American Bar Association
Section of Environment, Energy, and Resources

Evolving Issues in Eastern Water Law

Harmonizing Management of Ground and Surface Water Use

R. Timothy Weston
Kirkpatrick & Lockhart Preston Gates Ellis LLP
Harrisburg, Pennsylvania

15th Annual Section Fall Meeting
Pittsburgh, PA
September 26-29, 2007

I. Introduction

The law governing the withdrawal and use of water in the eastern United States has substantially evolved from principles of common law, particularly riparian rights law, originally borrowed from English precursors. Over the past 250 years, such common law precedent has undergone considerable adjustment and refinement, reflecting the differing circumstances of hydrology in the new world, evolving understanding of hydrologic science, the pressures of the 19th Century's industrial revolution and development through the 20th Century. That evolution continues as new challenges are confronted in the 21st Century, ranging from concerns over maintenance of flow regimes for biological diversity and productivity and the uncertain impacts of climatic change. In the process, in a number of eastern states, common law has been supplemented, and to a significant degree supplanted by, statutory enactments establishing regulatory permitting systems (so called "regulated riparian" regimes). In addition to State level legal regimes, a management of water withdrawals and uses is substantially affected by several existing and proposed interstate compacts.

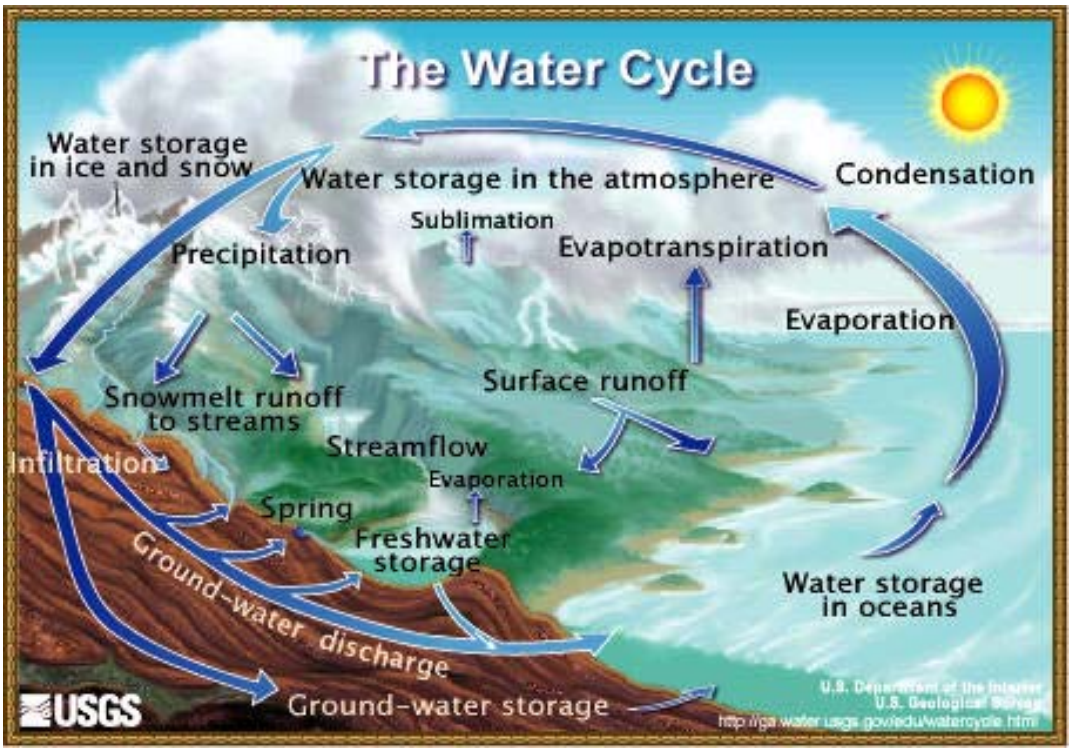
In large part, the common law doctrines governing surface and groundwater use evolved separately, with little to no recognition of the nexus between surface and groundwater within the hydrologic cycle. Likewise, some state-level administrative programs developed with particular focus on surface water or groundwater, but without an overarching understanding of the connection between such waters.

This paper provides a synopsis of the groundwater/surface water issue as it has evolved and continues to evolve in eastern water law regimes. After a brief overview of the hydrologic issue, we start with a summary of traditional common law doctrines, and how the common law dealt with (or failed to address) the groundwater/surface water nexus. Subsequent portions of this paper address examples of state "regulated riparian" administrative management programs, and how they have attempted to consider and address the connection between surface water and groundwater, and potential impacts involving withdrawals from one that may affect the other.

II. The Science Issue – Managing Water in the Hydrologic Cycle

Scientists generally consider all water as part of a unitary hydrologic cycle, and in general, many, if not most, eastern basin's ground and surface waters are hydrologically connected and interdependent.

As a starting point, The U.S. Geological Survey has provided a succinct graphic and verbal description of the hydrologic cycle (water cycle):



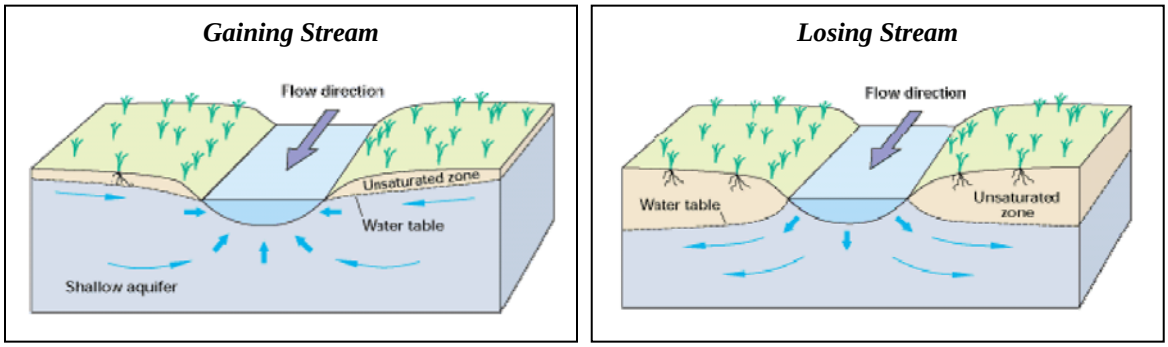
The water cycle has no starting point. But, we'll begin in the oceans, since that is where most of Earth's water exists. The sun, which drives the water cycle, heats water in the oceans. Some of it evaporates as vapor into the air. Ice and snow can sublimate directly into water vapor. Rising air currents take the vapor up into the atmosphere, along with water from evapotranspiration, which is water transpired from plants and evaporated from the soil. The vapor rises into the air where cooler temperatures cause it to condense into clouds. Air currents move clouds around the globe, cloud particles collide, grow, and fall out of the sky as precipitation. Some precipitation falls as snow and can accumulate as ice caps and glaciers, which can store frozen water for thousands of years. Snowpacks in warmer climates often thaw and melt when spring arrives, and the melted water flows overland as snowmelt. Most precipitation falls back into the oceans or onto land, where, due to gravity, the precipitation flows over the ground as surface runoff. A portion of runoff enters rivers in valleys in the landscape, with streamflow moving water towards the oceans. Runoff, and ground-water seepage, accumulate and are stored as freshwater in lakes. Not all runoff flows into rivers, though. Much of it soaks into the ground as infiltration. Some water infiltrates deep into the ground and replenishes aquifers (saturated subsurface rock), which store huge amounts of freshwater for long periods of time. Some infiltration stays

close to the land surface and can seep back into surface-water bodies (and the ocean) as ground-water discharge, and some ground water finds openings in the land surface and emerges as freshwater springs. Over time, though, all of this water keeps moving, some to reenter the ocean, where the water cycle "ends" ... oops - I mean, where it "begins."[1]

The problem is that this "school book" understanding of the connections within the water cycle is often missed in water management. As aptly observed in the forward to the USGS's *Ground Water and Surface Water A Single Resource*:[2]

> Traditionally, management of water resources has focused on surface water or ground water as if they were separate entities. As development of land and water resources increases, it is apparent that development of either of these resources affects the quantity and quality of the other. Nearly all surface-water features (streams, lakes, reservoirs, wetlands, and estuaries) interact with ground water. These interactions take many forms. In many situations, surface-water bodies gain water and solutes from ground-water systems and in others the surface-water body is a source of ground-water recharge and causes changes in ground-water quality. As a result, withdrawal of water from streams can deplete ground water or conversely, pumpage of ground water can deplete water in streams, lakes, or wetlands. Pollution of surface water can cause degradation of ground-water quality and conversely pollution of ground water can degrade surface water. Thus, effective land and water management requires a clear understanding of the linkages between ground water and surface water as it applies to any given hydrologic setting.

In most eastern watersheds, groundwater and surface waters are closely linked. Streams are often "gaining" surface water features, gathering water as they flow from springs and percolating groundwater entering the channel from the surrounding shallow groundwater table. The baseflow in many eastern streams (the flow that is sustained during periods without precipitation runoff), is directly derived from groundwater. In certain situations, where the groundwater elevation is lower than the stream level, surface waters may infiltrate to recharge the groundwater system, and the stream may be described as "losing."



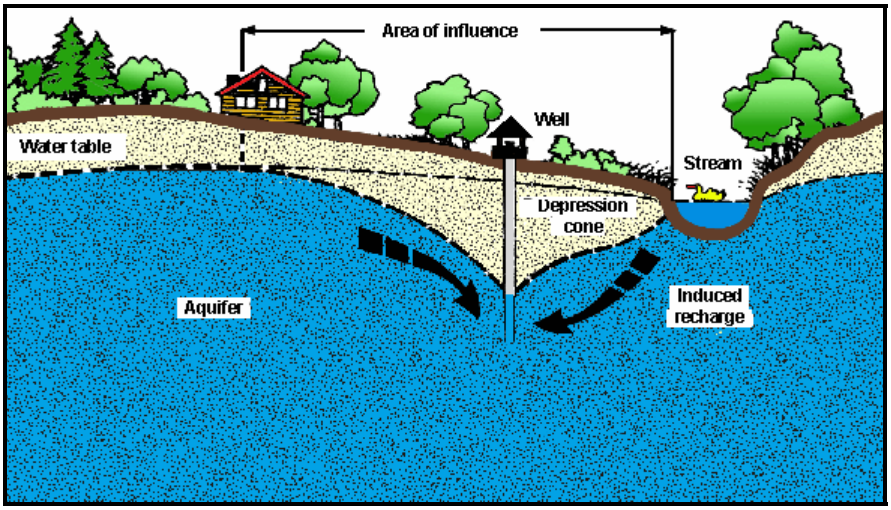
In nature, as a result of seasonal conditions or climatic events, such as droughts, stream / groundwater relationships may vary. Normally gaining streams may switch to replenishing

[1] USGS, The Water Cycle, http://ga.water.usgs.gov/edu/watercyclesummary.html.

[2] USGS Circular 1139, http://pubs.usgs.gov/circ/circ1139/htdocs/foreword.htm.

lowered groundwater under such conditions, and streams may temporarily cease to have surface flow.

Human activities, such as well pumping, may clearly affect this relationship. Where pumping generates a zone of influence that lowers the groundwater elevation in the vicinity of a stream, the result may be to induce recharge from the stream to the groundwater aquifer – interrupting or even reversing baseflow contributions to the stream.



The relationship between surface waters, groundwater and wetlands is even more complicated. Wetlands come in many different hydrologic and landscape settings. Some may represent areas where ground water is discharging to land surface, or they may represent situations where underlying geologic conditions prevent drainage of water from the land surface to the groundwater (*e.g.*, perched systems). Wetlands that occupy depressions in the land surface have interactions with ground water similar to lakes and streams. Unlike streams and lakes, however, wetlands do not always occupy low points and depressions in the landscape; they also can be present on slopes (such as fens) or even on drainage divides (such as some types of bogs). Understanding and predicting the relationship between wetlands, groundwater and surface water requires close analysis of topographic, geologic, and hydrologic conditions.

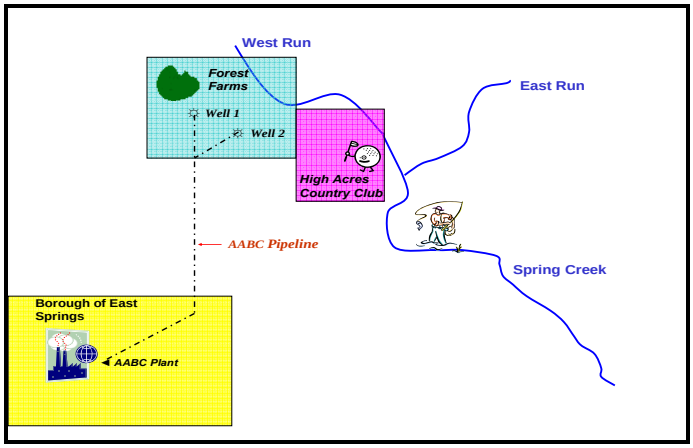
III. How the Interconnection Gets Raised - A Hypothetical

This brings us to the water management challenge. How do these relationships get raised and evaluated in the context of defining water withdrawal rights and resolving water withdrawal conflicts? For these purposes, perhaps a short hypothetical might be helpful.

- All American Brands Co. ("AABC") is proposing the development of a new specialty food processing and packaging facility in the Borough of East Springs, Trout County, in the State of Ripa. AABC requires a dependable peak day supply of 400,000 gallons per day to supply its plant, and the water must be of particularly high quality to meet food processing standards.

- The AABC plant site will be located in an industrial district of East Springs Borough, an economically depressed community.

- AABC has found available for purchase the 100 acre Forest Farms property about two miles away in the upper watershed of Spring Creek. The Forest Farms property overlies an aquifer known to produce very high quality water with substantial yields. AABC's plan is to install two 300 foot deep wells, each with a capacity to extract up to 300,000 gpd, but with a combined operating rate of 400,000 gpd.



- Forest Farms adjoins West Run, which joins East Run about two miles below Forest Farms to form the mainstem of Spring Creek.

- The bedrock aquifer underlying Forest Farms provides the source for a number of springs in the West Run watershed. Flows of some of those springs feed various pocket wetlands, while other springs flow more directly into unnamed tributaries of West Run.

- The upper and middle portion of Spring Creek is inhabited with varying populations of brook and brown trout, and sections of Spring Creek are frequented by recreational fisherman during the permitted fishing season.

- High Acres Country Club ("HACC"), whose facilities are adjacent to Forest Farms, operates a series of wells used for watering golf course tees, fairways and greens.

- Ripa Environmental Defenders & Development Opposition Group ("REDDOG") is concerned that the withdrawal and transfer of groundwater from Forest Farms to the East Spring Borough will (1) reduce stream flows in West Run and Spring Creek, and thereby impact downstream trout habitat and the aesthetic and recreational qualities of the Spring Creek watershed; (2) affect water quality in Spring Creek by reducing its assimilative capacity and causing a temperature increase as the result of reducing the amount of cool spring water flows entering the stream during the summer; and (3) reduce water levels in area wetlands, some of which may be habitat suitable for the Runamuck Turtle, a species listed as threatened by the Ripa Fish & Game Commission.

IV. Common Law Principles Applicable to Water Withdrawal Proposals

In large part, water rights in both surface and groundwaters in many eastern states are governed by common law, composed of the doctrines and precedents established by courts in cases decided over the past two centuries. Although regulatory programs adopted by some states or basin jurisdictions, such as the Susquehanna and Delaware River Basin Commissions, have displaced the courts as the arbiters of many water rights disputes, common law doctrines and traditions remain strong.

A. Classifications of Water

While scientists generally consider all water as part of a unitary hydrologic cycle, for purposes of water rights and allocation, the common law of most eastern states attempts to distinguish four different categories of water: (1) diffused surface waters (the sheet flow from rainfall); (2) surface waters in defined streams and lakes; (3) groundwaters in well-defined subterranean streams; and (4) percolating groundwaters.[3] Different rules have been developed for each classification in governing the diversion and use of such waters.

As aptly observed by one set of commentators:

> Man has coped with the complexity of water by trying to compartmentalize it. … [T]he legal profession … has on occasion borrowed from the criminal code to term some waters "fugitive" and others a "common enemy." The legal classification of water includes "percolating waters," "defined underground streams," "underflow of surface streams," "watercourses," and "diffuse surface waters", [even though] all these waters are actually interrelated an interdependent.[4]

These classifications developed in the nineteenth century because of an early lack of adequate hydrogeologic knowledge, and particularly a perceived inability to predict groundwater behavior. Some courts went so far as to describe the movement of water to and within groundwater aquifers as "secret," "occult," and "concealed,"[5] reflecting the view of the English court in *Acton v. Blundell*[6] that there could be no liability for interference with percolating groundwater, since "the percolation and flow of underground water are out of sight and are not susceptible of actual observation and proof."[7]

Although hydrologic science has progressed substantially, legal doctrines have been slow to accommodate to the now not-so-new knowledge. Some courts have acknowledged, if not embraced, the development of modern hydrogeologic science. For example, even before the beginning of the twentieth century, a Pennsylvania court observed:

---

[3] WATERS AND WATER RIGHTS §§4.05, 19.05 (R.W. Beck ed. 2001); R.T. Weston and J.R. Burcat, *Legal Aspects of Pennsylvania Water Management*, WATER RESOURCES IN PENNSYLVANIA: AVAILABILITY, QUALITY AND MANAGEMENT (1990).

[4] Harold E. Thomas and Luna B. Leopold, *Ground Water in North America*, 143 SCIENCE 103 (1964).

[5] *Chatfield v. Wilson*, 28 Vt. 49, 54 (Vt. 1856); *Frazier v. Brown*, 12 Ohio St. 294, 311 (1861).

[6] 12 Mees. and Wels. 324, 152 Eng. Rep. 1223 (Ex. 1843).

[7] *Forebell v. City of New York*, 164 N.Y. 522, 525, 58 N.E. 644, 645, *citing Acton, supra.*

> It is therefore clear, from the principles and reasoning of all the cases, that the distinction between rights in surface and in subterranean waters is not founded on the fact of their location above or below ground, but on the fact of knowledge, actual or reasonably acquirable, of their existence, location, and course. Geology is a progressive, and now, in many respects, a practical science; and … since the decisions in Acton v. Blundell, and Wheatley v. Baugh, probably more deep wells have been drilled in Western Pennsylvania than has previously been dug in the entire earth in all time. And that which was then held to be necessarily unknown, and merely speculative, as to the flow of water underground, has been, by experience in such cases as this, reduced almost to a certainty.[8]

Improved scientific knowledge has led some eastern State courts to substantially modify, if not abandon, prior distinctions in the classification of surface and groundwaters.[9] Yet many other jurisdictions, even where courts recognize the much changed status of hydrologic science, still reflect outdated classifications of water developed in another era. While little hydrologic or other scientific justification can be offered today for the distinctions between these various artificial classifications of water, a significant plurality, if not majority, of courts and legislatures have continued to adhere to distinctions developed in the nineteenth century.

B. Common Law Doctrines Governing Water Withdrawals

1. Riparian Rights in Surface Streams, Lakes and Subterranean Streams

Under the common law of eastern states, rights to withdraw and use waters in surface streams is generally governed by the "riparian rights" doctrine. Although subterranean streams are a very rare occurrence in most jurisdictions, where they exist, the use of water in such subterranean streams, like its surface stream counterpart, is almost always treated under the "riparian" doctrine.[10]

The details of riparian doctrine vary somewhat from jurisdiction to jurisdiction, and while many of the fundamental principles are shared, subtle but important nuances exist between the laws of eastern states. Under the common law, three main doctrines have developed for dealing with riparian water rights: the English common-law rule, also known as the natural flow doctrine, the reasonable use doctrine, and the appropriation or prior use doctrine.[11] Of these doctrines, the natural flow doctrine and the reasonable use doctrine are relevant to the development of water law in states east of the Mississippi.

Under the natural flow doctrine, each riparian proprietor of a watercourse has a right "to have the body of water flow as it was wont to flow in nature," qualified only by the right of other

---

[8] *Collins v. Chartiers Valley Gas Co.*, 131 Pa. 143, 159, 18 A. 1012 (1889)

[9] *See, e.g., Cline v. American Aggregates Corp.*, 15 Ohio St. 3d 384, 474 N.E.2d 324 (1984) (abandoning the absolute dominion rule that had been adopted in *Frazier v. Brown* based upon the unknowable and occult nature of percolating groundwater, and shifting to the principles of the RESTATEMENT (SECOND) OF TORTS §858).

[10] "Ripa" is Latin for river bank. A "riparian" owner is a person who owns the land along or under a defined stream.

[11] WATER AND WATER RIGHTS §§ 4.05, 7.02, 11.01; STOEBUCK & WHITMAN, THE LAW OF PROPERTY (3d ed), §7.4, pp 422-425.

riparian proprietors to make limited use of the water.[12] Put another way, under the natural flow theory, each riparian owner along a waterbody is entitled to have the water flow across the land in its natural condition, without alternation by others of the rate of flow, or the quantity or quality of the water.[13]

> The doctrine permits every owner to consume as much water as needed for "domestic" purposes, which generally means for personal human consumption, drinking, bathing, etc., and for watering domestic animals. Beyond this, the owner may use the water for "reasonable" artificial or commercial purposes, subject to the very large proviso that he may not substantially or materially diminish the quantity or quality of water. Certainly no water may be transported to land beyond the riparian land.[14]

While the natural flow theory may have served well in the agrarian society and areas of plentiful rainfall where it originated, the rule's proscription against alteration or diminution of flow was not found well suited when faced with the demands of the industrial revolution – where dams were erected to harness water power, and irrigation and industrial enterprises arose involving consumptive diversions that could measurably change flow volumes. As a result, courts evolved various exceptions and adjustments to the natural flow theory, sometimes retaining reference to its words, while failing to follow its explicit tenants.[15]

Faced with the realities of industrial and commercial development, many states moved from the strictures of the natural flow theory to what became known as the "American rule" or "reasonable use" doctrine. Under the reasonable use doctrine, "a riparian owner may make any and all reasonable uses of the water, as long [as] they do not unreasonably interfere with the other riparian owners' opportunity for reasonable use."[16] Whether and to what extent a given use shall be allowed under the reasonable use doctrine depends upon the weighing of factors on the side of the prospective user, and balancing those considerations against similar factors on the side of other riparian owners. No list of factors is exhaustive, because "the court will consider all the circumstances that are relevant in a given case."[17] While in theory no single factor is conclusive, domestic uses are strongly favored and will generally prevail over other uses. Further, while the reasonable use doctrine as applied in some states may allow water to be transported and used on non-riparian lands, such uses may be disfavored over uses on riparian land.[18]

Thus, under the reasonable use doctrine, each adjoining or overlying landowner has an equal and correlative right to make reasonable use of the water on the land which adjoins a

---

[12] RESTATEMENT (SECOND) OF TORTS, introductory note to §§ 850 to 857, p 210.

[13] 1 WATERS AND WATER RIGHTS § 7.02(c), and cases cited therein at footnote 181.

[14] STOEBUCK & WHITMAN at 422, *quoted in Michigan Citizens for Water Conservation v. Nestlé Waters North America Inc.*, 269 Mich. App. 25, 54-55, 709 N.W.2d 174, 194 (2005).

[15] 1 WATERS AND WATER RIGHTS § 7.02(c); *see, e.g., Dimmock v. City of New London*, 157 Conn. 9, 245 A.2d 569 (1968) (reciting to the natural flow theory, but refusing to issue injunction prohibiting city's diversion based upon a balancing of equities).

[16] STOEBUCK & WHITMAN at 423; 1 WATERS AND WATER RIGHTS § 7.02(d).

[17] STOEBUCK & WHITMAN at 423; *accord* 1 WATERS AND WATER RIGHTS § 7.02(d)(3).

[18] STOEBUCK & WHITMAN at 424; *see also* RESTATEMENT (SECOND) OF TORTS, introductory note to §§ 850 to 857, pp 211-212.

surface stream, or overlies the subterranean stream. As the reasonable use doctrine was explained by the Michigan Supreme Court, as between two riparian owners, the natural flow rule did not strictly apply because "it is manifest it would give to the lower proprietor superior advantages over the upper, and in many cases give him in effect a monopoly of the stream."[19] Thus, under the reasonable use theory, it is not a diminution in the water quantity or flow that will provide a right of action, if in view of all the circumstances, the withdrawal and actions that cause alleged injury "is not unreasonable."[20] What constitutes a reasonable use is determined on a case-by-case basis, weighing a myriad of factors.[21] The weighing of those factors may depend upon whether the dispute involves (1) two competing non-consumptive users; (2) a consumptive use competing (*e.g.*, agricultural irrigation or industrial withdrawal) with one or more non-consumptive users (*e.g.*, downstream boat liveries); or (3) competing consumptive users of similar or different nature.[22]

Further, the courts in some states, faced with a choice between the English version of riparian doctrine (which favors protecting the natural flow of a stream), and the American rule (which focuses on the reasonable use of the actor, and the reasonable needs of others), have adopted a fusion (or perhaps confusion) of the two rules. For example, Pennsylvania precedent holds that a riparian owner may divert, use, and consume all of the water necessary for household and general domestic uses on the land, even if the flow of the watercourse/subterranean stream is measurably and materially diminished.[23] If there is insufficient flow to maintain such domestic uses and other types of use, domestic uses have priority. Other uses, however, are classified as "extraordinary," including diversions for manufacturing, power generation and recreational use. Under Pennsylvania case law, a riparian owner's use of water for such extraordinary purposes is

---

[19] *Dumont v. Kellogg*, 29 Mich. 420, 422 (1874).

[20] *Id.*

[21] The RESTATEMENT (SECOND) OF TORTS §850A attempts to lay out those factors to be weighed in determining a reasonable use, including (1) its purpose; (2) its suitability to the water body; (3) its economic value; (4) its social value; (5) the harm it causes; (6) the potential for coordination with competing uses; (7) its temporal priority relative to competing uses; and (8) the justice of imposing a loss on the use. It should be noted that considerable debate has occurred among legal scholars as to whether the "reasonableness" test is to be determined in the abstract, based upon some form of "objective" standard (as advocated by Frank Trelease, Associate Reporter for the RESTATEMENT (SECOND) OF TORTS), or is fundamentally grounded upon determination of reasonableness as a relative relationship between disputing parties. *See* 1 WATERS AND WATER RIGHTS § 7.02(d)(1)-(2). As noted by Professor Joe Dellapenna in his insightful summary of the issue, the determination of reasonableness in individual cases almost necessarily requires courts to compare the benefits and costs of one use against the benefit and costs of another, incompatible use, to determine which use is "reasonable." *Id.* §7.09(d)(3). Such relative economic comparisons may include additional considerations of the costs to the plaintiff caused by the defendant's conduct, compared to the cost to the defendant of modifying that conduct to accommodate or mitigate impacts upon the plaintiff. *Id.*

[22] *Id.* § 7.03.

[23] *Palmer Water Co. v. Lehighton Water Co.*, 280 Pa. 492, 124 A. 747 (1924) (domestic uses superior to mechanical and manufacturing uses); *Philadelphia v. Philadelphia Suburban Water Co.*, 309 Pa. 130, 163 A. 297 (1932) (diversion for domestic uses superior to public right to navigation).

limited to that quantity which is reasonable in view of the rights of other riparian owners, and which will not materially or perceptibly diminish the flow of the surface or subterranean stream.[24]

Depending on the jurisdiction, the right to transfer water off of the land adjoining the stream may be limited or even entirely proscribed. Some state cases treat off-land transfers of water withdrawn from a stream to be *per se* unreasonable,[25] while others view such uses as merely disfavored or less favored than on land uses.[26]

2. Common Law Rights in Percolating Groundwater

As with riparian water law, three main common-law rights have developed with respect to groundwater withdrawal disputes: (i) the English rule of absolute ownership; (ii) the American doctrine of "reasonable use"; and (iii) the so-called doctrine of correlative rights.[27]

The first doctrine, referred to as the English rule or the absolute ownership rule, was first stated in *Acton v Blundell*.[28] Under this rule, a possessor of land may withdraw as much underground water as he or she wishes, for whatever purposes desired, without liability to neighboring property owners. This absolute ownership rule ostensibly remains the law in a very small minority of states.[29]

In the eastern U.S., the most prevalent rule applicable to groundwater disputes is the doctrine of reasonable use, also sometimes called the American Rule. However, the doctrine of reasonable use in the groundwater context is not actually dependent on the reasonableness of the use. Rather, as the doctrine has developed, it generally has been held that virtually all uses of water made upon the land from which it is extracted are "reasonable," even if they more or less deplete the supply to the harm of neighbors, unless the purpose is malicious or the water simply wasted.[30] The impact of the American Rule can sometimes be particularly harsh and surprising to laypersons. As late as 1957, for example, a Pennsylvania court ruled that a mine operator could dewater and lower water tables throughout an entire valley, with no responsibility for injuries to owners of domestic wells whose supply was thereby cut off.[31]

---

[24] *Palmer Water Co. v. Lehighton Water Co.*, 280 Pa. 492, 124 A. 747 (1924); *Brown v. Kistler*, 190 Pa. 499, 42 A. 885 (1889); *Clark v. Pennsylvania R.R.*, 145 Pa. 438, 22 A. 989 (1891).

[25] *See Scranton Gas & Water Co. v. Delaware L. & W. R.R.*, 240 Pa. 604, 88 A. 24 (1913); *Irving's Ex'rs. v. Borough of Media*, 10 Pa. Super. 132 (1899), *aff'd*, 194 Pa. 648, 45 A. 482 (1900).

[26] *Michigan Citizens for Water Conservation*, 269 Mich. App. at 57-58, 709 N.W.2d at 196.

[27] 3 WATERS AND WATER RIGHTS Ch. 20-22; STOEBUCK & WHITMAN, § 7.5, p 427.

[28] 12 Mees & Wels. 324; 152 Eng. Rep. 1223 (Exch, 1843).

[29] *See Sipriano v Great Spring Waters of America, Inc.*, 42 Tex. Sup. Ct. 629; 1 SW 3d 75 (Tex, 1999); *Maddocks v Giles*, 1999 ME 63, 728 A.2d 150, 153 (Me. 1999).

[30] *See, e.g., Wheatley v. Baugh*, 25 Pa. 528, 531 (1855); *Williams v. Ladew*, 161 A. 283 (1894).

[31] *DiGiacinto v. New Jersey Zinc Co.*, 27 Lehigh L.J. 307 (C.P. Pa. 1957). With respect to mining impacts on water supplies, the *DiGiacinto* approach has been explicitly reversed by subsequent legislation. For example, under the Surface Mining Conservation and Reclamation Act and the Non-Coal Surface Mining Conservation and Reclamation Act, the mine operator who

Under the American doctrine of reasonable use, groundwater use on overlying land is virtually unfettered, but when the question is whether water may be transported off that land for use elsewhere, this is usually found "unreasonable," though it has sometimes been permitted. As observed recently by the Michigan Court of Appeals, "[a]uthorities are not all agreed, but a principle that seems to harmonize the decisions is that water may be extracted for use elsewhere only up to the point that it begins to injure owners within the aquifer."[32]

The third doctrine is a variant of the reasonable use doctrine developed in California, often called the correlative rights doctrine.[33] Under the correlative rights theory, owners of land within an aquifer are viewed as having equal rights to put the water to beneficial uses upon those lands. However, an owner's rights do not extend to depleting his neighbor's supply, at least not seriously, and in the event of a water shortage, a court may apportion the supply that is available among all the owners.

3. The Restatement Rules for Surface Water and Groundwater

The RESTATEMENT (SECOND) OF TORTS tracks common-law "reasonable use" principles for surface and ground water use and withdrawal. However, the RESTATEMENT's enunciation of the principles have not met with universal approval. Some states have cited the RESTATEMENT with approval, while other jurisdictions have either rejected its tenants or only partly embraced its concepts.

As to uses of surface water, a "reasonable use" under the Restatement generally "depends upon a consideration of the interests of the riparian proprietor making the use, of any riparian proprietor harmed by it and of society as a whole."[34] The RESTATEMENT also collects a series of common-law principles and sets forth a non-exclusive list of factors to consider in determining the reasonableness or unreasonableness of the proposed use, including: "(a) [t]he purpose of the use, (b) the suitability of the use to the watercourse or lake, (c) the economic value of the use, (d) the social value of the use, (e) the extent and amount of the harm it causes, (f) the practicality of avoiding the harm by adjusting the use or method of use of one proprietor or the other, (g) the practicality of adjusting the quantity of water used by each proprietor, (h) the protection of existing values of water uses, land, investments and enterprises and (i) the justice of requiring the user causing harm to bear the loss."[35]

Similar to the American Rule, "[a] riparian proprietor is subject to liability for making an unreasonable use of the water of a watercourse or lake that causes harm to another riparian proprietor's reasonable use of water or his land.[36] For "diffused" surface water, the Restatement provides that "[t]he possessor of land is not subject to liability for a use of surface water on his

---

contaminates or diminishes a public or private water supply must restore or replace the affected supply. 52 P.S. §1396.4b(f); 52 P.S. §3311(g).

[32] *Michigan Citizens for Water Conservation*, 269 Mich. App. at 59, 709 N.W.2d at 197, *quoting* STOEBUCK & WHITMAN at 428-429.

[33] 3 WATERS AND WATER RIGHTS §21.01 *et seq.*; STOEBUCK & WHITMAN at 429.

[34] RESTATEMENT (SECOND) OF TORTS § 850A.

[35] *Id.*

[36] *Id.* § 850.

land that interferes with another person's use of the water, unless the use is made for the primary purpose of causing the harm."[37]

Under Section 858 of the RESTATEMENT (SECOND) OF TORTS, landowners withdrawing groundwater generally have no liability for interfering with the use of water by another if the withdraw is "for a beneficial purpose."[38] Liability attaches, however, if "(a) the withdrawal of ground water unreasonably causes harm to a proprietor of neighboring land through lowering the water table or reducing artesian pressure, (b) the withdrawal of ground water exceeds the proprietor's reasonable share of the annual supply or total store of ground water, or (c) the withdrawal of the ground water has a direct and substantial effect upon a watercourse or lake and unreasonably causes harm to a person entitled to the use of its water."[39]

C. Interaction Between Surface Water and Groundwater

The separate common law doctrines developed to deal with disputes between competing users of surface water, or between competing uses of groundwater, face a major challenge when confronted with the interplay between surface and groundwater within the hydrologic system. A withdrawal of groundwater may impact springs or the baseflow of nearby streams. Conversely, the withdraw from some surface water may impact the recharge of groundwater aquifers, or cause salt water movement in an estuary such as to come in contact with the recharge of a groundwater system (as has been the case with portions of the Potomac-Raritan-Magothy Aquifer in southern New Jersey).

Relatively few cases have tackled the nexus between ground and surface water, and those that have note the difficulty of reconciling sometimes diametrically inconsistent rules governing the two resources.

In *Pence v. Carney*,[40] for example, the West Virginia Supreme Court tackled claims from a landowners whose surface spring (used in a hotel spa) was materially and directly impacted by the pumping of a new well on neighboring land. The evidence of an interconnection between the groundwater and spring/surface water was virtually undisputed. However, the court apparently viewed the matter as involving the application of groundwater law, and in the absence of evidence of an underground stream connecting the well and spring, the interference would not be actionable.[41]

In contrast, several New York cases opt for a seeming more "absolutist" view toward protecting surface waters. For example, in *Stevens v. Spring Valley Water Works and Supply Company*, 247 N.Y.S.2d 503 (N.Y. App. Div., 1964), the New York court found a public water

---

[37] *Id.* § 864.

[38] *Id.* § 858.

[39] *Id.* Several states have explicitly adopted the RESTATEMENT's version of the rule. *See State v. Michels Pipeline Construction, Inc.*, 63 Wis. 2d 278, 299, 217 N.W.2d 339, 349 (1974); *Henderson v. Wade Sand & Gravel Co.*, 388 So. 2d 900 (Ala. 1980); *Cline v. American Aggregates Corp.*, 15 Ohio St. 3d 384, 387, 474 N.E.2d 324, 327 (1984).

[40] 58 W.Va. 296, 52 S.E. 702 (1905).

[41] The case contains a discussion of "reasonable use" in the groundwater context, but the focus appears to be more upon the reasonableness of the well owner's use for support of activities on his land, not the reasonableness of the interference with the spring owner's rights of flow.

supply company liable for damages where evidence indicated that the pumping wells intercepted groundwaters that had formerly fed a stream crossing the plaintiff's property, causing it to go dry. Resting on the premise that the "right to use and enjoyment of a stream, "running in a defined and natural channel, *jure naturae*, appertains to the riparian landowner," the court reasoned that the fact that the diversion and diminution of the stream was caused by collecting underground waters which fed the stream "does not affect the question."[42] Thus, the New York court applied the riparian doctrine of protecting a stream owner's interest to "natural flow" to impose liability on the what would otherwise have been a fully legitimate groundwater withdrawal.

A similar approach was adopted by the Connecticut Supreme Court in *Collens v. New Canaan Water Company.*[43] After the water company drilled five wells within 50 to 120 feet along the Noroton River, stream flows during the summer in the vicinity of downstream plaintiffs' lands were substantially diminished – to the point of going dry. The wells were found to have induced seepage of stream water into the underlying glacial formations, thereby feeding the wells. With these facts, the Connecticut court reasoned:

> The plaintiffs, as riparian owners along the Noroton river, are entitled to the natural flow of the water of the running stream through and along their land, in its accustomed channel, undiminished in quantity or unimpaired in quality. … This is not a case of interference with percolating waters …. Rather, this is a case of interference with the waters of an established and visible stream or river, although the interference occurs beneath the surface.
>
> It is immaterial in what manner the diversion of the stream by the stream by the defendant is effected. Diversion or diminution of the natural flow of a surface stream to the detriment of the riparian owners by the defendant's pumping water from wells supplied by the underground waters which support the visible stream is an interference with the rights of the riparian owners which entitles them to injunctive relief and damages for the injury sustained. … It has been recognized as a proposition of hydraulics that the flow of a stream may be diverted or diminished by the use of wells as was found to have occurred in the present case.[44]

A recent decision by the Ohio Supreme Court, *Portage County Board of Commissioners v. Akron,*[45] provides a different view of the groundwater / surface water connection issue. The court rejected claims of trespass asserted by Akron, as the holder of state-granted rights to take water from the Cuyahoga River. Akron complained that a municipal well field operated by Shalersville drew from an aquifer that would otherwise flow to the river, and therefore, infringed on Akron's water right. Reasoning that that Shalersville had a property interest in the groundwater underlying its land, the court found no basis for Akron's position that it had "ownership of the groundwater … because it eventually finds its way into the Cuyahoga River

---

[42] 247 N.Y.S. 2d at 511, *quoting Smith v. City of Brooklyn,* 160 N.Y. 357, 260-261, 54 N.E. 787, 788 (1899).

[43] 155 Conn. 477, 234 A.2d 825 (1967).

[44] 155 Conn. at 486-87, 234 A.2d at 831 (citations omitted).

[45] 109 Ohio St. 3d 106, 846 N.E.2d 478 (2006).

…."[46] Interestingly, the Ohio court framed the question solely in terms of "ownership" rights and trespass law, rather than relative use rights involving interconnected resources.

The diametrically opposed approaches of providing essentially no protection to spring flow interferences on the one hand, or absolute protection to stream natural flows on the other, underscore the clash between traditional surface water and groundwater doctrines. On the one hand, the West Virginia and Ohio decisions provide little recognition of the essential support provided to surface flows from groundwater withdrawals. Conversely, the New York and Connecticut court decisions that accord protection against interference with natural stream flows by well pumpage seem to go beyond modern riparian doctrine – affording downstream riparian owners with more protection against stream diminution from well pumping than they might receive from diminution resulting from upstream direct surface water withdrawals.

The clash of doctrines problem is highlighted in the 2005 decision in *Michigan Citizens for Water Conservation v. Nestlé Waters North America Inc.*,[47] where Michigan's intermediate Court of Appeals was confronted with claims that groundwater withdrawals for a new bottled water facility would impact water levels in certain wetlands and the flow of the most interestingly named "Dead Stream," to the alleged detriment of recreational and aesthetic interest of an environmental group's members. In *Michigan Citizens*, the Court of Appeals parsed a "reasonable use balancing test" to deal with such cross-resource impacts. The court started with the observation that "in our increasingly complex and crowded society, people of necessity interfere with each other to a greater or lesser extent. For this reason, the 'right to [the] enjoyment of . . . water . . . cannot be stated in the terms of an absolute right.'"[48] The reasonable use balancing test recognizes that

> virtually every water use will have some adverse effect on the availability of this common resource. For this reason, it is not merely whether one suffers harm by a neighbor's water use, nor whether the quantity of water available is diminished, but whether under all the circumstances of the case the use of the water by one is reasonable and consistent with a correspondent enjoyment of right by the other.[49]

---

[46] 109 Ohio St.3d at 125, 846 N.E.2d at 496, *citing McNamara v. Rittman*, 107 Ohio St.3d 243, 838 N.E.2d 640 (2005) (landowners have property interest in groundwater underlying their lands, and governmental interference with that right can constitute a taking).

[47] 269 Mich. App. 25, 709 N.W. 2d 174 (2005), *affirmed in part and reversed on other grounds*, Michigan Supreme Ct. No. 130802, 130803 (July 25, 2007). The Michigan Supreme Court recently addressed only one aspect of the Court of Appeals decision, concerning whether the plaintiffs in that case had standing to bring a claim under the Michigan Environmental Protection Act ("MEPA") as related to certain lakes, streams and wetlands. A closely divided state Supreme Court found that while the plaintiffs had sufficient standing to assert a MEPA claim as to impacts to Dead Stream and Thompson Lake, they had failed to allege injury in fact with respect to another lake or certain wetlands because there was no evidence that they used those areas or that their recreational, aesthetic or economic interests had been injured by the water company's pumping activities. Mich. Supreme Ct. slip op. at pg. 31.

[48] 269 Mich. App. at 69, 709 N.W.2d at 202 (*quoting Hart v. D'Agostini*, 7 Mich. App. 319, 321, 151 N.W.2d 826 (1967)).

[49] *Id.* (internal quotes omitted).

Recognizing that the balancing test is a case-specific inquiry, the *Michigan Citizens* opinion suggests that under Michigan law there are three underlying principles that govern the balancing process. First, the law seeks to ensure a "fair participation" in the use of water for the greatest number of users, and accordingly a court would attempt to strike a proper balance between protecting the rights of the complaining party and preserving as many beneficial uses of the common resource as is feasible under the circumstances. Second, the law will only protect a use that is itself reasonable. Third, the law will not redress every harm, no matter how small, but will only redress unreasonable harms. Therefore, a plaintiff must be able to demonstrate, not only that the defendant's use of the water has interfered with the plaintiff's own reasonable use, but also that the interference was substantial.[50] Applying these principles, the balancing test would involve a weighing of numerous factors, including (1) the purpose of the use; (2) the suitability of the use to the location, including the nature of the water source and its attributes; (3) the extent and amount of the harm; (4) the benefits of the use; (5) the necessity of the amount and manner of the water use; and (6) any other factor that may bear on the reasonableness of the use, such as the impacts on the quantity, quality, and level of the water.[51] The RESTATEMENT (SECOND) OF TORTS §850A recites a similar factor based balancing approach to determination of such water use conflicts.

V. Regulated Riparian Regimes

A number of states have moved away from a pure common-law, water-rights arrangement to what has been termed a "regulated riparian" system of water rights management. Traditionally, not many eastern states had regulatory schemes governing water rights; most relied (and many still do) on many of the common-law principles outlined above.[52] Western states typically experienced more regulation. Now, however, even eastern states have moved to regulated riparian systems.

The American Society of Civil Engineers published THE REGULATED RIPARIAN MODEL WATER CODE, which provides a comprehensive code designed for adoption by state governments (particularly states east of the Mississippi) "for allocating water rights among competing interests and for resolving other quantitative conflicts over water."[53] As stated in the preface to the Model Code, a number of eastern states have adopted some type of "regulated riparian" system.

The typical elements of a regulated riparian system are: (1) enactment of an administrative permitting or withdrawal approval program, typically applicable to new, expanded and (sometimes) existing withdrawals in excess of a trigger quantity; (2) assignment of an executive agency (a board, commission or department) to oversee, implement, and enforce the withdrawal approval program; (3) statutory or regulatory declaration of policies and criteria governing the approval and operation of regulated withdrawals (frequently involving a restatement or adjustment of "reasonable use" principles); and (4) a dispute resolution process for addressing conflicts between water users (such as interference between wells, or interference with stream flows).

---

[50] 269 Mich. App. at 69-70, 709 N.W.2d at 202-203.

[51] 269 Mich. App. at 71, 709 N.W.2d at 203.

[52] 1 WATERS AND WATER RIGHTS § 9.01, at 9-4 to 9-5 (R.E. Beck ed. 2001).

[53] AMERICAN SOCIETY OF CIVIL ENGINEERS, THE REGULATED RIPARIAN MODEL WATER CODE iii (J. Dellapenna ed. 1997) (preface to the Model Code).

An exhaustive review of regulated riparian regimes in individual states (both statutory enactments and regulatory implementation) is well beyond the scope of this panel and paper. However, to provide some insight into the relevant concepts of regulated riparian water management, and how such regulated regimes address the surface water/groundwater interconnection, we will review some "example" State jurisdictions. In addition to state-level regulated riparianism, the Delaware and Susquehanna river basin compacts, and the commissions created under those compacts, establish pervasive basinwide management of water quality and quantity issues addressing both ground and surface water resources, which are discussed below. Also, we have included a short discussion of the proposed Great Lakes – St. Lawrence River Basin Water Resources Compact, which (if finally adopted) will affect future management of the nation's largest fresh water resource.

A. State Regulated Riparian Regimes

State regulated riparian regimes vary widely in content, including the degree to which they address the connection between surface and groundwater resources, and seek conjunctive management of these interrelated resources. While some state water regulatory systems embrace an integrated management approach (setting aside traditional common law categories of water), other jurisdictions have adopted statutes and programs that separately regulate groundwater and/or surface water withdrawal and use, leaving the nexus unresolved.

1. State Integrated Regulated Riparian Regimes

A number of forward-looking states have enacted and implemented water withdrawal regulatory regimes which generally seek to achieve conjunctive management of ground and surface waters – applying the same general principles to approval of new or expanded water withdrawals irrespective of the source, while mandating a consideration of impacts on interconnected water resources. According to a survey conducted by Professor Joseph Dellapenna, twelve of the seventeen eastern regulated riparian states have integrated the regulation of groundwater with the regulation of surface water bodies.[54]

Delaware

Although the State of Delaware once relied upon a largely common law approach to water management, in 1966 Delaware adopted a permit system for regulating more significant withdrawals from surface water and groundwater under 7 Del. Code §6001 *et seq.* Section 6003 of the statute prohibits any person, without a permit issued by the Secretary of the Delaware Department of Natural Resources and Environmental Control ("DNREC") to "undertake any activity … [i]n any way which may cause or contribute to the withdrawal of ground water or surface water or both." Under regulations adopted by DNREC, this water withdrawal permitting

[54] 3 WATERS AND WATER RIGHTS §23.02(b) (*not counting Hawaii*). The 12 eastern states include: Alabama (Ala. Code §9-10B-3(3), (19)); Connecticut (Con.. Gen. Stat. §§ 22a-367(9), 22a-368); Delaware (Del. Code Ann. tit. 7, §§ 6003(a)(3), (b)(4)); Florida (Fla. Stat. § 373.019(17), 373.023(1)); Iowa (Iowa Code § 455B.264(l), 455B.268(1)(a)); Kentucky (Ky. Rev. Stat. Ann. §§ 151.120(1), 151.150(2); Maryland (Md. Code Ann., Envir. §§ 5-101(j)(1), 5-501(a), 5-502(a)); Massachusetts (Mass. Gen. Laws ch. 21G, §§ 2, 7); Minnesota (Minn. Stat. §§ 103G.005(17), 103G.271(1)); Mississippi (Miss. Code Ann. §§ 51-3-1, 51-3-5); New Jersey (N.J. stat. Ann. §58.1A-3(g)); North Carolina (N.C. Gen. Stat. § 143-215.21(3), (5)).

program has been restricted to projects involving the withdrawal of greater than 50,000 gallons of water in any 24 hour period.[55]

The Delaware statute declares that water is to be allocated on the basis of equitable apportionment,[56] and DNREC regulations provide substantial definition and refinement to that general concept in specifying the factors to be considered in review and issuance of water withdrawal permits. Delaware's rules establish some general guidelines for determining the limits on withdrawals from both surface and groundwater sources. Surface-water withdrawals are limited to those rates which:

- do not interfere with other permitted withdrawals unless compensation for such injury is provided satisfactory to the Department;
- allow dilution and flushing of waste discharges and maintain adopted water quality standards;
- protect valuable fish and wildlife; maintain adequate flow over spillways of downstream impoundments;
- prevent intrusion of saline waters where such intrusion threatens ground or surface water supplies; and
- provide other ecological, recreational, aesthetic, and private benefits which are dependent upon surface water flows.[57]

In a similar manner, groundwater withdrawals are limited to rates which will not cause:

- long-term progressive lowering of water levels, except in compliance with management water levels established by the Department;
- significant interference with the withdrawals of other permit holders unless compensation for such injury is provided satisfactory to the Department;
- violation of water quality criteria for existing or potential water supplies; significant permanent damage to aquifer storage and recharge capacity; or
- substantial impact on the flow of perennial streams below those rates specified for surface waters in the preceding section.[58]

During review of an application, DNREC will also evaluate whether the requested use permit is consistent with local, state, and regional water resources plans, land use plans, and

[55] DNREC Regulations Governing the Allocation of Water, §1.02.

[56] 7 Del. C. § 6010(f)(1).

[57] Regulations Governing the Allocation of Water § 3.03.

[58] *Id.* § 3.04.

zoning requirements.[59] DNREC's permit application forms solicit specific information upon which to review each proposal against the factors and criterion discussed above.[60]

Water allocation permits are typically issued with a specified maximum allowable withdrawal rate expressed in daily, monthly and annual terms.[61] Most users are required to install and record water use based upon metering,[62] although agricultural wells may utilize alternative means, such as time lapse recorders to estimate water withdrawals.[63] Permits for most wells (except agricultural wells) mandate a mechanism for recording water levels under both pumping and non-pumping conditions,[64] providing information that may later be used to determine potential drawdown and interference effects within the aquifer.

With certain exceptions, permits are issued for a thirty-year period and are reviewed every five years.[65] The periodic review of permits will be coordinated with periodic analyses of water withdrawals and hydrologic conditions on an aquifer or drainage basin basis where possible.[66] Permits are renewable so long as "the use remains reasonable and beneficial and providing the withdrawal has not exceeded the safe sustainable yield."[67] Existing permits may be modified, with modifications either initiated by the permit holder by application or by DNREC if the agency deems modification of an existing permit to be necessary in order to "avoid or mitigate significant adverse impacts on human health, aquifers, or the environment."[68]

Delaware's regulations do not establish any priority scheme or ranking of water uses. All types of water use deemed reasonable and beneficial are considered equal for the purposes of allocation.[69] Thus, the agency is left with substantial discretion in granting allocation permits and balancing the allocation among competing water uses.

Florida

Florida's Water Resources Act of 1972 has been regarded as "perhaps the most comprehensive modern statutory water code adopted by any of the eastern states."[70]

---

[59] *Id.* § 4.02

[60] Forms are available at http://www.dnrec.state.de.us/water2000/Sections/WatSupp/Library/WaterSuppForms.htm.

[61] *Id.* § 5.05.B.

[62] *Id.* § 5.

[63] *Id.* § 5.06.A.3.

[64] *Id.* § 5.05.D.

[65] *Id.* § 5.01.

[66] *Id.* § 5.02.

[67] *Id.* § 5.02.

[68] *Id.* § 5.03.

[69] *Id.* §5.02.

[70] Christine A. Klein, *Florida*, *in* 6 WATERS AND WATER RIGHTS 477 (R.E. Beck ed. 2005).

The Florida Department of Environmental Protection ("DEP") supervises five "water management districts" in the state, each of which has broad administrative powers, including general rulemaking authority. The water management districts have a significant role in statewide water resource planning.[71] The management districts have the power to issue "consumptive use permits" pursuant to Fla. Stat. 373.219 and "may impose such reasonable conditions as are necessary to assure that such use is consistent with the overall objectives of the district or department and is not harmful to the water resources of the area."[72] Permits need not issue for domestic consumption of water by individual users.[73] All but one of the management districts require no permit for uses or withdrawals of either surface or groundwater under 100,000 gpd.[74] Permits last anywhere from 20 to 50 years and can be renewed before the expiration of the initial term.[75]

Under the Water Resources Act, "water" is defined as "any and all water on *or beneath the surface of the ground* or in the atmosphere, including natural or artificial watercourses, lakes, ponds, or diffused surface water and water percolating, standing, or *flowing beneath the surface of the ground*, as well as all coastal waters within the jurisdiction of the state."[76] Thus, the permitting requirements of the Water Resources Act apply both to surface and ground water uses. To obtain a consumptive use permit, an applicant generally must meet the following conditions:

- That the proposed is a "reasonable-beneficial use," defined by Section 373.019 as "the use of water in such quantity as is necessary for economic and efficient utilization for a purpose and in a manner which is both reasonable and consistent with the public interest."[77]

- That the proposed use "will not interfere with any presently existing legal use of water"; and

- That the proposed use is "consistent with the public interest."[78]

Florida's DEP and water management districts have the mandatory duty to set minimum flows and levels to protect water resources and the ecology.[79] The minimum flow for surface waters "shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area."[80] The minimum groundwater level "shall be the level of groundwater in an aquifer and the level of surface water at which further withdrawals would be

---

[71] Fla. Stat. §§ 373.069 & 373.070.

[72] *Id.* § 373.219(1).

[73] *Id.*

[74] *See* Fla. Admin. Code r. 40E-2.041(1)

[75] Fla. Stat. § 373.236.

[76] *Id.* § 373.019

[77] *Id.* § 373.019.

[78] *Id.* § 373.223.

[79] *Id.* §373.042.

[80] *Id.* §373.042(1)(a).

significantly harmful to the water resources of the area."[81] Each water management district annually submits to DEP for review and approval "a priority list and schedule for the establishment of minimum flows and levels for surface watercourses, aquifers, and surface waters within the district[.]"[82]

Beyond withdrawal permits, Florida also requires "environmental resource permits" ("ERPs") for most land alterations affecting surface waters and wetlands.[83] Under the ERP system, DEP and water management districts may require "such reasonable conditions as are necessary" before issuing any permits for land alterations. An applicant generally must demonstrate that the proposed alteration will not harm existing water resources or be inconsistent with the overall objections of the water management district.[84] However, there are a host of exceptions to the ERP requirements.[85]

Kentucky

Kentucky is, by and large, a regulated riparian state but still relies to some degree on common law principles.[86] In Kentucky, surface water is either "diffused" (which is not "public water" of Kentucky[87]) or "in a natural watercourse."[88] Groundwater is either "percolating" or is an underground stream.[89]

The Water Resources Division of the Kentucky Environmental and Public Protection Cabinet regulates the use and transfer of "public water."[90] "Public water" – defined as "water occurring in any stream, lake, ground water, subterranean water or body of water in the Commonwealth which may be applied to any useful and beneficial purpose"[91] – is subject to permit requirements; other water is not.

Since 1966, Kentucky has required "any person, business, industry, city, county, water district or other political subdivision desiring to withdraw, divert or transfer public water" (both surface or groundwater) in excess of an average daily flow of 10,000 gpd[92] to register with the

---

[81] *Id.* §373.042(1)(b).

[82] *Id.* §373.042(2).

[83] *Id.* §373.413.

[84] *Id.* §§373.413(1), 373.414(1).

[85] *Id.* §§373.406.

[86] David Edward Spenard, *Kentucky*, *in* 6 WATERS AND WATER RIGHTS 607 (R.E. Beck ed. 2005).

[87] Ky. Rev. Stat. § 151.120(2).

[88] Ky. Rev. Stat. § 151.100 (definitions).

[89] *Id.* § 151.100(5); *Commonwealth, Dep't of Highways v. Sebastian*, 345 S.W.2d 46, 47 (Ky. 1961) (groundwater presumptively is "percolating").

[90] *Id.* § 151.120(1).

[91] *Id.*

[92] 404 Ky. Admin. Regs. 4:010 (2006).

Cabinet and apply for a permit.[93] Exceptions to permit requirements include use of public waters by abutting landowners for domestic purposes[94] and withdrawals for less than 10,000 gpd.[95]

The Cabinet has a duty to issue a permit to an applicant if, after investigation, the applicant has demonstrated the following: (1) "the quantity, time, place or rate of withdrawal of public water will not be detrimental to the public interest"[96] (2) the withdraw will not be detrimental to "the rights of other public water uses";[97] (2) issuing the permit would be "consistent with the administrative regulations promulgated by the Kentucky River Authority";[98] and issuing the permit would be consistent with "the long-range water resource plan and drought response plans developed by the authority."[99]

Maryland

Maryland has a well-established permit program governing withdrawals from both ground and surface water programs, operating as a "regulated riparian" regime. Maryland law requires every person obtain a permit from the Maryland Department of the Environment ("MDE") before appropriating state water or beginning to "construct any plant, building, or structure which may appropriate or use any waters of the State, whether surface water or groundwater."[100] Exceptions are provided for uses of water for domestic purposes (other than for heating and cooling) and for those agricultural withdrawals involving an average annual water use of less than 10,000 gallons per day.[101] MDE regulations further except residential subdivisions of ten or fewer lots if water is obtained from individual wells on each lot, where the property is not within a water management strategy area and (for property located west of the fall line) the lot is at least 1 acre in area.[102] In addition, related provisions require permits for the construction or alteration of dams, reservoirs, or waterway obstructions, and for any other activity that changes the course, current or cross section of any stream or body of water.[103]

The prime statutory criteria concerning review of water withdrawal permit applications establishes a balancing arrangement, where MDE must "weigh all respective public advantages and disadvantages" of the application.[104] MDE is required to issue a permit if it determines, based on its investigations, evidence before it and the water resources policy set forth in the

[93] Ky. Rev. Stat. § 151.150(1).

[94] *Id.* § 151.210(1).

[95] *Id.* § 151.140.

[96] *Id.* § 151.170(2).

[97] *Id.* § 151.170(2).

[98] *Id.* § 224.70-140.

[99] *Id.*

[100] Md. Code Ann., Envir. § 5-502 (West 2005).

[101] § 5-502(b).

[102] Md. Regs. Code tit. 26, §26.17.06.03.B.

[103] *See* § 5-503.

[104] *Id.* §5-507(a).

statute, that the "applicant's plans provide greatest feasible utilization of waters of the State, adequately preserve public safety, and promote the general public welfare . . . ."[105]

Criteria for review of applications is further elucidated in MDE regulations. MDE will issue a water appropriation or use permit only for a "beneficial appropriation or use"[106] – a term which is defined to mean a direct use of water which is (a) necessary to a permit applicant, (b) not wasteful, (c) reasonably non-damaging to the resource and other users; and (d) in the best interest of the public.[107] In judging beneficial appropriation and use, MDE will review whether the amount of water to be appropriated is "reasonable" in relation to the anticipated level of use during the permit period, and whether the requested appropriation and use does not have unreasonable impact on waters of the State or other water users.[108] In judging "reasonableness" for most uses, MDE will consider a series of factors, including (1) protection of existing waters uses, land values, investments and enterprises; (2) financial hardship of requiring a new user to bear the loss of potential harm to others; (3) the purpose of the use; (4) the suitability of the use to the watercourse, lake or aquifer; (5) the extent and amount of harm the use may cause; (6) the practicality of avoiding harm by adjustment of the proposed use or method of use by either the applicant or another permittee; (7) aggregate changes and cumulative impacts of current and future appropriations in the area; (8) contributions of the appropriation to future degradation of waters of the State; and (9) whether the proposed use is located within a water management strategy area.[109]

With respect to surface water withdrawals, MDE may condition approval upon the provision of low flow augmentation to offset consumptive use during lower flow periods.[110] Further surface water withdrawals may be condition on maintenance of a required minimum flow past the point of withdrawal (often called a "pass-by flow") to protect other uses and to protect flora and fauna within the watercourse.[111]

Special criteria govern ground water withdrawals. Among others:

- A ground water withdrawal permit will not be issued if the proposed withdrawal will "directly and substantially affect" a water course or lake and thereby cause unreasonable harm to persons entitled to use water from such surface sources.[112]

- With the exception of agricultural uses, if an applicant that intends to appropriate ground water in "unprecedented quantities" for "purposes not common to the locality" and if the appropriation would cause harm to other users by lowering the water table or potentiometric surface to a level that would render other wells unusable, MDE may condition the permit on payment by the permittee of the cost of

---

[105] *Id.* §5-505.

[106] Md. Regs. Code tit. 26, §26.17.06.05.A.

[107] *Id.* §26.17.06.01.B(5).

[108] *Id.* §26.17.06.05.A.

[109] *Id.* §26.17.06.05.B.

[110] *Id.* §26.17.06.05.C.

[111] *Id.*

[112] *Id.*

improving neighboring facilities or providing mitigation to impacts on nearby users.[113]

- Withdrawals from a confined aquifer will be limited to the "sustained yield" of the aquifer, with the regional sustained yield potentiometric surface not be lowered below 80% of the drawdown between the top of the aquifer and the historical pre-pumping level.[114]

- Withdrawals are limited to avoid saltwater intrusion into freshwater aquifers.

As noted above, Maryland rules provide for closer scrutiny and special regulation of withdrawals in "water management strategy areas." Such areas are designated by MDE based on identification of a specific water resource problem, for which MDE has adopted specific water use restrictions or criteria for permit approvals in order to protect the water resource or existing water users.[115]

In general, water appropriation permits are issued for 12 years, unless MDE determines that a shorter period is appropriate.[116] With the exception of agricultural water use permits, MDE reviews permits every three years, and during a permit review, may modify the quantity of water allowed or add conditions for water management purposes, such as avoidance or mitigation of unreasonable adverse impacts.[117] Even when a permit is issued, the permit may be altered if there is a water supply emergency that renders available water supplies inadequate to meet the needs of all permittees.[118]

Minnesota

Like Kentucky, Minnesota relies in part on common law riparian rights principles but has moved more towards a regulated permitting scheme.[119]

In general, the Department of Natural Resources' Division of Water must issue a permit for any withdrawal or appropriation in amounts exceeding 10,000 gallons per day or totaling more than 1,000,000 gallons per year of "waters of the state,"[120] which is defined to include both surface and underground waters.[121] Few exceptions are provided.[122]

---

[113] *Id.* § 26.17.06.05.D.

[114] *Id.*

[115] *Id.* § 26.17.06.01.

[116] *Id.* § 26.17.06.06.A.

[117] *Id.* § 26.17.06.06.B.

[118] *Id.* § 502(d).

[119] Kenneth Salzburg, *Minnesota*, *in* 6 WATERS AND WATER RIGHTS 693 (R.E. Beck. ed. 2005).

[120] Minn. Stat. §§ 103G.255, 103.G.271; Minn. R. 6115.0600 *et seq.*

[121] Minn. Stat. §103G.005(17).

[122] Minn. R. § 6115.0620 (*e.g.*, excepting appropriations of water for domestic uses serving less than 25 persons for general residential purposes; test pumping of a well)

An applicant must submit a range of hydrologic and hydrogeologic data, along with "justification of the reasonableness and practicality" of the proposed withdraw from the water source.[123] In reviewing an application, the agency will consider, among other factors, (1) the location and nature of the area involved, the type of withdrawal, and its impact on the availability, distribution and condition of water and related land resources in the area; (2) the hydrology of the water resources involved, and their capability to sustain the proposed withdrawal based on existing and probable future use; (3) probable effects on the environment, including anticipated changes in the resources; and (4) the aquatic system of the watercourse, riparian vegetation and existing fish and wildlife management within the watercourse.[124] Minnesota regulations accord particular procedures and requirements for assessing and resolving interference between groundwater wells,[125] and for addressing situations of water use conflict where the total withdrawals from ground and/or surface waters exceeds the available supply based on established resource protection limits, including protected flows and lake level elevations and the safe yield of groundwater aquifers.[126]

New Jersey

Like Maryland, New Jersey has moved from a common law riparian to a regulated riparian/water withdrawal permit system operating under the New Jersey Water Supply Management Act.[127] The permitting system, administered by the New Jersey Department of Environmental Protection ("NJDEP"), applies to withdrawals from both surface and groundwater sources. With limited exceptions, the New Jersey permit system applies to all persons diverting, having the capability to divert, or claiming the right to divert more than 100,000 gallons of water per day either from a single source or a combination of sources, and to all persons intending to divert more than 100,000 gallons of water per day from either surface or ground water.[128] Excepted from the permit program are most diversions for agricultural or horticultural purposes, diversions of salt water, and emergency diversion of water for periods of less than 31 days for fire fighting, spill response or other emergencies.[129]

The New Jersey statute requires NJDEP to establish standards and procedures to be followed by diverters to ensure that (1) proper methods are used to divert water; (2) only the permitted quantity of water is diverted, and that the water is only used for its permitted purposes; (3) water quality of the source is maintained and water standards for the water use are met; and (4) NJDEP is provided with adequate and accurate reports regarding the diversion and use of water.[130]

Information required for permit applications vary according to type of source. Ground-water diversion applications must include a discussion of the geology, hydrogeology, and

---

[123] Minn. R. § 6115.0660.

[124] Minn. R. § 6115.0670.

[125] Minn. R. 6115.0730.

[126] Minn. R. 6115.0740.

[127] N.J. Stat. Ann. § 58:1A-1 *et seq*.

[128] N.J. Admin. Code § 7:19-1.4(a).

[129] *Id.* § 7:19-1.4(a)1-4.

[130] N.J. Stat. Ann. § 58:1A-5.b,

expected impacts of the diversion on both the resource and other users. Applications for new or increased groundwater withdrawals require a hydrogeologic pumping test meeting specified criteria, and a hydrogeologic report.[131] Surface water withdrawal applications require information on the watershed, including drainage area at the diversion point, stream water quality classification, stream flow records and duration curves, upstream and downstream diversions, and a comprehensive hydrogeologic evaluation of the proposed diversion and its impacts.[132] All applicants must submit information regarding nearby diversions, landfills and groundwater contamination in the area, and delineated freshwater wetlands within the zone of influence.[133] Most users are required to submit a water conservation and drought management plan.[134]

To obtain a permit, an applicant must substantiate the need for the proposed allocation and the choice of resources for the allocation,[135] and must provide information establishing that:

- The proposed diversion is in the public interest.
- The diversion will not exceed the natural replenishment or safe yield of the resources, or threaten to exhaust such waters or render them unfit for use.
- Plans for the proposed diversion are "just and equitable" to other water users affected, and that the withdrawal does not adversely affect other existing surface or groundwater withdrawals.
- Any proposed ground water diversion will not cause an increase in saline intrusion that renders the water unfit for use, spread groundwater contamination, or interfere with any groundwater remediation plan or activity.
- Any application for a permit with a duration longer than 10 years is required by economic considerations, such as required amortization of new investment and the public interest.
- Any diversion structures are not located in a wetland.[136]

Under NJDEP regulations, the agency will establish a pass-by flow (called passing flows in the rules) "for each surface water diversion source or groundwater diversion source that impacts a surface water source . . . ."[137] Thus, the groundwater/surface water nexus is clearly and specifically addressed.

---

[131] N.J. Admin. Code §7:19-2.2(c).

[132] *Id.* §7:19-2.2(d).

[133] *Id.* § 7:19-2.2(e).

[134] *Id.* §7-19-2.2(i).

[135] *Id.* §7:19-2.2(g).

[136] *Id.* §7:19-2.2(f).

[137] N.J. Admin. Code § 7:19-1.6(e).

The passing flow requirement is set according to different criteria depending on the water use.[138] If the water is used for public water supply, the passing flow requirements will be set according to criteria set out in N.J. Admin. Code § 7:19-4.6.[139] Specific passing flows are established by rules for various public water supply systems drawing from particular streams. For other public water supply withdrawals, the passing flow is set by NJDEP based on an amount equal to the average daily flow for the driest month of record, or in lieu thereof, at a rate of 125,000 gpd per square mile of "unappropriated" watershed above the point of diversion.[140] In cases where the diverted water is not used for the public water supply, the passing flow requirement is established at a level that will not reduce the passing flow below the 7 day, 10 year low flow ($Q_{7\text{-}10}$) as established by the United States Geological Survey.[141] It is incumbent upon the permittee to "ensure that the intake structure for the surface water diversion source is designed to maintain the passing flow requirement."[142] If the permittee does not maintain the passing flow level, a charge will be imposed based upon a formula established by NJDEP.[143]

The regulations allow some variance from the standard passing flow regime. First, an applicant may propose a lower passing flow in lieu of that established by the regulatory formula. However, for NJDEP to allow a lower passing flow requirement, the applicant must submit "a detailed environmental impact study which demonstrates to the satisfaction of the Department that no adverse environmental impact will occur as a result of the proposed lower passing flow requirement."[144] Second, NJDEP may temporarily increase "the passing flow requirement . . . if the Department determines such an increase is warranted to preserve the water quality of the diversion source."[145] Third, under certain circumstances, typically where the flow of a stream is very low, the "Department will not establish a passing flow requirement."[146]

In addition to the statewide water withdrawal permitting program, New Jersey has a particularized program specifically aimed at designated "areas of critical water supply concern." After notice and hearing, the Commissioner of NJDEP may designate as areas of critical water supply concern ("critical areas") any area where the Department determines that "adverse conditions exist, related to ground or surface water, such that special measures are required to ensure the integrity or viability of the water supply source and to protect the public health, safety or welfare."[147] The agency demonstrates that such a designation is warranted through a water availability study, and "adverse conditions" are based on one or more criteria, including (1) a shortage of surface water due to diversions which leave insufficient water in a drainage area of at least ten square miles; (2) a storage of groundwater due to diversions exceeding the long-term safe or dependable yield of the aquifer, based on modeling or certain hydrologic or experiential

---

[138] *See* N.J. Admin. Code § 7:19-1.6(e)(1).

[139] *See* N.J. Admin. Code § 7:19-1.6(e)(1).

[140] N.J. Admin. Code § 7-19-4.6(f).

[141] N.J. Admin. Code § 7:19-1.6(e)(2).

[142] N.J. Admin. Code § 7:19-1.6(e)(6).

[143] *See* N.J. Admin. Code § 7:19-4.6(a)(4).

[144] N.J. Admin. Code § 7:19-1.6(e)(3).

[145] *Id.* § 7:19-1.6(e)(4).

[146] *Id.* § 7:19-1.6(e)(5).

[147] *Id.* § 7:19-8.2(a).

observations; (3) aquifer pollution; or (4) location in the Delaware River Basin Commission's groundwater protected area.[148]

To date, NJDEP has determined two such critical areas. The first encompasses the Mt.-Laurel-Winonah, Englishtown, Old Bridge, and Farrington aquifers of the New Jersey coastal plain. The second designated area covers a substantial portion of the Potomac-Raritan-Magothy aquifer system in southern New Jersey, including much of the area extending south and eastward from Camden and vicinity.

Designated critical areas are divided into two zones: the depleted zone and the threatened zone.[149] Different water use restrictions may be established in each zone.

In each designated critical area, NJDEP is charged to study water supply availability, estimate future water supply needs, identify reasonable and appropriate water supply management strategies, and select and adopt water supply alternatives after notice and hearing.[150] NJDEP may, after public hearing, modify the conditions of an existing water supply allocation permit in order to limit or reduce the quantity of water which may be diverted to the safe or dependable yield of the source.[151] Alternatively, NJDEP may allow the permittee to change the location of withdrawal, or require the permittee to use alternative sources of water.[152] The agency may impose more stringent water conservation, metering, leak detection and other measures. In general, NJDEP will not issue new or increased diversions from affected aquifers in a critical area, with exceptions provided, among others, for projects that provide recharge to the affected aquifer and temporary allocations to be used until an approved alternative source is available.[153]

2. State Regulated Riparian Regimes Without Integration

While some eastern states have moved to integrated regulatory regimes, addressing both ground and surface water together, many states continue to address surface water and ground water separately. In these jurisdictions, regulated riparian systems have been adopted to focus on a single resource (surface water or groundwater) separately – either on a regional or statewide basis – with little to no recognition of the inter-relationships within the water cycle. A few examples suffice to illustrate such disconnected regimes.

New York

---

[148] *Id.*

[149] *Id.* § 7:19-8.2(b).

[150] *Id.* § 7:19-8.3.

[151] When New Jersey's agency originally adopted the critical area program and attempted to cutback on over-pumping from the Potomic-Raritan-Magothy system, a court challenge held that the Department did not have the authority to order a cutback in diversions absent a governor-declared state of emergency. *Matter of Water Supply Critical Area No. 2,* 233 N.J. Super 280, 558 A.2d 1321 (1989). Subsequently, the Water Supply Management Act was amended in a manner which recognizes NJDEP's explicit power to order reductions in existing withdrawals within such critical areas, while limiting those powers for a 10-year period starting in 1993. *See* N.J. Stat. Ann. § 58:1A-7.3.

[152] N.J. Admin. Code § 7:19-8.3.

[153] *Id.*

Although one commentator has described New York as a regulated riparian state,[154] its state level management program with respect to water withdrawals is limited. New York's Water Resources Law (part of the Environmental Conservation Law) requires a permit from the New York Department of Environmental Conservation ("NYSDEC") for the acquisition, development, use and distribution of water for (i) potable purposes (public water supply); (ii) agricultural irrigation;[155] (iii) projects undertaken pursuant to Article 5-D of the County Law (relating to projects by small watershed protection districts); or (iv) multi-purpose projects undertaken pursuant to N.Y. Environmental Conservation Law §15-1101 *et seq.*[156] Notably, the statewide water withdrawal regulatory provisions of the Water Resources Law are limited to public water supply and agricultural irrigation, leaving a substantial range of water using enterprises outside the purview of the statute. Separately, New York purports to specially regulate surface and ground water withdrawal projects designed to transport water to points outside the state by establishing a separate permit program for interstate diversions.[157]

In addition to these statewide permitting requirements, the Water Resources Law establish two regional regulatory programs – one governing groundwater withdrawals from the Long Island area, and the second addressing withdrawals within the Great Lakes/St. Lawrence River watersheds. Because of concerns relating to potential over-pumping of aquifers under Long Island, permits are mandated for the installation or operation of new or additional wells on Long Island (the counties of Kings, Queens, Nassau and Suffolk) to withdraw ground water for any purpose, where the installed pumping capacity exceeds 45 gallons per minute (64,800 gallons per day).[158] Rules governing permitting of Long Island wells focus more specifically on criteria that evaluate the specific yield of the aquifer segment being tapped, whether the well site is in a stressed area, whether the water will be recharged or discharged to waste, the amount of water requested in comparison to regional levels of withdrawal and recharge, consistency with regional water management plans, and whether the purveyor has active and ongoing water conservation, leak detection and metering programs.[159]

At the other end of the State, New York requires reporting and registration of surface and ground water withdrawals exceeding 100,000 gpd within the Great Lakes basin.[160] In-basin use is only subject to registration, although the Water Resources law indicates that if the NYSDEC registers a withdrawal resulting in a consumptive loss in excess of 5 MGD averaged over any 30-day period, the Department is required to implement prior notice and consultation with other Great Lakes states pursuant to the Great Lakes Charter.[161] Withdrawals involving an interbasin

---

[154] N. A. Robinson, *New York*, in 6 WATERS AND WATER RIGHTS (R.E. Beck, Ed., 1994).

[155] Although the statute mentions agricultural irrigation, the NYSDEC regulations are notably silent regarding the regulation of water withdrawals for irrigation.

[156] N.Y. Envtl. Conserv. Law § 15-1501 (McKinney 2005).

[157] *Id.* § 15-1505.

[158] *Id.* §15-1527.

[159] N.Y. Envtl. Conserv. Law § 15-1527; N.Y. Comp. Codes R. & Regs. tit. 6. § 601.1 *et seq.* (2005).

[160] *Id.* § 15-1605.

[161] *Id.* §15-1607.

diversion, however, require state approval, as well as approval by the governor of each Great Lakes State pursuant to the Water Resources Development Act of 1986.[162]

In sum, the New York version of regulated riparianism is relatively narrow in focus, and provides no explicit recognition of the nexus between surface and groundwaters.

Pennsylvania

In large part, the right to withdraw water from both surface and groundwaters in Pennsylvania remains governed by common law.[163] With the exception of state laws regulating the withdrawal of surface water by public water supply agencies, Pennsylvania has no statewide regulatory program mandating the acquisition of permits for withdrawing surface or groundwaters. Basin level regulatory programs of the Susquehanna and Delaware River Basin Commissions have displaced the courts as the arbiters of water rights issues in the eastern two-thirds of the Commonwealth.

No state statute or regulatory program comprehensively addresses the allocation or use of ground or surface waters among competing users, or provides for long-term management of water resources. A few state statutes have attempted (or been interpreted) to impose regulations and permit requirements on withdrawals from specified sources and particular uses.

The 1939 Water Rights Act[164] requires that public water supply agencies wishing to withdraw water from surface sources, or to acquire rights in surface sources, first obtain a permit from the Pennsylvania Department of Environmental Protection ("PaDEP"). For these purposes, a "public water supply agency" is defined to include any corporation, municipal or quasi-municipal corporation, district or authority vested with the power, authority, right or franchise to supply water to the public. Traditionally, this has been interpreted to apply to those entities that supply water to the public via pipes (as opposed to bulk or bottled water suppliers). The 1939 Water Rights Act does not regulate industrial, commercial or agricultural water users, and the Act does not cover groundwater withdrawals. It has been estimated that the 1939 Water Rights Act regulates only about 10% of the total surface water withdrawals in the Commonwealth.

The Pennsylvania Safe Drinking Water Act[165] ("SDWA"), the state counterpart to the Federal Safe Drinking Water Act, was enacted primarily to address concerns regarding the quality of Pennsylvania's drinking water supply. In regulating the distribution of water to the public, however, the Pennsylvania SDWA more broadly defines "public water systems" subject to regulation to include (1) all systems that provide water to the public for human consumption that have at least 15 service connections or that serve at least 25 individuals daily at least 60 days out of the year, and (2) systems which provide water for bottling or bulk hauling for human consumption. The SDWA requires operators of both community and non-community public

[162] Pub. L. 99-662, implemented by N.Y. Envtl. Conserv. Law § 15-1613.

[163] R.T. Weston and J.R. Burcat, *Legal Aspects of Pennsylvania Water Management*, WATER RESOURCES IN PENNSYLVANIA: AVAILABILITY, QUALITY AND MANAGEMENT (1990).

[164] 32 P.S. §§631-641.

[165] 35 P.S. §721.1 *et seq.*

water systems to obtain construction and operation permits, which generally regulate the design, installation and operation of a system's sources, treatment, and distribution facilities.[166]

While the regulations adopted under the Pennsylvania SDWA are focused on setting water quality, design, construction and operating standards to assure safe and sanitary potable water, recent case decisions have drastically reinterpreted the statute to include consideration of the impacts of water withdrawals. In *Oley Township v. DEP and Wissahickon Spring Water, Inc.*,[167] the Pennsylvania Environmental Hearing Board ("EHB") reviewed an application by a private water bottling company for a permit under the SDWA related to development and use of a groundwater well source for bottling purposes. The EHB found PADEP abused its discretion in failing to consider the potential impacts on wetland of the proposed withdrawal. The EHB reasoned that the SDWA authorizes PaDEP to issue permits "*if it determines* that the proposed water system is not prejudicial to the public health and complies with the provisions of [the SDWA], the regulations adopted [under the SDWA], *and all other applicable laws administered by the Department.*"[168] The EHB further found that the SDWA requires an affirmative determination of compliance with all environmental laws before issuance of a permit. Finding that the proposed groundwater withdrawal might affect adjacent water resources to the point of affecting plant and animal species, and compromising the economical functions of the wetlands, the EHB noted that such "degradation" (affecting existing use of water resources) would violate the Clean Streams Law.

The potential impact of the *Oley Township* decision has not been fully assessed or felt. Instead of moving to develop regulations that would better define the process and applicable criteria, PaDEP has moved forward with guidance and draft policies that have left the regulated community with few guideposts. In one guidance document, PaDEP has provided screening criteria defining when surface or ground water withdrawals will be considered not likely to affect wetlands or water quality.[169] That guidance, for example, concludes that effects on stream or spring flows will not be considered significant if:

a. The quantity of surface or groundwater withdrawal is less than 10 percent of $Q_{7\text{-}10}$.

b. The zone of influence resulting from a groundwater withdrawal controls less than 10 percent of the drainage area at the point of impact – requiring a determination, through modeling or other acceptable procedures, of the area and shape of the zone of influence and the drainage area which is controlled by the cone of depression; or

c. The reduction in flow that results from a groundwater withdrawal is less than 10 percent of $Q_{7\text{-}10}$.

In July 2001, PaDEP issued for public comment a draft Policy for Protecting Aquatic Resources and Related Stream Uses in Processing Approvals for Water Rights Acquisitions in Selected Waters of the Commonwealth (the "Passby Flow Policy"). That policy proposed to establish passby flows for new or increased withdrawals subject to PaDEP regulation based upon

---

[166] 35 P.S. §721.7.

[167] 1996 EHB 1098.

[168] 35 P.S. §721.7(j).

[169] PaDEP, Screening Criteria on Water Quality/Quantity Impacts for Drinking Water Permits, Doc. No. 383-2131-001 (July 24, 2004), available at http://www.dep.state.pa.us.

modeled habitat impact, depending upon the classification of the stream. In some cases, the policy would have resulted in passby flows as much as 30% or more of average daily flow, effectively cutting off public water supply withdrawals for extended periods during droughts or even usual low flow portions of the summer and fall of every year. During public comment, the public water community severely questioned the basis for the policy, and the draft Passby Flow Policy has never been formally adopted. However, PaDEP appears to be following and applying the draft Passby Flow Policy both in making permitting decisions as to those withdrawals subject to agency jurisdiction, and in advocating positions before the DRBC and SRBC.

Virginia

Among those eastern states that have opted for a regulated riparian system, Virginia has taken a different approach. In contrast to statewide regulatory regimes enacted by most states, Virginia has adopted a regional approach, focused on specifically designated surface and groundwater management areas. Separate, but parallel, rules govern such surface and groundwater management area programs.

A permit system that governs surface water applies only to those areas designated as surface water management areas by the Virginia State Water Control Board ("VaSWCB"). A surface water management area is "a geographically defined surface water area in which the VaSWCB has deemed the levels or supply of surface water to be potentially adverse to public welfare, health and safety."[170] The factors that will trigger a surface-water management area proceeding are set out in the Virginia Surface Water Management Area Regulation.[171] Essentially, an area will be designated a surface-water management area when two sets of criteria are satisfied. First, evidence must indicate that (i) a stream has substantial instream values (such as fisheries, recreation, habitat, cultural or aesthetic properties); (ii) historical records or current conditions indicate that a low flow condition could occur which would threaten important instream uses; and (iii) current or potential offstream uses contribute to or are likely to exacerbate natural low flow conditions to the detriment of instream values.[172] If the VaSWCB finds that the first set of criteria are met, it may proceed to designate an area if it further determines that public welfare, health and safety require that regulatory efforts be initiated.[173] Upon that determination, the VaSWCB must determine the level of flow is such that permit conditions in the management area are in force, and define the boundaries of the water management area.[174]

The VaSWCB "encourage[s], promote[s], and recognize[s] voluntary agreements among persons withdrawing surface water in the same surface water management area."[175] The agreement, which must be approved by the agency following a public hearing, "shall control in lieu of a formal order, rule, regulation or permit" issued by the board, and is deemed to be a case

[170] Va. Code Ann. § 62.1-242 (West 2005).

[171] *See* 9 Va. Admin. Code § 25-220-40.A-F (setting out factors that will trigger surface-water management area proceeding).

[172] *Id.* § 25-220-40.A.

[173] *Id.* § 25-220-40.B.

[174] *Id.* § 25-220-40.C-D.

[175] *See* 9 Va. Admin. Code § 25-220-60(A-E).

decision under the Virginia Administrative Process Act.[176] Any permit issued pursuant to Chapter 220 must be incorporated into the terms of any agreement between parties.[177]

Within a designated surface water management area, a permit is required for any person to make a withdrawal of surface-water,[178] subject to four specific exclusions and certain exemptions.[179] Excluded and exempted from the system are any non-consumptive uses, withdrawals of less than 300,000 gallons per month, and withdrawals from a wastewater treatment system permitted by the VaSWCB or the Department of Mines, Minerals and Energy. In addition, a person who has entered into an approved agreement does not need a permit.[180] One of the most important exemptions, and one which creates a gap in the effectiveness of the water management area approach, excludes withdrawals in existence as of July 1989, unless the rate of withdrawal is increased.[181]

In deciding whether to grant a surface water withdrawal permit within a designated management area, the VaSWCB is required to consider several factors, including: (1) the number of persons using the stream, and the object, extent and necessity of their respective withdrawals and uses (*i.e.*, the relative competing uses on the stream); (2) the nature and size of the stream; (3) the types of businesses or activities to which various uses are related; (4) importance and necessity of the uses claimed by permit applicants, or of the water uses of the area, and the extent of injury caused or expected to be caused to instream or offstream water uses; and (5) other relevant factors.[182] All permittees are required to take reasonable steps to avoid environmental impacts that could result from their withdrawal activity, to minimize adverse impacts, and where impacts cannot be avoided, provided mitigation of the adverse impact on an "in-kind basis."[183]

The statute mandates that the VaSWCB include in each permit a flow requirement appropriate for the protection of beneficial instream uses. In determining the level of flow needing protection, the board is to consider, among other items, recreational and aesthetic factors, and the potential for "substantial and long-term adverse impact on fish and wildlife found in that particular surface water management area."[184] If the instream flow requirement determination indicates a need to restrict water withdrawals, the VaSWCB must consider the availability of alternative water supplies, the feasibility of storage or other mitigation measures, and the socioeconomic impacts of such restrictions.[185] Notably, the statute commands that the board

[176] *Id.*

[177] *Id.*

[178] *See* 9 Va. Admin. Code § 25-220-70(A).

[179] *Id.*

[180] *Id.*

[181] *Id.* §25-220-70.C.1.a.

[182] Va. Code Ann. § 62-1-248.B.

[183] 9 Va. Admin. Code § 25-220-80.B.

[184] Va. Code Ann. § 62.1-248.A; 9 Va. Admin. Code § 25-220-100.1.

[185] *Id.*

attempt to "balance offstream and instream uses" so that the public welfare is maximized without imposing unreasonable burdens on any individual water user or water-using group.[186]

Paralleling (but separate from) the system for surface water withdrawals, Virginia's groundwater withdrawal permitting program likewise only applies within designated groundwater management areas.[187] An area may designated as a groundwater management area by the VaSWCB if the board finds that groundwater levels in the area are declining or are expected to decline excessively, wells of two or more users are interfering, or may reasonably be expected to interfere substantially with one another, the available groundwater supply has been or may be overdrawn, or groundwater in the area has been or may become polluted. If one of those four criteria are met, and the board finds that public health, safety or welfare require regulatory efforts, the VaSWCB may proceed to define a groundwater management area.[188]

Within designated management areas, permits are required for any withdrawal of groundwater greater than 300,000 gallons per month. However, a number of exceptions are provided, including exemptions for groundwater remediation projects, and groundwater withdrawals coincident with the extraction of coal, oil, gas or other minerals.[189]

Virginia has designated groundwater management areas in Eastern Virginia and the Eastern Shore area. When originally adopted, the management area program exempted pre-existing users from the permit program, but in the early 1990s, these existing users were likewise required to obtain permits.[190]

In reviewing groundwater withdrawal applications in designated areas, the VaSWCB considers a variety of factors, including the nature of the proposed beneficial use, the proposed use of alternative or innovative approaches (such as aquifer storage and recovery systems, and conjunctive use of ground and surface sources), climatic cycles, economic cycles, population projections, the status of land use and other necessary approvals, and the applicant's implementation of a water conservation and management plan.[191] Permits will not be issued for more ground water "than will be applied to the proposed beneficial use."[192] Where proposed uses are in conflict, or if available supplies are inadequate for all who desire to use them, preference is given to uses for human consumption,[193] and thereafter to applicants in the order in which applications were considered complete.[194]

---

[186] *Id.*

[187] Va. Code Ann. § 62.1-257 (West 2005).

[188] Va. Code Ann. § 62.1-257.

[189] Va. Code Ann. §§ 62.1-258 – 62.1-259.

[190] Va. Code Ann. § 62.1-260.

[191] Va. Code Ann. §62.1-263; 9 Va. Admin. Code § 25-610-110.B-.D.

[192] *Id.*; 9 Va. Admin. Code § 25-610-110(A).

[193] Va. Code Ann. § 62.1-263; 9 Va. Admin. Code § 25-610-110.E.

[194] *Id.*

B. River Basin Regulated Riparian Systems

The Delaware and Susquehanna River Basins probably represent the "high point" of well-established integrated surface water / groundwater management arrangements. Both the Delaware River Basin Commission ("DRBC") and Susquehanna River Basin Commission ("SRBC") administer watershed based regulatory regimes for managing water withdrawals and diversions, irrespective of whether the withdrawals originate from surface or groundwater resources. As these programs have evolved over the past four plus decades, the DRBC and SRBC programs have become increasingly refined in terms of promoting conjunctive management of the hydrologic resource.

1. Delaware River Basin Commission

When adopted in 1961, the Delaware River Basin Compact[195] was a unique document. It was the first compact not merely consented to by Congress, but in which the Federal Government became a full signatory party. While Federal agencies resisted the proposal, the states persisted in the belief that Federal membership was requisite to the effectiveness of the new regional entity. Congress agreed. The Compact created a new institution, the Delaware River Basin Commission ("DRBC"), composed of the Basin State Governors and a Presidential appointee (each with one alternate). With few exceptions, a vote of the majority binds all.

DRBC is granted broad powers to plan, develop, conserve, regulate, allocate and manage the water and related land resources of the Basin. DRBC is directed to prepare and adopt a Comprehensive Plan "for the immediate and long range development and uses of water resources."[196] The Commission is further empowered to allocate water among the signatory states, providing the allocation could not constitute a prior appropriation of waters or confer any superiority of right.[197]

DRBC operates as a true management institution, with both regulatory and project development authority; and the power to adopt and enforce standards and rules covering the broad spectrum of water quantity and quality issues.[198]

As a central mechanism for implementing these regulatory powers, DRBC is authorized under §3.8 of the Compact to regulate and approve any "project" having a substantial effect on the water resources of the Basin, to assure consistency with the Commission-adopted comprehensive plan, and "the proper conservation, development, management or control of the water resources of the basin." The term "project" is very broadly defined by the Compact to include

> any work, service or activity which is separately planned, financed, or identified by the commission, or any separate facility undertaken or to be undertaken within a specified area, for the conservation, utilization, control, development or

[195] Delaware River Basin Compact, Pub. L. No. 87-328, 75 Stat. 688 (1961).

[196] Delaware River Basin Compact §13.1.

[197] Delaware River Basin Compact §3.3.

[198] Delaware River Basin Compact §§ 3.6(b) (standards for planning, design and operation of all projects and facilities in the basin which affect basin water resources), 5.2 (water quality standards), 5.4 (water quality enforcement), 6.2 (flood plain zoning).

> management of water resources which can be established and utilized independently or as an addition to an existing facility, and can be considered as a separate entity for purposes of evaluation.[199]

Under this provision, DRBC regulates a broad spectrum of projects that may affect the quality and quantity of water resources within the basin, including all surface and groundwater withdrawals exceeding 100,000 gallons per day (gpd) in any 30-day period; and the diversion (exportation or importation) of water from or to the Delaware Basin whenever the design capacity is greater than 100,000 gpd.[200]

The central criterion governing approval of projects is whether the project proposal is consistent with the Delaware River Basin Comprehensive Plan. More specifically, DRBC is required to approve a project if it determines that the project "would not substantially impair or conflict with the comprehensive plan."[201] The Comprehensive Plan encompasses a wide range of regulations and policies, most of which are now compiled as part of the DRBC Water Code.[202] Project review with respect to withdrawals includes consideration by DRBC of such factors as the need for the proposed withdrawal, alternative sources available, impacts on other uses in the area and on instream uses downstream of the point of extraction, proposed mitigation measures, implementation of conservation measures, and other issues. DRBC's general approach to water withdrawals looks at not only individual withdrawal proposals, but the overall cumulative situation in the watershed or aquifer in question.

In addition to basinwide project review authority, the Compact grants the Commission special powers to designate "protected areas" where withdrawals are exceeding, or threaten to exceed, available resources or conflict with the Basin comprehensive plan. Growing concerns regarding potential overuse of aquifers in southeastern Pennsylvania led DRBC in 1981 to designate the Southeastern Pennsylvania Groundwater Protected Area.[203] Within the area largely defined by Triassic formations, new or increased groundwater withdrawals exceeding 10,000 gpd are subject to strict review, including the requirement for sophisticated pump testing and hydrologic analyses prior to permitting. The aggregate of new and existing withdrawals are managed within "withdrawal limits" for the affected aquifers or sub-basins, to assure that total takings do not exceed the rate of groundwater recharge during normal or dry periods. DRBC has undertaken to further define the "withdrawal limits." DRBC has established numeric withdrawal limits for each significant sub-basin, based on the 1-in-25-year average annual baseflow rate. Where total withdrawals in a watershed exceed 75% of this value, the watershed is designated as "potentially stressed." In such potentially stressed sub-basins, the rules require that applicants include one or more programs to mitigate the adverse impacts of a new or expanded withdrawal.

In addition, as part of a protected area permit application, the project sponsor must show that the proposed withdrawal will not "significantly impair or reduce the flow of perennial streams in the area."[204] Under the Protected Area regulations, DRBC takes specific steps to

---

[199] Delaware River Basin Compact §1.2(g).

[200] 18 C.F.R. §401.35.

[201] Delaware River Basin Compact § 3.8.

[202] The Delaware River Basin Water Code is currently available on line at: www.state.nj.us/drbc/regula.htm.

[203] 18 C.F.R. Part 430.

[204] 18 C.F.R., § 430.13(d)(4).

consider and protect existing water users whose wells may be affected by newer, deeper and more powerful neighbors. Where interference is predicted or observed, new users are required to limit withdrawals in order to avoid interference, or to provide compensation (in the form of replacement water supplies) where interference is unavoidable.[205] Thus, DRBC attempts to promote efficient development of the resource, while protecting the reasonable expectations and investments of current users.

DRBC is further empowered to declare emergencies and impose restrictions on water withdrawals and diversions (including suspension of State-issued water rights) during such periods.[206] In both protected areas, and during emergencies, DRBC's authority to grant, modify or deny permits is guided by standards found in Compact §10.5, which calls for actions "so as to avoid such depletion of the natural stream flows and groundwaters … as will adversely affect the comprehensive plan or the just and equitable interests and rights of other lawful users of the same source, giving due regard to the need to balance and reconcile alternative and conflicting uses in the event of an actual or threatened shortage of water of the quality required." In effect, DRBC is granted plenary authority to reallocate and regulate waters within protected areas and during emergencies so as to balance all legitimate uses of water within the basin or particular affected area.

2. Susquehanna River Basin Commission

The Susquehanna River Basin Compact[207] was developed nearly a decade after the Delaware Compact, stimulated in part by concerns among some that the thirsts of the eastern seaboard metropolis might cause some (notably New York City) to look to the Susquehanna's headwaters as a new source for diversions. Although the Compact was adopted in 1970, SRBC actually came into being in 1972.

While SRBC's powers are nearly identical to those of DRBC, the emphasis of Susquehanna Commission's activities and the development of Basin programs have been different. Notably, the Susquehanna is the largest U.S. river flowing into the Atlantic, and its mixture of urban, suburban, agricultural and forest areas presents a far less dense population distribution. At the same time, however, major water users are found up and down the basin, the river basin is a major energy generation center, and the river provides a major source of water for diversions and interbasin transfers that serve portions of the lower Delaware Basin and the Baltimore/northern Maryland metropolitan and suburban areas. As a result, for the past three decades, SRBC has expressed concern for impact of growing consumptive uses in basin, and resulting lowering of drought flows for in stream water quality and water balance in the Chesapeake Bay. Considerable effort has been expended in the past two decades on reallocation/reformulation of storage in existing reservoirs in order to make room for flow augmentation storage.

Specific SRBC regulatory programs target the management of new and increased withdrawals and consumptive uses. SRBC requires project approval for all surface and groundwater withdrawals in excess of 100,000 gpd in any 30-day period.[208] In addition, any new

---

[205] 18 C.F.R. §§ 430.13(d)(5), 430.19.

[206] Delaware River Basin Compact §§ 10.4, 10.8.

[207] Susquehanna River Basin Compact, Pub. L. No. 91-575, 84 Stat. 1509 (1970).

[208] 18 C.F.R. §806.4(a)(4), 71 Fed. Reg. 78,569 (December 19, 2006).

or increased consumptive water use in excess of 20,000 gpd requires SRBC approval, irrespective of its source of supply.[209]

Standards for water withdrawals govern the review and operation of both surface and groundwater withdrawals.[210] Under those standards, SRBC will (i) limit withdrawals to the amount (quantity and rate) needed to meet the reasonably foreseeable needs of the project sponsor; and (ii) limit or condition an approval to ensure that the withdrawal will not cause significant adverse impacts to the water resources of the basin.[211] In evaluating potential adverse impacts, SRBC may consider, among other factors, potential lowering of groundwater or stream flow levels; impacts rendering competing supplies unreliable; affects on other water uses; water quality degradation; impacts on fish, wildlife or other living resources or their habitat; causing permanent loss of aquifer storage capacity; or affecting low flow of perennial or intermittent streams.[212]

The nexus between surface water and groundwater is explicitly addressed in the SRBC project review process. New or increased groundwater withdrawals are subject to requirements for extended pumping testing, involving measurements of impacts to surrounding groundwater levels, impacts on surface water flows, and (as applicable) wetland hydrology (as measured via piezometers). The hydrogeologic reports accompanying SRBC project review applications are frequently extensive and intensive, as the Commission reviews the total impact of the proposal.

Beyond impact analysis, SRBC has implemented policies for passby flows that apply to both surface withdrawals and those groundwater withdrawals that induce surface water impacts. As a guide used in administering its project review authority, in late 2002 the SRBC adopted guidelines governing the determination of passby flows and conservation releases for surface and ground water withdrawal projects.[213] The SRBC uses passby flows, conservation releases, and consumptive use compensation to protect aquatic resources, competing users, and instream flow uses downstream from the point of withdrawal.[214] Passby flow requirements mandate that, while water is being withdrawn, a specified amount of water must be allowed to pass a certain point downstream from the point of withdrawal.[215] Approved surface-water withdrawals from small impoundments, intake dams, continuously flowing springs, or other intake structures in applicable streams ***will*** include conditions that require minimum passby flows.[216] Additionally, approved groundwater withdrawals from wells that impact streamflow, or for which a reversal of the

---

[209] 18 C.F.R. §806.4(a)(3).

[210] 18 C.F.R. §806.23.

[211] *Id.*

[212] *Id.* §806.23(b)(2).

[213] SRBC, *Guidelines for Using and Determining Passby Flows and Conservation Releases for Surface-Water and Ground-Water Withdrawal Approvals*, Policy No. 2003-001 (November 8, 2002).

[214] *Id.*

[215] *Id*.

[216] *Id*. (emphasis added).

hydraulic gradient adjacent to a stream (within the course of a 48-hour pumping test) is indicated, also will include conditions that require minimum passby flows.[217]

The method of determining passby flow for streams that support trout populations is based upon the SRBC's *Instream Flow Studies Pennsylvania and Maryland* (May 1998) publication. That publication reflects studies which applied Instream Flow Incremental Methodology ("IFIM") to evaluate cold water fish habitat impacts in a sampling of streams in several hydrologic regions of Pennsylvania and Maryland, arriving at a surrogate model to be applied to other streams in assessment predicted "habitat loss." The SRBC policy pegs the acceptable amount of habitat loss depending upon the classification of the stream. Less than 5% habitat loss is allowed for exceptional value streams. Generally, less than 5% loss (or at most 7.5% habitat loss) is allowed for high quality waters. Passby flows to prevent more than 10 or 15% habitat loss would be imposed on streams with lower classifications supporting trout populations. For areas of the basin that do not support trout populations, the SRBC passby flow policy sets levels generally ranging from 15 to 25 percent of average daily flow.[218] In no case is the passby flow less than the $Q_{7\text{-}10}$ flow.[219]

In lieu of the "desktop" methodology set forth in the SRBC passby flow policy, the policy allows a project sponsor to provide an instream flow study to demonstrate that lower passby flows and releases will provide an acceptable level of aquatic habitat protection. Exceptions may also be provided if the applicant can demonstrate that there are no viable alternative supplies available, or if after coordination, another acceptable passby flow criterion can be established.[220] Conversely, the Commission may increase the passby flow requirement for any project when water quality or sensitive environmental resources may be adversely effected.[221]

---

[217] *Id*. There are three narrowly tailored exceptions to the SRBC passby flow requirements. First, an exception is provided in cases where the surface water or groundwater withdrawal has only a minimal impact in comparison to the natural or continuously augmented flows of a stream or river. The SRBC defines minimal impact as 10 percent or less of the natural or continuously augmented $Q_{7\text{-}10}$ low flow of the stream or river. Second, an exception may be provided where the project in question requires Commission approval and a passby flow would be required under the guidelines, but where a passby flow has historically not been maintained. In these cases, withdrawals exceeding 10 percent of the $Q_{7\text{-}10}$ low flow will be permitted whenever flows naturally exceed the passby flow requirement plus the taking. When streamflows do not naturally exceed the passby flows, the rate of withdrawal and quantity allowed are reduced to less than 10 percent of the $Q_{7\text{-}10}$ low flow. This procedure is allowed for a period of four years from the approval date, and during this period the project sponsor should develop additional storage or supplies that will allow for withdrawals while still maintaining the passby flow requirement. In such cases, within two years from the SRBC approval date, the project sponsor will be required to file a plan outlining the proposed development of additional on-site storage or supplies.

[218] *Id.* at pg. 6.

[219] *Id.* at pg 3-4.

[220] *Id.* at pg. 7.

[221] *Id.* at 2.

SRBC has also established particular "standards" governing consumptive uses of water within the Susquehanna Basin,[222] which apply to all consumptive uses that involve more than 20,000 gpd over any 30-day period and that were initiated or increased after January 23, 1971. For these purposes, a "consumptive use" is defined to mean the "loss of water from a ground-water or surface water source through a manmade conveyance system (including such water that is purveyed through a public water supply system), due to transpiration by vegetation, incorporation into products during their manufacture, evaporation, diversion from the Susquehanna River basin, or any other process by which the water withdrawn is not returned to the waters of the basin undiminished in quantity."[223] Consumptive uses include, for example, situations where water is incorporated into a product (such as beer), or is evaporated as part of a process (such as steam generation or cooling). SRBC regulates such consumptive uses whether they derived their water directly from the surface or groundwater, or indirectly from a public water supply system or other connection. Thus, for example, a major commercial building connected to a municipal water system that uses water cooler air conditioning systems may be subject to SRBC consumptive use rules.

Under the SRBC rules, regulated consumptive users must either curtail their consumptive use during low flow periods (defined at the time when streamflow at the point of taking is equal to or less than the 7-day, 10-year low flow (Q_{7-10})), or must provide compensation for that use.[224] Such compensation may be provided by one of several methods, including development of storage facilities and provision of releases from those facilities during low-flow periods; purchase of available water supply storage from existing facilities; use of water from a public water supplier that maintains a conservation release or flow-by of Q_{7-10} or greater at the supplier's point of taking; use of groundwater; or other means approved by SRBC. In lieu of providing such compensation, a user may provide payments to SRBC under a set fee schedule, and SRBC, in turn, utilizes those funds for the operation of several storage facilities acquired by the commission to provide for streamflow augmentation during low-flow period.

3. Proposed Great Lakes – St. Lawrence River Basin Water Resources Compact

On December 13, 2005, the Governors and Premiers "signed" two documents, intended to establish an expansive regional approach to managing water withdrawals from the Great Lakes Region. These two documents – the Great Lakes-St. Lawrence River Basin Water Resources Compact ("Compact") and the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement ("Agreement") – seek to implement the lofty goals of cooperation and conservation described in the Great Lakes Charter signed by the Governors and Premiers in 1986.[225]

Since adoption of the Great Lakes Charter in 1986, the Great Lakes jurisdictions have been grappling with issues of how best to manage, husband and conserve the region's water resources for both economic benefit and environmental protection. In 2001, the States and Provinces adopted an Annex to the Charter outlining further measures they would consider to

---

[222] 18 C.F.R. §806.22.

[223] 18 C.F.R. §806.3.

[224] 18 C.F.R. §806.22(a).

[225] Copies of both documents are available at the Council of Great Lakes Governors website: www.cglg.org.

foster greater regional cooperation and consistency. The Compact and Agreement signed in December 2005 are intended to implement the principles of Annex 2001. The Compact would only become effective upon adoption by the legislatures of the eight Great Lakes States, and consent by Congress. The Agreement, in contrast, is an undertaking by the governors of the respective states and the premiers of Quebec and Ontario to implement state/provincial laws in a coordinated manner following certain common principles, utilizing a regional body to coordinate consultation and cooperation.

The Compact and Agreement seek to establish a statutory and regulatory framework for imposing substantial additional regulatory controls on water withdrawals involving Great Lakes Basin waters, including withdrawals from the lakes themselves, streams within the basin, and groundwaters within the Great Lakes and St. Lawrence River watersheds. The key elements of this program include:

- ***Registration.*** All existing water withdrawals greater than 100,000 gallons per day in any 30-day period would be required to register with their states or provinces. Criteria applied through this process will be used to define the "grandfathered" amount of those existing withdrawals (thereby establishing a baseline defining future increases that may trigger permit requirements).

- ***Water Withdrawal Permitting.*** States and provinces are required to establish permitting programs regulating new or increased withdrawals above to-be-defined trigger levels. In the absence of arriving at another trigger, the default would be 100,000 gallons per day over any 30-day period Such withdrawals may be approved only if they meet prescribed minimum criteria (referred to as the "decision-making standard").

- ***Decision-Making Standard.*** The Agreement and Compact embrace a decision-making standard, with the commitment that each jurisdiction would review regulated withdrawals consistent with that standard. The decision-making standard in §4.11 of the Compact requires a determination that the proposed use is reasonable, considering a series of factors, including (a) whether the withdrawal is planned in a fashion that provides for efficient use of the water and will avoid or minimize waste; (b) whether efficient use is being made of existing water supplies; (c) the balance between economic development, social development and environmental protection; (d) the supply potential of the water source, considering quantity, quality, reliability and safe yield of hydrologically interconnected water sources; and (e) the probable degree and duration of any adverse impacts to other lawful consumptive or non-consumptive water uses or to the quantity or quality of the waters and water dependent natural resources, and proposed plans or arrangement for avoidance or mitigation of such impacts. Other criteria require that each withdrawal or consumptive use incorporate "environmentally sound and economically feasible water conservation measures"; and mandate that the withdrawal and consumptive use be implemented so as to ensure that the proposal will result in "no significant individual or cumulate adverse impacts" to the quantity or quality of waters and water dependent natural resources of the basin or the applicable "source watershed" (defined as the watershed of each Great Lake and its associated tributraries).

Notably, some aspects of the decision-making standard have proven controversial as the proposed compact has been introduced and debated in several of the state legislatures. In particular, the meaning and scope of the "no significant impact" language has raised considerable questions and concern.

- ***Out-of-Basin Diversions and Intra-Basin Water Transfers.*** With limited exceptions, the Compact and Agreement would prohibit out-of-basin diversions of water; and transfers of water between the subbasins of the Great Lakes will be restricted. Subject to some high regulatory standards, use of basin waters by straddling communities will be permitted. Under the Agreement, all proposals involving out-of-basin diversions or transfers between subbasins of the Great Lakes would be subject to review by a regional body (involving the states and provinces), with the a determination of findings to be presented back to the host state or province. If the Compact is ultimately adopted, out-of-basin diversions and transfers between the lakes would be subject to review and approval by a newly-formed Regional Council.

- ***Significant Consumptive Water Uses:*** Where withdrawals involve significant consumptive uses of water (> 5,000,000 gpd in any 90-day period), the host state/province is obligated to provide notice to the other jurisdictions, and invite their comments, which then would be considered in the applicable state/provincial permitting agencies.

- ***Water Conservation Measures.*** States and provinces are required to develop and implement voluntary and/or mandatory water conservation measures applicable to both existing and new users. New or increased withdrawals must implement environmentally sound and economically feasible water conservation measures.

On their face, the Great Lakes Compact and Agreement recognize the relationship between groundwater and surface water, and seek to provide a mechanism within which the basin states will manage the resource conjunctively. The details of that management are, however, left to the individual states; and the degree to which the promise of conjunctive management is achieved will largely rest upon the choices and actions of those individual states.

VI. Conclusion

Water management law in the eastern riparian states has undergone considerable development over the past two centuries. In this first decade of the 21st Century, we are witnessing an accelerated refinement of the principles of water management in the east. As increased tensions have arisen between users and between states, some very sophisticated water management regimes have developed, and are continuing to develop, in a wide range of jurisdictions and watersheds east of the Mississippi.

Thus, despite historical common law doctrines which poorly recognized the linkages between ground and surface water, we are seeking both an evolution of judicial understanding (as seen in the *Michigan Citizens for Water Conservation* decision) and a growing shift to regulated riparian regimes which are shedding antiquated legal notions of hydrology. The environmental and resource management bar has a critical role to play in fostering this ongoing evolution – for only when the law truly embraces the science of water resources, will the key to effective stewardship and management of these resources be unlocked.