REPORT ON
2007 MONITORING OF PESTICIDE DRIFT FROM APPLICATIONS MADE TO CONTROL BROWNTAIL MOTH

MAINE BOARD OF PESTICIDES CONTROL

Abbreviations	
BPC	Board of Pesticides Control
cm	centimeter
GPS	Global Positioning System
LOQ	limit of quantification
MHWM	mean high water mark
ND	non-detect
ng	nanograms
QA/QC	quality assurance/quality control
QAPP	quality assurance program plan
WSP	water-sensitive paper

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Abstract

At the request of the Legislature the Maine Board of Pesticides Control (BPC) conducted a browntail moth pesticide drift study during May and June 2007, as required by PL 2007, Chapter 50. Three coastal sites were chosen and the two pesticides involved were permethrin and cyfluthin. Air-assisted (air-blast) sprayers were used and the samples were taken upwind of spraying to affirm that the requirement to spray when the wind is coming off the ocean was adequate to prevent drift into the water. No residues of permethrin (limit of quantification 15 ng) or cyfluthrin (limit of quantification 125 ng) were found.

Background Information

In 2006, BPC staff conducted a drift-monitoring study, as directed by PL 2006, Chapter 553. This statute was intended to minimize the risk to Maine's marine waters and organisms when pesticide applications were made to control browntail moth larvae in specific geographic areas near marine waters. This original statute established a no spray buffer, placed restrictions on pesticides that could be used, limited power applications to hydraulic hand-held sprayers and required that the wind not be blowing toward marine waters at the time of the application.

Based on the 2006 study, BPC staff concluded that, when pesticide applications were made according to statutory requirements, pesticide drift to marine waters would be negligible. Board staff made several recommendations from the study's findings. One recommendation was to specify that the wind be greater than or equal to 2 miles per hour and blowing away from marine waters at the time applications were made. Another recommendation was to expand the type of powered application equipment that could be used to include air-assisted sprayers. These new amendments were included in PL 2007, Chapter 50.

The new law, PL 2007, Chapter 50, included a section that directed the BPC to conduct a further monitoring study of pesticide applications to control browntail moths near certain coastal areas. Based on amendments in the new statute, the focus was to be placed on applications that used air-assisted sprayers.

Goal

The May/June 2007 study was done to collect data to help determine if the restrictions placed on air-assisted sprayers in Section 2 of PL 2007, Chapter 50, are sufficient to prevent unreasonable pesticide drift into marine water bodies.

Materials and Methods

Study Design. The plan for this drift study was drawn from other drift research and patterned after the first study done in 2006. That study had input from representatives from the BPC, the Department of Environmental Protection, the Department of Marine Resources, the University of Maine Food Chemical Safety Laboratory, and the Maine Lobstermen's Association. At the urging of the BPC staff toxicologist, the 2007 study was designed with a greater statistical validity by sampling in triplicate.

Site Selection. BPC staff contacted all companies that were known to make pesticide applications to control browntail moths. Of the companies contacted, only two had air-assisted sprayers. These companies provided a

list of planned spray sites. BPC staff field-checked these sites prior to the spray dates and selected some fitting the sampling project goals. On the day of spraying, however, the applicators did not spray all pre-selected sites. This was due to a number of reasons, but primarily because the wind conditions were not right. For these reasons and because of a reduction in brown tail moth populations in 2007, there was not a lot of spraying near marine waters with air-assisted sprayers.

Based on these circumstances, three sites were monitored by the BPC in 2007. The first company treated one site in Brunswick that was within 250 feet of the ocean. The other company, treated two sites in Cumberland that were inland, but the sampling simulated spraying conditions that the project was intended to monitor.

The Brunswick study site (Site #1) was treated with permethrin on May 14, 2007. The other two Cumberland sites (Sites #2 and #3) were treated with cyfluthrin on June 7, 2007. The site diagrams with accompanying legends show how the sites were sampled and the wind conditions that existed at the time of sampling (*see Appendix*).

Monitoring Equipment. The equipment used for sampling included 185-millimeter-diameter, laboratory-grade filter discs attached to cardboard rectangles set out on wooden stakes. TeeJet water- and oil-sensitive papers were also used at each site. Fluorescent flagging, a compass and a Kestrel 3000 pocket weather meter were used to monitor weather. Tree heights and land slopes were determined using a Suunto model PM-5/66 optical reading clinometer. A Garmin GPS 12 XL (set to North America Datum of 1983), tape measure, measuring wheel and Kodak DX3900 digital camera were used to document the location and the physical characteristics of the site.

QA/QC. BPC standard operating procedures for the collection of environmental samples and chain-of-custody procedures were observed throughout the sampling project. Samples were kept in certified contaminant-free glass jars and on ice or frozen until delivered to the laboratory. The University of Maine Food Chemical Safety Laboratory maintains a quality assurance project plan (QAPP) with QA/QC protocols for the BPC and the US EPA for the analysis of samples used in the enforcement of state and federal pesticide regulations.

Sampling. Six samples and one field blank were taken at each site. Four water-sensitive paper samples were included at each sample site as an additional tool to monitor upwind drift of the spray mixture (802WSP, for example, was one water-sensitive paper sample at Site #1). All filter paper sample discs were stapled to cardboard rectangles and placed in plastic bags at the BPC office prior to the day of sampling. On the day of the spraying, the BPC met with the applicators, discussed the sampling objectives, observed the mixing and loading procedures and set out the sample discs and water-sensitive paper samples prior to the spray event. One set of triplicate blanks was placed out at each sampling site, but this was collected, labeled and jarred just before the application was made. These were later sent to the lab along with the drift samples as a way to assure that field-sampling error did not contaminate the filter paper samples.

After the field blanks were collected, but with the remaining sample discs still in place, and when wind conditions met the application criteria of the statute, the applicators were signaled to start the application. The wind speed and direction were monitored throughout the spray event to assure a direction reversal did not occur and the wind speed remained at least 2 miles per hour with the sample discs upwind. After the spray event was completed, BPC staff collected the paper sample discs. Using a clean pair of disposable nitrile gloves for each sample disc, each disc was put into its own certified contaminant-free glass jar and labeled. These samples were then placed on ice in a cooler and, upon returning to the BPC office the same day, placed in a freezer. Samples were then delivered to the University of Maine Food Chemical Safety Laboratory within one week of collection.

Laboratory Methodology. The University of Maine, Food Chemical Safety Laboratory performed the sample analyses using ethyl acetate extraction and a gas chromatograph/ mass spectrometer system (GC/MS) for detection, quantification and confirmation. The limit of quantification (LOQ) for cyfluthrin was 125 ng (0.47 ng/cm^2) and the LOQ for permethrin was 15 ng (0.05 ng/cm^2).

Results

The total number of drift cards analyzed by the laboratory, including QA/QC samples, was 63. The lab report indicated no detection (N/D) for any of the samples at the lab's limits of quantification. The yellow water-sensitive cards matched the laboratory results. No blue dots, representing drift, were found on any of the water-sensitive cards. Full study results are available by contacting the Board.

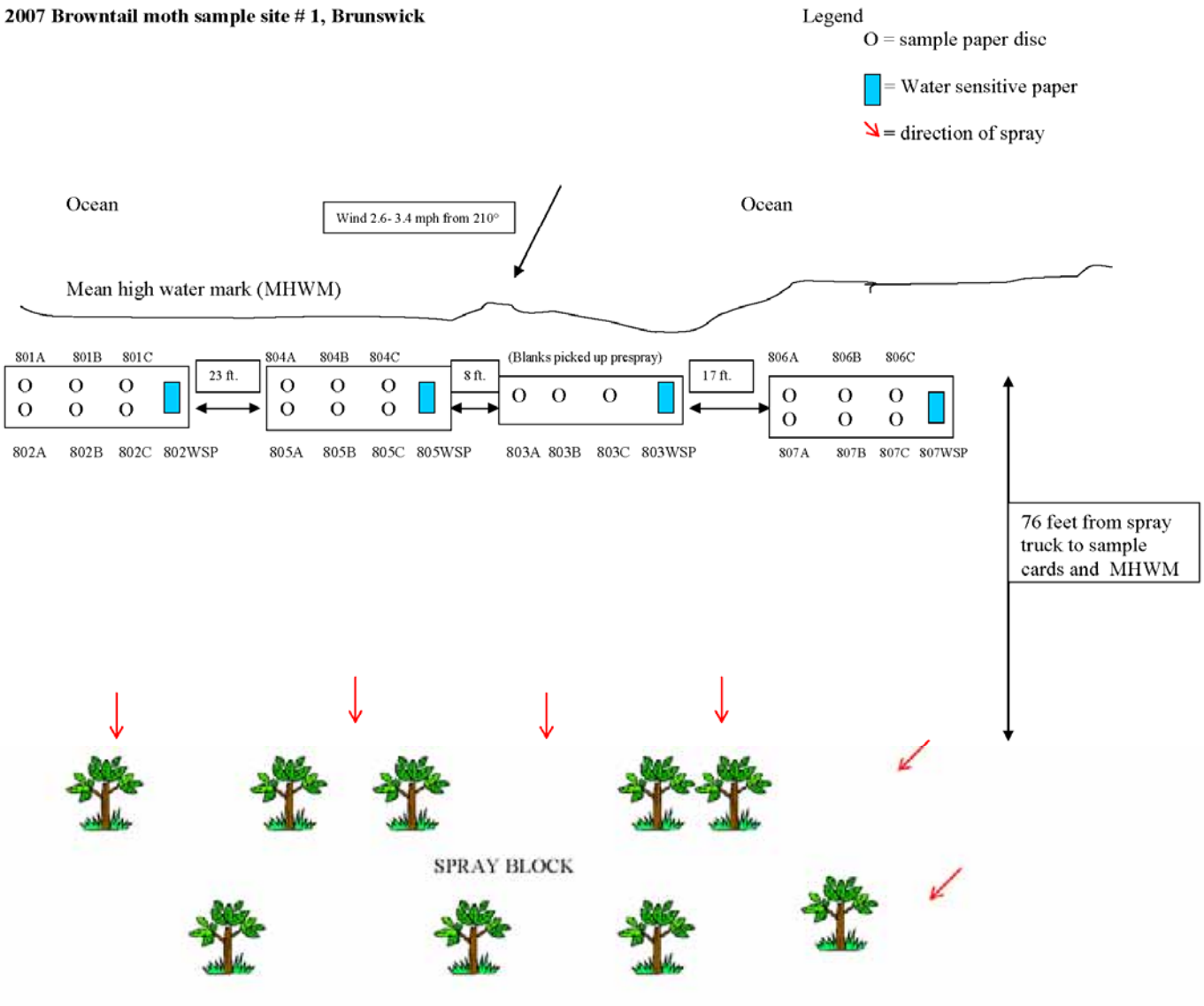
Discussion and Conclusions

This study found no evidence that pesticides drifted upwind when applicators used air-assisted sprayers and followed the application restrictions required in PL 2007, Chapter 50. Based on these results, the application restrictions in PL 2007, Chapter 50, on air-assisted sprayers appear to be sufficient to prevent unreasonable pesticide drift into marine water bodies when the regulations are followed.

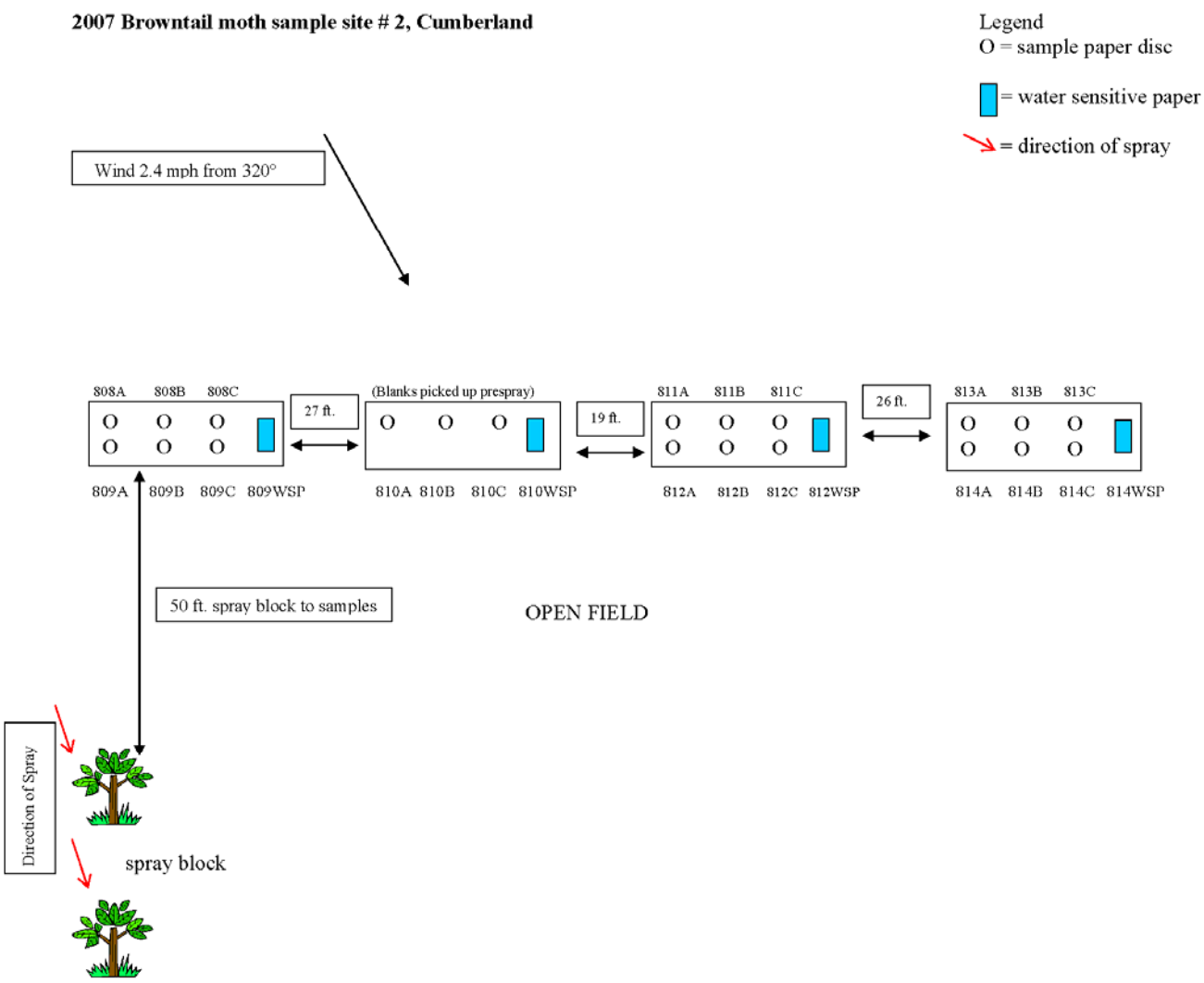
These restrictions required in PL 2007, Chapter 50, will be added to Chapter 29 of the Board's rules prior to the 2008 spray season. The amended rule is slated for adoption at the Board's January 25, 2008, meeting.

APPENDIX

2007 Browntail moth sample site # 1, Brunswick



2007 Browntail moth sample site # 2, Cumberland



2007 Browntail moth sample site # 3, Cumberland

Legend
O = sample paper disc
= water sensitive paper
= direction of spray