I. INTRODUCTION TO WATER RESOURCES MANAGEMENT

Water is abundant in many different forms throughout the earth. However, most of it is tied up in non-drinkable forms such as oceans (97.5% of the total water resources), glaciers and ice formations (1.8%), and within soil or rock (0.6%). The remaining forms of water such as that in lakes, rivers, vegetation, and the atmosphere make up less than 0.5% of the total. The renewable water supply in the continental United States is approximately 1400 billion gallons of water per day (bgd)*. This water is not evenly distributed throughout the country and the seasonal and regional distribution of water takes place through precipitation patterns. Water constantly circulates from the sea to and through the atmosphere to the land and eventually returns to the sea by stream flow and to the atmosphere through evaporation. This constant circulation pattern is termed the “hydrologic cycle”. The movement of water and moisture is driven by energy from the sun and involves precipitation, evaporation, surface runoff, and groundwater flow. The water cycle is made up of a variety of geochemical and biological processes.2

Of the 40,000 billion gallons per day (bgd) of water that passes over the United States in the form of clouds and in the atmosphere, about 4,200 bgd falls as precipitation and

2 Id.
about two-thirds of this is returned to the atmosphere through evaporation and transpiration of plants. The remaining 1,400 bgd discharges to streams, to lakes, or to the ocean, or seeps into the ground where it is stored.\(^3\) According to the U.S. Geological Survey, Estimated Use of Water in the United States in 1995\(^4\) data shows that after a continuous increase from 1950 to 1980 in withdrawals for off stream use, actually declined from 1980 to 1995. This decline occurred even though population increased during those 15 years by 16%. However the “public supply” and “rural domestic and livestock” categories are the only two categories that showed continual increases. The 13% increase in rural domestic and livestock withdrawals is attributable to an increase in livestock withdrawals, especially animal specialties withdrawals, which were 43% higher in 1995 than during 1990. The total number of acres irrigated in the United States has steadily increased as well.\(^5\)

Pennsylvania itself has more than 83,000 miles of streams, nearly 4,000 lakes, 120 miles of coastal waters and 80 trillion gallons of groundwater.\(^6\) The total withdrawal of ground and surface water in Pennsylvania has climbed to 10 bgd. According to the PA Department of Environmental Protection in Pennsylvania (DEP), eight of the last ten years have been years of drought in the Commonwealth and there is a growing need for monitoring of water use. In 1900 the residential use was approximately 5 gallons per person, per day. Today residential use is approximately 62 gallons per person, per day. The Pennsylvania water plan has not been updated in twenty-five years.\(^7\) Recently there have been many concerns over water resource allocation in Pennsylvania. It is important to understand the Common Law that has governed water use in the Commonwealth and the new legislation designed to preserve our resources and allocate them fairly.

### II. COMMON LAW ALLOCATION OF WATER IN PENNSYLVANIA

Pennsylvania common law has distinguished four general categories of water. The first type is surface water; the second type is diffused surface waters; the third type is ground water in well-defined subterranean streams; and the fourth type is percolating ground

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\(^7\) “Will you have enough water tomorrow? (What farmers need to know about the Water Resources Planning Act” 2003 Brochure provided by the Pennsylvania Department of Environmental Protection and the Pennsylvania Department of Agriculture. 3920-PA-DEP3103.
waters.\textsuperscript{8} Rules have been developed for each of these classifications in governing diversion, use and disposal of these waters.\textsuperscript{9}

A. SURFACE WATER

The “riparian doctrine” gives rights to those who have ownership of real property underlying or bordering streams and rivers.\textsuperscript{10} This doctrine governs allocation and use of waters flowing in a natural watercourse.\textsuperscript{11} A riparian right is the right to make use of the water available upon riparian land. The holder does not have property rights in the actual water but they have a non-exclusive right to use the water.\textsuperscript{12} All rights to water use by riparian owners depend on the equal and correlative rights of other riparians to use the common resource. Pennsylvania allows riparian owners to use their rights on lands that are contiguous to the land adjoining the surface water source if those lands are owned by the same person and are located in the same watershed. Waters may not be diverted to non-contiguous plots located some distance from the watercourse or to contiguous lands that do not lie in the same watershed (the waters must be able to return to the stream origin above the next downstream riparian’s land).\textsuperscript{13} Rights to use water off of riparian lands may only be acquired by municipalities, utilities, and other users through prescription, eminent domain, or contract with all affected riparians.

Pennsylvania case law has followed a hybrid of natural flow rules and the reasonable use rational. This simply means that the strict version of natural flow, which would never allow for diminution flow to lower riparians under any circumstance, is given a reasonable use standard, allowing some diminution in flow, so long as other riparian users are not harmed “unreasonably”.\textsuperscript{14} However, domestic uses are given the highest priority above all other uses.\textsuperscript{15} The extent of diversions allowed for agricultural irrigation depends on the consideration of the rights of other stream users. Irrigators with riparian rights can cause

\textsuperscript{12} Mayor of City of Philadelphia v. Comm’r of Spring Gardens, 7 Pa. 348 (1847).
\textsuperscript{14} 1 Waters and Water Rights § 7.02 (C) (R.E. Beck, Ed., 1991).
\textsuperscript{15} Palmer Water Co v. Lehighton Water Co. 280 Pa. 492, 124 A. 747 (1924).
some diminution of flow but may not substantially or unreasonably lessen the amounts needed by lower riparians.16

Waters used for power production, milling, manufacturing, railroad uses, recreations, and citizens of municipalities without the use of eminent domain are classified in Pennsylvania as “extraordinary uses”.17 For these uses, the riparian may only divert the quantity which is reasonable in view of the rights of other riparian owners and which will not materially or perceptibly diminish stream flow. 18

The priority structure in Pennsylvania for use of surface water by various riparian users is as follows: (1) domestic uses and those uses naturally related to the riparian land (2) irrigation and “extraordinary uses”, and (3) diversions for use off of riparian land. If conflict arises among several uses with the same priority, each user is required to limit their diversion amounts to reasonable uses that do not diminish flow. 19 These priorities do not take into account the time that the users began withdrawing water from the source. In emergency situations municipalities have been allowed to divert water from sources, even to the diminishment of those downstream. However, they do remain liable to those with domestic uses that were impaired because of the diversion. Non-domestic uses temporarily forego their diversions.20

Another aspect of surface water rights includes navigation of waters. The navigation right has priority over all purposes except domestic uses. All extraordinary riparian uses may not impair the navigable waterways.21

B. SUBTERRANEAN STREAMS

Although subterranean waters are very rarely streams, any waters that are “subterranean streams” may be subject to riparian doctrines that would govern surface streams.22

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16 Messinger’s Appeal, 109 Pa 285, 288, 4 a 162, 162-163 (1885).
22 Lybe’s Appeal, 106 Pa. 626 (1884); Haldeman v. Bruckhart, 45 Pa. 514 (1863).
C. PERCOLATING GROUND WATER

Waters that are not flowing in defined channels and are stored beneath the surface of the land are considered “percolating waters”. Pennsylvania follows the “American Rule”, which holds that a landowner may withdraw percolating waters beneath his land for “natural and ordinary” uses located on that land regardless of consequences to his neighbors. Unlike surface water definitions, “natural and ordinary use” includes domestic water use, mining, irrigation, and manufacturing. Liability can only arise where withdrawal is malicious, negligent, or causes foreseeable harm to adjacent lands. When drawing water for uses off of the land of origin, the uses are not considered “ordinary and natural”. At common law these off land uses were considered unlawful and unreasonable. However the Pennsylvania Supreme Court modified the rule by allowing transfer of water for public need.

Today there is much debate over whether rules allocating ground water usage are in the best interest of Pennsylvania’s water resource management. Recognizing the public need for this water, more recent cases have allowed municipal authorities to withdraw water for their services, when these authorities obtained approval from basin commissions or the DEP. However, if a dispute were to arise between two adjacent land owners, the land owner who dug the deeper well with the more powerful pump would get the water.

D. ARTIFICIAL WATERS

Lands adjacent to artificial reservoirs do not gain riparian rights to stored waters. Water is available to the owner of riparian land if the intended use is above the riparian and surplus or return flow water is available. However, in situations where the federal government sponsors a water resource project for navigation or water quality improvement, releases are only allowed when authorized by Congress.

E. PRESCRIPTIVE RIGHTS

There are few cases that have adjudicated the actual extent of prescriptive water rights. Open, notorious, and continuous use of water that is adverse to the rights of others

\[\text{Wheatley v. Baugh} 25 \text{ Pa. 528 (1855)}, \text{Williams v. Ladew} 161 \text{ Pa. 283 (1894)}.\]
\[\text{Id.}\]
\[\text{Rothrauff v. Sukins Spring Water Co.}, 339 \text{ Pa. 129, 14 A.2d 87 (1940)}.\]
\[\text{Miller v. Lutheran Conference and Camp Association}, 331 \text{ Pa 241 (1938)}.\]
for a period of 21 years has been allowed in some instances. A person who diverts water to non-riparian land, or uses it for “extraordinary” riparian reasons and substantially diminishes the flow of the stream may acquire a prescriptive right by use. It is more difficult for a downstream owner to gain prescriptive rights against upstream riparians, because downstream use is rarely adverse to those upstream.

F. EMINENT DOMAIN

Pennsylvania statutes authorize the exercise of eminent domain powers in gaining water rights. All of these acts include the requirement of a permit from the DEP. The eminent domain powers do not extend to private springs or water supplies. This water may be obtained through purchase, lease, prescription, waiver, appropriation, or eminent domain.

III. STATE REGULATORY PROGRAMS

In 1971 the Pennsylvania Department of Environmental Resources (now DEP) assumed powers that had been vested in the Water Supply Commission and Water and Power Resources Board to regulate the construction of dams, water obstructions, condemnation and appropriation of waters, and applications for permits for water and water power.

DEP has the power and duty to devise a State Water Plan and maintain inventory of all water resources and collect water use data. The DEP administers the Safe Drinking Water Act, Dam Safety and Encroachments Act, the Limited Power and Water Supply Act, and Storm water Management Act. DEP also monitors metals, nutrients, and pathogens in water sources throughout the state.

A. SAFE DRINKING WATER ACT

The Safe Drinking Water Act (SDWA), formed as the state’s counterpart to the Federal Safe Drinking Water Act, was enacted to address concerns about the quality of the

31 15 P.S. §1322, 53 P.S. §§ 2905-06, 3071, 3080, 3850.
32 32 P.S. § 631-641.
33 71 P.S. §§ 510-1 through 510-8.
34 35 P.S. § 721.1.
drinking water in Pennsylvania. This act requires that public water systems be subject to regulation including: (1) systems that provide water to the public for human consumption that have at least 15 service connections or serve at least 25 individuals daily for 60 days of the year, and (2) systems which provide water for bottling or bulk hauling for human consumption. DEP regulates design, installation, and operation of systems that treat and distribute drinking water.35

The Environmental Hearing Board (EHB) hears appeals of final actions by the DEP. In 1996 the EHB reviewed the granting of a permit claiming that the withdrawal of water would have effects on wetlands in a valued watershed.36 The EHB found that DEP should consider all regulations and laws administered by the department, and should have denied the permit because of the likely result on the adjacent wetlands. The EHB further found that there should be compliance with all other laws before issuing a permit.37

B. 1939 WATER RIGHTS ACT

This act requires all public water supply agencies (this includes public utilities, municipalities, and districts) to obtain prior approval before withdrawing waters.38 The act abolished the prior eminent domain system for individual municipal water allocations, and vested the authority in DEP.39 When DEP reviews applications they must consider the following: (1) that the proposed diversion is reasonably necessary for present purposes and future needs, and (2) that the taking will not interfere with navigation, jeopardize public safety or cause substantial injury to the Commonwealth.40 A right to a hearing is provided to anyone who may be affected by the action of DEP.41

C. 1923 LIMITED POWER AND WATER SUPPLY ACT42

This act covers the hydroelectric and thermal electric uses of water for fossil fueled and nuclear plants. It does not apply to hydroelectric plans and to thermal electric facilities

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35 35 P.S. § 721.7.
36 Oley Township v. DEP and Wasahickon Spring water, Inc., 1196 EHB 1098.
37 Id.
38 32 PS § 631-641.
40 32 P.S. § 637.
41 35 P.S. § 7511 et seq.
42 32 PS § 591.
that affect interstate or foreign commerce.\textsuperscript{43} This act requires that any person who uses a
dam or alters a stream or other body of water in order to develop hydroelectric power, or
who diverts water for thermal electric plan steam generation or cooling obtain a limited
power permit.\textsuperscript{44}

D. DAM SAFETY AND ENCROACHEMENTS ACT

DEP is given authority to regulate construction, operation and maintenance of dams
and other water obstructions and related activities.\textsuperscript{45} This program incorporates minimum
release guidelines, establishing minimum flows in streams below the obstructions. This Act
also establishes the legal basis for Pennsylvania’s regulation of activities affecting wetlands.
Permits are required for projects involving fill, draining and inundation or other
encroachment on all wetlands in the state.\textsuperscript{46}

E. WELL WATER DRILLERS LICENSE ACT

All well drillers must be licensed by the Department of Conservation and Natural
Resources (DCNR), Bureau of Topographic and Geologic Survey. This Act does not
regulate or allocate water use, but recognizes it as a “renewable resource” requiring “orderly
and reasonable development”.\textsuperscript{47} The Act was passed to monitor the collection of
groundwater information, by requiring the drilling licenses and recording of well locations
and design. The records must be submitted to DCNR Topographic and Geologic Survey,
with the owner retaining a copy and the driller retaining a copy.

F. CLEAN STREAMS LAW\textsuperscript{48}

The Clean Streams Law was created in conjunction with the Federal Clean Water
Act.\textsuperscript{49} DEP is given authority to address and adopt regulations concerning potential
pollution. The DEP has adopted rules for erosion and sedimentation control\textsuperscript{50}, pollution

\textsuperscript{43} R.T. Weston and J. Gray, \textit{Legal control of Consumptive water Use by Pennsylvania Power Plants}, 80 DICKINSON
\textsuperscript{44} 32 PS § § 591 (2-4).
\textsuperscript{45} 32 P.S. § § 693.1-693.27.
\textsuperscript{46} 25 Pa. Code § § 105.11, 105.16, 105.15-105.18a.
\textsuperscript{47} 32 P.S. § § 645.1 \textit{et seq.}
\textsuperscript{48} 35 P.S. § 691.1 \textit{et seq.}
\textsuperscript{49} 33 U.S.C. § 1251 \textit{et seq.}
\textsuperscript{50} 25 Pa. Code § 102.
control, and prevention at agricultural operations.\textsuperscript{51} DEP issues discharge permits, construction permits, storm water discharge permits for industrial or construction operations, and tests and monitors water quality of “high quality” waters (those waters that have been monitored as exceptionally clean). This law gives the DEP power to require alternatives that are environmentally sound, and allows the agency to define what the best available technology for point sources would be.

G. STORM WATER MANAGEMENT ACT

This Act is administered at the county level. It is designed to encourage planning and management of storm water runoff. It is implemented through municipal ordinances based on a watershed plan for the area that plans for flooding and natural flow, and groundwater storage and recharge. New developers must assure that runoff is not greater after their changes, and that the direction of flow is adequate for protecting health and property from injury.\textsuperscript{52} Because of the localized implementation of this plan, there is inconsistency throughout the state in managing runoff water. Municipalities vary in their regulation of these waters; some maintain specific and extensive plans and some regulate loosely.

H. WATER RESOURCES PLANNING ACT (ACT 220)

This Act is similar to the Well Water Driller’s Act in that it does not regulate water use. Beginning in September 2003 citizens and businesses that use or withdraw 10,000 or more gallons of water per day must register and report their water usage to DEP. Public water suppliers, hydropower facilities, and individuals that use or withdraw over 50,000 bgd are required to provide metered information. This Act does not give DEP authority to regulate, control, or require permits for withdrawal of water. The Act also expressly prohibits metering of homeowner wells. Six regional water resource committees, made up of representatives of business, agriculture, local government, and environmental interests will oversee creation of water plans on local levels. The regional committees will take public

\textsuperscript{51} 25 Pa. Code § 91.35.
comment and recommend regional water plans to the Statewide Water Resources Committee, created by the Act.  

**IV. BASIN COMMISSION MANAGEMENT OF WATERS**

Basin Commissions are composed of one Federal Representative from the U.S. Army Corps of Engineers appointed by the presidential, and State Representatives from each state that has lands as part of that river basin. Pennsylvania is most actively participating in the Delaware River Basin Commission (DRBC) and the Susquehanna River Basin Commission (SRBC). Both of these Commissions were set up by Basin Compacts. These Commissions are granted broad authority over allocation of basin water. They review both surface and groundwater withdrawals that may have a “substantial effect” on basin waters. They generally limit their review to large withdrawals of 100,000 bgd or more. The commissions are concerned with the lowering of groundwater levels, water quality degradation, and any loss of aquifer storage capacity or substantial impact of flow. The SRBC and DRBC use their review authority and power to set standards that protect existing users from interference of new users coming in. Since 1985 the DRBC has required that all individual wells or groups of wells withdrawing 10,000 bgd or more to register. The withdrawals are registered with DEP. Withdrawal limits were traditionally watched by the DRBC during recharge periods to make sure that the takings did not exceed the rates of recharge. However, with the increased development and water usage along the basin, the Commission has been looking into making these limits more quantified. Now, new or increased withdrawals of 10,000 bgd must obtain permits. The applicant must show that their proposed withdrawals will not “significantly impair or reduce the flow of perennial streams in the area”. Both the DRBC and the SRBC have the authority to regulate withdrawal under emergency drought conditions.  

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53 “Will you have enough water tomorrow? (What farmers need to know about the Water Resources Planning Act” 2003 Brochure provided by the Pennsylvania Department of Environmental Protection and the Pennsylvania Department of Agriculture. 3920-PA-DEP3103  
55 Delaware River Basin Water Code §2.20.4; C.F.R. § 803.62.  
57 DRBC Resolution No. 85-19.  
58 18 C.F.R. §430.13 (d) (4).  
59 DRBC Compact §10.4, and SRBC Compact §11.4.
Project sponsors who are subject to governance by these Basin Commissions must file applications for approval of water usage. They may seek a preliminary consultation with Commission staff to discuss the plans. Project sponsors who are unsure whether their projects are subject to review by the Basin Commissions can ask for a determination. Public hearings are held in conjunction with the Commission meeting for approval or denial of the application. The hearings are legislative and not adjudicatory, although they may conduct adjudicatory hearings at their discretion. The DRBC has increased formality in their procedure. “Contested cases” are reviewed within 30 days of the initial decision, and the entire Commission will consider the request for hearing. The DRBC hearings allow for representation by counsel and the right to cross examine before a hearing officer. Following review of the hearing officer’s report, the DRBC enters a final decision. Appeals can be filed in federal district court within 45 days.

Both programs defer to the state water agency, unless interstate impacts are perceived.

V. THE MUNICIPAL AUTHORITIES AND THEIR RELATIONSHIP TO WATER MANAGEMENT

Pennsylvania is a state that defers much of its powers to municipalities. The Borough Code specifically authorizes municipal regulation of water wells. Other municipalities have the power to adopt ordinances deemed necessary for the peace, health, safety and welfare of the municipality. Among the allowable purposes of zoning ordinances are to promote or facilitate access to water and provision of water, unless they are superseded or preempted by Federal or State Laws.

Dispute has arisen between parties who have obtained DRBC permits but not zoning permits from their municipalities. The Commonwealth Court has ruled that the municipality must defer exclusive power to the DRBC and DEP. This decision has been upheld by the PA Supreme Court in other decisions because local zoning powers should not

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60 18 C.F.R. §§803.21-803.22.
61 18 C.F.R. §401.84.
62 18 C.F.R §401.90.
63 53 P.S. §§10603-10604.
be able to undermine the fundamental purposes of the Commissions. Acts 67 and 68 also give state agencies the power to review and consider local plans.\textsuperscript{65}

VI. THE FUTURE OF WATER MANAGEMENT IN PENNSYLVANIA

With the Passing of Act 220, Pennsylvania has taken the first step toward establishing better water resource management. The collection of rate usage information will be the foundation for a modern state water plan. The state water plan will have to be formed through the legislature in conjunction with the various basin commissions, taking into consideration all regional and municipal needs and uses. This is an enormous task that will include the codification of older state regulations and the adoption of new ones. If Pennsylvania follows other state’s examples, the legislature may create a quasi-independent Water Resource Board to regulate water use or approve water planning, separate from the DEP.\textsuperscript{66} This restructuring will require reallocation of funding from various programs and a likely need for increased funding to begin what would essentially be a new agency or a large branch of an existing agency.

Conflicts over water rights are currently resolved through Pennsylvania courts. With changes in water regulation, alternative dispute resolution may become necessary for efficiently and effectively settling disputes. Disputes between the state and those seeking permits would also require a hearing board, either the currently existing Environmental Hearing Board, if the authority rests within DEP, or perhaps a hearing board created along with the act delegating water management authority.

Pennsylvania will be undergoing a significant amount of change in the next decade to establish a water plan that conserves our resources and allows for development and use. It is important for the state to make the transition carefully, codifying the useful limits and systems that are in place and restructuring regulation of water use for best use and renewal.

\textsuperscript{65} see “Policy for Consideration of Local Comprehensive Plans and Zoning Ordinances in DEP Review of Permits for Facilities and Infrastructure” DEP Guide for Implementation of Acts 67 and 68.

VII. STRATEGIES FOR AGRICULTURAL WATER MANAGEMENT

It is important for individuals involved in agricultural water use to understand the state water management laws as they are at this point in time and to monitor the changes that will be taking place. The following outline will assist in understanding how these laws apply to an individual agricultural establishment.

A. Understand your withdrawal.
   1. Where are you getting your water? (a well, a stream, both?)
   2. Approximately how much water do you use on average daily basis?
   3. What is the majority of your water use for? (irrigation use?)

B. Understand the Government entities that have authority over your use.
   1. If you plan to develop land that had not been used in the past, are there municipal zoning considerations?
   2. Do you live within an area designated to a Basin Commission?
   3. Do you operate with DEP permits and testing for irrigation and drainage?
      EPA works through the DEP.

C. Act 220 Compliance.
   1. Do you use 10,000 bgd on average over a month?
   2. If you don’t know how much water you use, contact the DEP for measurement and data collection techniques.

D. Watch to see what plans are developed in the months and years following Act 220 data collection. Water plans will definitely be updated after the information starts coming in from Act 220. Will there be changes that affect your operation?