

SUSQUEHANNA RIVER BASIN COMMISSION

*Annual Report 2017*

A photograph of a forest stream with large tree roots extending into the water. The roots are thick and gnarled, some reaching down into the dark water. The forest floor is covered in fallen leaves and branches. The water is calm and reflects the surrounding greenery.

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## CONTRIBUTORS

John Balay, Brent Bauman,  
Mike College, Andrew Gavin,  
Aaron Henning, Pierre MaCoy,  
Benjamin Pratt, and Matthew Shank

## EDITOR

Gwyn Rowland

On the cover: West Branch  
Susquehanna River, Lycoming  
County, within the Borough  
of Jersey Shore.  
Photo by Nicholas A. Tonelli.



*Brook trout require cold, flowing water year-round to maintain robust populations. For more on protecting aquatic ecosystems, see page 10.*



Andrew D. Dehoff, P.E.

## EXECUTIVE DIRECTOR'S *Message*

As I reflect on the Commission's activities in 2017, two elements stand out—advancement of our mission through the use of technology and the benefit of the Commission's on-the-ground presence in comprehensive water resource management.

In support of its commitment to encouraging the use of state-of-the-art technology, in 2017 the Commission made good on its 2015 resolution offering incentives for the use of dry cooling technology at power generating facilities. The technology dramatically reduces the consumptive water use associated with power generation and serves as a model for modern and effective water conservation. The Commission approved or began the permit review process of seven natural gas-fired power plants using dry cooling technology in 2017, reducing consumptive use by as much as 90 percent.

State-of-the-art technology is also evident in the cooperative flood forecasting and warning system. The Commission worked with local and federal partners in the installation of remotely controlled and digitally transmitting cameras that provide real-time, around-the-clock observations of flood conditions on urban streams. The system also added new locations to the online flood inundation mapping tool, affording

those communities the best available warning of possible onset of flooding.

Equally critical to meeting our mission are the Commission's boots on the ground. Commission scientists routinely take to the field to participate in environmental improvement projects, study the impacts of water use on our ecosystems and communities, collect information for drought and flood planning, and ensure regulatory compliance. To highlight our ongoing efforts to effectuate sound water management, this annual report includes an overview of our staff's involvement in the American eel restoration effort, our commitment to providing technical assistance to municipal water suppliers, a focus on ensuring trout are returning to a creek where their habitat had been lost, and examples of our pursuit of innovative consumptive use mitigation initiatives in the Basin.

I am proud to share these examples of the Commission's 2017 accomplishments and welcome your input on future Commission direction and efforts.

## 2017 COMMISSIONERS



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Secretary  
Maryland Department  
of the Environment

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*2nd Alternate:* Virginia Kearney



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Secretary  
Pennsylvania Department of  
Environmental Protection

*1st Alternate:* Dana Aunkst  
*2nd Alternate:* Jennifer Orr

## COMMISSION LEADERSHIP

### EXECUTIVE STAFF

Andrew D. Dehoff, P.E.  
*Executive Director*  
Andrew J. Gavin  
*Deputy Executive Director*  
Marcia E. Hutchinson, MBA  
*Director, Administration and Finance*

### GENERAL COUNSEL

Jason E. Oyler, Esquire

### MANAGERS

John W. Balay, P.E., P.H.  
*Planning and Operations*  
Paula B. Ballaron, P.G.  
*Policy Implementation and Outreach*  
Todd D. Eaby, P.G.  
*Project Review*  
Gordon D. Lauger  
*Accounting*  
Brydon H. Lidle, III  
*Information Technology*  
Gwyn W. Rowland  
*Governmental and Public Affairs*  
Eric R. Roof  
*Compliance and Enforcement*  
James P. Shallenberger  
*Monitoring and Protection*

### SECRETARY TO THE COMMISSION

Stephanie L. Richardson

# ASSISTING MUNICIPALITIES *with* TECHNICAL SUPPORT *and* TRAINING

The Commission continued to provide free assistance to municipal public water suppliers to keep them abreast of and comply with regulatory requirements. This year, the program was expanded beyond Pennsylvania to offer assistance to municipal systems throughout the Susquehanna River Basin, now including New York and Maryland.



*Panel discussion at  
September 2017 workshop.*

*If a utility does not  
manage its assets, the assets  
will manage the utility*  
was a take-home  
message at the Water  
Resource Management  
Instructional workshop  
on asset management.

The Public Water Supply Assistance Program (PWSAP) offers municipal systems with fewer than 10,000 customers specialized technical assistance in meeting regulatory requirements and provides opportunities to participate in workshops that address a variety of management challenges. By attending the free workshops, system managers benefit by learning about the latest advancements in design, construction, operation and maintenance of wells and distribution systems.

Other topics in the workshop series included:

- **Water Loss Management Instructional Series**

Targeting aging distribution systems, this three-part workshop series provided in-depth training on water loss auditing, accurate metering and billing, and reducing water losses through leak reduction and pressure management;

- **Water Resource Management Considerations for Public Water Supply Managers**

Workshops focused on operational and financial aspects of public water supply management.

More than 45 representatives from 30 municipal systems attended the 2017 workshop series.

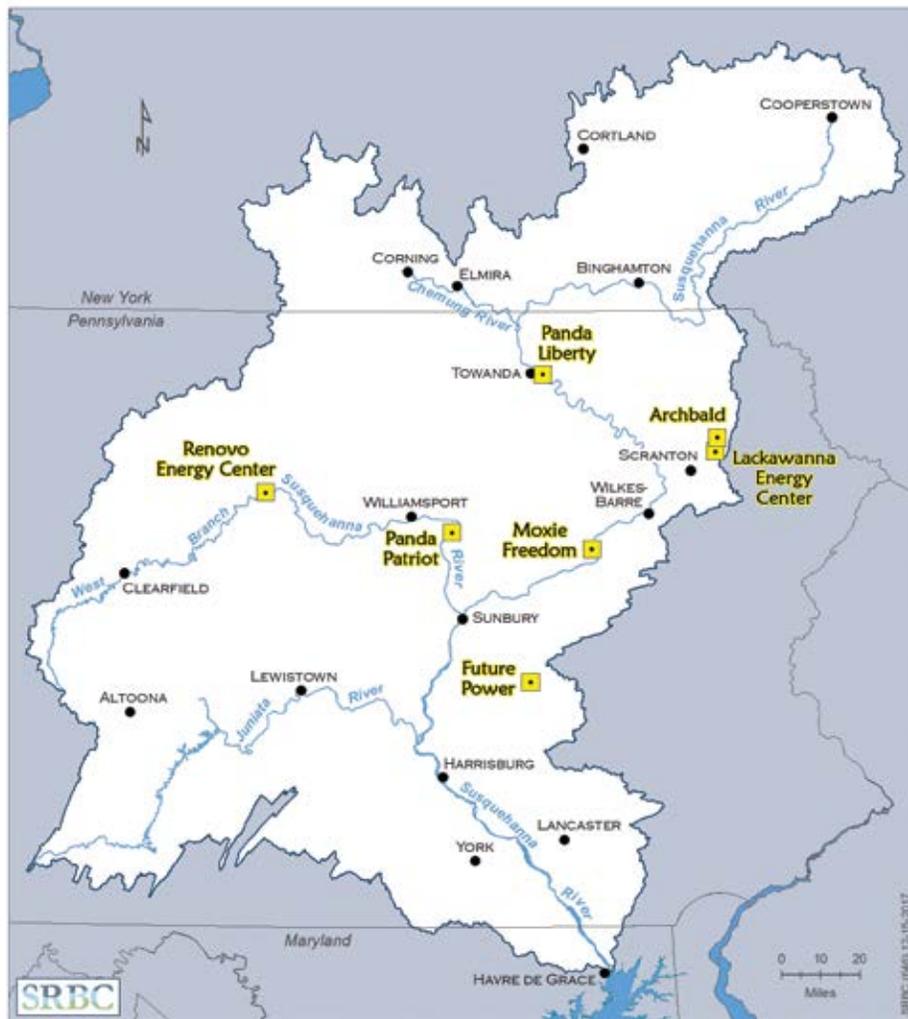
A new element to the program involves helping water supply systems meet their post-approval permit conditions. Once a water withdrawal permit is approved by the Commission, public water suppliers are required to conduct monitoring to best manage their system and show that significant adverse impacts will not occur as a result of the withdrawal. Commission staff can now assist municipal systems with the data collection and analyses needed to satisfy this post-approval permit condition.

# PROMOTING WATER CONSERVATION *through the* USE of NEW TECHNOLOGIES

In 2014, power generation accounted for 30 percent of reported consumptive water use in the Basin that was removed and not returned to the Basin's streams and rivers. However, significant changes to these water use rates are occurring as new power plants are using combined cycle and dry cooling technologies that can greatly reduce a facility's water usage.

Traditional power plants typically use water-intensive cooling techniques such as once-through cooling or evaporative cooling. Both of these methods of cooling are considered "wet" cooling methods where the steam that drives a turbine to produce power is cooled using water passing through a condenser.

Power plants that use natural gas have the additional opportunity to switch from single cycle to combined cycle (gas and steam turbines in concert). With combined cycle gas turbines comes increased opportunities for dry cooling technology that uses air to cool the steam. The use of dry cooling results in the reduction of consumptive use of approximately 95 percent over evaporative cooling.



*Map of dry cooling power plants in the Basin.*

In 2015, the Commission adopted a resolution encouraging the use of dry cooling as it presents an opportunity to conserve significant quantities of waters in the Basin with the increased use of natural gas for power generation. As part of the resolution, the Commission offers incentives for the use of dry

cooling, which can include prioritizing permit reviews and the consideration of reduced streamflow passby conditions.

To date, two dry cooling power plants have been constructed in the Basin and five are in various phases of design or construction.



# BALANCING WATER USES *and* ECOSYSTEM NEEDS

*Whitney Point Lake, Broome County, NY.*

The authors of the Susquehanna River Basin Compact felt strongly that in order to best manage the Basin's water resources, the Commission would need to regulate water that is consumptively used.

Consumptive water use is defined as water that is withdrawn either from groundwater or surface-water sources and is not returned undiminished in quantity. Examples include water that is evaporated, incorporated into manufactured products, or injected deep underground.

When drought or low streamflow conditions exist within the Basin, the Commission's regulations require projects using certain volumes of water to mitigate their water use to ensure that water is available for downstream

uses and the aquatic ecosystem. Mitigation can be accomplished several ways—by releasing water from a pond or reservoir, not withdrawing water during low water flows, or paying an optional fee that the Commission uses to develop mitigation projects on behalf of those facilities that cannot provide the mitigation themselves.

Through a partnership with the U.S. Army Corps of Engineers (USACE), the Commission has secured agreements for the use of water storage from Curwensville Lake, Clearfield County,

and Cowanesque Lake, Tioga County, Pennsylvania, to help offset consumptive water use by power generation projects and other users in the Basin.

The following projects also illustrate the Commission's commitment to managing low streamflows through consumptive use mitigation and ecosystem restoration.

### *Environmental Improvement Projects*

#### **Whitney Point Lake, Broome County, New York**

Beginning in 1997, the Commission collaborated with USACE to study and implement improvements at the lake that resulted in the elimination of a 7-foot winter drawdown and added 8,500 acre-feet of water storage in order to make water releases from the reservoir of 30 to 65 million gallons per day during low flow periods to improve the downstream aquatic ecosystem.

#### **Foster Joseph Sayers Reservoir, Centre County, Pennsylvania**

The Commission is currently partnering with USACE to study the feasibility of operational alternatives at the dam to improve the quality of the lake and downstream environments in a similar manner as the Whitney Point project.

### *Other Low Flow Management Initiatives*

#### **Lancashire #15 Abandoned Mine Drainage Treatment Plant, Cambria County, Pennsylvania**

Built in partnership with the PA Department of Environmental Protection, this treatment plant maintains water levels in an underground mine pool that not only prevents the formation and discharge of acid mine drainage, but also provides streamflow augmentation to help mitigate Pennsylvania's agricultural consumptive use.

#### **Billmeyer Quarry, Lancaster County, Pennsylvania**

Currently being studied in partnership with the Lancaster County Solid Waste Management Authority, this abandoned limestone quarry may be able to provide water releases to mitigate consumptive uses within the Lower Susquehanna region.

#### **Pennsylvania State Park Lakes**

The Commission, PA Department of Conservation and Natural Resources, and PA Fish and Boat Commission have agreed to coordinate periodic water releases from state park lakes. This coordination provides the opportunity to time water releases to provide additional water during periods of low water levels.



*Lancashire #15 Abandoned Mine Drainage Treatment Plant, Cambria County, PA.*



*Billmeyer Quarry, Lancaster County, PA.*

# COMMUNITIES BUILDING FLOOD RESILIENCY

As part of its mission, the Commission strives to safeguard human life and property in the face of flooding. The Commission focuses on non-structural techniques such as flood forecasting and warning and enhanced communication tools to offset risks associated with flooding. During 2017, Commission staff continued to work toward completion of several projects.

## *Tri-County Digital Flood Warning System*

In partnership with Huntingdon, Dauphin, and Lancaster Counties in Pennsylvania, the Commission installed nine cellular-based web cameras (three in each county) in known flood hazard locations identified by local emergency management officials. The cameras provide real-time observations of on-the-ground conditions and facilitate an early warning of flood conditions. Camera footage can be viewed at [www.srbc.net/planning/stagecam.html](http://www.srbc.net/planning/stagecam.html). The project was supported by a grant from the Federal Emergency Management Agency, Hazard Mitigation Grant Program.



*Chiques Creek floods Elizabethtown Road in Lancaster County as captured by the camera on April 6, 2017.*

## *Wyoming Valley Flood Inundation Mapping*

Residents in the Wyoming Valley will soon be able to view flood inundation maps using an online map viewer made possible by the National Oceanic and Atmospheric Administration's Advanced Hydrologic Prediction Service. The inundation maps are being produced through a partnership with the Pennsylvania Silver Jackets Program, an interagency team dedicated to working collaboratively to reduce flood risk across the Commonwealth. The online flood inundation maps will allow users to zoom into an area of interest to view the extent of flooding associated with a predicted flood stage. The maps will be available for the Susquehanna River at Sunbury, Bloomsburg, Danville, and Wilkes-Barre. Each of these locations will have an associated map library that depicts the expected area and depth of flooding at one-foot stage intervals. The maps will be available in the summer of 2018.

## *Swatara Creek Flood Study*

In partnership with the U.S. Army Corps of Engineers (USACE), the Commission collected bathymetric, or river bed contour mapping, data for nearly 50 miles of the Swatara Creek from the mouth at Middletown to near Pine Grove in Schuylkill County, Pennsylvania. The bathymetric data is needed to support a detailed flood study being undertaken by USACE for the Federal Emergency Management Agency. The study will ultimately provide background data needed to produce flood stage-based inundation maps for Swatara Creek.



*Inundation map for Jersey Shore, PA. Light blue areas indicate possible water levels at flood stage.*

# *The* AMERICAN EEL— *a* STORY of RECOVERY?

The American eel was once one of the most abundant fish in the Susquehanna River. More than a million pounds per year were harvested before the Conowingo Dam, located in Maryland, was constructed in the late 1920s. While eels can crawl around or over a small dam or other obstacle, the 94-foot dam has been insurmountable. However, the eel population is making a comeback thanks to the efforts of the Susquehanna River Anadromous Fish Restoration Cooperative, of which the Commission is an active partner.

Beginning in 2008, the U.S. Fish and Wildlife Service (USFWS) began collecting juvenile eels at the base of Conowingo Dam, then transporting and releasing them upstream in the lower portion of the Basin. Luckily, the eels are easy to catch. Biologists simply run a trickle of water down the rocky river slopes below the dam, and the eels follow the water, slithering several feet up a plastic conduit into holding tanks, where they await their ride upstream.

Since 2005, more than one million juvenile American eels have been captured and stocked in the Basin. Eels remain in the river for 10 to 20 years before returning to the ocean to spawn, making it easier to rebuild their populations.

The Commission monitors three streams in the Basin where eels have been experimentally stocked to evaluate the impact of their return on the aquatic community. More than 45,000 eels were stocked throughout these streams in 2016 and 2017. Commission biologists are monitoring changes to river systems as a result of a growing eel population. A predator species, eels may help reduce

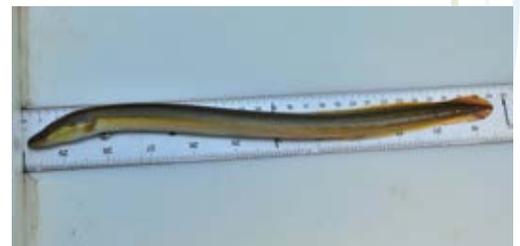
the number of invasive rusty crayfish. Eels may also boost the populations of eastern elliptio mussels, as mussel larvae temporarily attach to eels before they drop off and mature. Mussels provide a powerful water-filtering capacity in river systems.

Eels are starting to appear throughout the Basin. They have been captured at the Colliersville Dam above Oneonta, New York (more than 400 river miles from Conowingo Dam) and near Hornell, New York. Anglers and biologists have reported adult eels in the Juniata River, West Branch Susquehanna, Chemung River, and North Branch (mainstem) of the Susquehanna. A large population of American eel is also present in the Pine Creek watershed due to a prior stocking experiment by the USFWS.

In 2017, through negotiations with Exelon, owner of the Conowingo Dam, the company assumed the operation of an eel ramp and a long-term trap and transport initiative that is showing great promise for the American eel's sustained recovery.



*Biologist Aaron Henning weighing and measuring an American eel recaptured at North Branch Muddy Creek, York County, PA.*



*American eel (Anguilla rostrata) captured in North Branch Muddy Creek, York County, PA.*



# PROTECTING AQUATIC ECOSYSTEMS *through* COMPLIANCE

*Discontinuance of a required cold water release from the dam (above) caused impacts to Stafford Meadow Brook's downstream aquatic community, which included native brook trout.*

In order to maintain and enforce the Commission's regulations and permit conditions, a dedicated Compliance staff is in place to conduct random and routine inspections and audits, respond to complaints, and contact facilities that may need to apply for approval of their water usage. An inspection by the Commission's Compliance staff highlights the importance of ensuring that permit requirements are followed in order to protect the Basin's aquatic ecosystems.



*Brook trout sampling on Stafford Meadow Brook.*



*The re-established water release supporting the recovering trout population.*

A nine-acre pond was constructed on Stafford Meadow Brook in Lackawanna County, Pennsylvania, in the mid to late 1800s to serve as a public water supply, taking advantage of the exceptional quality of the water. Currently, the pond is used for snow making and other commercial purposes. As part of the current owner's water withdrawal permit, a continuous release of water from the pond is to be maintained to protect the naturally reproducing trout downstream. However, Compliance staff discovered that the critical water release intended to protect the Stafford Meadow Brook had not been made for two years, severely impacting the brook trout population.

Subsequent investigation by Commission scientists showed that brook trout were absent downstream of the dam and the aquatic community overall was degraded. The historic presence of

brook trout in this section, as well as existing abundant populations upstream of the dam, were strong evidence that the discontinued cold water release had resulted in ecological harm to the stream.

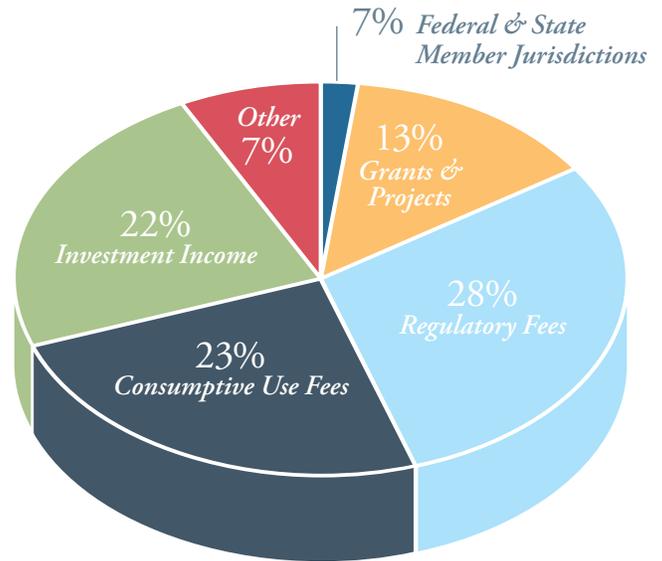
Following corrective action that dictated the release of water again, Commission scientists conducted additional surveys in the spring of 2017 and found that some recovery of the aquatic ecosystem had already started to naturally occur downstream of the dam. The brook trout population appears to be moving back to the degraded stream as their food supply recovers, which is composed primarily of habitat-sensitive aquatic insects such as mayflies and stoneflies. Continuous instream monitoring equipment was also installed and will track improving water quality conditions needed for the full recovery of Stafford Meadow Brook's trout population.

# SUSQUEHANNA RIVER BASIN COMMISSION FISCAL YEAR 2017 FINANCIAL SUMMARY

*Fiscal Year 2017 Total*

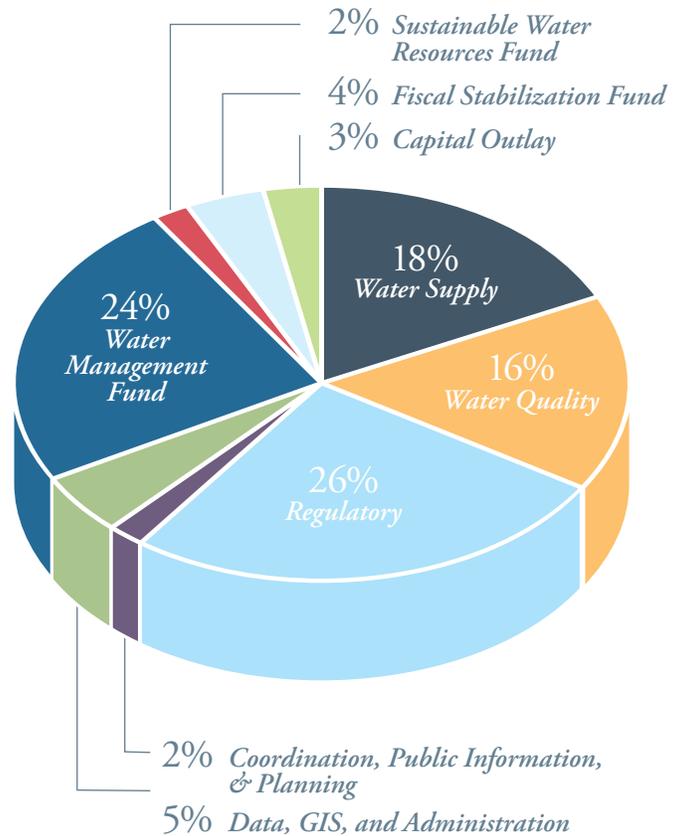
## REVENUE

Federal & State Member Jurisdictions	\$ 1,078,000
Grants and Projects	\$ 2,094,585
Regulatory Fees	\$ 4,635,395
Consumptive Use Fees	\$ 3,709,522
Investment Income	\$ 3,682,484
Other	\$ 1,169,850
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TOTAL	\$ 16,369,836



## EXPENDITURES

Water Supply	\$ 2,976,480
Water Quality	\$ 2,638,748
Regulatory	\$ 4,214,202
Coordination, Public Information, and Planning	\$ 347,261
Data, GIS, and Administration	\$ 868,861
Water Management Fund	\$ 3,910,738
Sustainable Water Resources Fund	\$ 293,805
Fiscal Stabilization Fund	\$ 707,736
Capital Outlay	\$ 412,005
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TOTAL	\$ 16,369,836



## 2017 ANNUAL EXCELLENCE AWARD

**Ava Stoops**  
*Administrative Specialist*



Ava has been a valuable team player for the Commission since beginning her tenure in 2006. She supports both management and technical staff by covering a wide range of administrative tasks and does so with great poise and professionalism. Among her many accomplishments included supporting a busy year for the Public Water Supply Assistance Program workshops where she organized logistics and made sure everything ran smoothly. The Commission received very positive reviews about the workshops, and much of that had to do with Ava's organization and customer service skills. She is a dedicated employee and handles difficult situations with ease and a sense of humor.

### 2017 QUARTERLY SPOTLIGHT AWARD

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FIRST QUARTER

**Hilary Hollier**  
*Administrative Specialist*

SECOND QUARTER  
**Graham Markowitz**  
*Hydrologist*

THIRD QUARTER  
**Dawn Hintz**  
*Environmental Scientist/Database Analyst*

FOURTH QUARTER  
**Gordon Lauger**  
*Manager, Accounting*  
**and Donna Heiser**  
*Accounting Assistant*

