[Submitted via PEPC]

Elizabeth Maclin Vice President for Eastern Conservation Trout Unlimited, Inc. April 15, 2011 Pamela Bush, Commission Secretary Delaware River Basin Commission P.O. Box 7360 25 State Police Drive West Trenton, NJ 08628 Dear Ms. Bush: Please accept the following comments from Trout Unlimited (TU), and its New Jersey, New York and Pennsylvania councils, on the Delaware River Basin Commission's (DRBC) Draft Natural Gas Development Regulations, Article 7 of Part III - Basin Regulations. TU is the nation's largest and oldest coldwater conservation organization dedicated to conserving, protecting and restoring North America's trout and salmon fisheries and other watersheds. With approximately 23,000 members in New Jersey, New York, and Pennsylvania who live, work, and recreate in the Delaware River Basin, TU is deeply concerned about the potential impacts that gas drilling and hydraulic fracturing may have on the Delaware's irreplaceable rivers and watersheds. The headwaters to the Delaware River Basin boast a valuable trout fishery that has supported and sustained the local communities for generations. The pace and scale of proposed gas drilling in this part of the basin threatens the watershed resources and its local economies. In 1994, TU commissioned Impact Research Associates to conduct a socio-economic study of the Beaver Kill-Willowemoc (BeaMoc) watershed and its trout fisheries, as part of a larger effort to assess the impacts of drought on local communities who rely upon angler participation. The study concluded that angler-related revenues were estimated to be approximately $10.1 million (in 1994 dollars) for the Town of Rockland (Villages of Roscoe and Livingston Manor), with direct economic impact (wages, profits, local re-spending and local tax revenues) in Rockland from angler visits of $4.8 million. Trout fishing ranked third among industries generating jobs in the area, with 90% of those jobs held by local residents earning wages totaling $2.3 million (in 1994 dollars). Finally, the study found that 88% of anglers surveyed indicated that they would not come to Roscoe and Livingston Manor, if there was no trout fishery. The headwaters that serve as trout habitat and the fishery itself are an important part of the local economy. Gas drilling must comply with strict regulatory standards in this part of the basin, in order to prevent harm to these valuable and irreplaceable trout and watershed resources and the economies that rely upon them. To assure protection of these important watershed resources, TU urges the DRBC to postpone the issuance of the final gas drilling regulations until a full cumulative impact analysis is conducted, assessing a comprehensive build-out of all wells, water withdrawals and wastewater discharges within the basin. Until such analysis is carried out, the DRBC cannot be sure that gas drilling will not injuriously affect the waters of the basin. The Draft Natural Gas Development Regulations (hereafter "regulations"), issued on December 9, 2010, apply to all natural gas development projects including the construction or use of production, exploratory or other natural gas wells in the Basin regardless of target formation, and to water withdrawals, well pad and related activities, and wastewater disposal activities associated with such projects. As such, these regulations form the foundation of all natural gas drilling in the basin-with development projected to last into the next century-and they must build upon principles of sound watershed management, recognizing hydrological and ecological systems. As the draft regulations rightfully acknowledge, decision-making should be based upon sound scientific principles and an understanding of the relationship between land and water resources. Sound science demands that the cumulative impacts anticipated from drilling thousands of wells in proximity to headwater streams of the sparsely populated upper portion of the Delaware Basin that comprises the Special Protection Waters be assessed before drilling is allowed to go forward in the watershed. On several occasions-including in §7.4(b)(2) of the draft regulations-the DRBC has recognized that there is a potential for water withdrawals, wastewater disposal and other activities associated with Marcellus Shale gas drilling to have a cumulative impact on the water quality of Special Protection Waters within the Basin. Given the extensive well development projected in the basin, a cumulative impact study must be conducted to provide an understanding of how gas drilling and the associated water withdrawals and wastewater discharges will affect the land and water resources in the basin. Only when those impacts have been determined, will the DRBC be in the position to adopt final regulations that adequately protect the Delaware River and its communities, fish and wildlife. Moreover, while

portions of the draft regulations provide a greater level of protection than the individual states' laws, there is still room for improvement. Please find below TU's comments and recommendations for enhancing the draft regulations. Section 7.1: Purpose, Authority, Scope and Relationship to other Requirements and Rules Under Section 7.1(i) of the draft regulations, the DRBC defers to the well construction and operation regulations of the State of New York and the Commonwealth of Pennsylvania, in lieu of separately administering its own standards for well construction and operation. Well integrity is the "holy grail" when it comes to ensuring that aquifers are not contaminated. By relying solely upon the host state's requirements for well construction and operation, the DRBC is delegating its responsibility to protect the Delaware River basin's water resources to the individual host states. TU instead urges the DRBC to adopt stringent standards for well construction and operation that, at a minimum, incorporate appropriate best management practices identified by the American Petroleum Institute (API) and other experts in the field. Section 7.2: Definitions In Section 7.2, "Best Management Practices (BMPs)" is defined as "activities, facilities, measures or procedures used to protect, maintain, reclaim and restore the quality of waters and the existing or designated uses of waters within the Delaware River Basin." While BMPs are defined in this section and required as part of the erosion and sediment control plan, the regulations do not prescribe the specific activities or measures that shall be required to ensure the water quality and designated uses of waters within the Basin. TU recommends that a list of specific BMPs be included in the regulations and that employment of BMPs be mandated as part of the permit approval process. As currently defined, the "Post Hydraulic Fracturing Report" includes the requirement for disclosure of the type and volume of chemicals used during the hydraulic fracturing process; however, the definition neglects to include a requirement that the concentration of chemicals used be disclosed. Without knowledge of the concentrations used, the DRBC cannot determine if wastewater is being adequately treated before being discharged into water courses, nor can the DRBC ascertain whether the receiving stream has the capacity to assimilate the wastewater. Section 7.3: Administration As proposed, Section 7.3(c) would allow for fast track approvals (Approval by Rule) by the Executive Director without public input for many gas drilling sites and well pads, and for some water withdrawals. A considerable percentage of applications for wells and associated processes will fall under this type of approval, providing the Executive Director with overly broad discretion to decide whether a well pad or water withdrawal will have impact-out of view of the public eye. Given the high level of public interest in natural gas drilling inces in the Delaware River basin, as it is not a tool designed to set protective low flows. An alternative method of setting a passby flow that takes into account the ecological flow requirements for fish and other aquatic life must be developed. In even the most protected category of stream, the minimum by-pass flow requirement of 30 percent of the average monthly flow could allow a drilling operation to extract a significant percentage of a stream's flows – potentially in excess of 70 percent of total stream flow during periods where flows were above average. Although this is much less likely to occur in larger, higher order streams, there is a real risk of such withdrawals occurring in smaller streams. For example, water withdrawals for Marcellus Shale drilling can include a series of water trucks pumping a significant percentage, or even all, of a very small streams flow for a short period, and then transporting that water to a nearby well. Such withdrawals could deprive the stream of the benefits of high flows and might impair hydrologic functions such as flushing and channel forming flows. Such withdrawals could also impair important components of the life cycles of certain fish and other species, including migration, spawning, and rearing. In extreme cases such pumping might result in flow deprivation sufficient to cause fish kills or other damage to the stream's ecosystem. The risk of these impacts could be significantly mitigated by including a limit on total withdrawals for gas drilling from individual streams at any given time. The withdrawal limitation could be based on a fixed percentage of annual monthly flow or other streamflow statistic. One proposed method for accomplishing this is the approach embodied in the current draft Connecticut streamflow regulations [proposed amendments to Regulations of Connecticut State Agencies, sections 26-141b-1 to 26-141b-9], which is based on a seasonally varying percentage of the estimated Q99 flow, accounts for local conditions, and provides for stricter withdrawal limits on streams with less water available, due to size, ecological needs, or hydrologic conditions. TU

recommends adopting such an approach with by-pass flow requirements to minimize the risk of excessive short-term withdrawals and provide for better protection of natural stream functions. In addition, the final regulations must include specific provisions explaining how the DRBC will enforce the pass-by flow standards. Without enforcement, the minimum flow standards may be futile. Section 7.4 (d)(2) allows a project sponsor of a facility, who has been previously approved to discharge treated wastewater or non-contact cooling water, to seek ABR approval to become an approved source of water for natural gas well projects, if such sponsor meets specific conditions. Because the water that had been discharged to surface waters in the past will now be diverted, the project sponsor must show that the diversion will not adversely affect upstream or downstream dischargers or withdrawers, or aquatic life. TU appreciates this approach, as it considers the ability of surface waters to assimilate existing loading when potentially significant diversions are permitted, to be critical to the health and survival of aquatic life. Again though, TU is concerned about the lack of detail and definition in the regulations, specifically related to the method that must be used to show that the diversion will not affect surface water levels. Under §7.4(e)(1)(i), a project sponsor may apply through the ABR method for a new water withdrawal from a new source located within the physical boundaries of an approved Natural Gas Development Plan (NGDP) for uses within the NGDP. As defined in §7.5(c)(1), a NGDP is prepared for leaseholds encompassing more than 3,200 acres-or 5 square miles-or if a project sponsor intends to construct more than five well pads in the basin. Allowing for ABR in this instance is arbitrary and relegates waters within the perimeter of the NGDP to second class protections, subject to approval without public input. TU urges the DRBC to remove this special fast track approval opportunity and require that all new water withdrawals be subject to public scrutiny and the docket approval process. TU applauds the DRBC for including a requirement for pre- and post- erosion and sedimentation controls at water withdrawal sites located within the Special Protection Waters, as described in Section 7.4 (e)(2). We urge the DRBC to require these stormwater runoff BMPs throughout the basin, including at sites that are not located in the Special Protection Waters. Requiring each new water withdrawal site operations plan to include specific procedures for metering, recording and reporting pass-by flow requirements as well as procedures for monitoring, reporting and recording usage, transport and destination of all water withdrawn, as stated in §7.4(e)(2)(vi), will help to ensure that there is a comprehensive plan to mitigate impacts on streamflow. For consistency sake, the DRBC should describe specific protocols for each procedure required so that both the industry and the public have a reasonable expectation of how water withdrawals will be managed to protect water quality and quantity. Section 7.4(e)(4)(ii) requires a project sponsor who learns-by monitoring or other means-that his project significantly affects or interferes with any designated ground or surface water, or if the project sponsor receives a complaint regarding said project, then the project sponsor must immediately notify the DRBC Commissioner. Self-reporting by the industry has proved ineffective at identifying potential pollution incidents and providing sufficient time for the problem to be remedied. Again, this section begs the question "what does immediately mean?" Section 7.5: Well Pads for Natural Gas Activities As the regulations note, more than 15 million people rely on the waters of the Delaware River Basin for drinking, agricultural, industrial and recreational use. There is no doubt that gas drilling will change the landscape of the watershed and it is critical that the DRBC's regulations assure gas drilling and associated activities occurring on the land will neither impact water quality nor water quantity. TU commends the DRBC for establishing prohibitions and restrictions on where a well pad may be cited to protect the water quality of the rivers of the basin. Limitations under §7.5(b)(3) include prohibiting the siting of a well pad in a 100-year floodplain, on slopes greater than 20% pre-alteration grade, or in areas that serve as critical habitat for a federal or state designated or endangered species unless host state/federal mitigation measures are approved. Further, §7.5 (b)(4) requires that well pads be setback 500 feet from water bodies, wetlands, surface water supply intakes, and water supply reservoirs. Similar restrictions have been lauded by decision-makers in the West as best management practices necessary to limit the risk of contamination from the construction and operation of the well pad, access roads and other associated infrastructure. Site restrictions are only effective if they are implemented and enforced. TU is very concerned that the process outlined in §7.5(b)(9) for obtaining a variance from the siting

and setback restrictions in §§7.5(b)(3) and 7.5(b)(4) (except for the floodway prohibition) is overly simplistic and lacks appropriate public scrutiny. As currently proposed, a project sponsor may request the Executive Director to grant a variance if he shows that meeting the setbacks or siting restrictions would cause an undue burden and that the requested siting conditions are equally or more protective of water resources than those imposed under the regulations. Section 7.5(b)(9) only requires that the project sponsor notify the property and mineral rights owners. TU recommends tat a project sponsor seeking a variance be required to follow the notice procedures outlined in Section 7.3(i), to ensure that members of the public have the opportunity to identify any potential impacts from the nonconforming site plan location. Furthermore, TU urges the DRBC to ensure that the variance approval process is subject to public review and input. To require otherwise, would deflate the protections outlined in the setback and siting restrictions. Under §7.5(b)(5), the DRBC has elected to defer to the spacing and unitization requirements of the host state. However, a project sponsor is required under the draft regulations to fulfill other land use planning requirements, such as completing a Natural Gas Development Plan and developing a site plan, in accordance with the draft regulations. To carve out the spacing and unitization requirements from the land use planning aspect, eliminates the DRBC's ability to determine how many wells can be developed in a given area and how far apart these wells must be located. How can the DRBC reasonably determine the cumulative impacts of gas drilling on water resources and watershed lands, if it does not know how many wells be allowed within a given acre-unit? In addition, in Pennsylvania, unit sizes are set by an individual company not by statute, with limited exceptions. TU urges the DRBC to adopt spacing requirements to provide for consistency, to minimize surface disturbances and to provide the DRBC with information necessary to assess cumulative impacts. As part of the Natural Gas Development Plan (NGDP), section 7.5(c)(3)(ii) requires the project sponsor to submit a landscape analysis, comprised of maps for the basin leaseholds including: state orthophotography; list of property and mineral rights owners; 7.5 minute USGS quad showing roads, rights of way, and community, domestic, and wellhead protection areas, among other items; hydrology map; geology map; soils series maps; slope map; critical habitat map; natural heritage sites; and a map of all forested landscapes. The requirement to prepare a landscape analysis should not be limited solely to a NGDP, which is only required for the development of more than 5 well pads in the basin, or for an area where total leaseholds for one company exceeds 3,200 acres. It is imperative that these features be considered for each well pad proposed to be developed in the basin to determine the impacts of each well site on water, fish, wildlife and habitat. Additionally, TU recommends that the features on the map be field-verified prior to approval-specifically the features on the hydrology map-as many features, such as intermittent and ephemeral streams, are seasonal and therefore may not be depicted on maps. Again, TU is concerned about the discretionary latitude afforded to the Executive Director to approve, by ABR, certain applications under these regulations. Section 7.5(e) allows for ABR when a well pad is not in conformance with an approved NGDP, if it is not located on a forested site nor on a site with a slope less than 15%, if it is located outside National Park Service management areas and the New York City watershed, if it meets the setback and siting restrictions, and if for exploratory or low volume hydraulic fractured well pad, if it has state approval. Any well pad meeting these conditions is not subject to public notice, review or scrutiny, allowing for behind closed door approvals. TU urges the DRBC to make the approval process transparent and inclusive of all affected parties, including the public. TU applauds the DRBC for requiring a project sponsor to implement a continuous program to encourage water conservation in all types of use within the facilities served by the DRBC's well pad approval. Re-use and recycling of flowback and production waters will reduce the need for large withdrawals of freshwater for the hydraulic fracturing process. Given the importance of limiting impacts on flows, as well as water quality, TU recommends that such plan be subject to DRBC review and approval. As currently drafted, the water conservation section in §7.5(h)(1)(iii)(F) does not require that the project sponsor submit such plan to the DRBC for review or approval. TU supports the prohibition of the use of wastewater, recovered flowback and or production water and brines for application to roads or other surfaces within the Delaware River Basin, as outlined in §7.5(h)(1)(iv)(A)(4). TU again appreciates the level of detail required to be collected in the manifest and reporting

system, under 7.5(h)(1)(iv)(B) and (C), requiring a project sponsor to record the amounts and destinations of any flowback removed from the site for disposal or reuse and the amounts of all wastewater transported by truck or pipeline. However, TU disagrees with §7.5 (h)(1)(iv)(C)(1), which only requires a project sponsor to report the recorded information within 60 days of completion of the hydraulic fracturing. By that time, the wastewater will have been disposed of, treated and discharged into the surface waters of the basin. Acute impacts to aquatic life and water quality may be caused by sharp increases in TDS levels as well as other contaminants that can be found in gas drilling wastewater. TU urges the DRBC to establish more frequent wastewater reporting cycles to avoid impacts to water resources and aquatic life before they occur. Section 7.5(h)(1)(vi) explains proposed mitigation, remediation and restoration measures that must be followed if a spill or other release should occur or threaten to occur. A project sponsor is required to immediately report to the Executive Director and other appropriate agencies any release or threatened release to the environment of any substance, pollutant or contaminant from a well, a well pad site, associated drilling equipment, wastewater, that has the potential to reach ground or surface water or that may cause an adverse impact to the Basin's water resources. Once again, this section does not include a definition of "immediately," leaving the public and the water resources it relies upon unnecessarily exposed to unknown contaminants for an unknown time. Section 7.5(h)(1)(vi) also delegates the investigation authority to a "qualified professional"-to be hired by the well operator-to conduct an investigation and prepare a mitigation plan. However, this section does not establish the criteria for being qualified nor does it specify that the professional be independently-certified. The vague language in the section is symbolic of a reoccurring concern: the regulations delegate the DRBC's inspection and enforcement responsibilities to the regulated industry. TU supports the requirements described in section 7.5(h)(2)(i), requiring a project sponsor to submit an independently-prepared pre-alteration groundwater and surface water monitoring study report, but we urge that the geographic scope be broadened and more detail added to this section. In accords with subsection (A)(2), the report must also include "mapped locations and results of surface water monitoring in the nearest water bod(ies) upstream and downstream of the well pad for temperature, specific conductivity, water chemistry parameters and benthic macroinvertebrates." TU strongly recommends that further definition be added to subsection (A)(2), to clarify the geographic range within which water bodies must be identified and what the definition of "nearest" means as it is interpreted in this section. The draft regulations require a project sponsor to disclose the volume and amount of chemicals and additives used under 7.5(h)(2)(ii), but the disclosure of concentrations of such chemicals is not required. Without knowing the concentration of chemicals used in hydraulic fracturing process, determining the toxicity in the case of a spill, leak or illegal discharge will be extremely difficult if not impossibleTU strongly urges the DRBC to require disclosure of the concentrations of chemicals, in addition the type, amount and volume. Section 7.6: Wastewater Generated by Natural Gas Development Section 7.6(b) requires a project sponsor of a treatment and disposal facility proposing to accept natural gas wastewater to submit a treatability study. The treatability study must demonstrate that introducing natural gas wastewater will not interfere with existing treatment operations, sludge treatment or disposal operations, and that accepting such wastewater will keep the facility in compliance with the host state's wastewater permit requirements and the approved Commission docket. However, the regulations fail to define the criteria to be assessed in a treatability study, nor do they establish wastewater standards for constituents used in or resulting from the drilling process-such as radionuclides and other chemicals that are not treatable by biological treatment. The DRBC must establish a comprehensive set of wastewater standards for all possible constituents found in gas drilling wastewater and set strict requirements for facilities proposing to accept such wastewater before adopting final regulations. The regulations attempt to limit toxicity exposure under § 7.6(e) , in accords with its Water Quality Regulations and stream quality objectives, by including specific permissible toxic unit exposure levels, and defining where mixing zones may be located and what size the zones may be. Yet, §7.6(e)(1)(E) weakens those protections by granting the Executive Director a significant amount of discretion to consider alternatives to the protections established at the request of one or more dischargers. In a recent series of articles in The New York Times, reporter Ian Urbina

uncovered confidential reports from the industry and the U.S. EPA, explaining that dilution of drilling waste-the most current common practice for treating waste in Pennsylvania-does not always succeed in eliminating health risks posed by drilling wastewater. Specifically, the confidential report focuses on the effects of exposure to radioisotopes found in produced water on human health by assessing, among other factors, the impacts on aquatic organisms. The report suggests that chronic radiation exposure may lead to lower rates of spawning males after exposure to >10 R/d, and that the most sensitive stage of development appears to be fish fry. Effects on individual aquatic organisms have been detected at dose rates in the range of 1-10mGy/day (0.1-1.0) radioactivity absorbed dose/day. The range of lethal does for fish and invertebrates is 375 to 55,000 rad (radioactivity absorbed dose) and for invertebrates, the lethal doses range from 210 rad to 50,000. Fifty-percent mortality for fish embryos was demonstrated as low as 16R (roentgen). According to the Times article, the industry study focused on drilling industry wastewater being dumped into the Gulf of Mexico, where it would be far more diluted than in rivers. It also used estimates of radium levels far below those found in Pennsylvania's drilling waste, according to the study's lead author. The New York Times article also highlighted the results of macroinvertebrate studies at sample stations in and around two wastewater sewage treatment plants that had been discharging Marcellus shale wastewater into Pennsylvania's waterways. The study's authors concluded that the plants' effluent discharge is a major contributing factor to the impact on downstream aquatic life. As proposed, the draft regulations do not address the effects of exposure to radioisotopes found in the produced water on aquatic organisms or macroinvertebrates. The DRBC must establish a basin-wide plan for managing, treating and disposing of drilling wastewater from the thousands of wells to be drilled in the basin-including flowback and produced water-that addresses the toxicity and the effects of exposure to radioisotopes on human and aquatic health, before allowing even one well to be drilled. This is an area that has been overlooked by the states and TU urges the DRBC to take this opportunity-before regulations are finalized-to establish a basin-wide wastewater management plan. While in §7.6(g), the importation of wastewater into the basin is discouraged, the DRBC still allows drilling wastewater to be imported into the basin as long as the Commission approves. Adding more wastewater to the effluent stream reduces the assimilative capacity of the receiving stream, thereby impacting water quality and aquatic life. TU strongly recommends that the importation of drilling wastewater be prohibited not just discouraged. Summary In conclusion, the draft regulations provide a starting point for protecting the water resources of the Delaware River basin. However, without first conducting a full comprehensive assessment of the build-out of all wells, water withdrawals and wastewater treatment, these regulations fall short of ensuring that the water quality and water quantity of the basin are not adversely impacted by gas drilling. It is the responsibility of the DRBC to ensure proper management and protection of the Delaware River Basin’s water resources, especially those listed as Special Protection Waters. As such, the DRBC must complete a full cumulative impact analysis based upon sound science, before adopting final gas drilling regulations and making decisions that could negatively impact the Delaware River Basin’s water resources. Thank you for consideration of TU's comments. If you have any questions, please do not hesitate to contact me at 703.284.9437 or emaclin@tu.org. Sincerely, Elizabeth Maclin Vice-President of Eastern Conservation Trout Unlimited, Inc. Diane Maciejewski, Chair New York State Council of TU Rick Axt, Chair New Jersey Council of TU Ken Undercoffer, President Pennsylvania Council of TU... EDITED for Length