Climate change and water management in Eastern States: Overcoming barriers to innovation in regulated riparianism

**AWRA Webinar**
Wednesday, February 15, 2017
11 AM-12 PM eastern

**Lara B. Fowler, Penn State University**
- Senior Lecturer, Penn State Law
- Assistant Director for Outreach & Engagement, Institutes of Energy & the Environment

**Beth Kinne, Hobart and William Smith Colleges**
- Associate Professor of Environmental Studies

**Matthew E. Draper, Draper & Draper LLC**
- Partner & Co-Founder
Water law follows hydrology and assumes that regional water balances will remain relatively constant or “stationary” over time; however, this assumption is no longer valid.

Much of the east coast is at a critical junction: as much as we devote time to the engineering, so must we devote time to institutional dynamics.

“Any system of water works must be accompanied by a system of human enterprise that involves the allocation, exercise and control of decision-making capabilities in the development and use of water supplies.”
The challenge is adapting the law to account for what we know— and will come to know— about water resources and climate change

“If the body of law attached to water resources is antiquated, archaic, and incapable of flexible adaptation for modern needs, then economic technological and hydrological principles toward maximizing water use cannot be realized.”


“Connecticut, like all the other New England States, lacks a statewide comprehensive water allocation policy to deal with the current water crisis.”


http://wtnh.com/2017/01/26/no-change-in-drought-status-for-connecticut/
Parts of the United States faced dry conditions or drought at the end of last growing season, not just in the areas you’d expect...
At first glance, things are looking better (though switching drought for flood has been tough on California)

Drought in the east remains an issue:
in soil moisture levels, in root zones, and in shallow aquifers

http://drought.unl.edu/MonitoringTools/NASAGRACEDataAssimilation.aspx
Conditions in the southeast illustrate a trend towards increasing late summer drought

Source: USGS WaterWatch (Drought / Map Comparison) at http://waterwatch.usgs.gov/index.php?id=wwchart_map2
In October, more than 98% of Alabama was in some kind of drought: “It’s epic. It’s really bad.”

Predictions for the Northeast (including the mid-Atlantic) are for more floods, and more winter precipitation.
Real changes are already being seen: overall runoff in the northern and mid-Atlantic U.S. is increasing.

Historic Runoff in Along Eastern Seabord (mm/yr)

At the same time, extreme events are breaking records

Historic flooding grips South Carolina: ‘We are at a 1,000-year level of rain’

https://tribwxin.files.wordpress.com/2015/10/south-carolina-flooding-2.jpeg?w=1200
However, the impact of drought in the summer remains a concern.
People are adapting to changing patterns of precipitation; one Delaware County added ~18,000 new acres of irrigation from ‘07-‘12.

Irrigation along the eastern shore of Maryland & Delaware
Increasing groundwater withdrawals are creating water shortages in areas generally thought of as water-rich.
The Midwest and the Mississippi River Valley are also experiencing shortages, and more irrigation

“Wisconsin Groundwater Dispute Is a Warning Signal for the Eastern United States”
October 26, 2015

“[Iowa] State regulators approve new rule for Jordan Aquifer water supply”
June 17, 2015

“The alluvial aquifers adjacent to the Mississippi River, of which Arkansas is the biggest user, have been depleted by 26 percent. Most of that depletion occurred in the last 35 years.” (Arkansas is now in the top 15 irrigated states, along with Georgia, Mississippi, Missouri, and Florida)

Mississippi is suing Tennessee in the US Supreme Court in the 1st equitable apportionment case re: groundwater: http://www.ca6.uscourts.gov/special-master

Water level change from 1870 to 2007 in the Mississippi River Valley Alluvial Aquifer
Ground and surface water withdrawals also significantly impact local ecology and recreation in places like Massachusetts’ Ipswich River Basin.

http://pubs.usgs.gov/fs/fs-160-00/

Although the riparian doctrine has principles to address shortage, the common law doctrine alone is inadequate.

- Adjoining “riparian” landowners have the right to make “reasonable use”
- Share and share alike (including in times of shortage)
- No export from basin
The definition of “riparian” may change as the rivers change

Mississippi R. meander map
Cape Girardeau, MO to Donaldsonville, LA.
(Fisk, 1944)
Factors determining “reasonable use” invite litigation

- Water withdrawals
- Changes in Surface Water Flow

Social Value of Use:
- Harm to other riparian users
- Duration of use
- Benefits to user
- Benefits to the environment

Economic Value of Use
In reacting to these issues, common law riparianism has become increasingly regulated (regulated riparianism), with a public trust overlay.
Climate change creates additional challenges

Change in avg. annual precipitation, 1901-2015
EPA, 2016; Data source: NOAA, 2016
Water shortage is only one side of the water quantity problem; public health & safety, as well as energy reliability, are also issues.

Source: Federal Emergency Management Agency, Google Earth
Graphic by Ryan Kelly and Randy Leonard/CQ Roll Call

NASA satellite images show extent of outages
The Government Accountability Office found that state governments are making significant efforts to understand and better manage freshwater resources.

Studies and Assessment

Conservation Efforts

Drought Preparedness Plans

Climate Change Planning

http://www.gao.gov/products/GAO-14-430
Collaborative, long-term water resource planning is a rational answer, and Federal initiatives have focused on providing support.

**USGS: National Water Census**
- Authorized by the 2009 SECURE Water Act (Public Law 111-11)
- USGS Core Science Directive for 2007-017

**National Drought Resilience Partnership**
- NOAA, USDA, EPA, ACE, and others

**Mississippi Basin Healthy Watersheds Initiative**
- USDA and 13 states
Implementing new protective regulations is fraught with conflict.

Pignataro, T.J. The Buffalo News, June 21, 2016

Increasing monitoring of withdrawals aids in water resource allocation planning

2011 NY State Water Withdrawal Law

“Initial Permits” not subject to Environmental Review.

*Sierra Club and HRFA v. Martens II* (2016 NY Slip Op 51391)
Pennsylvania also has a registration system but much regulatory work is done through local regulation or the Basin Commissions

<table>
<thead>
<tr>
<th>Pennsylvania Dept. of Env’tl Protection</th>
<th>Susquehanna River Basin Commission (SRBC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permits Required For:</td>
<td>Permits Required For:</td>
</tr>
<tr>
<td>- Withdrawals of more than 10,000</td>
<td>- 100,000 or more gallons per day for</td>
</tr>
<tr>
<td>gallons/day (30 day average)</td>
<td>withdrawals and 20,000 or more gallons</td>
</tr>
<tr>
<td>- All public water suppliers and</td>
<td>per day for consumptive uses (30 day</td>
</tr>
<tr>
<td>hydropower facilities</td>
<td>average).</td>
</tr>
<tr>
<td>- 5 year update requirements, BUT</td>
<td>- All surface/groundwater withdrawal for</td>
</tr>
<tr>
<td>statewide water plan hasn’t been</td>
<td>natural gas development (2011)</td>
</tr>
<tr>
<td>updated since original plan</td>
<td>- Also low flow protection in headwater</td>
</tr>
<tr>
<td></td>
<td>streams (2012)</td>
</tr>
</tbody>
</table>
According to the SRBC’s recently completed “cumulative water use and availability study”, more than 1 bgd of water is approved for consumptive use, with more than 375 mgd reported in current use.

http://www.srbc.net/planning/cwuas.htm
The need to adapt the law to changing conditions is critical!!

Vermont, 2011 (post Hurricane Irene)

Connecticut, 2015

Pennsylvania, 2016
Effective regulation in the face of uncertainty and variability is challenging; changes create both more challenges, and opportunities.

<table>
<thead>
<tr>
<th>Challenges</th>
<th>If changes made, more challenges</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vested interests/rights in existing system (over-allocation?)</td>
<td>Risk of creating new vested interests</td>
<td>Gather information</td>
</tr>
<tr>
<td>Law &amp; science don’t match</td>
<td>Increased documentation = Increased regulation?</td>
<td>Permits with reopeners/adaptation</td>
</tr>
<tr>
<td>Data issues: lack or gaps, non-comparable, private</td>
<td>Privacy concerns</td>
<td>Adaptive Management</td>
</tr>
<tr>
<td>Changing climate &amp; increasing variability</td>
<td>Difficulty of managing uncertainty</td>
<td>Coordination of effort</td>
</tr>
<tr>
<td>Legacy issues (acid mine drainage, old mill ponds)</td>
<td>Funding</td>
<td>Expansion of Environmental Review</td>
</tr>
</tbody>
</table>
Yet we must find a way to manage these types of issues, or the issue will make its way to the courts.