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MEMORANDUM

DATE: April 13, 2010
TO: Board Members
FROM: Henry Jennings, Director
SUBJECT: History of BPC Water Monitoring Efforts

The Maine Board of Pesticides Control (BPC) first got involved in water quality issues in the 1980s when the insecticide aldicarb was found to be contaminating forty-seven percent of wells near use sites in potato growing areas of the state. Aldicarb is now severely limited in its agricultural uses to parts of the country and cropping systems for which ground water contamination is far less likely.

The BPC next cooperated in a three-year study (1986 – 1988) of domestic wells near agricultural areas of the state, spearheaded by the Maine Geological Survey. Fourteen percent of the 229 samples analyzed showed detectable levels of pesticides. In addition, this study was the first to demonstrate that bedrock wells are most likely to contain detectable levels of pesticides (and nitrates) in Maine, while wells in sand and gravel deposits are the least likely, turning the conventional wisdom – which predicted the opposite result – on its head.

In July of 1990, the BPC hired its first Water Quality Specialist (WQS) using federal pesticide funds earmarked for ground water protection. The first job for the newly hired WQS was to develop a so-called “Generic State Management Plan for Pesticides and Ground Water” as required by EPA. The plans were termed “generic” because EPA anticipated states would later develop pesticide-specific plans as necessary. Development of the generic plan proved somewhat contentious and the first generic plan was completed in 1994.

While the generic plan was under development, the BPC staff began piloting some small scale water monitoring efforts. Early BPC ground water surveys focused on corn herbicides since EPA had identified several of them as posing ground water threats. A series of small-scale surveys between 1990 and 1996 near corn growing areas showed that a handful of corn pesticides were often present in ground water, including atrazine, alachlor and carbofuran.

The BPC’s first statewide ground water survey was conducted in 1994, following an extensive planning process. The vast majority of the 129 sites sampled were taken adjacent to agricultural use sites. Twenty-four percent of the samples were positive for at least one pesticide. Fifteen of twenty samples taken adjacent to blueberry growing areas were positive for hexazinone, which prompted the BPC to initiate a separate survey specific to hexazinone and blueberries beginning in 1998. Since these initial two ground water surveys were conducted, the statewide survey was repeated in 1999 and 2005, while the hexazinone survey was repeated in 2002 and 2006. In addition to ground water monitoring efforts, the WQS also oversaw development of a state management plan for hexazinone. It is believed that this was the only pesticide-specific plan in the country ever completed.

When concerns about failing populations of Atlantic Salmon became prominent in the mid-1990s, the BPC began to venture into surface water sampling in conjunction with Maine's Atlantic Salmon Conservation Plan. Sixty-four samples were collected from seven Maine salmon rivers in September of 1997. Nineteen of those samples – all coming from three rivers – had detectable levels of hexazinone. Sampling related to the Salmon Conservation Plan continued in various forms through 2004. Much of the work focused on efforts designed to determine if pesticide drift from aerial spraying was a threat to the salmon populations. Low levels of drift were sometimes detected in or adjacent to salmon rivers, but salmon experts were not particularly alarmed. A time series project was also conducted on the Pleasant River during this period in an attempt to evaluate seasonal fluctuations of hexazinone levels. Levels trended slightly higher in the mid-summer months, and then declined gradually through the late fall and winter. During the summer of 2000, Julie Chizmas, the WQS at the time, conducted another enlightening study when she sampled spring water as it emerged from the ground adjacent to the Pleasant River. Six of eight spring water samples were positive for hexazinone with a high of 3.08 parts per billion. Julie also sampled eleven first-order tributaries to the Pleasant River that summer. Eight of eleven of those samples were positive for hexazinone, although the highest concentration was 1.4 parts per billion.

Small-scale studies of surface water continued through most of the 2000 decade. Corn herbicides were again a focal point and those pesticides were shown to be problematic in surface water also. Other studies looked primarily at residential use of pesticides, a growing area of use. Pesticides have not been detected as frequently in residential samples, but some chemicals have been detected. In 2008, Gary enlisted his summer help to sample a few streams draining golf courses in the greater Portland area. Chlorothanamil was detected at very low concentrations in four of eight samples.

In general, surface water sampling strategies have proven far more challenging and labor intensive, because pesticides tend to enter surface waters only during significant precipitation events. The optimal sampling time is thought to be just prior to peak flow, which is both difficult to predict and rarely occurs (or so it seems) during normal work hours. So statewide surface water sampling projects have not been feasible to this point.

Between 1992 and 2001, the US Geological Survey (USGS) conducted a comprehensive surface study over a cross section of watersheds throughout the country. USGS data show that at least one pesticide was detected in samples from agricultural and urban areas ninety-seven percent of the time. Levels of some pesticides have begun to drop in certain areas in recent years.

Beginning in 2006, the BPC has been involved in collecting sediment samples from stream outfall areas in Casco Bay. This effort was sparked by findings in California indicating that the popular class of synthetic pyrethroid insecticides is largely hydrophobic and more likely to migrate to the sediments. Sediment samples collected in 2008 demonstrated that at least one of these compounds – bifenthrin – can be readily found adjacent to urban areas.

The BPC has not had a WQS staff person since Heather Jackson left in January of 2007. Consequently, sampling efforts have been very limited over the last three years and depended on assistance from the Friends of Casco Bay and other cooperators. The BPC's existing ground water plans both suggest it's time to repeat the surveys. Fortunately, when Wes Smith retired in March of 2009, the BPC decided to combine the pesticides registrar function with the WQS function into one position. Mary Tomlinson was hired into that position in May of 2009. Almost all of Mary's time has been devoted to an overhaul of the pesticide registration process to date; however Mary is optimistic about working in the water quality area soon.