

# VEHA Bulletin

Virginia  
Environmental  
Health  
Association

Volume 1, Issue 3  
Summer 2005

## Presidents Message

Eric S. Myers, REHS

### Real Challenges to the Public Sector Environmental Health Profession

What is the future of public sector environmental health (EH) over the next 10 years? How rapidly is change coming to our profession? If you are currently working in the Environmental Health (EH) profes-

**“accredited institutions of environmental health at colleges and universities appear to be declining”**

sion, you may already have some indication of the significant “icebergs” in the waters just ahead of us. The news is not good. However the upcoming changes will present opportunities as well.

While attending the National Environmental Health Association (NEHA) Annual Education Conference this past June in Providence, Rhode Island, multiple challenges to the public sector environmental health profession were discussed by representatives from all over the United States. The primary concerns regarding the environmental

health profession were; 1) up to 50% of the EH workforce in the U.S. will be eligible for retirement in the next 5-7 years based on NEHA’s survey data, 2) accredited institutions of environmental health at colleges and universities appear to be declining, based on enrollment figures and recent closures of some programs, 3) possible dilution of the Registered Environmental Health Specialist (REHS) credential by making lesser credentials “equivalent” 4) the future role of EH and public health professionals in emergency/disaster response (if we will be a real player “at the table” or not) and 5) many environmental health programs are “off the radar” of elected officials and the general public.

If large numbers of experienced EH personnel retire in the next 5-7 years, a sizable amount of program knowledge will also leave with them. Many of these forthcoming retirees are in management/leadership positions. The Centers for Disease Control (CDC) has begun a concerted effort over the past several years to provide leadership development for EH programs as well as recruitment training at colleges and universities.

Presentations at the conference revealed at least two states (Michigan and Alabama) reporting recent or impending closures of accredited environmental health programs. With declining student interest, colleges and universities will continue to shift resources to the programs which have more demand. Representatives reported there are approximately 300 students in the U.S. which graduate with at least a bachelor of science in environmental

### Inside this issue:

<i>Presidents Message</i>	1
<i>Declining Groundwater Levels in VA’s Northern Neck</i>	2-3
<i>Real Challenges to the Public Sector EH Profession</i>	3
<i>Note from the Editor: Hurricane Preparedness</i>	3
<i>Environmental Health “War”</i>	4
<i>Rabies as Usual</i>	5
<i>Marina Programs Sport Fish Restoration Grant Awards</i>	6
<i>Emergency Operations Center</i>	6-7
<i>Virginia Food Safety Task</i>	7
<i>Emergency Operations Center (cont)</i>	8

## VEHA Fall Educational Workshop

November 4th, 2005

at the Monticello

Conference Center

Charlottesville, VA

## “Declining Groundwater Levels In Virginia’s Northern Neck”

*By Frank Fletcher, Hydrogeologic Consultant*

Declining groundwater levels pose a serious threat to the water supply of the Northern Neck. In a report presented to SAIF Water ([www.saifwater.org](http://www.saifwater.org)) at its April 2005 meeting, Dr. Frank W. Fletcher, a registered professional geologist and hydrogeologic consultant, stated that large groundwater withdrawals in Southern Maryland and in the vicinity of West Point, Virginia are lowering water levels in wells of the regional artesian aquifers and endangering public and domestic water supplies across the Virginia and Maryland Coastal Plain.

### Impact on Local Residents

At this time, lowered groundwater levels are forcing owners of public and private water wells to reset the pumps in their wells at a greater depth and, in many cases, to drill new wells. In the long term, declining groundwater levels threaten the very capability of the aquifers of the region to provide an adequate supply of water.

Groundwater levels of the regional artesian aquifers have been falling steadily since before 1900. At that time, according to anecdotal reports, water levels stood at 30 feet or more above sea level and many wells were free flowing. The past 25 years have witnessed a marked drop in water levels. In Northumberland and Lancaster Counties, water levels now stand 60 to 70 feet lower, at approximately 30 to 40 feet below sea level, and are declining at a rate of 1.1 feet per year

### Effect of Water Users Outside the Northern Neck

Outside of the Northern Neck, in Southern Maryland and at West Point (King William County), Virginia, urban development and industrial activity are imposing potentially disastrous stresses on the artesian aquifers. In the vicinity of Lexington Park, Maryland, water levels in artesian wells now lie at approximately 150 feet below sea level. Moreover, they are falling at a remarkable rate of 3.5 feet per year, the sharpest decline of the region. At

West Point, groundwater withdrawals by the paper manufacturing plant have been largely responsible for lowered water levels to nearly 150 feet below sea level. Here, the rate of decline has averaged 2.5 feet per year for the past 15 years.

As a result of the over-pumpage of groundwater at these localities, two large depressions (called “cones of depression”) have developed in the water-level surface of the region. These cones of depression intersect beneath the Northern Neck. Consequently, as water levels are pumped down in Southern Maryland and at West Point, the water levels in the artesian wells of the Northern Neck decline. The cause of this undesirable occurrence is simple. Groundwater is drawn away from the portion of the aquifers underlying the Northern Neck and directed toward the pumping centers of the Maryland and West Point cones of depression.

Although a precise connection between groundwater levels and water use is difficult to establish, it is obvious that the greatest declines in water level are occurring in the regions of the largest groundwater withdrawals. According to information obtained from the Virginia Department of Environmental Quality, the paper plant at West Point, Virginia, is withdrawing an average of approximately 19 million gallons of groundwater a day. In contrast, only about 5.5 million gallons of groundwater are withdrawn each day by the entire five counties of the Northern Neck. Similarly, the rapidly-growing counties of Southern Maryland are large-scale users of groundwater. The residents of Calvert, Charles, and St. Mary’s Counties pump nearly 30 million gallons of groundwater a day from the aquifers that extend into the Northern Neck.

### Results are permanent – No Replenishment

The continued pumpage of the artesian aquifers of the region will degrade their usefulness as the principal source of public and domestic water and, ultimately, destroy their storage capacity. This threat arises from the fact that once the groundwater level is pumped down below the top of an aquifer,

### CALL FOR ARTICLES

The Virginia Environmental Health Association, Inc. (VEHA) invites environmental health professionals, educators, researchers, and other persons or entities to submit manuscripts for possible publication in the *VEHA Bulletin*. Original technical papers, review articles or reports on experiences, research, endeavors, management techniques, or current issues are considered. Guest commentaries, letters to the editor, cover art, and other items of interest to the readership are also encouraged. Authors receive no monetary compensation for their contributions. All material is subject to peer review. Submit articles and letters for publication to: [rflannery@cox.net](mailto:rflannery@cox.net), or call (757) 685-5031 for information.



VEHA is an affiliate member of the  
National Environmental Health  
Association



## “Declining Groundwater Levels In Virginias Northern Neck (cont)”

fer, the aquifer becomes “dewatered” and can no longer sustain the previous rate of withdrawal. Furthermore, any further recharge and replenishment of the aquifer becomes virtually impossible.

### Estimated Time Frame

Currently, this risk of aquifer destruction is greatest in the vicinity of West Point, Virginia, where groundwater withdrawals by the paper manufacturing plant have been a major factor in bringing the water level down to within 150 feet of the top of the principal aquifer. If the present rate of decline of 2.5 feet per year continues, then the water level will fall to the top of the aquifer in only 60 years. Of course, a future increase in population growth and industrial activity will accelerate the rate of decline and shorten the time to the destruction of the aquifer.

In the three counties of Southern Maryland, where the population is expected to grow from approximately 290,000 in 2005 to more than 443,000 by 2030, groundwater levels will continue to fall at a rate that exceeds the historic rate of 2.5 to 3.5 feet per year. Here, the crisis that threatens the

West Point region will be postponed somewhat, because water levels are currently more than 200 to 500 feet above the top of the principal aquifer. However, in Anne Arundel County, where this aquifer is closer to the land surface, dewatering is already a reality.

### Chief Danger is Not Us

The chief danger to the groundwater resources of the Northern Neck comes not from current or future withdrawals by residents of the Northern Neck but, instead, from the over-pumpage occurring in the regional artesian aquifers of Southern Maryland and the Middle Peninsula.

### Prompt Action Needed

In order to protect the local groundwater supply, the elected officials of the Northern Neck will have to act promptly and forcefully if they are going to be effective at influencing the water management policies of these extra-jurisdictional regions.

---

## Real Challenges to the Public Sector Environmental Health Profession (cont)

health each year. Of that 300, roughly half will enter the private sector workforce during any given year. Therefore, there remains a vacuum of positions not filled in the public sector. An estimate by the federal government shows that there may be as many as 12,000 public sector EH openings over the next 10 years.

Where will the replacements come from? One state association reported that city governments within their state made a decision to fill EH openings with high school graduates. This year the Council for Food Protection has considered using the Certified Food Safety Professional (CFSP) as the minimum qualification for people to perform food safety audits (vs. the REHS credential and a 4 year science degree).

In addition to those items already presented here, participants and presenters at the conference readily agreed that if environmental health personnel need to play a more prominent role in emergency/disaster re-

sponse. Otherwise, the profession and involvement in the community environmental health programs would continue to be “sidelined.”

So what can we do as trained EH professionals? I believe the best defense is to continue developing your knowledge, skills and abilities in the environmental health field. Learn new computer skills, continue to offer superior service, and network with other colleagues through organizations such as the Virginia Environmental Health Association (VEHA) and the National Environmental Health Association (NEHA). Yes, a storm may be brewing for us in the future but that is why it is more important than ever to get your ship ready to ride the winds of change. NEHA assured the affiliates that they are fully committed to representing the profession to the best of their ability to seek solutions to the challenges facing public sector EH.

## Note from the Editor

By Richard R. Flannery, REHS

As I complete this edition of the newsletter, hurricane Katrina is battering New Orleans, LA and Biloxi, MS. There is no doubt that the rebuilding of homes, businesses, and peoples lives will take a tremendous amount of time, resources, and money. As the rebuilding begins, there will be news reports showing the devastation and despair of those affected by the wrath of this powerful force. However, there is one area of news reporting that many of us never see. Environmental health professionals working to restore safe conditions for the residents affected.

Naturally, there will be notices to boil and/or treat water before use until the water treatment plants and linking distribution systems are repaired, flushed, and treated prior to consumption by the public. Other efforts in sewage treatment systems and plants will have on-going efforts to restore systems to normal use, various efforts to control vectors and pests associated with flooding problems, and safety of food in stores and restaurants. Will these stories make the daily or evening news?

## Environmental Health “War Stories” Column

### Foot in Mouth Syndrome

By Cecil Sink

One of the more rewarding aspects of environmental health work is that it's “where the rubber meets the road.” Environmental health in it's applied everyday context, out in the real world, with real people, many of whom have no idea what we are doing, or what we



are talking about when we try and explain, is a different challenge every day. Sometimes it can be a challenge because of personality-conflicts, a language barrier, an educational gulf, or just a difference in life-philosophy and communication techniques. For some, it can be just keeping our feet out of our own mouths.

Here are a few “foot in mouth” stories. The names have been changed, mostly to protect the author.

#### **Defending the family name:**

One morning a young lady came into our local office to apply for a septic system permit.

I recognized her last name, “Smith”, as being unusual, and in my experience, limited to a small rural community in the County. To make conversation, I asked if she was related to the “Smiths of Pine Holler” and, with an expression of distaste, she admitted that she was. I told her she shouldn't be ashamed to admit the relationship, as I found them to be a fine group of folks. “Well”, she

snapped, “I just divorced one of them” to which I immediately replied, “oh... well, I don't know all of them”.

#### **A Higher Authority:**

A friend and co-worker once had an application for a septic system intended to serve a new worship center in a rural area. After a thorough attempt to locate a suitable drain-field area, he had to inform the pastor that the property that a church member had so generously donated to his church was not suitable for an onsite sewage disposal system. The pastor was rather upset to have his hopes, and those of his congregation dashed, and replied that “God wants this church to be here!” To which my friend replied “well, then, maybe He can issue the permit, but I can't.”

#### **Rough Riding:**

A consultant friend once worked a rather tough site, with very shallow, heavy clay soils, and after many hours of hard work, located a (barely) suitable area. Upon returning to the site to take final measurements, she found that the owner had rather cavalierly traversed the area with heavy construction equipment while the soil moisture was high. She attempted to explain that such activities might have damaged the delicate soil structure of the clay, and that further soil studies would be necessary to evaluate the damage.

An argument ensued, and in trying to make the point about compaction, and proper care of drain-fields in clay soils, she told the gentleman that in this case, it was unwise to even ride a horse, or a heavy cow, across the area. (We can only hope he took her advice).

#### **Keep your mind on the job, son:**

One hot August day, I made an appointment to meet a lady at 3:00PM at her lake-front lot to do a septic system soil study. The day was hot and humid, and the lady apparently decided to cool off a bit by doing a little kayaking be-

fore I arrived. When I drove up she met me at the lake-front house site, wearing a rather flattering two-piece swimsuit. To my credit, I feel I did a commendable job of keeping my mind, and attention on the task at hand.

After doing the soil investigation, and arriving at an estimated percolation rate, I began laying out the tank location and sizing the drain-field. The lady was very interested in the entire process and asked a lot of questions. The one thing she (and in fact, most people) had trouble grasping, was the

*“To my credit, I feel I did a commendable job of keeping my mind, and attention on the task at hand”*

fact that we don't take plumbing fixtures into account when designing septic systems. The idea of using bedrooms as the basis for predicting sewage flows seems counter-intuitive to most people. Finally she accepted it on faith, and moved on...so I thought.

In a few moments rather out of the blue she asked “does it matter if they are stacked”. She was referring, of course, to a two-story home, as opposed to a single-floor residence, quite a logical question, in retrospect.

I was startled and, as in most cases of foot-in-mouth syndrome, the reply outran my better judgment as I told her quite sincerely “no ma'am, we treat everyone the same.”



## Rabies As Usual

*Editorial by Cecil Sink*

Rabies is a truly frightening disease. Its 100% fatality rate surpasses even Ebola and the Black Plague, and its long incubation period makes the time from a potential exposure to an “out of the woods” sigh of relief a long wait indeed. Modern vaccines make the post-exposure prophylaxis (rabies shots) series reliable, and fairly safe and painless; at least physically painless. However, the financial pain is something different, as a complete series can be costly.

The most frightening aspect of rabies is its proximity to Virginians. It is “out there” and lurking in populated and unpopulated regions of the state. If you live anywhere in the Appalachian Mountain range of Virginia, chances are there is a rabid animal lurking somewhere within a few miles walk of your hearth and home.

In discussing rabies with the public, there are many misconceptions typically conjured up. Most people imagine the worst scenario of humans contracting rabies. However, the animals

### *Environmental Health Professionals must guard against complacency*

that **contract** rabies vary, but **commonly include** domestic dogs and cats. Raccoons make up a higher number of animals infected with rabies. What is truly amazing about the raccoon variant rabies epidemic (or “pandemic”) is the lack of human cases.

Rabies in raccoons has progressed to a higher incidence rate within Virginia. But, the transmission of rabies from raccoons to humans has been minimal. The success for the lack of human cases is a success story that we in the Environmental Health Community as well as the Health Care Community can take a great share of the credit for. Taking a proactive stance to educate the public and providing support in bite investigations has greatly affected the management of rabies control programs. Additionally, the CDC (Center for Disease Control and Prevention) has set forth exact guidelines for rabies control and prevention, in its annually updated Rabies Compendium.

### Note from the Editor (cont)

In most cases, the efforts of environmental health experts go unnoticed by the public but remain an integral part of the community rebuilding.

If a hurricane with the magnitude of “Katrina” landed on Virginia, would your city/county be prepared to manage the responsibilities associated with response and recovery efforts? Do you have a workable plan to work with the city/county emergency managers? Does anyone on your staff report to the

The guidelines are based on comprehensive research in which caution and precise recommendations has worked admirably when followed.

Now enter the factor of the inherent courage and complacency of human nature. People tend to fear what they don’t understand, or aren’t familiar with. An amazing capacity of human nature is the ability to become accustomed to living with danger. High-steel workers, soldiers, policemen, firefighters, and many others face danger every day, and think



little more of it that the rest of us do of driving to work. It is very easy for people to start feeling complacent about rabies, to underestimate the danger, and, possibly as a result to start taking it less seriously.

This is the more insidious danger with rabies. When the barrier of the

CDC human rabies prevention protocol is disregarded, a potentially fatal link in the chain of prevention is disrupted. In order for rabies prevention to be effective, prevention programs need to be ongoing. Additionally, every bite, and every exposure or potential exposure, has to be taken seriously, investigated, and post-exposure protocols followed with precision.

We, as Environmental Health Professionals must guard against complacency, in ourselves, with those we work with from other agencies, healthcare professionals, animal control officials, co-workers, and the public so that no-one makes that one potentially fatal mistake or omission. We owe it to ourselves, and to each other, to never let our guard down in the continued presence of this an ever-present danger.

local or regional emergency operations center (EOC) to provide environmental health expertise?

If you cannot answer these questions easily, maybe it’s time to network with your local/county/state emergency managers to ensure environmental health issues for a disaster have been addressed and a plan developed. Make yourselves visible and a viable part of the plan. Preparedness is simpler than reaction.

## Marina Program Sport Fish Restoration Grant Awards

*By Anne L. Smith, Marina Consultant; Virginia Department of Health*

The Virginia Department of Health (VDH) Marina Program received more than \$1,450,000 in federal grant money to be used for the development of transient boating facilities, the installation and maintenance of sewage holding tank pump-out and dump stations and boater education programs. The funds, provided through the Boating Infrastructure Grant (BIG) and the Clean Vessel Act (CVA), are both Sport Fish Restoration Grants. Administered by the United States Fish and Wildlife Service on a national level, the grants are both managed by the VDH Marina Program on a state level.

The CVA award of \$769,875 will be used for the installation and maintenance of sewage holding tank pump-out and dump stations throughout Virginia. A portion of the funding will be used to support the departments public outreach programs in Hampton Roads and the Smith Mountain Lake region. Student interns in both areas pass out literature promoting the proper disposal of recreational boat sewage holding tank waste and offer free holding tank pump-outs as an incentive. As of June 26, the programs combined have spoken to more than 1920 boaters and



pumped 4740 gallons of boat sewage.

The BIG is divided into two tiers. Tier 1 funding is noncompetitive, guaranteeing \$100,000 to any state or territory that submits an eligible proposal. Virginia received \$100,000 to fund several small projects. Tier 2 funding is very competitive and enables states to compete for funding for larger projects. Virginia will receive \$595,000 to develop 17 transient slips with supporting

infrastructure in the Town of West Point. Other tier 2 awards include \$375,000 to develop transient slips in Belfast, Maine and \$235,000 for Georgetown, South Carolina.

For information on the CVA or BIG, please contact the Virginia Department of Health, Office of Wastewater Engineering, 109 Governor Street, Fifth Floor, Richmond, Virginia 23219 or telephone (804) 864-7454.

## Emergency Operations Centers

*By Richard R. Flannery*

Where is your Emergency Operations Center" (EOC)? Or better yet, what is an EOC? As an EH professional, are you or your agency actively involved in the EOC during a disaster or do you only participate when called upon and participate in a reactionary mode?

The name "Emergency Operations Center" conjures up many terms or ideas when used in disaster response and recovery. Some of the terms used for the EOC are "situational room," "war room," or "command center." The EOC supports and coordinates disaster plans for multiple agencies and is a central location for operational information-sharing and resource coordination in support of on-scene efforts. The EOC

serves many functions in a disaster response and recovery mode. For instance, in a biological terrorist related incident, the EOC:

- Serves as an interagency coordinator.
- Coordinates interagency response to any biological event.
- Notifies the State Health Department and FBI of any reported illness caused by a biological agent of concern.
- Oversees the coordination of the arrival and distribution of supplies and personnel.
- Coordinates the request for all mutual-aid, federal, and state

assistance during a biological incident.

- Coordinates and integrate personnel with credentials.
- Coordinates the city's efforts to provide mass medication and mass treatment.

The functions listed above are just an example of the many roles in which an EOC can be utilized for. The role of the EOC in incident response and recovery can be as simple or as complex as needed. A key thought is to understand that the EOC does not dictate what happens on the scene of a disaster, but rather serves as a resource manager for the on-scene Incident

## Emergency Operations Centers (cont)

Commander. This can be a single disaster site in the midst of response and recovery or multiple sites that requires the coordinated efforts away from the scene of disaster.

Senior elected and appointed officials are often located at the EOC, as well as personnel supporting critical functions, such as operations, planning, logistics, and finance and administration. The task of who are the appropriate people to include in the EOC is the decision of planning teams. This does not limit itself to those who will be using it. Here is a partial listing of those who may be of value. Note that few of these people will actually man the EOC in disaster and recovery efforts. However, all of these personnel may play a very important role in ensuring the EOC is manned with the capability for long term use should it be necessary.

- Leadership & Governance

- EOC Manager & Major Section Heads
- Fire Marshall
- Public Works
- Transportation Specialists
- Civil/Structural Engineers
- Security Officers
- Fiscal/Finance
- Communications & IT Specialists
- Public Health/Industrial Hygienists/Environmental Health Specialists

The key function of EOC personnel is to ensure that those who are located at the scene have the resources (e.g. personnel, tools, and equipment) they need for the response. In large emergencies and disasters, the EOC also acts as a liaison between local responders and the State and Federal agencies.

The EOC has three basic functional elements. These elements are comprised of (1) command and control, (2) operational control, and (3) recovery planning. One person is generally assigned the function of command and control. This person in charge is the one who will set objectives and priorities and has overall responsibility of the incident or event. Operational control is divided amongst a variety of individuals who maintain any one of the common elements identified in the Incident Command Structure (ICS). The response and recovery aspect of an EOC usually begins before many disasters are near completion (e.g. hurricane). However, not all recovery operations can begin until the event has occurred due to the nature of the event (e.g. tornado, terrorist incident).

Most EOCs are established in a fixed

## VA Food Safety Task Force

*By Catherine Cummins*

The purpose of the Virginia Food Safety Task Force is to guide and promote an integrated statewide food safety system that protects public health. The group is comprised of representation from government, industry, academia, consumers, and other interested parties. The Virginia Environmental Health Association has been a participant and member organization since the inception of the group.

The latest meeting of VFSTF was held on July 13, 2005. Among the items on the days agenda was a presentation regarding the soon to be opened Virginia Fusion Center. The Virginia Fusion Center is an infrastructure protection group that will be in place near the state police headquarters. The site will be staffed with 5 dedicated analysts, who will work in conjunction with the state police in assessing information to determine risk and the need for response as part of our Homeland Security efforts in Virginia. In addition to the presentation and discussion for the

Virginia Fusion Center was the "Statewide Exercise" currently scheduled for October 2005 in the western part of the State. Environmental Health representatives should be working with their respective emergency



managers in accessing their roles and responsibilities within the scheduled exercise.

Finally, the VFSTF completed the day's agenda with a presentation of the latest version of the Emergency Response for Food Establishments procedures.

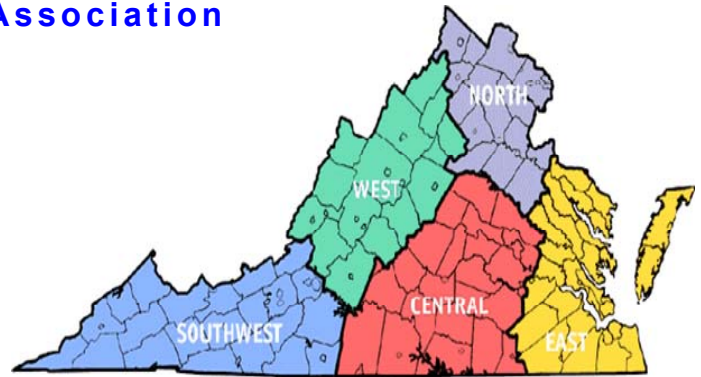
This document will be completed and released in the near future for distribution and posting on numerous web sites and offices throughout the Commonwealth. One of the components of the plan is a detailed assessment of what "a boil water notice" means and how it affects a commercial food establishment. For example, how to shut down a soda dispensing system, and how to perform cleaning and sanitizing during times when a notice is in effect. Also included are components on handling power outages and similar disaster situations in regards to sanitation issues. The document was developed with input from industry, regulatory staff, and VEHA representation.

Maintaining and updating the information on a regular basis is a goal of the group. If there are any items that Environmental Health professionals believe need addressing, contact VEHA's representative, Catherine Cummins.

# Virginia Environmental Health Association

## VEHA Board of Directors

President — Eric Myers  
Past President — Guerry Beatson  
VP Professional Advancement — Jason Fulbright  
VP Programs — David Fridley  
VP Member Services — Amy Pemberton  
Capitol Area Delegate — Preston Smith  
Northern Area Delegate — Richard Michelback  
Blue Ridge Area Delegate — Karl Rudolph  
Southern Area Delegate — vacant  
Tidewater Area Delegate — vacant  
Southwest Area Delegate — Cecil Sink  
Delegate At Large — Tina Thompson  
Delegate At Large — Valerie Payton  
Treasurer — Terra Pascarosa



*VEHA is a non-profit corporation organized by environmental health professionals within the Commonwealth of Virginia, and dedicated to promoting through educational means, public awareness of environmental factors which affect general well-being of the populace.*

**VEHA is on the internet:**  
<http://www.veha.org/>

## Emergency Operations Center (continued)

location within businesses, organizations, and cities and or counties. These centers are generally located in a designated safe area that has a reliable critical infrastructure. An example of an established EOC is the Virginia Emergency Operations Center (VEOC) located in Richmond, VA. "The center is Located in a secure facility on the grounds of the Virginia State Police Headquarters in Richmond, VA., the VEOC is staffed 24-hours a day, seven days a week to respond to calls for assistance from 135 local governments and city jurisdictions throughout Virginia" <http://www.vaemergency.com/about/veoc.cfm>. The VEOC maintains liaison with all seven regions of Virginia's Emergency Management Regions. Communications will flow from the various city and county EOCs, to the regional EOCs, and then to the central VEOC in Richmond. Some of the counties and cities have a combined EOC depending on their location and populace being served. For instance, the cities of Hampton, Newport News, Williamsburg, James City County, and York County operate a combined EOC to manage disaster recovery. The Virginia EOC was utilized for hurricane Isabel recovery in 2003 and most recently in a bioterrorism response and recovery exercise with the Strategic National Stockpile.

In addition to the centers established throughout Virginia, the VEOC maintains a mobile EOC that can be used for disaster response and recovery efforts throughout the state. The mobile EOC may become the method used for disaster response and recovery if efforts are spread throughout many regions or areas with limited communications or assets. These mobile EOCs are preloaded with communications gear that normally used for a particular region/area. This includes items such as various types of radios, cellular phones, and computers. Depending on the nature of the disaster, the communications of choice will be driven by the availability of services available (e.g. loss of cellular towers). Most importantly, the mobile EOC is preloaded with plans, "maps, work stations, and a conference /policy room" (<http://www.vaemergency.com/about/mobile.cfm>) and a directory of available resources from which to draw on in the field.

Some of the fixed and mobile EOCs maybe lost in a disaster when they are needed most. "The New York Office of Emergency Management lost its state-of-the-art emergency operations center (EOC) when World Trade Center 7, which was situated across the street from Tower 1, caught fire and collapsed on September 11<sup>th</sup>. As a result, the

EOC was unusable-just when it was needed most." Since then, many organizations are now considering the use of Virtual EOCs. The virtual EOC is an adjunct to a physical EOC and can be managed from just about any location provided communications are not interrupted. This allows key players who are normally located in one location, to perform their roles in a physical and virtual sense. New developments in telecommunications have enabled this type of EOC greater opportunities to manage a disaster response and recovery with little to no compromise of completing the effort. Software has been developed to assist the role of a Virtual EOC comprehensive recovery effort. By using the technology available with the key players who normally staff a physical EOC, disaster recovery maybe enhanced and coordinated easily with local, state, and federal agencies as well as non-governmental organizations (NGO) and the private sector. Response and recovery efforts can easily move forward without waiting for the establishment/manning of a physical or mobile EOC. Although this type of EOC may or may not work well for governmental EOCs, their net worth has proven to be a reliable asset that private business has used to recover from a disasters that affect operations in other regions.