems. Education & Training grants, road demonstration projects, maintenance project work, and skill training for road managers and equipment operators will be eligible activities for funding. The new program became effective on July 1, 1997 and will be operational in the Spring of 1998.

Of special note to local governments, the law emphasizes streamlined appropriation ... the grant application shall not exceed one page, hand-written.

County _____ Township _____ Date _____

STATE CONSERVATION COMMISSION ACT 3 SECTION 9106 OF 1997 - GRANT APPLICATION

Official Name of Applying Agency	Mail Address	Post Office	Zip
Contact Person	Phone	FAX	E-Mail
Affected Stream or Tributary		Road I.D. # and Name	

1. List personnel with certificate "Environmentally Sensitive Maintenance of Dirt and Gravel Roads".

Print: Last Name,	First Name	Last Name	First Name
Position	Certificate Year	Position	Certificate Year

2. Will the work involve flood plain, stream work or wetlands? YES or NO (Circle if involved)

If yes, list the permits that have been obtained for the proposed work area.

3. Check all the conditions that exist in the proposed work area.

<input type="checkbox"/> Eroded ditches	<input type="checkbox"/> Inadequate stream crossings	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Eroded road banks	<input type="checkbox"/> Inadequate cross pipes	
<input type="checkbox"/> Discharges directly to stream	<input type="checkbox"/> Groundwater in road bed	
<input type="checkbox"/> Streambank erosion	<input type="checkbox"/> Excessive loss of road fines (dust)	
<input type="checkbox"/> Lack of road cross/cross slope	<input type="checkbox"/> Poor base composition	
<input type="checkbox"/> Excessive road shading	<input type="checkbox"/> Ineffective vegetable buffers	

4. Is this a previously verified work site? Yes or No. List circled work site number from county map. _____

5. a. Do the proposed materials meet State Conservation Commission requirements for pH, environmental soundness and durability? YES or N/A

b. List commercial products. _____

6. Sketch proposed work on back of application. (see example in instructions.)

7. Proposed start/completion date _____ / _____

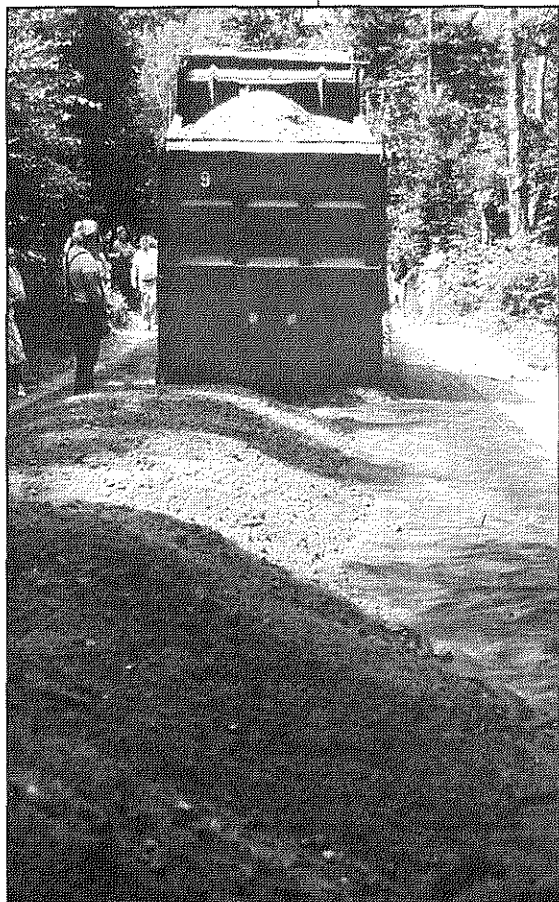
8. Project Cost Summary:

Grant Requested	\$ _____
In-Kind	\$ _____
Total Project	\$ _____

I certify application is accurate

In the first year of the program, priority will be given to specific trouble spot locations already mapped by the Task Force. Further, all four (4) of the problem areas identified in the Task Force's original operating tenets are encapsulated in the law:

- *employing maintenance techniques affordable to rural townships;*
- *providing information/education on environmental ramifications of road maintenance to local maintenance personnel;*



- *advocating research and design on demonstrations of practical solutions to common identified problems;*
- *increasing public awareness of the problem caused by sediment and dust pollution and need for more financial resources to support environmentally sound maintenance practices.*

The Task Force welcomes the opportunity to help the program take hold. And it looks as if they'll get their chance — because the State Conservation Commission, at its first meeting following enactment of the new law, adopted the following recommendations:

- *the Task Force on Dirt and Gravel Roads stay involved in the transition to help the Commission in carrying out its Act 3 - Section 9106 responsibilities;*
- *a steering committee made up of a smaller group from the Task Force be formed to provide technical assistance and help oversee Section 9106 implementation;*
- *a full time coordinator be employed to do the work in developing, coordinating, and implementing the required components of Section 9106. (PennDOT has agreed to lend current Task Force Coordinator, Woody Colbert, to the Commission for this purpose);*
- *an implementation plan be presented to the Commission for consideration at its July 24, 1997 meeting. (NOTE: The plan was subsequently adopted.)*

The Section 9106 grant program will be closely coordinated with the education and training efforts undertaken by the Task Force.

EDUCATION AND TRAINING PROGRAM COMPLETED

The Task Force has produced a multimedia education and training program for people involved in the maintenance of dirt and gravel roads. It emphasizes low cost techniques and environmentally sensitive procedures. The program was developed at Penn State University in cooperation with the Task Force, by technical experts and training specialists from the Pennsylvania Transportation Institute (PTI) and the Earth Resources Research Institute (ERRI). It consists of seven (7) inter-related modules — ranging from “road surface drainage characteristics” to “erosion control measures” to “laws, regulations, and compliance.” The education and training is targeted at policy makers (i.e., township supervisors, planning commissions, and state agency personnel) as well as road maintenance personnel (road managers and equipment operators). It employs common sense principles using available equipment and machinery. The need for environmentally sensitive maintenance practices is highlighted and the rewards for doing so are documented.

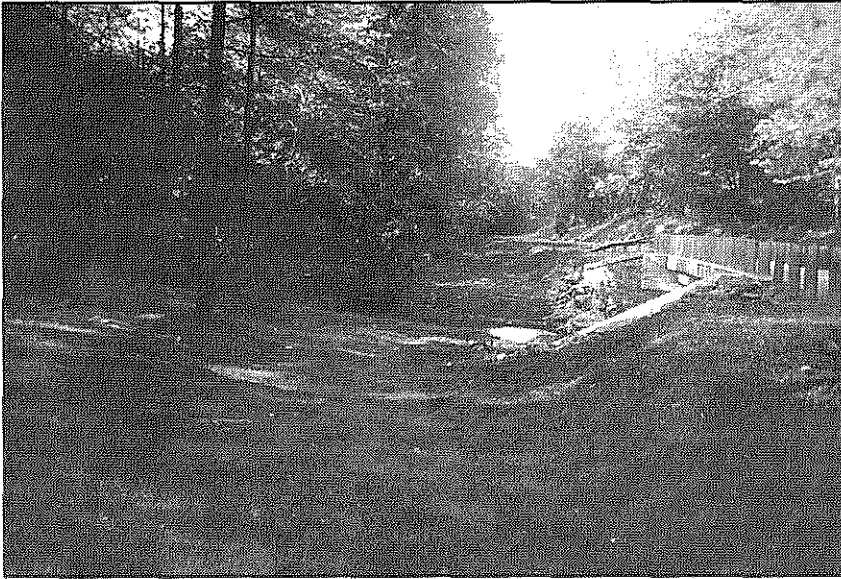
Through its research and analysis to develop the so-called “best maintenance” practices, the Task Force found that many traditional maintenance techniques were actually part of the nonpoint source pollution problem, not part of the solution. To remedy this, the instructional materials are focused on the basic principles of natural systems and environmental common sense. Rooted in the understanding that local folks, those closest to the earth, have the best feel for “what is right,” the education and training course poses the question “what makes good sense environmentally?” Rather than trying to teach a calculus of arbitrary standards, the training course reinforces common sense principles about the environment which people have most often been exposed to in the context of gardening, fishing/hunting, or recycling.

For example, the environmentally sensitive perspective treats dust as a cause of pollution not as a symptom of inadequate road maintenance. Therefore, the lesson becomes “don’t apply a road treatment to control dust that (when it is transported as runoff) will pollute the stream.” Rather, knit the road materials into a more tightly bonded surface to minimize runoff and divert or decrease the flow of adjacent stormwater away from the road surface altogether. Channel stormwater and runoff discharge into vegetative filters to screen sediment. Do not drain the road directly into the stream. As a result, participants learn to question traditional road maintenance practices, procedures, and products by asking,

Rather than teach a calculus of arbitrary standards, the required education course reinforces common sense environmental principles, already learned from gardening, farming, or fishing.

Participants learn to question traditional road maintenance practices, procedures, and products by asking, “Does this harm the countryside that my grandchildren will depend on?” “Are there alternatives that do not?”

“Does this harm the countryside that my grandchildren will depend on?”, “Are there alternatives that do not?” and “How do I implement the alternatives in the most cost effective manner possible?”



BEFORE: Two ditches discharged run-off directly to the stream.



AFTER: Earth mounds were created and covered with native vegetation to retain stormwater so that it could be slowly released into nearby woodlands.

The pilot session for this training program was held in June, 1997 in Mercer County to very favorable reviews and evaluations. Participation in the training program will be a pre-condition of Section 9106 grant eligibility. At the time of this writing and throughout the remainder of the 1997 construction season, the State Conservation Commission plans to accomplish its overall program objectives by:

- *delivering the education program “Environmentally Sensitive Maintenance of Dirt and Gravel Roads” to counties with identified trouble spots, and*
- *continuing to construct exemplary field demonstrations of best maintenance practices.*

Meanwhile, the Section 9106 non-pollution criteria are in development. Local Quality Assurance Boards (QABs) are being impaneled. Discussions are underway to determine how best to present the environmental education, the skills training component for equipment operators, and the environmental policy-making for elected officials. Feedback from early participants and suggested improvements from interested parties are being incorporated into the program before a roll-out of the statewide training effort is launched in the fall of 1997.

POLLUTION "TROUBLE SPOTS" IDENTIFIED

In order to identify specific locations of pollution sites arising from erosion/sedimentation in streams along unpaved roads and, subsequently, gauge the extent of necessary corrective action, on-site observations were essential. To accomplish this substantial undertaking, citizen volunteers from 40 chapters of Pennsylvania Trout (at their own expense) conducted over 6,000 on-site inspections and documented their findings using site evaluation cards designed and provided by the Task Force.

The site evaluation survey utilized a low cost, mechanical "pin sorting" methodology to record the location, presence of stream effects, and road characteristics. The completed site cards comprise a data base inventory of information to be provided to local Quality Assurance Boards (QABs) and Townships for use in locating problem sites and completing Section 9106 grant applications for dirt & gravel road maintenance funding.



Citizen volunteers from 40 chapters of Pennsylvania Trout (at their own expense) conducted over 6,000 on-site inspections and documented their findings.

POLLUTION SITE DATA INCORPORATED WITH GEOGRAPHIC INFORMATION SYSTEM (GIS)

With the assignment to conduct the pollution site inventory, the Task Force was faced with the question of how to integrate this information with other relevant available data resources. Clearly, it was imperative to create an automated system to adequately manipulate the pollution site information.

Such information management problems are inherent in a statewide data base program representing 27,000 miles of roads spread over 66 counties, involving over 2000 municipalities, 5 physiographic provinces, and divided amongst 6 primary ownership entities. The numerous and differing factors are all variables which must be addressed in a sound decision-making framework.

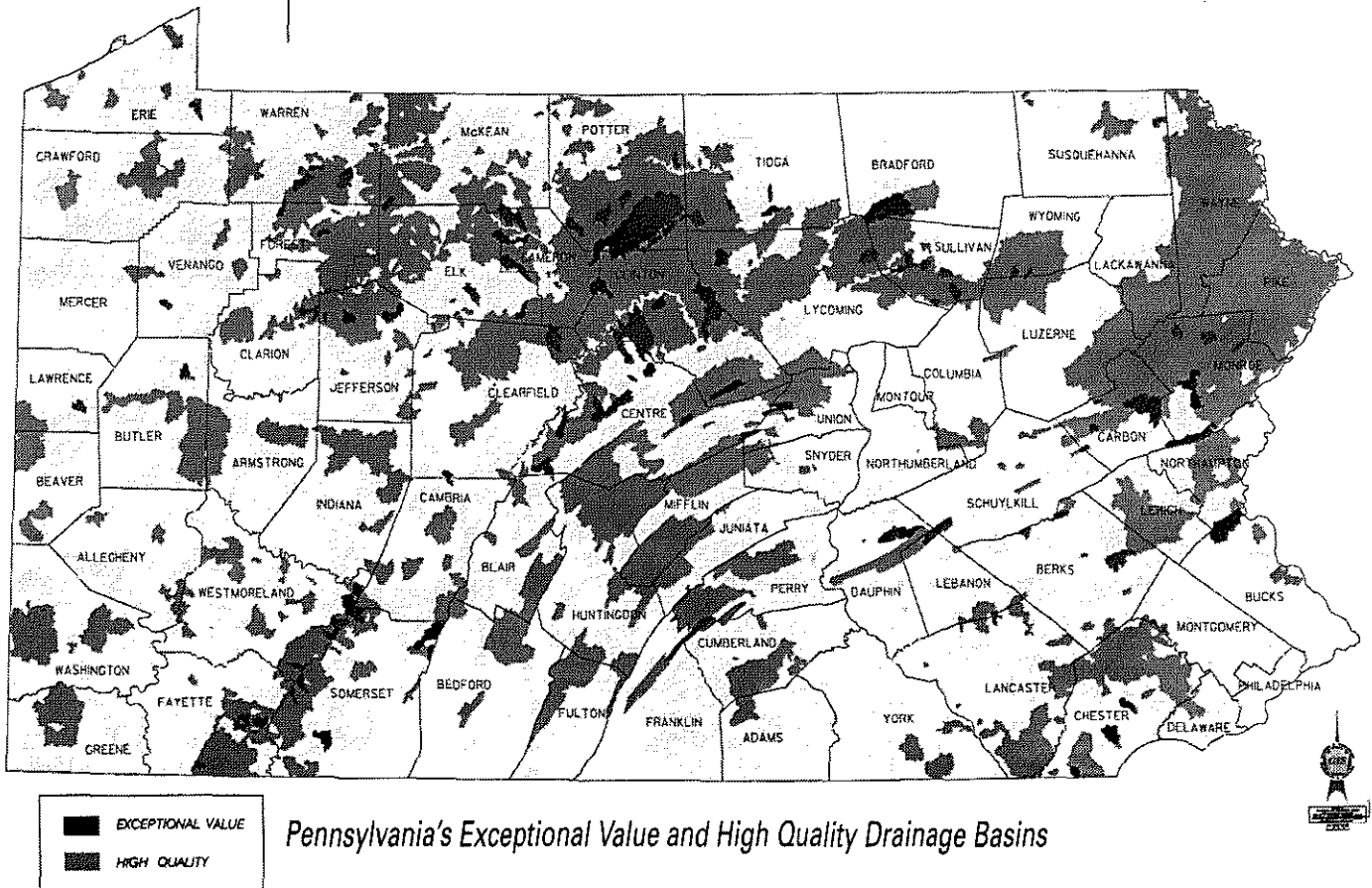
With help from the Task Force, a system was developed in a basic hard data format keyed to baseline Geographic Information System (GIS). Expansion capabilities have been included to accommodate future attrib-

utes of the system which are, as yet, unavailable but will need to be considered in future project decisions.

The information system is currently housed within PennDOT's GIS in an "Intergraph" format. Data can be readily translated into "Arc-Info" or other formats most commonly used by local municipalities, Local Development Districts (LDDs) and Metropolitan Planning Organizations (MPOs). The dirt & gravel road pollution inventory work effort enabled watershed

data to be loaded into the Department's GIS data bank. This integration has been instrumental in the creation of statewide watershed mapping.

It is planned to use this data system for determining dollar allocations, programming work, and reporting completed work. Inclusion of costs to correct trouble spots on the original data file will produce an analysis of the program's effectiveness and efficiency without adding layers to the bureaucracy.



Pennsylvania's Exceptional Value and High Quality Drainage Basins

TEMPORARY CLEARINGHOUSE FOR DIRT AND GRAVEL ROAD INFORMATION ESTABLISHED

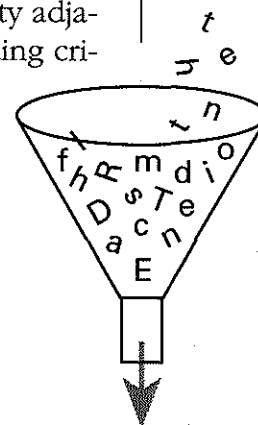
As part of its work activities, the Task Force has encountered a major stumbling block in Pennsylvania's attempts to address road maintenance problems associated with dirt and gravel roads. The absence of any central ownership, jurisdictional control, or recognized "center" for improving best maintenance practices has been problematic. Given the diverse ownership amongst federal, state, and local entities, remedial improvement efforts have been stymied. Even owners of similar standing, such as townships, are united only in loosely knit membership associations which function on a voluntary compliance basis.

There is more than ample evidence that a critical need exists to fill this void. The Task Force has repeatedly encountered an outpouring of concern about effective dirt and gravel maintenance, received constant solicitations for assistance and fielded nearly as many offers to help with the initiative. For the time being and on a temporary basis, the Task Force has functioned as a central clearinghouse to catalogue concerns, coordinate activities, focus research, and disseminate information. A more permanent solution is needed.

WORK ELEMENTS AND ENVIRONMENTAL MONITORING FOR DEMONSTRATION SITES DEVELOPMENT

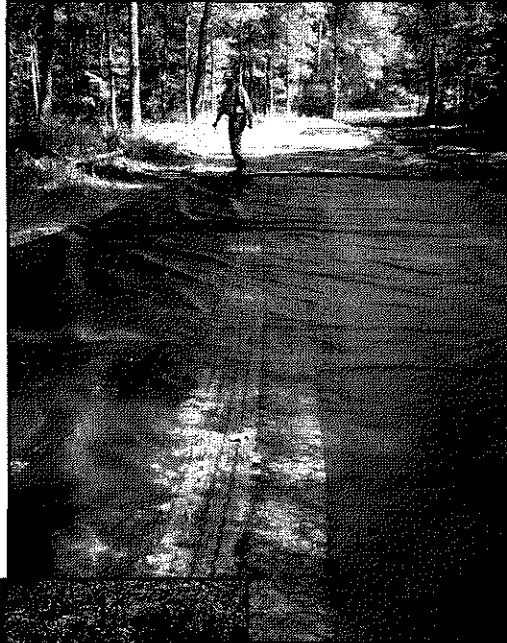
A two-mile demonstration road in Roulette Township, Potter County adjacent to Card Creek was selected (in compliance with specific funding criteria) to ascertain the physical, chemical, and biological in-stream effects of unpaved roads before, during, and after various maintenance activities. The Task Force developed a format to recommend demonstration of low cost techniques to prevent erosion and run-off pollution. Stream monitoring was conducted using a contract with the Mid-Atlantic University Transportation Center (MAUTC) funded by three (3) separate PennDOT bureaus. The monitoring work effort was supplemented by sampling activities carried out by the Pennsylvania Fish & Boat Commission's (PFBC) Environmental Services Unit and the Department of Environmental Protection's (DEP) Bureau of Air Quality.

A permanent central clearinghouse is needed to catalogue concerns, coordinate activities, focus research, and disseminate information on best maintenance practices.

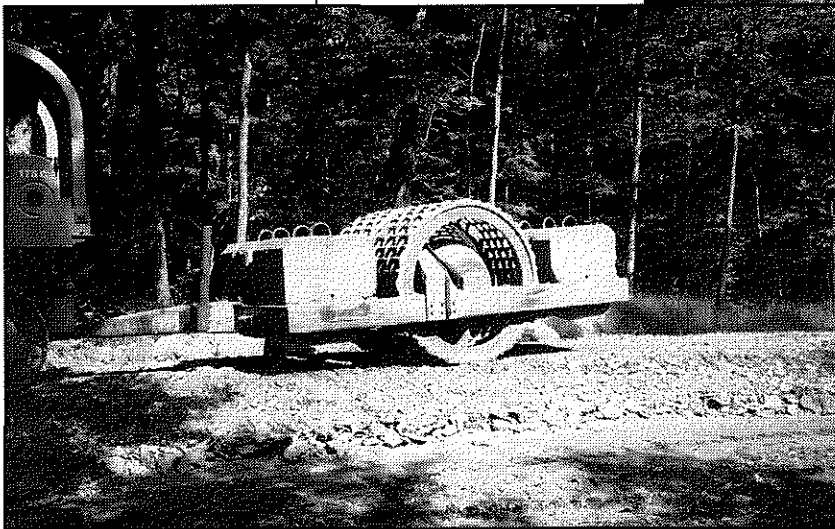


- Technical Information
- Education
- Research
- Demonstrations

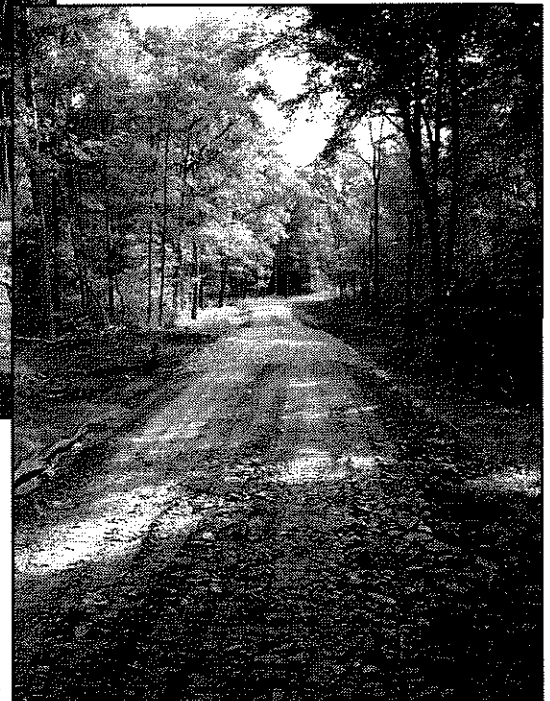
A report entitled "In-Stream Effects of Streamside Unpaved Road Improvements" was produced by lead author Dr. Dean Arnold of the US Geological Survey's (USGS) Fish and Wildlife Research Unit at Penn State University. The available report documents procedures to follow and precautions to take in conducting environmental assessments of the effects of various road maintenance activities on dirt and gravel roads.



Geotextile



*Locally available
inexpensive machinery*



Geotextile

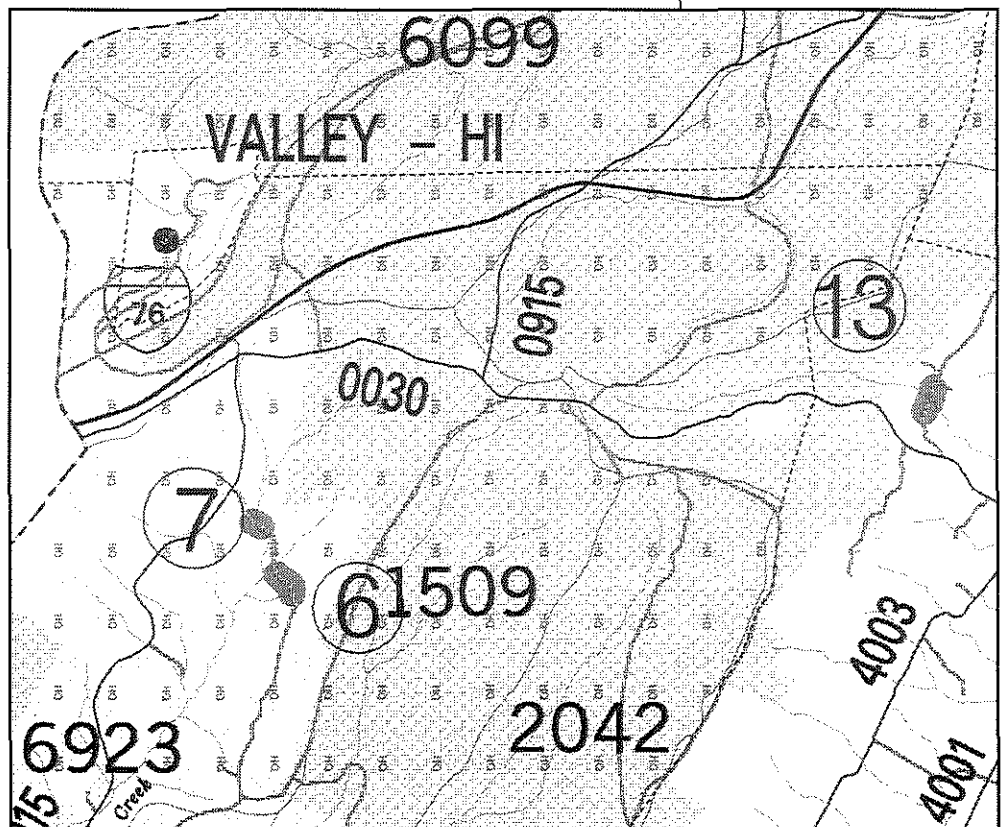
Spin-Off Benefits

WATERSHED MAPPING

In order to inventory the roads located in protected watersheds, it was first necessary to create mapping that portrayed both the road networks and stream/watershed networks on the same map. The Task Force brought about this important resource by, initially, encouraging a private company, Chem-Nuclear, to donate digitized mapping of Exceptional Value Watersheds. Later, work by the US Geological Survey (USGS) was expedited on behalf of the Task Force to supply watershed information for the entire Ohio, Susquehanna, and Delaware river basins. Then, the Earth Resources Research Institute at Penn State translated the data into the "Intergraph" computer format used by PennDOT's GIS.

Once compiled and verified by DEP's Watershed Management staff, this valuable combination of data will create an entirely new layer of cartography to be made available to local government, state and local planning agencies, the general public, sportsmen, and other interested parties. PennDOT plans to use the watershed maps extensively in its highway maintenance operations as a planning tool in preparing maintenance projects and also to avoid the costs associated with purchasing this information whenever an environmental clearance document is required.

Maps highlighting Pennsylvania's protected watersheds will be made available to local government, state and local planning agencies, the general public, sportsmen, and other interested parties.



Demonstration projects will both highlight known best maintenance practices and explore the use of base course fills produced from inexpensive recycled or waste products.

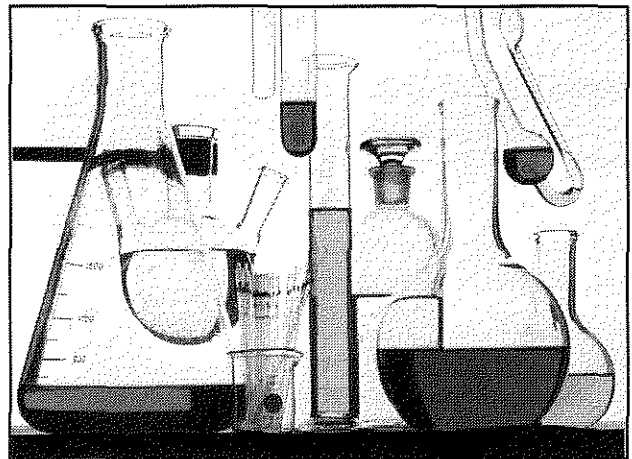
DEMONSTRATIONS TO CONTROL EROSION/RUNOFF FROM DIRT AND GRAVEL ROADS

Members of the Task Force have submitted a funding application and received approval through DEP's 319 Grant program to demonstrate low cost methods to control sedimentation and erosion pollution into adjacent streams in a degraded watershed. In several work site locations near the Babb Creek Watershed in Tioga County, site specific demonstration treatments will be deployed to:

- *construct alternate drainage methods and landscape features to demonstrate environmentally sensitive management of road drainage;*
- *blend aggregate with sufficient range of particle size to knit to existing road surface and harden the road through better adhesion and enable a crown to be graded and drainage flow to be more efficiently controlled;*
- *demonstrate erosion control benefits from low cost vegetation enhancement measures, (such as fertilization, lime and seeding, root stock additives, etc.);*

- *demonstrate new technologies, especially use of recycled or waste products.*

Of special interest in these 319-approved field demonstrations is the utilization of cheap, readily abundant recycled or waste materials as "synthetic" aggregates. Under the direction of two Penn State University researchers (Profs. Michael Silsbee and Barry Sheetz), such waste materials can be applied as suitable road surface material with small equipment generally available to local municipalities. This application has



widespread interest since there are some geographic areas within Pennsylvania where good quality limestone is not locally produced, and, therefore, not affordable. As a result, a serious problem exists. An inexpensive material which can stabilize the road surface but not cause air or water pollution (via dust or erosion) is desperately needed. Materials and methods

to harden dirt and gravel road surfaces with such products are not widely known.

The Babb Creek Watershed demonstration project (adjacent to the abandoned Rattler deep mine complex) will explore the use of such a non-polluting, "synthetic" aggregate produced from inexpensive recycled or waste products. Interest in this Task Force spin-off is high because Babb Creek, which is degraded by acid mine drainage from the Anna "S", Rattler, and other mines, discharges to Pine Creek, one of Pennsylvania's finest treasures. Babb Creek is a significant tributary (i.e., contributing approximately 16% of the water flow) to Pine Creek, the state's most popular stream for fishing as ranked in a 1991 Fish and Boat Commission survey. For years, Babb Creek had been considered a "dead" stream with a pH factor of 2.5, which is worse than vinegar. Acid mine drainage is the biggest chemical water quality problem in Pennsylvania so this demonstration has obviously important implications.



PennDOT now requires its Product Evaluation Committee to request that vendors disclose environmental effects of proposed new products.

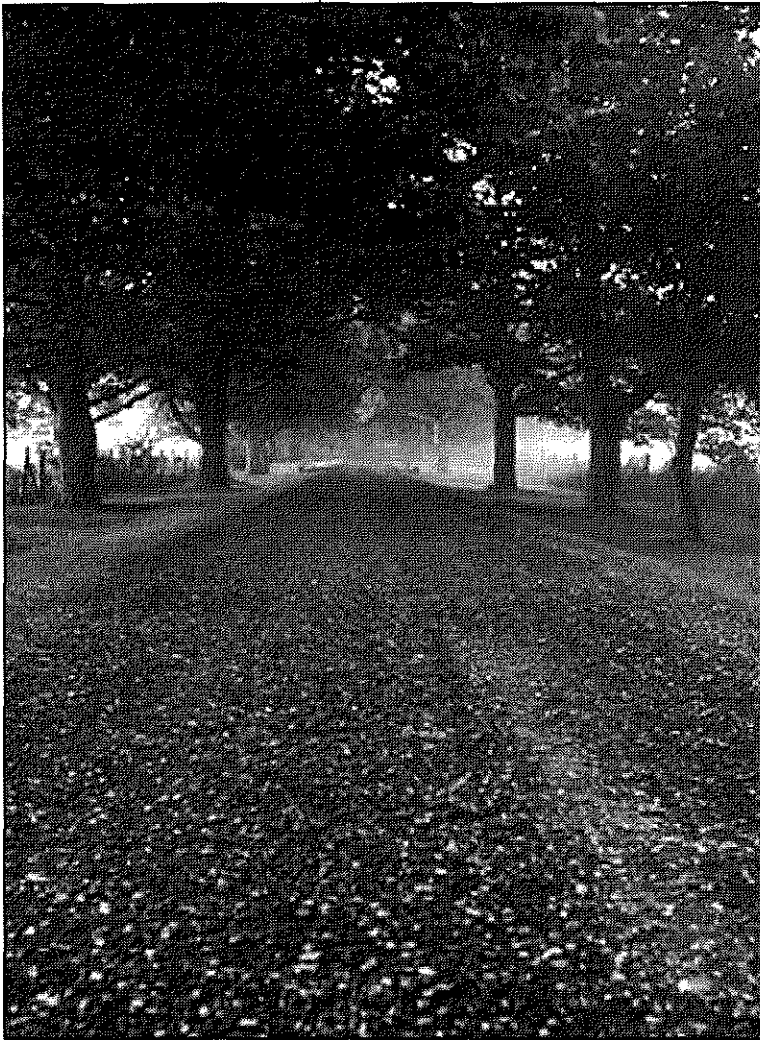
ENVIRONMENTAL PARTNERING

PennDOT, reacting to expressed needs of the Task Force, now requires its Product Evaluation Committee to request information from vendors disclosing the environmental effects of new products seeking approved use. The composition of the committee was restructured to include an environmental specialist.

An example of the benefit derived from this effort is the inclusion of a dust control and road stabilization product, documented to be environmentally safe, on the approved purchasing schedule for use by all levels of government. The Pennzoil Corporation's PennzSuppress® D is an emulsified petroleum resin that binds together the "fines" (the smallest particles in soil) within the road materials without harmful effects on the water table or nearby streams.

Classified by the Occupational Safety and Health Administration (OSHA) as a non-hazardous chemical, PennzSuppress® D is derived from a paraffin-based crude oil and is proven effective in controlling fugitive dust and binding surface materials together into a stable road bed. Importantly, the product is non-toxic to animal life, non-corrosive to metal, does not inhibit plant growth, and exhibits low toxicity toward fish. The Pennzoil product has been used in several dirt and gravel road demonstrations with good results.

The Task Force has also worked to introduce environmental sensitivity into the partnering relationships being encouraged by PennDOT in its Agility Initiative with local government entities.



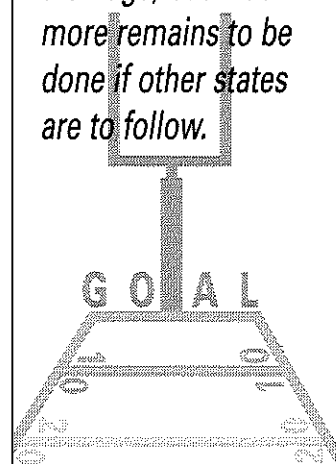
Remaining Challenges and Future Directions

The Task Force on Dirt and Gravel Roads has accomplished a great deal since its creation. A perspective recognizing the transportation value of the state's dirt and gravel roads has been fostered. A scientific approach to best maintenance practices has been developed. An environmental context linking the viability of stream habitats to road runoff pollution has been acknowledged and encouraged. An inventory of pollution sites has been catalogued. A mechanism for long term financing of real world improvements has been enacted. An education and training initiative has been assembled and refined. All this and more has happened.

In many respects, the Commonwealth of Pennsylvania has distinguished itself by its pursuit of such innovations and the resultant accomplishments. Indeed, Pennsylvania has demonstrated leadership in this important area of nonpoint source pollution prevention for other states to follow. But much more remains to be done if we are to build on the work of the Task Force. More research and further studies into the best management practices are needed. In fact, the relationship between paved and unpaved roads must be more clearly defined so that both are accorded their rightful place in the state's transportation network. Timely and effective implementation of the Motor Vehicle Code Section 9106 must be an immediate priority if pollution benefits are to be realized from the simplified procedures (i.e., "streamlined appropriation" and "one page grant application") incorporated into the statute. Finally, if the Task Force is to fulfill its mission of improving unpaved road maintenance while preventing erosion and sediment pollution, a permanent commitment should be made to environmentally sensitive management through creation of a Center for Dirt & Gravel Road Maintenance.

The remaining challenges and future directions presented here are based on observations of Task Force deliberations, interviews with key participants and interested parties, written records/proceedings of the Task Force, as well as involvement with the early stages of Section 9106 implementation. Completion of these items will satisfy the original operating tenets given to the Task Force at its inception and demonstrate

Pennsylvania has demonstrated leadership in addressing nonpoint source pollution from road drainage, but much more remains to be done if other states are to follow.



Emphasizing that dirt road geometry, architecture, circuitry and maintenance standards be different from paved roads helps people to understand the primacy of dirt roads, their role in supporting industry, serving rural citizens, and retaining a country atmosphere.

Pennsylvania's leadership in the environmentally sensitive management of dirt and gravel roads.

REMAINING CHALLENGES

1. Education and Training

For many people, a dirt road is nothing more than a paved road waiting to happen. One might call it a "paved road wannabe." In this version of an ideal world, all roads would be wider, flatter, and straighter. Line of sight problems would be "corrected" and speeds would be "enhanced." The nuisance of dirt roads would be eliminated. This perspective needs changing!

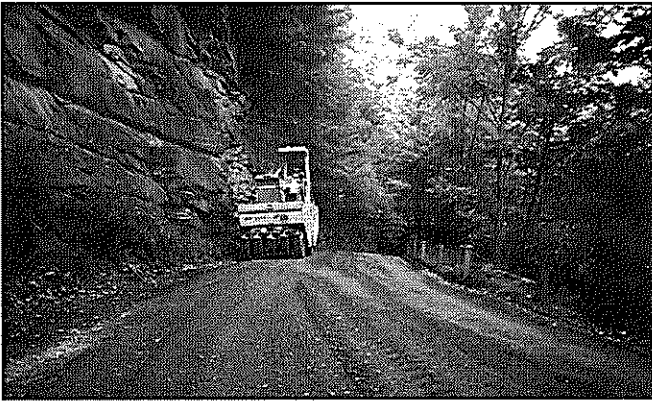
Quite possibly the most important accomplishment of the Dirt and Gravel Road Task Force is its accumulation of evidence documenting the primacy of dirt roads. Although both dirt roads and paved roads are part of the same transportation network, they do not and, more importantly, should not look alike. Their form and function are significantly different. They both provide access but not speed. They both play a role in tourism. For dirt roads, the tourist seeks aesthetics and quaintness; for paved roads, the tourist wants convenience. The geometry and architecture of each are different (as evidenced by line of sight, contour, base, surface, and circuitry) and it only makes sense that

their maintenance standards and management requirements be different.

Dirt roads play a different game with different rules. It is wholly inappropriate to apply the same set of standards, the same engineering assumptions, and, worst of all, the same operating expectations to dirt roads as are commonly employed for paved roads.



The Task Force has identified these fundamental differences and begun the important work of educating and training local officials and road maintenance personnel to appreciate the uniqueness of dirt and gravel roads. The education and training initiative launched by the Task Force takes an unusual approach by marrying skills training (maintenance practices, equipment operations, etc.) with environmental education (pollution prevention procedures, connectivity of natural systems, environmental sensitivity).



For example, it is one thing to document that most local municipalities in rural areas can ill afford the increased maintenance costs associated with paved roads. It is another matter altogether to impart the understanding that retention of a dirt road's

curvature is desirable because when speed increases — tourism decreases. That is to say that traditional straightening and line of sight clearance routinely result in higher travel speeds. These higher speeds are incompatible with safe handling on unpaved surfaces, disturb the restful atmosphere on which tourism depends, and accelerate deterioration of the wearing surface.

It remains a challenge for the Task Force to see that its education and training program, like other nonpoint source pollution awareness efforts, is widely disseminated throughout Pennsylvania. Environmental education is as essential to local awareness and pollution prevention as are improved maintenance practices. It is as important to establish the environmental character and worth of dirt and gravel roads as it is to curb the potential pollution impact through sensitive maintenance. Thus, the Task Force recommends that the "hand-in-hand" coordination of environmental education and maintenance training be intensified and continued in order to maximize the value of the Section 9106 special funding.

The Task Force recommends that the hand-in-hand coordination of environmental education and maintenance training be intensified.

The Task Force can assist the State Conservation Commission with implementation of the program. The Task Force possesses the expertise to provide assistance on allocation, education, technical guidance tailored to environmental constraints, and understanding of the real workings of local government.

2. Act 3-Section 9106 Implementation

The Task Force must assist the State Conservation Commission (SCC) in its implementation of the Section 9106 program. Especially in the first few years of this new program, the Task Force will provide valuable technical assistance and necessary background to assist the Commission as the Dirt and Gravel Road Maintenance Program takes shape. In particular, the experience and expertise of the Task Force will be needed to:

- *assist in the development of the apportionment criteria and performance standards required of the SCC to meet the “streamlined appropriation” intent and purpose of the new law;*
- *help roll-out the Education & Training on a statewide basis that provides “incentives for training road managers and equipment operators”;*
- *prepare technical guidance materials for local Quality Assurance Boards (QABs) and Conservation District staff to ensure efficient administration of the grant program and adherence to environmentally sensitive standards; and*
- *serve as a technical guide and information resource to grant applicants and local recipients seeking “to comply with the nonpollution requirements established” in Section 9106 (Act 3 of 1997).*



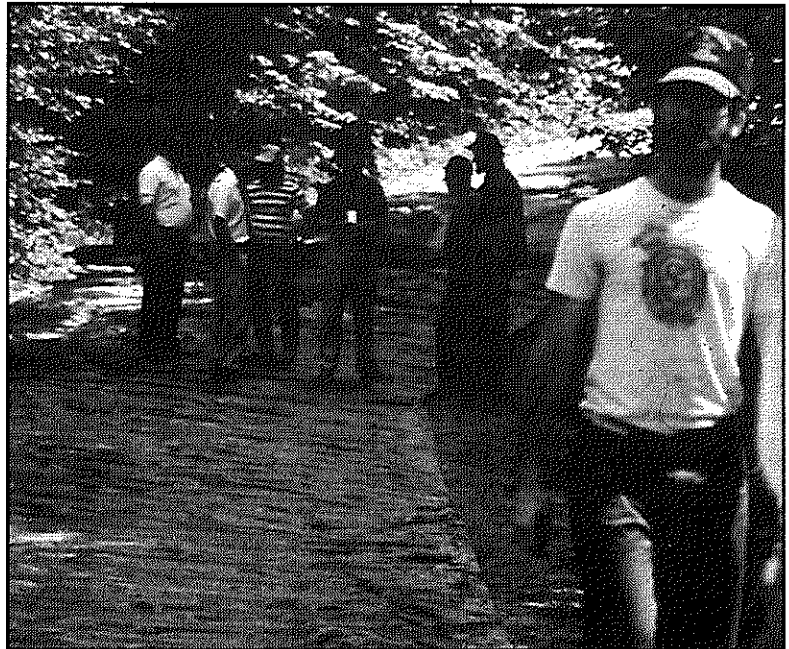
The Section 9106 implementation goes hand-in-hand with the education and training. Technical guidance materials to be supplied to local Quality Assurance Boards (QABs) and Conservation District staff will enable local communities to submit grant applications that comply with the new law while carrying out their own locally-developed pollution prevention projects.

3. *Field Demonstrations*

In the immediate future, the State Conservation Commission (SCC) should deploy several “in-the-field” demonstrations of environmentally sensitive road maintenance practices and corridor management objectives. It is critically important that a number of different and varied projects be put into practice throughout the Commonwealth to demonstrate appropriate maintenance techniques, showcase recommended design features, and present favorable road surface treatments. By so doing, the SCC will provide much needed examples of real-life solutions to real-life problems while also generating documentation to be used in developing a self-evaluation methodology and objective criteria for dirt and gravel road maintenance standards.

Field demonstrations would enable the Task Force to share some of its magic with the SCC and hopefully perfect its message. A certain creative synergy has occurred over the last few years through Task Force members working cooperatively to bring about constructive environmental change while keeping an eye toward preserving valued resources such as clean waterways, good fishing, and involved local decision-making. This energy must be shared to be perfected. People need to see real-life examples of what everyone is talking about. They need to “kick the tires” and get a first hand understanding of how to put such disciplines to work in their local community. Similarly, the SCC needs to develop objective criteria and evaluation methodologies that can be used to measure the effectiveness of maintenance standards for dirt and gravel roads and codify a regimen of the “best practices.” Such field demonstrations will also reinforce the above-mentioned challenges simultaneously underway in the areas of Education/Training and Section 9106 Implementation.

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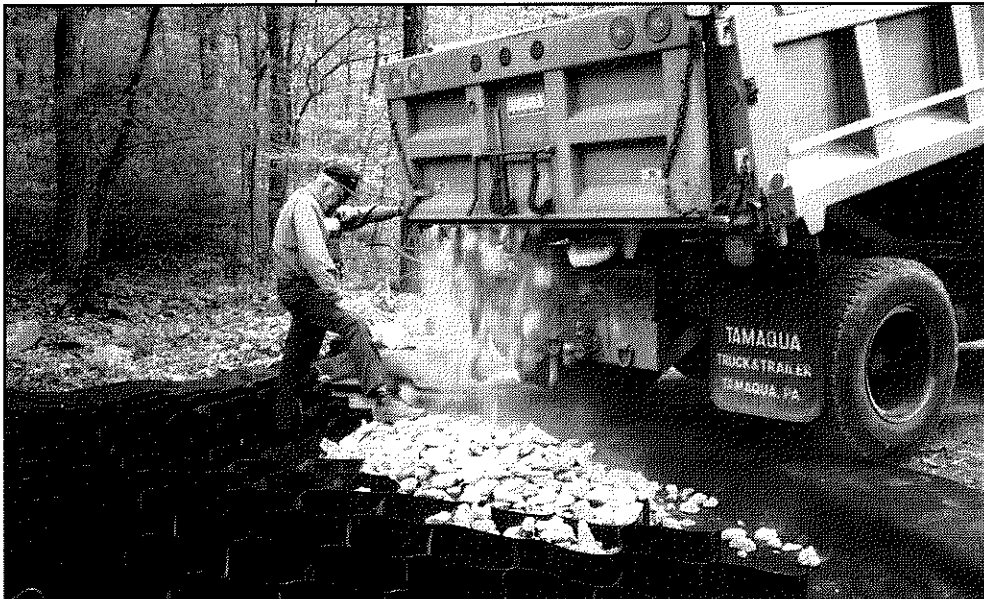
FUTURE DIRECTIONS

Pennsylvania has demonstrated foresight and leadership in tackling the pollution resulting from dirt and gravel roads. When the state's pollution prevention efforts are coupled with the innovative work of the Task Force on best maintenance practices, it is easy to see the basis for the Commonwealth's leadership distinction. The General Assembly acknowledged this fact by enacting a dedicated source of restricted state highway maintenance funding — Section 9106 of the Pennsylvania Motor Vehicle Code — for the purpose of:

“safe, efficient and environmentally sound maintenance of sections of dirt and gravel roads which have been identified as sources of dust and sediment pollution.”

This “objective-based” legislation puts a good deal of responsibility for successful implementation on the shoulders of the state and local program coordinators such as the State Conservation Commission, local conservation districts, Quality Assurance Boards, local municipalities, and involved citizens.

Pennsylvania's environmental leadership in the area of dirt and gravel roads has been based on impressive first steps generally coordinated by the Task Force and largely spurred to action by fish and wildlife enthusiasts. Productive working relationships and a shared commitment to pollution prevention have been forged amongst individual members and member agencies of the Task Force. In order to build on this track record of achievement, stay ahead of the curve, and move productively into the future, the following future directions are recommended.



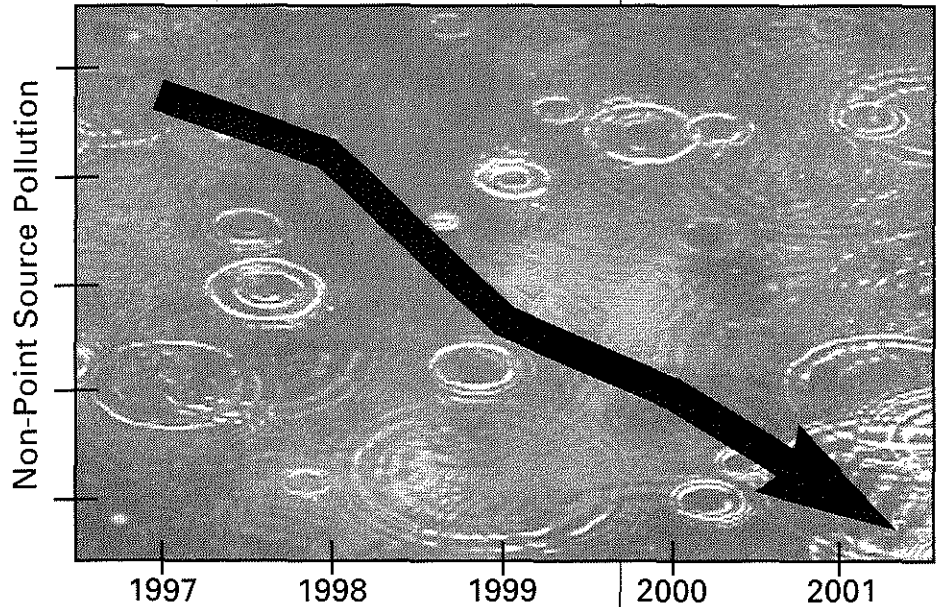
1. Develop Next Level of Apportionment Criteria

The statutory language of the new law reflects the early work of the Task Force in identifying “specific trouble spot locations” as a priority basis for the first year of fund apportionment. Likewise, dirt and gravel roads located “within watersheds protected ... as exceptional value or high quality waters of the Commonwealth” are afforded special consideration in the statewide apportionment criteria required of the State Conversation Commission.

In preparation for the future, it is recommended that work be undertaken to develop the next level of apportionment criteria for roads not located in protected watershed areas as well as an updated process for “verifying” pollution problems. It is logical and appropriate to prepare for the time when the pollution trouble spots identified by the Task Force have been targeted and remedied. Thus, a new set of objective criteria will be needed to guide future funding allocations. Dirt and gravel roads with no specific tie-in to protected streams or adjacent to streams of a different classification will need to be addressed. Whatever the criteria may be - whether curbing dust pollution in residential areas, sediment prevention in non-protected watersheds, pollution safeguards for industry, or other such considerations - development, analysis and evaluation should begin now.

This type of forward-thinking preparation will ensure that the Section 9106 program will move gracefully through start-up to fulfill the pollution prevention objectives in the 27,000 mile segment of the state’s transportation network.

The Goal



The next level of apportionment criteria must be developed. Whatever those criteria may be — whether curbing dust pollution in residential areas, sediment prevention in non-protected watersheds, pollution safeguards for industry, or other such considerations — development, analysis and evaluation should begin now.

With the enhanced GIS, PennDOT will be capable of facilitating environmental clearance work, enhancing highway maintenance efforts and potentially streamlining the environmental review process.

2. Watershed Mapping Tie-in to Geographic Information System (GIS)

Over the past few years, the Pennsylvania Department of Transportation has begun to integrate several essential components of the state transportation system into its Geographic Information System (GIS): traffic monitoring, winter pavement conditions, bridge inventory, state highway network, cultural resources, project programming, etc. It is the expressed purpose of PennDOT's GIS effort to develop a data-base driven, operational tool that can be shared by and amongst all eleven District offices in carrying-out their system maintenance and improvement duties/responsibilities. Numerous other interested parties (i.e., state/local planning agencies, sportsmen, community conservation groups, environmental educators, and the general public) have also expressed a need for such map information.

It is a logical next step to take the watershed mapping and environmental feature data (referenced earlier in this status report) which has been compiled by the Task Force (largely through its citizen volunteers) and plug this "new layer of cartography" into the Department's GIS system. By so doing, PennDOT will be capable of providing another GIS applica-

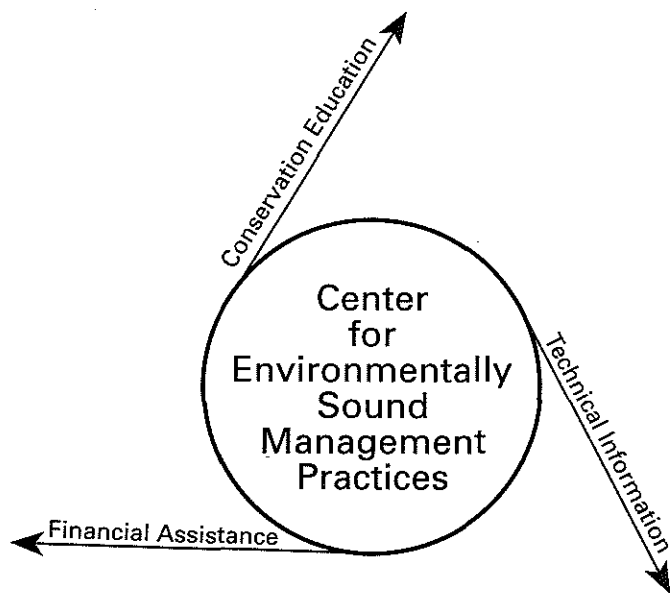
tion to its district offices that will facilitate environmental clearance work, enhance highway maintenance efforts and potentially streamline the environmental review process. Equally important for dirt and gravel roads, this GIS watershed mapping capability would benefit numerous parties in the Section 9106 program. Through the timely conveyance of map records to Conservation Districts and local road officials, the community can be drawn together in its expectations for the program and evaluation of the program's performance. GIS provides an ideal medium for a clear portrayal of accurate information. Consequently, local communities will be empowered to plan, conduct, and report their pollution prevention work in a cooperative and collaborative manner.

Ultimately, it is the Department's intent to produce CD-ROM video logs of the state system to be referenced to the GIS system in order to provide a site specific, multi-media capability for engineering purposes as well as executive decision-making. The dirt and gravel road inventory and the watershed mapping component ought to be a part of this integrative system. The importance of unpaved roads in the overall transportation network would be reinforced by inclusion in such a GIS system. Likewise, more

sophisticated tools would be readily available for Section 9106 implementation purposes.

3. *Establish a Permanent Center for Dirt & Gravel Road Management*

Previously it was identified in this Status Report that the Task Force has assumed, on a temporary basis, the role of “unofficial” clearinghouse for information, research, and best maintenance practices concerning dirt and gravel roads. In order to bring about a permanent solution to the ever-increasing need for such assistance and recognizing the temporary nature of the Task Force, it is recommended that a permanent Center for Dirt & Gravel Road Management be established. To accomplish this, consideration of the following steps is encouraged.



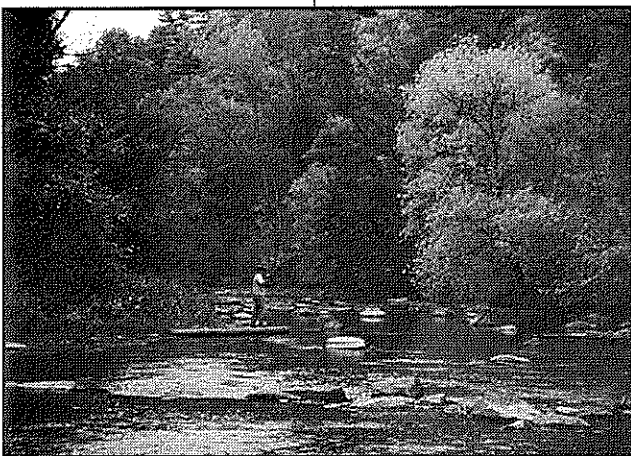
Call to order a summit on “Best Management Practices for Dirt and Gravel Roads.” Within the immediate future (i.e., the next 4 months), invitations could go out to interested researchers, transportation officials, road maintenance personnel, members of the legislature, affected state/local agencies, local government decision-makers, environmental resource agencies, and interested stakeholders to convene a summit in Harrisburg (to be held in 1998) on the subject of “Best Management Practices.” The summit (to be sponsored by the State Conservation

In recognition of the temporary nature of a task force, two additional steps should be taken:

- *call to order a summit on Best Maintenance Practices for Dirt and Gravel Roads and*
- *create a Center for Dirt and Gravel Road Maintenance that would serve as a permanent clearinghouse, function as “the” technical resource on the subject, and provide a mechanism to identify, coordinate, and fund appropriate research.*

Commission and the Task Force, conducted in cooperation with PennDOT, DEP, DCNR, related state agencies, and the Transportation Committees of the Pennsylvania House and Senate) would serve to:

- *focus people's attention on the subject of dirt and gravel roads;*
- *get the word out on the forthcoming implementation of the Section 9106 pollution prevention program;*
- *allow groups/individuals to present evidence and bear testimony of what's working best, where, and why;*
- *assist in compiling and cataloging a public record of the best practices in actual practice around the state and nation;*
- *announce the creation of the permanent Center and identify its location; and*



- *provide a visible "kick-off" to the new Section 9106 grant program.*

The Center would combine the materials and proceedings resulting from the summit with the existing body of knowledge on best maintenance practices to create a set of objective standards and criteria specifically validated for dirt roads. This manual would represent the first comprehensive work product of the Center and be made available to all interested parties.

The Center for Dirt and Gravel Road Maintenance would serve as a permanent clearinghouse, function as "the" technical resource on the subject, and provide a mechanism to identify, coordinate, and fund appropriate research. The Center would ensure that the important work of the Task Force is carried forward and guarantee ready access to these best practices for all. Pennsylvania, as a leader in the field of pollution prevention and dirt and gravel road maintenance, is ideally suited to host the Center. Due to the size of the state's dirt and gravel road network and the recognized importance that unimproved roads play in our major commercial industries of agriculture, mining, forestry, and tourism, Pennsylvania has a vested interest in the Center. Equally important, the Center would serve as a concrete working example and real-world commitment to Pennsylvania's "Maintenance First" philosophy.

INVITATION TO PARTICIPATE

The opportunity to participate in this challenging and rewarding work is extended to all. If your interest has been aroused by any aspect of this worthwhile work, please feel free to contact any Task Force member organization or call (717) 772-0833 and leave a message.

As stated in the challenges - "much remains to be done." Volunteer assistance from all fields of endeavor will be put to immediate use. Likewise, if any reader is aware of any additional documented technical information or product that is applicable to the stated goals, please advise us at the following address:

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555 Walnut Street
Harrisburg, PA 17101-1900*