THE COMMONWEALTH OF MASSACHUSETTS

WATER RESOURCES COMMISSION

100 CAMBRIDGE STREET, BOSTON MA 02114

Meeting Minutes for June 11, 2009

Minutes approved July 9, 2009

Members in Attendance:

Kathleen Baskin	Designee, Executive Office of Energy and Environmental Affairs
Marilyn Contreas	Designee, Department of Housing and Community Development
Michele Drury	Designee, Department of Conservation and Recreation
David Terry	Designee, Department of Environmental Protection
Gerard Kennedy	Designee, Department of Agricultural Resources
Margaret Kearns	Designee, Department of Fish and Game
Thomas Cambareri	Public Member
David Rich	Public Member

Others in Attendance:

Linda Hutchins	DCR
Bruce Hansen	DCR
Sara Cohen	DCR
Marilyn McCrory	DCR
Duane LeVangie	DEP
Jennifer Pederson	Massachusetts Water Works Assn.
Roger Frymire	Citizen, Cambridge, MA
Paul Lauenstein	WSCAC/Neponset River Watershed Assn
Pam Heidell	Massachusetts Water Resources Authority
Tim Purinton	DFG/Riverways
Yushiou Tsai	Tufts University

Agenda Item #1: Executive Director's Report

Baskin announced that Secretary Bowles has convened a climate change adaptation advisory committee, a requirement of the Global Warming Solutions Act. Several members of the Water Resources Commission are participating in the committee. The committee is charged with evaluating strategies for adapting to climate change. Planning areas represented include water supply, forestry, built infrastructure, transportation, and energy generation and distribution. These areas are organized into five subcommittees with similar interests: Key infrastructure (for example, water, sewer, energy, transportation, and telecommunications), local economy (municipalities and business), human health and welfare (e.g., agriculture, vulnerable populations, public health), natural resources and habitat (e.g., wildlife, fisheries, forest management, rivers, wetlands), and coastal zone and ocean. She noted that the subcommittees have overlapping interests. Subcommittees will meet over the summer to identify vulnerabilities and develop strategies for adaptation. Recommendations will be compiled into a report by the end of 2009 and submitted to the legislature. The report is intended to be a blueprint, and the first

of many steps to address climate change in Massachusetts. The second advisory committee meeting will be held July 30.

Baskin also announced that the Office of Technical Assistance had hosted a one-day conference on water conservation in the hospitality industry. Baskin described the focus of her remarks on the environmental and economic benefits of keeping the fisheries and wildlife sector, a one billion dollar industry in Massachusetts, healthy.

Cohen summarized a presentation and tour co-hosted by the Department of Conservation and Recreation on June 9. The tour covered four of the low-impact development demonstration projects funded by a USEPA Targeted Watersheds Grant for restoration of the Ipswich River. There were more than 90 attendees, with wide representation from municipalities and state and federal agencies.

Baskin announced that Erin Graham, WRC Staff, had delivered a baby girl on June 10th and that commission member David Rich had submitted his resignation, effective upon appointment of a replacement. She thanked Rich for his service, adding that he had been a tremendous asset to the commission over his many years of service. Rich commented that his experience on the commission had been enlightening. Attendees applauded Rich for his service. Later in the meeting, Kearns asked if there was a timeline for replacing commissioners as they leave. Baskin responded that there is no specific timeline, but she has been advocating for designation of replacements to fill vacancies and to ensure good representation from the public on the commission.

Hansen provided an update on the hydrologic conditions for May 2009. Precipitation in May had been close to normal, with some variation across the regions of the state. Groundwater conditions were below normal in the Northeast and Central regions of the state. The hurricane season started June 1 and extends through November. The National Oceanic and Atmospheric Administration's statistical analysis indicates a normal hurricane season. For drought, the Standardized Precipitation Index points to normal to extremely wet conditions across Massachusetts, depending on the region.

Agenda Item #2: Vote on the Minutes of May 2009

Baskin invited a motion to approve the meeting minutes for May 14, 2009.

VOTE	A motion was made by Rich with a second by Cambareri to approve the meeting minutes for May 14, 2009. The vote to approve was unanimous of those present with one abstention (Kearns).

Agenda Item #3: Update: DEP/DAR Memorandum of Agreement Concerning Milkhouse Waste and the Newly Promulgated Groundwater Regulations

Kennedy provided a presentation on the status of the memorandum of agreement (MOA) between the Department of Agricultural Resources (DAR) and the Department of Environmental Protection (MassDEP) on the groundwater discharge permitting regulations (314 CMR 5.00) as they relate to agricultural waste (*ed. note*: see previous discussion in WRC meeting minutes of April, October, and November 2008). Baskin noted that the MOA has been signed.

As background, Kennedy noted that MassDEP classifies any waste that is not "sanitary" waste as "industrial" wastewater, which, if applied to the ground, a typical practice of farms in rural areas, is subject to the groundwater discharge permitting regulations. Kennedy noted DAR's previously stated concerns that the characteristics of agricultural wastewater are different from those of industrial wastewater, the regulations provide no threshold for the quantity of waste discharged, and classifying agricultural waste as an industrial wastewater for purposes of permitting creates an economic burden for farmers. He outlined a host of agricultural activities that generate wastewater and noted that farms are typically located in rural areas with no access to wastewater infrastructure. He added that farmers have traditionally recycled waste products by applying them to the land in order to take advantage of their resource value.

Kennedy also noted that the increasing interest in locally grown food has sparked a 27% increase in the number of small farms in Massachusetts from 2002 to 2005, though commercial dairy operations have declined from 332 in 1997 to 190 in 2006.

Kennedy described a three-year pilot program to evaluate the performance of wastewater treatment strips – a vegetated area designed by the Natural Resource Conservation Service (NRCS) – in treating wastewater from milkhouse operations on dairy farms. The pilot focuses on the NRCS system, but the MOA provides flexibility to also explore the use of bark-bed systems and constructed wetlands. The MOA and the pilot apply to milkhouse waste only, and do not cover bottling or other wastewater (such as vegetable wash water). The MOA extends enforcement forbearance to pilot program participants. Kennedy described the protocol developed by MassDEP for monthly groundwater monitoring at two pilot sites. He outlined next steps for the MOA, including identifying a second farm for monitoring and seeking regulatory clarity on the larger issue of wastewater and manure management on other types of farms.

Drury asked if participants in the second pilot program would be located in a different region of the state. Kennedy responded that because DAR is relying on volunteers to participate in the pilot, a second participant would likely be in the eastern part of the state. Cambareri requested clarification on how the MOA would work. Kennedy explained that the MOA creates two kinds of farms: pilot participants, where monitoring will take place, and grantees, who will receive technical assistance and funding to implement these conservation practices.

In response to a question from Rich, Kennedy confirmed that farmers had provided positive feedback on developing a mechanism to allow the use of wastewater treatment strips. He added that the pilot will provide MassDEP with the science and data needed to evaluate any changes needed to the regulations. Rich expressed concern that the issues discussed in previous WRC meetings had not been addressed. He expressed hope for a consensus between the commonwealth and the farming community. Kennedy acknowledged that there is not consensus yet on the broader issues related to wastewater management on farms.

In response to a question from Contreas, Kennedy clarified that enforcement forbearance would apply to all farms participating in the pilot program, either as pilot or grantee farms. Kearns asked if all dairy farms were expected to install wastewater treatment strips this year. Kennedy responded no, explaining that there are 180 dairy farms in the state, and that these strips are not suitable for some farms because of the space requirements associated with the strips.

Terry expressed interest, on behalf of MassDEP's Drinking Water program, in the results of the pilot program. He adding that working out best management practices involves potential risk.

Kennedy responded that farms traditionally have applied waste to the land, and the pilot should provide data needed to evaluate this practice.

Baskin asked about performance criteria for the monitoring data. Kennedy explained that the evaluation will be based on the limits prescribed by the drinking water regulations. He noted that none of these levels had been exceeded to date. Terry expressed concern about nitrate levels and requested that results of the monitoring be shared with the Drinking Water program at MassDEP.

Cohen requested clarification on manure management. Kennedy explained that manure is sometimes composted, but most is applied directly to fields twice a year, based on soil testing and testing of the manure. Farmers are allowed to store material for several months, since it is not considered good practice to apply manure during the winter months.

Baskin thanked Kennedy for the update on the MOA and expressed interest in hearing the results of the pilot program.

Agenda Item #4: Presentation: Revisions to MassDEP's Model Outdoor Water Use By-Law/Ordinance

LeVangie provided background on MassDEP's model water-use restriction bylaw, which was first published in 1994. His presentation summarized the changes incorporated into the updated model published in May 2009.

LeVangie stated that the intent of the bylaw is to protect public health, safety, and welfare and aquatic resources by giving the public water suppliers the authority to enforce limitations on the use of water, particularly during periods of high demand. He clarified that the word "model" means that this is only a general legal framework, not necessarily the best bylaw available for a particular community. He pointed out three implementation tools in the model: (1) a declaration of a state of water supply conservation, which imposes restrictions on nonessential outdoor water use; (2) declaration of a state of water supply emergency, which covers extreme situations such as drought or loss of water supply to contamination; and (3) the authority to impose penalties. The model defines "nonessential uses" and outlines key exceptions.

LeVangie outlined the key changes in the new model bylaw. Rather than designating odd-even watering days, the model limits nonessential outdoor water use to two or fewer days per week, allowing water suppliers to comply with the parameters of their Water Management Act permits. The model also limits outdoor watering to non-daytime hours, prohibiting use between 9:00 a.m. and 5:00 p.m. Other changes include options to require compliance by private well users and regulate the use of inground sprinkler systems.

LeVangie concluded by describing the status of Seasonal Demand Management Plans developed by public water suppliers and the number of municipalities that have reported implementing mandatory or voluntary restrictions on outdoor watering since 2006.

Kearns asked if community bylaws based on MassDEP's 1994 model are sufficient to comply with new WMA permit requirements. LeVangie responded that MassDEP believes the existing bylaws are sufficient but encourages communities to update their bylaws to incorporate the recent changes. LeVangie added that the permits require some public water suppliers to implement restrictions based either on the calendar or based on streamflow triggers and that MassDEP encourages water suppliers to include environmental considerations in their implementation of restrictions.

There were several questions about who enforces restrictions and how this is done. LeVangie noted that the most effective enforcement is peer pressure and reports from neighbors. Depending on how a community's bylaw is written, enforcement authority is often given to Water Department staff, with municipal police sometimes providing backup enforcement because of their presence in the community. Enforcement usually starts with warnings and proceeds through fines at various levels.

Cambareri asked what is known about the number of private irrigation wells and their impact. LeVangie said he knew of two communities which have bylaws in place that cover private wells. DCR's well driller program shows 430 new irrigation wells were installed in Massachusetts last year, a decline from 700 to 800 wells in 2004. He said impact depends on where the wells are located. In response to a followup question, LeVangie said he was unaware of any test cases on enforcement of restrictions on private well users. It is MassDEP's legal opinion that municipalities clearly have the authority to regulate private wells.

Rich commented that it is very difficult to enforce restrictions on owners of private wells and expressed reservations about the connection between private residential wells and public health and safety. He also noted that some water suppliers encourage property owners who install automatic sprinkler systems to also install irrigation wells because it eases summer demands on the public water supply system.

Terry noted that local boards of health, with oversight from EPA, are responsible for regulating private wells from a public health standpoint, and this system works well. He added that there is a concern that a proliferation of private wells will create an environmental problem, though data on this issue is lacking.

McCrory commented that water suppliers have reported that inconsistent enforcement of watering bans within the community creates confusion and a sense of unfairness in the public's mind if private well owners are not subject to the same restrictions as the rest of the community. Rich acknowledged this as a problem, but said he was looking for empirical data.

Lauenstein commented that peak demand in the town of Sharon affected fire-fighting capacity. As a result, the town limits outside watering to two hours twice per week. He also suggested that MassDEP's model bylaw should make it clear that individual communities can enact more stringent restrictions. LeVangie confirmed that a cover letter accompanying the model bylaw describes these options. Lauenstein added that the U.S. Drought Monitor would be a more responsive trigger than the drought-declaration process currently used by the state.

Cambareri called attention to the need to exempt new septic system drain fields from watering restrictions, since these are required by Title V to be loamed and seeded.

Agenda Item #5: Presentation: Results of Water Conservation Demonstration Projects in the Targeted Watersheds Grant program for the Ipswich River Basin

Cohen said her presentation would focus on the results from the five water conservation demonstration projects funded by the grant, and she would present results on the four low-impact development demonstration projects at a future commission meeting. She acknowledged Ms. Tsai, a graduate student at Tufts University, and thanked her for her work on the statistical analyses of the data from the water conservation demonstration projects. Because not all

commissioners were present, Baskin offered Cohen the option of making a second presentation on the water conservation projects to the commission at some future date.

Cohen described the general purpose of the Targeted Watersheds grant program and the nine demonstration projects (*ed. note*: see WRC meeting minutes of October 11, 2007, for a general overview of the EPA Targeted Watersheds grant program). She thanked the U.S. Environmental Protection Agency, which funded the program, and key project partners, including the U.S. Geological Survey, the Ipswich River Watershed Association, and municipal partners. She reviewed the sources of flow problems in the Ipswich basin, including the export of 79% of all water withdrawals out of the basin.

Cohen briefly described the five water conservation demonstration projects. These involved weather-based irrigation control systems, rainwater harvesting from roof runoff, soil amendments at athletic fields, indoor appliance rebates and retrofits, and a project involving institution of a monthly billing cycle for water bills. She then listed the research questions associated with each demonstration and summarized results of the data collection and analysis.

Cohen explained how the weather-based irrigation control systems work and said that two types of analyses were conducted for this demonstration. One analysis compared outdoor water use in households with the weather-based system (the experimental group) and households with a conventional automatic irrigation system (the control group). She noted high variability in irrigation water use by both the control and experimental groups before installation of the weather-based systems. After installation, variability remained high among the control group but was reduced in the experimental group, especially among the top 25th percentile of water users. Both groups used less water on average in the post-installation period. The experimental group saw a greater reduction than the control group, but the difference was not statistically significant because of the wide range of values. However, half of the control group used more water post-installation, with some using significantly more water, while in the experimental group, few participants used more water post-installation, and none used significantly more. A pre-installation versus post-installation analysis that focused strictly on the highest water users among both groups showed a statistically significant departure in the experimental group, in which users reduced average water use by approximately 55 hundred cubic feet per year, post-installation.

A retrospective analysis was also done comparing actual irrigation water use in 2003 and 2004 to simulated water use with the weather-based controls. The simulated water use was derived by multiplying the number of irrigation cycles triggered (calculated from evapotranspiration thresholds for each system and historic weather data for 2003 and 2004) and measured volumes of water associated with a single irrigation cycle for each system. This analysis was done on both the household group and a set of five municipal athletic fields. The results for the residential group showed high variability, with some households showing savings would have occurred in 2003 and 2004 had the weather-based systems been in use, and others showing the weather-based systems would have resulted in greater-than-actual water use. The greatest potential savings were observed during wet-weather periods and for the higher water users. She noted that the weather-based unit generally is set up to prevent browning of lawns during dry periods, though property owners with some tolerance for browning can adjust the evaporation thresholds to save water during dry periods. On the other hand, the retrospective analysis for the athletic fields showed consistent water savings would have been achieved with the weather-based systems, with an average savings of 36%.

Cohen summarized the results from the rainwater harvesting demonstration. The magnitude of the difference between domestic (i.e., from the pubic water supply) water use and the relatively low-volume storage capacity of the rainwater harvesting systems made it difficult to discern reductions in domestic water use that may have resulted from the substitution of rainwater. However, in a survey of participants, all respondents indicated that some or all of the rainwater they used replaced domestic water that they would have otherwise used.

Another analysis looked at the influence of storage capacity on efficiency of meeting watering demand with rainwater. The study indicated that the larger domestic systems (800 gallons) were more efficient than the smaller systems (200 gallons), as measured by the ratio of total rainfall on the contributing roof area that was captured and used during the study period. Interestingly, two households that tailored system size to their own needs (365 gallons and 600 gallons respectively) were among the most efficient users, even compared with the 800-gallon systems. She described the various factors that affect system efficiency. She also reviewed outputs from a rainwater harvesting calculator developed by a Tufts University graduate student. Analysis of an 8,000-gallon system installed at a school in Wilmington, as part of the project, showed that 80% of the watering demand could be met with rainwater, and that increasing storage capacity would not necessarily be cost effective.

Results from the drought-resistant athletic field demonstration, where the soil was amended with zeolite, a moisture- and nutrient-retaining mineral, showed water savings of 63% on the amended field, which was also visibly healthier than an adjacent control field. Results from the water conservation rebate and retrofit programs in the town of Reading showed moderate but statistically significant savings in both programs, with an average savings of 5,400 gallons/year among participating households. Results from the monthly billing demonstration were inconclusive because a town-wide watering ban was instituted at the beginning of the study period, affecting water use by both the control and experimental groups.

Commission members and attendees had several questions and requests for clarification on the data and the results.

Cohen invited the audience to view details on all the demonstration projects at the project website, http://www.mass.gov/dcr/watersupply/ipswichriver/index.htm. A paper summarizing the presented results will be posted on the project website in the near future.

Agenda Item #6: Discussion: Potential Actions and Policies on Outdoor Water Use

Baskin explained that WRC staff has suggested that the commission, on occasion, have a meeting with a theme and allow time on the agenda for commissioners to discuss the theme, exchange ideas, and provide guidance to staff. She added that outdoor water use was suggested as a theme for today's meeting, since two of the agenda items addressed this topic. She called attention to an article by journalist Beth Daley in the *Boston Globe* ("Concerns are rising on water overuse: Fish stock, rivers drop as lawns soak," *Boston Globe*, June 7, 2009), the first of a series of articles to appear in the Globe this summer on issues related to water quantity. She also called attention to the variety of reader comments that appear in the online version (http://www.boston.com/news/local/massachusetts/articles/2009/06/07/in_mass_concerns_rising_on_water_overuse/). She noted that Drury had prepared a summary of the general nature of these comments. Baskin suggested using this summary to guide today's discussion. She also noted that the Massachusetts Water Conservation Standards were last updated three years ago,

and this presents an opportunity for self-reflection on what is being implemented and what is not, and what we can do to move forward on conservation.

Cambareri commented that there are many variables to consider, and he emphasized the need to continue to collect measurements and data. He added that Drought Management Task Force provides a consistent characterization of the state's water and how we use it as conditions change. Pederson commented that the *Boston Globe* article was not balanced, from the water suppliers' perspective. She noted that there are other factors than water withdrawals contributing to streamflow issues and called for a more holistic approach, taking into account stormwater and wastewater. She noted that DEP data indicate that water use has declined by 80 million gallons per day in the past 24 years, while population, according to census data, has increased by 600,000. Baskin asked for clarification on whether the savings cited by Pederson included the savings achieved in the system operated by the Massachusetts Water Resources Authority. Heidel commented that the MWRA savings were much greater, and Pederson offered to research this and clarify later what the 80 mgd represents. Baskin acknowledged the holistic nature of the water problem, and noted that the 2004 Water Policy considered stormwater, dams, and wastewater returns, among other issues, while the fish and habitat study being conducted by the Department of Fish and Game will be examining the effect on fish populations of different kinds of habitat alterations.

Purinton commented on the overarching need to update the stressed basins evaluation, to quantify flow stress, and to describe the method for quantifying stress. Heidel added that the MWRA system is a regional resource with many years of storage that can help the state weather a drought. Hutchins referred to Cohen's presentation, which highlighted the impacts of development and impervious surfaces on water resources, particularly in eastern Massachusetts.

Lauenstein called attention to a graphic in the Globe article, which shows that toilets are the highest user of water indoors. He added that the state could help water suppliers meet the 65 gallons per capita per day consumption standard by updating the plumbing code to require use of high-efficiency toilets, as California recently did and Texas is about to do. He noted that Massachusetts was the first state to require 1.6-gal. toilets, and the industry now offers reliable and powerful equipment that can save billions of gallons of water. Baskin acknowledged that this was a good suggestion and that discussion questions for today's meeting included looking at changes to the plumbing code for irrigation equipment. Drury responded that staff member Graham had researched possible changes to the plumbing code, including other appliances, such as high-efficiency washing machines and dishwashers. Lauenstein commented that it is important to not lose sight of the role of indoor water use even in the summer. In the town of Sharon, he added, indoor water use represents two-thirds of water use in summer, and reducing indoor water use can help moderate spikes resulting from irrigation.

Frymire called for more focus on the problem of infiltration to leaky sewage pipes, adding that groundwater from local river basins, in an amount equivalent to all the water pumped from the Quabbin Reservoir, is being lost to infiltration. Frymire also expressed concern about changes EPA has proposed to MWRA's permit that would name MWRA communities as co-permittees. Hutchins seconded Frymire's concern about the loss of groundwater and base flow in sewered areas, and said the stressed basins task force is looking for ways to include this problem in stress classification. She commented on the difficulty of quantifying infiltration into leaky sewage pipes and the lack of high-quality data. She requested the commission to flag this as an area needing more research. Baskin added that the loss of stormwater to inflow is a similar problem. She asked if MWRA provides guidance to communities on estimating infiltration and inflow.

Heidel responded that MWRA relies of guidance from MassDEP. Baskin suggested adding infiltration and inflow to the WRC Work Plan for 2010. Hutchins added that being able to quantify the problem is the first step. Frymire suggested a more detailed and nuanced analysis of one storm a year by MWRA to obtain specific data on where losses are occurring in individual communities.

Lauenstein called for establishing the position of state water conservation coordinator, as recommended in the Massachusetts Water Conservation Standards since 1992. Baskin acknowledged this was a good idea.

Drury suggested more discussion on what the state can do to support communities in implementing MassDEP's model bylaw on outdoor water use. Baskin responded that education is a key area where the state can help communities.

Cohen commented on the need to disseminate information to water suppliers on alternative water pricing structures that can allow them to provide water conservation incentives without losing their critical base revenue that covers fixed costs. Baskin commented that the Secretary of Energy and Environmental Affairs is interested in pricing tools. Cohen suggested offering a web seminar with a California expert at a future commission meeting.

Pederson highlighted some current legislative efforts, including creation of a water infrastructure finance commission to look at funding of various infrastructure issues as well as legislation sponsored by the Irrigation Association to require weather-based irrigation controllers. Baskin asked if the association was also sponsoring legislation to require certification of irrigation contractors; she noted concern by some of the state agencies about which entity would certify irrigation contractors. Pederson responded that a hearing on certification legislation was held recently and offered to provide contacts with the Irrigation Association.

Meeting adjourned

Attachments distributed or presented at meeting:

- Current Water Conditions in Massachusetts, June 11, 2009.
- Presentation by Gerard Kennedy, DAR: DEP/DAR MOA for Wastewater Management on Farms.
- Presentation by Duane LeVangie, MassDEP: Water-Use Restriction Model Bylaw.
- Presentation by Sara Cohen, DCR: Restoring Flows to the Ipswich River through Low-Impact Development (LID) and Water Conservation
- Water conservation discussion questions/topics (compiled from reader's comments on the June 7, 2009, *Boston Globe* article, "Concerns are rising on water overuse," by Beth Daley.