THE COMMONWEALTH OF MASSACHUSETTS

WATER RESOURCES COMMISSION

100 CAMBRIDGE STREET, BOSTON MA 02114

Meeting Minutes for November 18, 2010

Minutes approved January 13, 2011

Members in Attendance:

David Cash	Executive Office of Energy and Environmental Affairs
Kathleen Baskin	Designee, Executive Office of Energy and Environmental Affairs
Tina Brooks	Department of Housing and Community Development
Marilyn Contreas	Designee, Department of Housing and Community Development
Jonathan Yeo	Designee, Department of Conservation and Recreation
Laurie Burt	Department of Environmental Protection
Ann Lowery	Designee, Department of Environmental Protection
Gerard Kennedy	Designee, Department of Agricultural Resources
Mary Griffin	Department of Fish and Game
Mark Tisa	Designee, Department of Fish and Game
Joseph E. Pelczarski	Designee, Massachusetts Office of Coastal Zone Management
Thomas Cambareri	Public Member
Bob Zimmerman	Public Member

Others in Attendance:

Todd Richards	DFG	Derek Etkin	CDM
Marilyn McCrory	DCR	Duane LeVangie	DEP
Tom O'Rourke	NStar	Sue Beede	MA Rivers Alliance
Rosalie Starvish	GZA	Julia Blatt	MA Rivers Alliance
Bruce Hansen	DCR	Jeff Davis	University of Massachusetts
Robert Pickering	Haley & Ward	Rebecca Cutter	DEP
Greg Eldridge	Haley & Ward	Lexi Dewey	WSCAC
Jennifer Pederson	MA Water Works Assn.	Tom Lamonte	DEP
Linda Hutchins	DCR	Anne Carroll	DCR
Peter Newton	SEA	Erin Graham	DCR
Vandana Rao	EEA	Lexi Dewey	WSCAC
Steve Long	TNC	Margaret Callanan	EEA
Michele Drury	DCR	Peter Weiskel	USGS
Pam Heidell	MWRA	Jack Buckley	DFG
Alison Bowden	TNC	Margaret van Deusen	Charles River Watershed Assn.
Ralph Abele	EPA	Tom Philbin	Mass. Municipal Assn.

Baskin welcomed distinguished commission members and EEA's Assistant Secretary for Policy, David Cash. She noted that the meeting's agenda would focus on the work over the past year of the Sustainable Water Management Initiative.

Agenda Item #1: Presentation and Discussion: Sustainable Water Management Initiative – Update on Safe Yield and Streamflow Criteria

Cash provided an overview of discussions to date by the various committees involved in the Sustainable Water Management Initiative, along with a preview of where the initiative is heading.

Cash provided background on the initiative, starting with discussions of safe yield in October 2009. As a result of the discussions that followed, EEA launched a process that would develop a safe yield methodology that incorporates an environmental protection factor, work on streamflow criteria, and address issues related to the sustainable water supply and habitat protection functions that the various state agencies and stakeholders are invested in.

Since December 2009, Cash noted that monthly meetings of the Advisory Committee, Technical Subcommittee, and a variety of other subcommittees have been attempting to address a complex suite of policies and questions. He noted that there had been good inter-agency cooperation through a Steering Committee and Implementation Committee. He added that federal agencies, including U.S. EPA and the U.S. Geological Survey, have made significant contributions to the technical work. He acknowledged Jeff Davis for his work in facilitating the meetings.

Cash stated that the purpose of the initiative is to develop an integrated package with multiple components that will address the suite of issues. One of the pieces of the package is Safe Yield, a drought volume that considers storage and an environmental protection factor. He added that Safe Yield is only one of nine factors to be considered in Water Management Act permitting in determining the amount of water that can be allocated in permits. He outlined the other pieces of the integrated package, including existing habitats, water supply categories, streamflow criteria, impervious cover, goal-setting, mitigation and restoration, and development of an allocation methodology. He added that other stressors, such as dams and wastewater, will also be addressed.

Cash acknowledged stakeholder interest in a definitive proposal describing the components of Safe Yield. Though there is no definitive proposal, he noted that the initiative is making progress toward a proposal for public comment.

Carroll outlined the technical components of Safe Yield as discussed by the various committees. The current thinking is that Safe Yield consists of three components: (1) Basin Yield, a drought volume; the committees are considering a monthly Q90 flow; (2) Drought Environmental Protection Factor, a percent of Basin Yield that would be set aside; recent discussions propose a methodology that would use information from the Fish and Habitat study; and (3) Storage Volume, a volume that would be added to Basin Yield for systems that meet certain conditions. She also outlined issues that are the subject of ongoing discussions, including the scale that is appropriate for the analyses; the time step to be used in analyses; and where return volumes should be counted.

Cash outlined the components of sustainable allocation, including biological categories, water supply categories, streamflow criteria, and determining goals for specific areas. A methodology will also have to be developed for balancing the nine factors MassDEP must consider in permitting.

Carroll described the work on establishing biological categories that reflect ranges of impacts on fluvial fish. Five biological categories have been described. A model has been developed for

assessing the condition of aquatic habitat, with key considerations being August flow alterations, impervious surfaces, and natural basin characteristics. Staff also looked at the flow alteration levels associated with the five biological categories as a way of guiding decisions on flow criteria. She reviewed a map that showed which of the 1,400 subbasins fall into each of the five flow alteration categories. A future analysis will focus on impervious surfaces to see how levels of impervious cover correspond to the five biological categories.

Cash introduced the concept of setting general goal classes statewide and establishing a process for basin-specific goal classes. Carroll acknowledged the contributions of stakeholders, who suggested the concept of goal classes, which would be independent from, but informed by, existing conditions. She reviewed potential goals, as expressed by various stakeholders, and showed an example of how goal classes might be associated with the maximum percent alteration of August flow. More analysis of percent flow alteration for other bioperiods (October, January, and April) is being done by staff. She outlined data that could be used to inform decisions about goal classes.

Cash described the next steps of the initiative, including developing a process for setting goals, establishing an allocation methodology, and developing implementation approaches, whether through incentives, permits, or regulations.

Pederson requested clarification on how the fish model was used in some of the analyses. Carroll explained that the analysis she described looked at the effect of one variable at a time. Weiskel added that in order to look at the effect of each variable, the anthropogenic variable has to be a constant.

Cambareri commented that the goal classes should not be mutually exclusive and asked whether the concept presented assumes that the "default" goal class is the sustainable condition. Carroll acknowledged that there could be areas where goal classes overlap and explained how the three goal classes were initially determined. She added that a more basin-specific process for goal-setting might look at other variables besides flow alteration and the biological categories. Cash added that the initiative will need to establish a process for setting goals to balance competing interests.

Van Deusen commented that some of the categories seem broad and asked how the process could avoid a "race to the bottom" of a particular category. In response to a question from Philbin about how dams are ranked on their impact, Weiskel responded that impacts are better described in basin-specific terms. He discussed USGS analyses of variables. He commented that when the focus was on impervious cover, with flow alternation held constant, the results showed impervious cover as a more powerful effect over the full range of imperviousness in the state. He emphasized that effects do vary from basin to basin. Richards added that the impacts of impoundments are best studied at a site-specific level.

In response to a question about the pathway that is envisioned for goal-setting, Cash responded that those decisions have not yet been made. One proposal is to address goals in each area as permits approach their renewal dates. Kennedy asked what would be brought before the Water Resources Commission. Cash responded that the core of this work would inform a policy document that would come before the commission, part of which would be prescriptive, as, for example, a Safe Yield methodology. Proposals for a process for setting goals would follow. Pieces of the policy would then be implemented through regulatory processes at the appropriate agencies.

Agenda Item #2: Sustainable Water Management Initiative – USGS Report of Assessment of Factors Influencing Riverine Fish

Baskin acknowledged the hard work of the U.S. Geological Survey and the Massachusetts Division of Fisheries and Wildlife, who accelerated work on a long-term study originally scheduled to be completed in 2011. Baskin expressed gratitude to these two agencies for developing the science that serves as the underpinnings for new policies the commonwealth will develop.

Weiskel summarized results from the accelerated fish and habitat study, which is part of a larger study being conducted in cooperation with the Massachusetts Department of Conservation and Recreation, Department of Environmental Protection, and Department of Fish and Game. He noted that this study is the third of three studies (see attachments list), with the first two studies forming the basis for the third.

The accelerated study focuses on the factors that govern the composition of fish communities. He reviewed some important sources of data, including new georeferenced datasets. The objective of the study was to assess the response of stream fish communities in Massachusetts to variations in natural basin characteristics, flow alteration, and other forms of anthropogenic stress, including impervious cover and dams. The study used 756 fish sampling sites distributed across the state. Weiskel displayed maps showing flow alteration (streamflow depletion and surcharging) and impervious cover for the basins that contribute to the fish sampling sites.

The study used two analytical tools: quantile regression and generalized linear modeling (GLM). He highlighted results of the quantile regression analyses for fluvial fish abundance (number of fish) and richness (number of species present). The results indicate that fluvial fish decline in abundance and richness as percent alteration increases. Separate analyses were conducted for the net-depleted sites and net-surcharged sites. The results also indicate that fluvial fish decline in abundance and richness as impervious cover increases. At about ten percent impervious cover, half the number of fish are lost and the number of species declines sharply.

Weiskel also reviewed the results of the GLM analyses. Fluvial fish relative abundance was found to depend on both natural and anthropogenic variables. Major findings were that (1) a unit increase in August flow alteration for net-depleted or net-surcharged streams is associated with a 0.4% decrease in fluvial fish abundance; and (2) a unit increase in percent impervious cover is associated with a 5.5% decrease in fluvial density. More specifically, by 10% to 15% impervious cover, most fluvial fish are gone from the stream. He noted that this is a significant finding since most of eastern Massachusetts is in the 5% to 15% or greater range of impervious cover.

Agenda Item #3: Sustainable Water Management Initiative – Fluvial Habitat Categories

Richards commented that the efforts of his team have focused on incorporating the results of scientific analyses into policy. The first step is to develop a statewide screening tool to describe the current condition of streams and rivers in Massachusetts using the best available science. The result should be a living document that will be useful in ongoing discussions of goal-setting, streamflow criteria, and safe yield.

Richards explained that the study of fish communities is useful in these efforts because fish are good indicators of the condition of aquatic environments, and there are long-term study data available on fish communities. He highlighted the new USGS study of factors influencing

riverine fish communities in Massachusetts (see Armstrong et al. 2010) and said that the model developed to assess fluvial fish relative abundance identified highly significant variables that can be used in the stream categorization process.

Richards explained that the preliminary categories are narrow at the low end of alteration, because high-quality resources have fish populations that are more sensitive to alteration. Categories are broad at the high end of alteration, because these resources consist of species that are more tolerant of alteration. He reviewed graphs illustrating the quantile regression analyses. At 5% flow alteration, one-third of blacknose dace are lost; at 15% flow alteration, two-thirds of this species are lost; and at 35% flow alteration, nearly all of the population is lost. He showed similar results for this analysis using brook trout.

He reviewed the break points for five stream categories based on declines in fluvial fish relative abundance in response to changes in August flow alteration: the breakpoint for Category 1 would be 5% biological loss, while the break point for Category 5 would be 65% or greater biological loss. The next step was to develop a statewide screening tool. The study team developed a regression equation to analyze all the variables for each of the 1,429 subbasins developed for the Massachusetts Water Indicators study (Weiskel et al. 2010). Richards showed a map displaying the distribution of the five categories of biological loss statewide. He explained that the map shows the biological condition of the subbasins expressed in terms of fluvial fish relative abundance.

Questions and discussion revolved around differences in impact between surcharged and depleted basins; consumptive use of water by septic systems, where wastewater is discharged in a different subbasin; and whether and how water quality is considered. Pederson expressed concern that the final map in Richards's presentation focused on net depletion when other presentations highlighted surcharged basins. Baskin noted that the Massachusetts Water Indicators report does include a figure showing both depleted and surcharged basins and added that this figure was included in Weiskel's presentation earlier today.

Cash commented that scale issues must be considered in goal setting. He added that the map showing categories of biological loss does not indicate causes of impacts on fluvial fish communities. At smaller scales of analyses, it may be possible to discern these causes.

Agenda Item #4: Vote on the Minutes of September and October 2010

Baskin invited motions to approve the meeting minutes for September 16, 2010, and October 14, 2010.

VOTE	A motion was made by Contreas with a second by Kennedy to approve the meeting minutes for September 16, 2010. The vote to approve was unanimous of those present, with two abstentions (Cambareri and Zimmerman).

VOTE	A motion was made by Yeo with a second by Contreas to approve the meeting minutes for October 14, 2010. The vote to approve was unanimous of those present, with two abstentions (Cambareri and Zimmerman).

Agenda Item #5: Executive Director's Report

Baskin noted that there are several vacancies on the Water Resources Commission and invited nominations. Baskin announced that the Drought Management Task Force will recommend to the governor that the drought has ended.

Hansen provided an update on the hydrologic conditions for October and early November 2010. He reported that rainfall had been above average in all regions of the state. This excess rainfall has continued in early November. Groundwater levels were normal or above normal in all regions. Streamflows are also normal or above normal. However, all reservoirs, with the exception of the Quabbin and Assawompsett, are below normal. Fire danger has dropped off considerably since September. All drought indicators are normal to very wet, and no tendency for drought is indicated through January 2011.

Baskin acknowledged and thanked Hansen and Hutchins for their extra work in reviewing drought indicators and preparing various reports related to drought management planning and reports needed to support the Drought Management Task Force.

Meeting adjourned.

Attachments distributed, presented, or referenced at meeting:

- Current Water Conditions in Massachusetts, November 18, 2010.
- Archfield, S.A., Vogel, R.M., Steeves, P.A., Brandt, S.L., Weiskel, P.K., and Garabedian, S.P., 2010, The Massachusetts Sustainable-Yield Estimator: A decision-support tool to assess water availability at ungaged stream locations in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2009–5227, 41 p. plus CD-ROM. http://pubs.usgs.gov/sir/2009/5227
- Weiskel and others, 2010. Indicators of streamflow alteration, habitat fragmentation, impervious cover, and water quality for Massachusetts stream basins: USGS Scientific Investigations Report 2009–5272, 79 p. http://pubs.usgs.gov/sir/2009/5272/
- Armstrong, D.S., Richards, T.A., and Brandt, S.L., 2010, Preliminary assessment of factors influencing riverine fish communities in Massachusetts: U.S. Geological Survey Open-File Report 2010–1139, 43 p. http://pubs.usgs.gov/of/2010/1139/