

Procedures and Template for Pest Management Strategic Plans

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Introduction to Strategic Plans

A Pest Management Strategic Plan (PMSP) identifies pest management priorities for a commodity and through stakeholder involvement. A PMSP presents a prioritized list of needs for research, regulatory activity, and extension education. It lists options for adjusting to recent and foreseeable changes and provides a vision for improved pest management practices

The PMSP is the final step in the survey-profile-plan sequence. A PMSP goes beyond the descriptive facts provided by the crop profile. It addresses the research questions, and Extension delivery priorities, and regulatory situation for each major pest and management option. The PMSP reviews the strengths and weaknesses of current practices described in the crop profile, why current practices are the way they are, and considers the strategic implications of the current situation. It addresses constraints that define the current situation and opportunities for progress.

Foreseeable contingencies such as the loss of major pesticides, arrival of pesticide-resistant pest strains, newly imported pest species, or other significant regulatory or market developments that would affect pest management decisions are identified and discussed. The PMSP thus serves as a preliminary “emergency preparedness plan” by reviewing possible responses to such situations.

PMSPs provide EPA and USDA with information needed to account for New England’s needs in pesticide registration, funding and direction for education and research, and in other policy decisions. Developing a PMSP also benefits stakeholders through the guidance it provides within the region for commodity organizations, extension programs, and research activity.

A PMSP that follows this template will meet all the USDA requirements. Northeastern IPM Center PMSP requirements are online at http://www.ipmcenters.org/pmsp/PMSP_CHECKLST.pdf

PMSP Procedures

Six months before desired meeting date

1. Hotel arrangements

Finalize contract with hotel for meeting room, meals, break snacks, overnight guest rooms. You cannot start too early for this, so as soon as you have a date in mind, call the hotel.

We have a relationship with the Concord Marriott (front desk = 603-225-0303), they have a good location and in the past have given us a better price than competing hotels. Establish a contact in their sales office (603-573-4013) and ask them to act as our liaison with the front desk. This can be important because the sales office, front desk, and kitchen do not always communicate very well, which causes problems with room booking, billing, and meal arrangements.

You will want to set up a Direct Bill relationship between your University and the Concord Marriott. Communicate with the reservations desk that you are covering cost of rooms for participants. Therefore, there is no need for them to ask for a participant's credit card number to hold a reservation in your block of rooms.

The Marriott has four meeting rooms suitable for hosting a PMSP session. We have used the Capitol room twice and it is a good space for our needs. The Concord and Merrimack rooms are almost identical to the Capitol, but just a bit larger with no extra cost. The Constitution room is also the same price and slightly fancier (has a chandelier). What we need is a comfortable place to spend two days looking at a Word file projected onto a screen. This requires lighting that allows the room to be partially lit without washing out the screen image, but not so dark to decrease the vitality of discussion. Split lighting is best – lights on above people but no light directly on the screen.

Meeting room suggestions:

- Reserve the meeting room from 12–9pm on day one, and 7am–4pm on day two.

- U shaped table for participants, small table for the computer projector

- Food: Coffee and snacks on arrival, afternoon break day one, dinner in the hotel restaurant on day one (arrange for hotel to take dinner selections during the afternoon so that the food is ready when you take dinner break).

- Breakfast, morning break, Lunch, afternoon snack day for two.

The Concord Marriott has a meal plan that provides all three of these for less cost than ordering them individually, but the breakfast portion is only bagels and cream cheese. The hotel can augment the Day-Tripper to include eggs, bacon, and other more substantial breakfast offerings. Having breakfast right in the meeting room, helps the meeting get started on time for day two. People are donating their time, feed them well!

2. Enlist participants

Get names of participant candidates from each state. The PRONewEngland Pest Management Network (NEPMNet) liaison in each state is responsible for identifying at least one or two grower and commodity expert candidates in their state.

For the region, you need to have a minimum of at least 6 growers, up to a maximum of about 10. If you arrange for the minimum number, you may end up short of the minimum due to last minute cancellations. The growers should include representation from small and large farms, different production regions in New England, organic and conventional, retail and wholesale.

You need to have a minimum of at least 5 commodity and research experts, up to a maximum of about 8. Both University and private industry should be included as commodity experts. Between different members of the group, there should be expertise in all areas of pest management pertinent to the crop. This will usually require finding research and Extension participants with expertise in entomology, plant pathology, and weed science. For some crops, you may need expertise in nematology and vertebrate pest management.

You also need to have an IR-4 representative to bring updated information on new pest controls in development. There is an IR-4 person in each New England state. Edith Lurvey at Cornell is the regional IR-4 program leader. She has asked to be invited to all of our PMSP meetings.

You should invite the NEPMNet state liaisons and the co-directors of the Northeastern IPM Center (John Ayers and Carrie Koplinka-Loehr). Invite any EPA, farm bureau, state department of agriculture or other governmental agencies representatives who you think would contribute to the meeting.

3. Contact candidates to ask for their participation, give the dates and location, explain purpose of the meeting, describe the lodging, meal and travel reimbursement arrangements, and how to contact you.

4. Establish responsibilities. Determine who will be the facilitator, who will be the recorder (person editing the PMSP file live during the meeting), and who will finalize the document after the meeting. The recorder should be familiar with the crop, its pests, the crop profile, and the draft PMSP document. This makes it much easier for them to understand what is being said, know spellings, appropriate paraphrasing etc. The person who will be writing the final PMSP needs to be present at the meeting.

5. Optional - Pesticide Recertification credits. Apply to the New Hampshire Division of Pesticide Control for pesticide recertification credits. Wendelyn Chapley, Director; pesticides@agr.state.nh.us; (603) 271-3550; NH Dept. Agriculture, Markets & Food, PO Box 2042, Concord, NH 03302. The NH state liaison can help with this.

Four weeks before the meeting

1. Send copies of the survey summary and crop profile (electronic or paper) to each person who has agreed to attend the meeting. Ask participants to read these documents before the PMSP meeting, and to bring their copies with them.

2. Send the meeting agenda and travel directions to each participant. Finalize needs for overnight guest rooms.

3. Contact the hotel – Confirm arrangements for meeting room, guest rooms, and meal arrangements. Ask about the release date for reserved rooms.

4. Use the PMSP Word template to create a draft version of the PMSP document. Create a table for each pest to be reviewed. Enter pesticide brand and active ingredient names and efficacy ratings from Extension pest management guides (though meeting participants may want to adjust these at the meeting). Record the sources for ratings in the acknowledgements at end of the document. Leave the Pros and Cons cells blank.

Complete the PMSP appendix. The **pesticide efficacy tables** and **new technologies tables** should be completed before the meeting so that they will be available to inform discussion and for editorial review at the PMSP meeting. This will require some investigation and contact with the IR-4 representative you have arranged to attend the meeting.

The New Pest Management Technologies website is a great resource: <http://www.pestmanagement.info/NPMT/>. Materials marked as registered should be represented in the "Currently Registered Pesticides" table for the appropriate pests, not in the "New Technologies" table. But don't take the NPMT database as the final word. It does not appear to be updated very frequently.

Other useful sites to check are the IR-4 program at <http://ir4.rutgers.edu/>, recent and upcoming EPA pesticide registration activity are at <http://www.epa.gov/opprd001/workplan/newchem.html> and <http://www.epa.gov/opprd001/workplan/newuse.htm>. After reaching these pages, you can use Control-F in your web browser to search the page for the name of the crop.

The new pest management technologies table for each pest group (insects/mites, disease, weeds, vertebrates) should include anything that is under research and may become available in the near future, or management tools for other crops that might be applied to this commodity. To the extent possible, add comments for each new technology about pests for which it could be used, expected efficacy, pros, and cons, and status or timeline for availability.

A table on toxicity of pesticides to beneficial species (primarily arthropod predators and parasites of pest arthropods) will be very useful, and is listed as a PMSP component in the USDA checklist. But I do not think we have that information for many crops. Use the best information you can find. Create a table if you have enough information to do so.

- 5. Make a folder for each participant.** The folder should contain:
- Schedule for the two days
 - Name tag
 - Participant list (name, affiliation, phone number, mail address, and email address)
 - Draft PMSP appendix pesticide efficacy and new technologies tables (and toxicity to beneficial species table if you have it)
 - How PMSPs Are Used fact sheet

(online at <http://pronewengland.org/Content/PROpubs/PMSP-Uses.htm>)

- Travel expense voucher
- Hotel information, such as check out time, hours for pool etc.

A thank you gift for participants is a nice touch. A pest management book or other publication makes a nice gift. Include this as part of your budget. Growers and other private sector participants are donating two days for the meeting, plus preparation and document review time before and after the meeting.

Before release date for rooms (about two weeks before the meeting)

1. Finalize contract arrangements with the hotel. Finalize the number of guest rooms you will be using to avoid being charged for rooms on hold that will not be used. Otherwise, you may be charged for empty rooms. Finalize number of servings for meals.

At the meeting

1. Begin the meeting on time. This sets the tone for an efficient process for the next two days.

2. Hand out participant folders. Bring a couple of extra copies of the survey results summary and the crop profile. Also, bring relevant publications such as Extension pest management recommendations from New England and other states, and other useful pest management references including the Farm Chemicals Handbook.

3. Equipment. Bring a laptop computer with draft of the strategic plan Word file loaded. Bring a projector for the laptop computer, a screen (if not renting from hotel), extension cords, a power strip with multiple sockets, disks or USB memory stick with backup copies of all files you are bringing to the meeting, and to make backups of the file you create/edit at the meeting. A hard disk can malfunction at any time. Do not trust all this work to a single piece of computer hardware.

4. Bring a second computer with a wireless network card. The Concord Marriott has a wireless internet connection. This allows checking pesticide labels on the internet for details on REI, PHI, crops, and pests on the label etc. Maine can provide such a computer if you notify us in advance.

5. Facilitator duties:

The PMSP meeting facilitator plays an important role in having a successful PMSP meeting.

a. Welcome participants. Have everyone introduce themselves with name, where they are from, and their involvement with the subject (i.e. grower, ag supplier extension, research, processor etc.).

b. Give a short introduction, 15 minutes or less. Tell the group that after you are done with the introduction, they are the ones who will be doing the talking and that your job is to facilitate their input.

Review the agenda for the next two days, clarify arrangements for meals, lodging, travel reimbursements, and pesticide recertification credits.

Describe what a PMSP is, that it is the culmination of the three-step pest management tactic survey-crop profile-PMSP sequence. Tell the group that PMSPs were originally devised for, and are used by EPA and USDA. PMSPs also provide factual direction for commodity organizations, extension, research, granting agencies, state regulatory agencies, IR-4 priorities, and are a tool to increase public understanding of agriculture. Mention the "PMSP Uses" fact sheet in their folder.

c. Describe the group discussion process for developing the PMSP. Tell them that it requires input from each participant, and that the intent is to record comments on the importance of each pest, the pros and cons for each of the management alternatives, and to identify research, extension, and regulatory priorities. Emphasize the fact that their experience-based insights and practical comments about a pest or a control tactic are the essential part of a PMSP, and that you appreciate their willingness to share their expertise. We already have the basic facts from the crop profile. The PMSP applies real-world context to the information in the profile. Remind the group that you have survey data and publications available for reference. Tell the group that it is particularly important to note associations between pesticide use and worker activities because worker safety has emerged as a key factor in pesticide registration decisions.

d. Propose ground rules for running the discussion: everyone is encouraged to participate, speak one at a time, listen respectfully even if you disagree, avoid side conversations, start work sessions on time, and stay on track. Ask for any questions or comments about the process or the objectives. Ask if everyone is comfortable with these arrangements.

Finally, remind the group that after the meeting they will be asked to read and comment on the resulting draft document.

6. Project the draft PMSP on the screen. At the Concord Marriott, the Capitol, Concord, and Merrimack meeting rooms have both fluorescent fixtures and dimmer controlled recessed lights. The best lighting is to have the fluorescent fixtures turned off and the recessed lighting dimmer set at about half. This keeps a fair amount of light in the room (even with the curtains closed, a lot of light comes in from the window that makes up the end wall). For best contrast on the screen, place the screen far enough in from the end window to be just in front of the second recessed ceiling light.

The default display for Word is white background with black text. This is hard to look at on the screen for hours at a time. Instead, use the blue background – white text display option. To do that, go to Tools – Options - General on the menu bar. Put a check in the box for “Blue background, white text”

To make full use of the screen so that the text big enough to read for everyone in the room, use Word’s zoom display setting. To do that go to View | Zoom on the Word menu. Set the zoom level as high as possible while keeping a full page width visible on the screen.

These details make a difference! Attention to proper lighting and screen display can have a major impact on how engaged and energetic the group will be.

7. Start with a review of information copied from the pest management Profile that served as foundation for creating the draft PMSP. Discuss worker activities that involve potential pesticide exposure. Ask participants to review and revise or augment it as needed for the PMSP. Give an overview of the commodity and pests, acreage, value, production, major varieties, marketing etc. Point out that the pest management needs are tied directly to the business setting.

Review the appendix tables, get comments, suggested changes. Project the insect, disease, and weed pesticide and nonchemical method efficacy ratings, and effects on beneficials tables to get group comments. Project the new pest management technologies table for each pest type and get comments on missing or invalid entries.

Go through the “Crop, Worker, Pest and Pesticide Timing” table to see if growers have corrections. This table is a required element and possibly the single most important page in a PMSP. It is important to EPA regulators as a way to quickly grasp the context in which pesticides are used on a crop.

It may seem backward to begin the process by reviewing the Appendix tables, but going over the tables not only contributes to the final document, but gives everybody a refresher course and overview for the discussion to follow.

Try to get through step 7 within the first hour. But if going over the tables generates relevant discussion do not feel compelled to limit this section to the first hour. The appendix tables are worth spending time on because they are the foundation for subsequent individual pest and pesticide discussion and priority setting.

8. The main event. You will spend the rest of the first day and the much of the next morning on this step.

Go through each key pest step-by-step, entering group comments as you go. The facilitator should occasionally ask people who are not saying much for their opinion. Some people wait to be asked before they will speak. For each pest, cover steps a-d as described below.

a) Pest significance – What percentage of acres are likely to have this pest over the economic threshold in a typical year? How many times each season might it require management intervention? Is it a rare but potentially devastating pest? How costly is the damage if the pest is ignored? How much damage does it cause even with control? What are the consequences caused by the damage this pest causes? Examples might be possible rejection of an entire shipment because of just a few damage items, export problems, expenses to cull out damaged crop, harvest interruptions. Include any relevant information on intraregional differences in pest significance. Compare significance of the pest in New England to importance elsewhere in the Northeast or other important production areas.

For each pest, create two management method tables, one for pesticides and the other for alternative control methods.

b) For each registered pesticide – Include all control measures that growers typically use or are recommended by consultants or extension personnel. For each, rate the efficacy, discuss why it is, or is not used. Identify pesticides that likely to be focus of regulatory review.

Give special attention to the Pros and Cons for each pesticide including: applicator and plant safety, restricted entry (REI), preharvest interval (PHI), cost, packaging, resistance, export, environmental hazards, restrictions by processors or other buyers. Discuss the unique benefits or constraints for each pesticide. **Give special attention to potential problems caused by the pesticide for worker activities** that may occur after pesticide applications, such as hand weeding, thinning, pruning, and hand-harvesting, etc. **The Pro and Con comments for individual pesticides are Key Elements of the PMSP!** These are factors that EPA will focus on in making regulatory decisions.

c) Create a separate table for alternative control methods including unregistered pesticides and non-pesticide tactics such as cultural practices, pest-resistant varieties, and biocontrols. Include information on efficacy, pros, cons and other comments as was done for pesticides. Give special attention to why they are used or not used.

d) Strategic issues. Discuss constraints, opportunities, and foreseeable potential problems, and possible solutions, related to the pest or to the pesticides or other methods used to manage it.

e) Create “To Do” lists for Research, Regulatory, and Education/Extension needs. These lists should address problem areas and new opportunities. Do not bother prioritizing these, that will done at the end of the meeting. This is time for more open brainstorming.

Keep on track. The discussion may drift off into side topics or get bogged down on one particular issue. Remember, you have to get through all of the key pests by lunchtime on the second day. The facilitator needs to keep the group moving ahead to get through the document in the allotted time. You have to be willing to step in and redirect the conversation if needed. You want to allow for open conversation and interesting discoveries that occur as the group shares their different experiences and perspective, but you also want to keep the action moving forward.

9. Rank the highest priority research, regulatory and education needs.

This is the wrap up phase, but it is very important so be sure to leave enough time to do this without rushing. Allow two hours after getting through all the important pests (previous step) to identify and rank priority lists of research, regulatory and education needs. A priority list combines and narrows the individual pest lists down to the five or six highest priority items for the crop.

Steps to identify priority needs:

a) Start with research needs. Read through the research needs you recorded earlier for each of the individual pests. But then set them aside. You will create the overall priority list from scratch.

b) Define the scope of the priorities to be limited to topics that are least partially related to pest management. For example, research on new crop varieties could be included because breeding programs can take susceptibility to pest damage into account. But in most cases, research on fertilizer needs or marketing is getting pretty far from pest management.

c) Tell participants that in listing priorities they should not be too concerned with practicality. This is a list of ideas not plans. While we do not want completely unrealistic ideas, we also do not want to filter out good ideas based on resource concerns.

d) Give the group five minutes to write down their top research priorities. Work in silence.

e) When everybody is done, or the five minutes are up, work around the table to record priorities. The first person shares one item from their list. Type this idea into a list that is projected on the screen as you go. Then go the next person. If a priority has already been listed, it does not need to be repeated. Keep going around until everyone has shared all of their candidate priorities. Aim for a list of 10 – 20 items.

f) As a group, go over the lists to see where items can be consolidated and clarified. Move items from one list to another if it fits better that way.

g) Conduct a vote to prioritize items on each list. Each member of the group gets four votes. They can use all four votes for a single compelling priority, or they can spread them out. Remind group members that this is the time to factor in practicality. If you cannot do X without doing Y first, then Y should be a higher priority. If Z is a nice idea but not feasible, then it should be a lower priority.

Work from the top of the list and ask for a show of hands as votes for each item. Record the number of votes. There may be some changing “on the run” that goes on: people clarifying what they meant, combining items, changing votes. It is OK to do this with group consensus, but do not let this turn into a rambling discussion that prevents completion of the voting process.

h) When voting is completed, reorder the list by vote tallies. Look for a natural break point between tallies for highly rated and lower rated items. Remind the group that a short and focused list of priorities that somebody may actually act upon is preferable than a long diluted wish list. A list of no more than six research topics is ideal. When you have reached group consensus on how far down the list to keep items, this is the finished research priority list.

i) Repeat steps a–h for regulatory and education/extension priorities. With everyone familiar with the process, these may take less time than the first round of priority setting for research topics.

11. Set timeline for review and finalizing the plan. Enlist participants to contribute by agreeing to respond to draft version of document. Get group input to make a list of other people who will be sent a draft copy for review. This list should include technical experts in the region, the NEPMNet state liaison for each state, and other interested persons such as commodity group leaders.

After the meeting

1. Send thank you letters to all PMSP meeting participants.

2. Finalize the Word document. Write the Executive Summary and Summary sections. Import any reference information noted but not available for entry during the PMSP meeting.

3. Review the draft before sending it out for review.

- Correct typos and grammatical errors, run a spell check. These errors should be fixed before sending to reviewers. The reviewer's job is to check for validity of statements, not to correct typing mistakes. It is a waste of time to have multiple people correcting the same obvious typos.

- Check for consistent font types and sizes in lists, table cells, and other repeated sections. All the cells in a table should have the same font type and size. Tables repeated for different pests should share formatting. All items in a list should have the same font and size.

- Check that all the required components, as shown in the checklist at the end of this PMSP template, are in the final document.

4. Send the Word file as an email attachment to each participant and other reviewers, asking for their feedback with a three-week deadline. Add line numbers to the file before sending. This makes it easier for reviewers to identify location of specific suggested changes. Steps to add line numbers in Microsoft Word 2003:

On the **File** menu, click **Page Setup**, and then click the **Layout** tab.

In the **Apply to** box, click **Whole document**.

Click **Line Numbers**.

Select the **Add line numbering** check box, and then select the options you want.

5. Finalize the PMSP document. Incorporate changes suggested by reviewers. Remove line numbers (see step 4). Send finalized Word file to Glen for posting on the PRONewEngland.org web site and submission to the Northeastern IPM Center and to the national PMSP database.

PMSP Document Template

How to use this template:

Instructions and examples for using this template are located between rows of asterisks. Example text is in green Verdana font.

Red text indicates where crop specific content is needed.

Comments are written in maroon.

Formatting:

1. The following pages show the content and formatting needed for your pest management strategic plan (PMSP), with comments and examples. To start creating your PMSP, copy the template pages below and paste them into a new file. Delete the maroon and green comments and examples located between rows of asterisks. For more examples, see the previously completed PMSPs online at

<http://pronewengland.org/INFO/PROInfoPMSP.htm>

2. The template uses Verdana font for text sections. Arial is used in tables because it requires less space. The crop profile will be published as a web document. Reproduction on paper is secondary. Verdana and Arial fonts are much easier to read on a computer screen than Times Roman.

Twelve-point font is a standardized minimum size. Do not use 10 point font. Larger font sizes (14, 16) can be used for titles.

Please avoid having page breaks in the middle of paragraphs or in the middle of tables, though sometimes with a long table it is unavoidable. Set Word's Table Properties – Row so that a row cannot break across pages. The tables in the template below have been set that way.

3. Please keep the Word document as simple as possible. Microsoft Word features such as automatic bulleted lists and formatting text by putting it into tables (beyond the tables supplied in the template) creates problems when converting a document for web publication. Please turn Word's automatic formatting features OFF when you create your crop profile. (Go to "Tools – Autoformat" and make sure that 'Automatic bulleted lists' and 'Automatic numbered lists' are unchecked.)

4. Report percentages rounded to the nearest whole number. Our surveys results do not allow reporting statistically significant results at the 0.1% level, and whole numbers are preferable for clarity.

5. Using the outline that starts on page 12 as a foundation will make creating a PMSP easier and faster, and will help us get better results.

6. Please insert page breaks between sections to prevent automated page breaks in the middle of sections, or even worse, in the middle of a paragraph. This makes the final online document easier to read and gives it a more organized look.

Pest Management Strategic Plan for **Cropname** in New England **200X**

Compiled for the PRONewEngland Pest Management Network by **author
name**

University of **State**

Address: **xxxxxx**

Telephone: **(xxx) xxx-xxxx**

Email: **xxxxx**

Revised: **Month, day, year when final version submitted.**

Table of Contents

Use page numbers for major section headings only. Contents may vary slightly between crops or other IPM settings.

Executive Summary..... 3

I. Introduction

Background of **Cropname** in New England.....
How this plan was created.....
Benefits of this strategic plan to the New England **Cropname** industry

II. Summary

Key Pest Strategic Issues.....
Strategic Issues for Pest Management Tactics.....
Research, Regulatory, and Education Priorities.....

III. Key Pests

***** List by species under each group heading *****

Insects and Mites.....
Diseases.....
Weeds.....
Vertebrates.....

IV. Appendices

- Crop, Worker, Pest and Pesticide Timing.....
- Pesticide and Nonchemical Methods Efficacy for Insect and Mite Pests.....
- Potential New Pest Management Technologies for Insect and Mite Pests.....
- Pesticide Effects on Beneficials.....
- Pesticide and Nonchemical Methods Efficacy for Diseases.....
- Potential New Pest Management Technologies for Diseases.....
- Pesticide and Nonchemical Methods Efficacy for Weeds.....
- Potential New Pest Management Technologies for Weeds.....
- Pesticide and Nonchemical Methods Efficacy for Vertebrate pests.....
- Potential New Pest Management Technologies for Vertebrate pests.....

V. Acknowledgements

Strategic Plan Meeting Participants.....
References.....
Other Key Contacts and Resources.....
Reviewers.....

Executive Summary

Keep this short, a single page is best, two pages at most. Briefly describe the importance of the crop in New England and how the PMSP was developed. List the highest ranked research, education, and regulatory priorities. Use background statements where necessary to describe the rationale or benefit for a priority.

If there are critical strategic issues or potential threats such as imminent pest resistance, new pests, trade issues, or regulatory restrictions, describe these if they are not already addressed in the research, education, and regulatory priority lists.

Write for a nonagricultural audience.

Highest Research Priorities

Research priority 1

Research priority 2

Research priority 3

Highest Education Priorities

Education priority 1

Education priority 2

Education priority 3

Highest Regulatory Priorities

Regulatory priority 1

Regulatory priority 2

Regulatory priority 3

Example from Peach PMSP

Peach production contributes \$4,000,000 annually to the New England economy. Peaches are a fragile crop, subject to damage by a variety of insect and disease pests as well as vertebrates.

A panel of New England peach growers, industry representatives, and Extension tree fruit staff met for two days in November 2003 to discuss strategic issues in peach pest management. The group reviewed the advantages and disadvantages of current practices and alternatives to manage key pests, and identified priorities to address research, education, and regulatory needs.

After working through all key pests, comprehensive priority lists were ranked. The over-riding priority identified by growers at the Peach PMSP meeting was the need to fill critical extension specialist positions in the six states. Key vacancies include plant pathologists in all states and fruit specialists in Connecticut, Rhode Island, and New Hampshire.

Highest Research Priorities

Monitoring for plant bug complex - Monitoring systems and thresholds for tarnished plant bug, oak-hickory bug, and stink bugs are needed because these pests currently require treatment from petal fall up to harvest.

Borer mating disruption - Peach tree borer and lesser peach tree borer are major pest problems in New England. Research is needed on mating disruption technology to reduce or eliminate the need for insecticide applications during the growing season.

Brown rot decisions - Research that identifies the relationship of weather to brown rot infection risk is needed to minimize and insure accurate timing of fungicide applications.

Highest Education Priorities

- Maintain specialist staffing and programs in Cooperative Extension.
- Develop a peach pest management guide for New England growers.
- Develop a grower tool for use in making decisions on treatment for brown rot.
- Extension programming on disease biology, relationship between weather and diseases, impact of sanitation practices, and pesticide strategies.

Highest Regulatory Priorities

- Preserve & maintain currently effective materials, especially organophosphates, until effective and safe alternatives are available.
- Establish an avenue for effective communication from growers to regulators.
- Establishing an effective vehicle for influencing Fish & Game on deer management.

End of Example

I. Introduction

Background of Cropname in New England

Example, you may want to save this text and adapt for your crop.
Information for this section should be available in the crop profile.

The six New England states combine to rank seventh in national production of apples. A total of 16,500 acres produce 162 million pounds of harvested fruit that contribute \$46 million dollars to the New England economy. Three quarters of the fruit is destined for fresh markets while the rest is sent for processing. While only contributing 1.9% to the national production of apples, the apple orchard is an integral part of the New England economy both in direct value and in its attraction and appeal as part of the New England landscape. (NASS 2002)

Apples are susceptible to many types of pests including insects, diseases, weeds, nematodes, and vertebrates. It is critical that these pests be effectively managed to maintain adequate yields of quality fruit that is acceptable to consumers.

New England apple growers have adopted innovative integrated pest management (IPM) and other practices designed to manage these pests while reducing pesticide use, improving worker and food safety, and protecting environmental quality. While these methods allow pesticides to be used more efficiently, they neither eliminate the need for pesticides nor reduce the critical importance of pesticides in apple production. The loss of important pesticide tools due to pest resistance, regulatory, and consumer-driven pressures is a concern for the entire apple industry.

End of example

How this plan was created

Example, you may want to save this text and adapt for your crop

A review group of **cropname** growers, researchers, and industry stakeholders from throughout New England met for two days in month **200X** to develop this Strategic Plan.

Key pests driving pesticide use were identified from the New England **Cropname** Pest Management Tactic Survey conducted in 200X. Current use patterns for pesticides and alternative methods of **cropname** pest management were described in the New England **Cropname** Crop Profile.

The review group discussed the efficacy, practicality, advantages and disadvantages of current pest management methods; identified at-risk pesticides for key pests, identified acceptable alternative pest management methods, and created lists of research, regulatory and education priorities needed to improve pest management outcomes while minimizing reliance on pesticides.

Points made in this discussion were recorded as table and list entries to create the draft Pest Management Strategic Plan document. The draft document was reviewed by meeting participants and by other New England University and private sector experts for accuracy and completeness. At least one person in each New England state reviewed the draft PMSP and approved it as representative for their state.

End of example

Benefits to the New England **Cropname** Industry

Example, you may want to save this text and adapt for your crop

This strategic plan identifies regional needs for consideration in EPA regulatory decisions. The collective judgments recorded in this document provide a basis for contingency plans should EPA decisions result in the loss of key pesticide registrations

The priority lists provide guidance for research, Extension, and regulatory efforts to improve **cropname** pest management in New England. By documenting stakeholder-identified priorities and participation, the strategic plan brings attention to immediate needs and promising opportunities, and provides justification for funding proposals designed to address those priorities.

Current pest management programs will also benefit from the review of advantages and constraints of current practices contained within this strategic plan.

End of example

II. Summary

Key **Cropname** Pest Strategic Issues

Summary comments on strategic issues for each key insect, disease, weed, and vertebrate pest. This section is created after the PMSP meeting by condensing from the individual pest sections. See example below.

Insects and Mites

Diseases

Weeds

Vertebrate and other pests

Example

Insects and Mites

Plant Bugs. The plant bugs (tarnished plant bug, oak-hickory bug, and stink bugs) are key insect pests affecting peaches in New England. This population insures an active risk window that spans the entire season from pre-bloom through harvest. Growers have managed these insects primarily with protective sprays. Insect traps are used to time applications.

Plum Curculio. Plum curculio is one of the most significant insects attacking peaches. Plum curculio is considered a difficult pest to monitor and control. Most commercial orchards are free of resident populations and are infested by adults moving in from hedgerows and woodlands.

Oriental Fruit Moth. Oriental fruit moth is a more serious pest problem in southern New England than at the northern production limits of peach. Uncontrolled, this pest can damage up to 100% of fruits but with protective sprays, damage is usually insignificant.

Peach Tree Borer and Lesser Peach Tree Borer. The borers are significant pest problems in New England, leading to reduced peach tree life. Damage is often most troublesome for trees suffering from winter injury or other damage.

European Red Mite (ERM). ERM pressure is highly variable from year to year. Populations are affected by toxicity of several key insecticides to predatory mites.

Diseases

Brown Rot. Brown rot is the most significant fungal pest attacking peach fruits. All New England peach orchards are treated with protective sprays beginning at bloom and continuing up to harvest. This disease can be epidemic in years with favorable environmental conditions.

Peach Scab. Peach scab currently affects about 20% of peach acres in New England because fungicides applied to manage brown rot control this disease as well.

Peach Leaf Curl. Peach leaf curl is an erratic pest problem in New England peach orchards. Since information on this pest is limited, most growers manage this pest with a single protective fungicide dose applied in late autumn or early spring.

X-Disease. X-disease is a cyclic, but often extremely destructive disease problem in New England peach orchards. Growers manage this pest by eradicating both infected peach trees and nearby wild choke cherry, which serves as the alternate host. Antibiotic injection has been effective in controlling symptoms in infected trees, but its use is not generally available to grower.

Weeds

Annual Grasses and Broadleaf Weeds. Control of annual grasses and broadleaf weeds has shifted from a primary focus on soil-applied, pre-emergence herbicides to an increasing reliance on the use of post-emergence application of both selective and non-selective herbicides.

Perennial Grasses. The perennial grass Quackgrass is perhaps the most important weed species affecting peach and other tree fruits in New England. Control is achieved with post-emergence application of systemic herbicides.

Perennial Woody Weeds. Poison Ivy, wild raspberry, and other woody species will populate under-tree areas when annual grasses and broadleaf weeds and perennial grasses are managed. These can serve as hosts for pests that attack peach trees and interfere with harvest and other orchard management tasks.

Vertebrate and other pests

Voles. Rodenticides as a supplement to mowing and other ground cover management are important components of most vole management programs. Cultural controls including mowing, use of herbicides under-tree, and vole guards greatly reduce the need for rodenticide application.

Deer. New England peach growers manage deer primarily with exclusionary fencing. In light deer pressure situations, taste and odor repellents are employed.

End of Example

Strategic Issues of Specific Pest Management Tactics

This section is for summary of comments on strategic issues for important pesticides and other pest management technologies (mating disruption, sanitation, trap out, etc.). Create this section after the PMSP meeting by gathering comments from the individual pest sections. See example below.

Group materials by insecticides/miticides, fungicides/bactericides (and nematicides if relevant), herbicides, and vertebrate repellants. Address issues of applicator hazard, worker activities in relation to exposure, consumer acceptability, phytotoxicity, tankmix compatibility, pest resistance, pest spectrum, negative impact on beneficial species, environmental impacts, cost, preharvest and reentry interval.

Insecticides, Miticides

active ingredient (pests targeted)
issue 1
issue 2
issue 3 etc.

Fungicides, Bactericides

active ingredient (pests targeted)
issue 1
issue 2
issue 3 etc.

Herbicides - pre-emergent

active ingredient (pests targeted)
issue 1
issue 2
issue 3 etc.

Herbicides - post-emergent

active ingredient (pests targeted)
issue 1
issue 2
issue 3 etc.

Vertebrate and other pests

active ingredient (pests targeted)
issue 1
issue 2
issue 3 etc.

Example

Insecticides, Miticides

azadirachtin (plant bugs, plum curculio, Oriental fruit moth, borers)
Very limited experience in New England.
OMRI certified

azinphos methyl (plum curculio, oriental fruit moth)

Widely used for management of plum curculio, applications which also give fair to good control of oriental fruit moth and limited control of plant bugs.

carbaryl (plum curculio, Oriental fruit moth)

Only fair control

High toxicity to bees

Tougher on mite predators than organophosphates.

chlorpyrifos (borers)

Single application per season gives good control.

Penetrates bark

Etc. others deleted to keep example short

Fungicides, Bactericides

azoxystrobin (brown rot, peach scab)

Apple phytotoxicity risk if same sprayer used for that crop or if drift occurs.

Limited New England experience

captan (brown rot, peach scab)

Important in disease resistance management.

Generally used in combination or rotation with other materials.

Phytotoxicity risk for peach leaves.

Not used close to oil application due to phytotoxicity risk.

chlorothalonil (brown rot, peach leaf curl)

For brown rot, limited to blossom phase only.

Effective for peach leaf curl.

Herbicides – pre-emergent

dichlobenil (annual grasses, broadleaf weeds)

Application in dormant season only.

High leach risk on soils with very low organic matter.

Quickly lost if applied to warm soils.

diuron (annual grasses, broadleaf weeds)

High leaching risk on low organic matter or sandy soils.

Can cause injury to peach trees if organic matter in soil less than 1%.

napropamide (annual grasses)

High leaching risk on low organic matter soils.

Must be incorporated into soil by shallow cultivation or water within 24 hours of application to reduce photo-degradation.

norflurazon (annual grasses)

High leaching risk on low organic matter soils.

High organic matter can reduce activity.

Herbicides – post-emergent

clethodim (annual grasses, perennial grasses)

For use on non-bearing peach trees only.

fluazifop-butyl (annual grasses, perennial grasses)

Applied to actively growing grasses.

A single application will generally not kill perennial grasses.

glyphosate (annual grasses and broadleaf weeds, perennial grasses and broadleaf weeds, woody weeds)

For use with wiper equipment only.

Very effective against hard to control woody weeds.

paraquat (annual grasses and broadleaf weeds, perennial grasses and broadleaf weeds)

Tree must be shielded from spray.

Apply during active weed growth

Etc. others deleted to keep example short

Vertebrate and other pests

ammonium salts of C8-18 and C18' fatty acids (deer)

Very limited effectiveness.

putrescent whole egg solids (deer)

Very limited effectiveness.

thiram (deer, rabbits, voles)

Some limited control.

Skin irritant for some people.

zinc phosphide bait (voles)

Effective

Water inactivates, limiting off-target species risk.

Broadcast works only for meadow vole.

End of Example

Research, Education, and Regulatory Priorities

This section is for summary of comments on priorities from all key pests. Thus, you cannot create this section until after the PMSP meeting by gathering comments from the individual pest sections.

Example

Highest Research Priorities

Monitoring for plant bug complex - Tarnished plant bug, oak-hickory bug, and stink bugs are major pest problems for New England growers. Monitoring systems including threshold levels for treatment are needed as this complex of plant bugs currently requires treatment from petal fall up to harvest to prevent losses.

Borer mating disruption - Peach tree borer and lesser peach tree borer are major pest problems in New England. Mating disruption technology could reduce or eliminate the need for insecticide applications during the growing season.

Brown rot decisions - Brown rot management includes orchard sanitation and the application of fungicides starting at bloom and continuing up to harvest. Research that identifies the relationship of weather including temperature (and degree days) and rainfall to infection risk is needed to insure accurate timing of fungicide applications.

Other research priorities

- Efficacy trials for new pest control materials.
- Development of thresholds for management of European Red Mite.
- Organic peach production research.
- The impact of orchard floor composition and management on plant bugs, borers, mites, and voles.
- The oriental fruit moth – distribution and importance in New England, treatments, appropriate timing, mating disruption.
- New treatments for X-disease.
- Development of a treatment threshold for Peach Leaf Curl.
- Bio-control for stink bugs.
- Evaluate cultivars for Bacterial Spot variety resistance (early, mid-season, and late varieties with good horticultural characteristics as well).
- Vole bait-station density research.
- Site attributes relative to brushy borders and nearby pest sinks on insect and disease management.
- Spray program for non-bearing peaches.
- Other effects of materials applied for pest management including positive effects (e.g. nutrients) and negative effects (impacts on beneficial insects and mites in the orchard).
- Plum curculio – treatment guidelines for making the second application (including if needed).

Highest Education Priorities

- Maintain specialist staffing and programs in Cooperative Extension.
- Develop a peach pest management guide for New England growers.
- Develop a grower tool for use in making decisions on treatment for Brown Rot.
- Extension programming on disease biology, relationship between weather and infection, impact of sanitation practices, pesticide strategies.

Other education priorities

- Peach tree short life issues related to borers and canker diseases.
- Pest management program for non-bearing peach trees.
- Organic peach production recommendations.

Highest Regulatory Priorities

Preserve & maintain currently effective materials, especially organophosphates, until effective and safe alternatives are available.

Establish an avenue for effective communication from growers to regulators.

Establishing an effective vehicle for influencing Fish & Game on deer management.

Other regulatory priorities

Development of a cost-sharing program to increase use of desirable (low risk) but costly new materials.

Reducing problem REI's such as those for captan and the organophosphates that make timely harvest and field work such as hand thinning difficult.

Determination and certification that we are plum pox free.

Maintenance of EBDC fungicides for peach tree manganese & zinc nutrition needs.

End of Example

III. Strategic Issues for Key **Cropname** Pests

For each key pest:

Fill out the table of "Currently registered pesticides" with notes on efficacy, pros/cons, and other comments. Pesticides not yet registered in New England are not listed in this table. There is a table in the Appendix for new pest management technologies in development.

Format for pesticide names is active ingredient first, in bold, without capital letter. Followed by capitalized product brand names in parentheses and regular (not bold) font.

Fill out the table of "Cultural and Biological Alternatives" with notes on efficacy, pros/cons, and other comments. Alternatives in development go in the Appendix table for new pest management technologies.

Copy the template tables below for insect and diseases as needed for the number of key pests you have. Weed tables are provided for standard groupings, adapt as needed.

Do not put bulleted lists in cells; just use a blank line to separate entries.

Make lists of Research, Regulatory, and Education needs for each pest. Rather than identify problems, state priorities in terms of steps and achievements that offer possible solutions to critical needs.

Key Insects and Mite pests

Key insect/mite Pest 1

Acres Affected:

Yield Losses:

Currently Registered Pesticides

Pesticide	Efficacy	Pros	Cons	Comments
active ingredient: Brand name				

footnotes

Nonchemical (Cultural and Biological) Alternatives

Method	Pros	Cons	Comments

New Pest Management Technologies for **Pest 1**

Method	Source	Status	Pests Affected

Potential biological, market, or regulator challenges related to **Pest 1**

Challenge	Possible responses

Research Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Regulatory Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Education Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Repeat for other key insect and mite pests.

Example (the strategic

1. Tarnished Plant Bug-Oak Hickory Bug-Stink Bug Complex

Acres Affected: All (Total crop loss possible if not managed – due to cat-facing injury primarily); every season and every orchard; come sequentially, causing season-long risk

Yield Losses: 10% when a full-season control program is employed (most damaged fruits are removed during thinning operation, increasing hand thinning costs); 100% if not controlled

Pest Migration: Plant bugs move into orchard throughout the season, requiring repeat applications to control new orchard populations

Honey Bee Risk: A critical control time for tarnished plant bug is about bloom so there is some risk to bees. Tarnished plant bug activity during bloom will thin bloom rather than result in cat-facing damage to fruits.

Currently Registered Pesticides

Pesticide	Efficacy	Pros	Cons	Comments
permethrin (Ambush, Pounce)	Very effective	Can be used at reduced rate with organophosphate Less expensive Manages plum curculio	Mite outbreaks are a risk due to bio-control disruption Subject to FQPA review	Sometimes used in combination with Guthion
esfenvalerate (Asana)	Very effective	Long residual Less expensive Manages plum curculio	Mite predator toxicity is a real problem	Mite predator toxicity may not be an issue if used pre- petal fall
formetanate HCl (Carzol)	NA	Quick knockdown	Very rough on mite predators Very expensive	

			Human risk Up through petal fall only	
azinphos-methyl (Guthion)	Fair to good	Soft on predators Less expensive Manages plum curculio	Plant bug resistance to organophosphates can be an issue Label restrictions (14 day REI) EPA SARA Title 3 list	
imidacloprid (Provado)	Effective	Effective on late season stink bug 0 PHI Manages Japanese beetles Lower human toxicity Generally soft on predators	Extremely expensive but effective Bee toxicity	Lack of knowledge
phosmet (Imidan)	Fair	Soft on predators Less expensive 48 hour re-entry (current) Lower applicator risk than azinphos-methyl Manages plum curculio	EPA SARA Title 3 list	
permethrin + azinphos-methyl (Ambush plus Guthion)	Very effective	Reduced rates of each (0.33 Ambush, full rate Guthion or Imidan)	Rough on mite predators Human toxicity	
permethrin + phosmet (Ambush plus Imidan)	Very effective	Reduced rates of each (0.33 Ambush, full rate Guthion or Imidan)	Rough on mite predators Human toxicity	

methomyl (Lannate)	Very effective	May be effective at low rates	High human toxicity Tough on predators EPA FQPA issues Short residual Expensive at full rate	
endosulfan (Thiodan, Phaser)	Fair		Short residual High human toxicity Stinks Limited pest control spectrum	
kaolin clay (Surround)	NA	Improved fruit color OMRI approved	Difficult to maintain good coverage Visible residue on fruit at harvest Improves environment for San Jose scale buildup	Unproven in NE
azadirachtin (Aza-Direct, Neemix, Align)	NA	OMRI approved	Short residual	Unproven in NE

Cultural and Biological Alternatives

Method	Pros	Cons	Comments
Management of alternative hosts	Reduces local population	Labor intensive Often located off property Does not preclude need to treat with insecticide	Alfalfa, lambs quarters & redroot pigweed are alternate hosts for tarnished plant bug Red oaks support oak-hickory bug population Ground cover research needed Incorporate cover crops pre-bloom
Trap Cropping	Offers potential to treat with registered pesticides off-site	Unproven	Work with strawberry using lamb quarters as trap crop for tarnished plant bug in Quebec promising
Intensive hand thinning	Insures high quality	Labor costs are high REI's for organophosphates delays hand thinning past optimum time	Growers remove insect damaged fruits when hand thinning
Monitoring	White and Pink traps will give idea of population trends but trap catches are not correlated to damage (tarnished plant bug, oak-hickory bug)	Time requirement Cost Need valid data for time spent No monitoring for stink bug	There is currently no monitoring strategy and/or threshold established
Clean cultivation	TPB control Water and weed management	Soil compaction Soil erosion Cold temperature injury to roots Calcium nutrition long term Root injury Early bloom – frost risk	

Research Needs:

Define the impact of cover crop species and management on plant bug populations.

Develop monitoring systems for tarnished plant bug, oak-hickory bug, and sting bugs and develop action thresholds based on trap catch numbers.

Conduct efficacy trials for new materials as potential replacements for organophosphates and pyrethroids.

Determine the effect of orchard border composition on population and in-migration of plant bugs.

Develop a best management plan for the plant bug complex that has the least impact on predaceous mites.

Regulatory Needs:

Expanded labeling for materials determined to be effective against plant bugs on peach.

Pursue Section 18, emergency registration requests (for New England as a state like region) for materials like Actara.

Education Needs:

Best management plan for management of pests with least impact on beneficial insects and mites and the environment.

Weed control (broadleaf) as part of an overall orchard floor management program.

End of Example

Key Diseases

Key disease #1

Acres Affected:

Yield Losses:

Currently Registered Pesticides

Pesticide	Efficacy	Pros	Cons	Comments
active ingredient: Brand name				

footnotes

Cultural and Biological Alternatives

Method	Pros	Cons	Comments

Potential biological, market, or regulator challenges related to **Disease 1**

Challenge	Possible responses

Research Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Regulatory Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Education Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Repeat for other key diseases.

Weeds

Weeds can be listed by group or by individual species, or both, i.e. groups but with special attention to a few problematic individual weed species.

You can define weed groups in a way that works best for the crop. This could be by botanical characteristics (as shown in template tables below) but you could also organize by management timing (preemergence, postemergence) or by combinations.

Instead of New Technologies table for each weed group, you can have a single combined New Pest Management Technologies for Weeds table.

Annual grasses

Acres Affected:

Yield Losses:

Currently Registered Pesticides

Pesticide	Efficacy	Pros	Cons	Comments
active ingredient: Brand name				

footnotes

Cultural and Biological Alternatives

Method	Pros	Cons	Comments

Research Needs:

Need 1
Need 2
Need 3
Etc.

Regulatory Needs:

Need 1
Need 2
Need 3
Etc.

Education Needs:

Need 1
Need 2
Need 3
Etc.

Annual broadleaf weeds

Acres Affected:

Yield Losses:

Currently Registered Pesticides

Pesticide	Efficacy	Pros	Cons	Comments
active ingredient: Brand name				

footnotes

Cultural and Biological Alternatives

Method	Pros	Cons	Comments

Research Needs:

Need 1
Need 2
Need 3
Etc.

Regulatory Needs:

Need 1
Need 2
Need 3
Etc.

Education Needs:

Need 1
Need 2
Need 3
Etc.

Perennial grass weeds

Acres Affected:

Yield Losses:

Currently Registered Pesticides

Pesticide	Efficacy	Pros	Cons	Comments
active ingredient: Brand name				

footnotes

Cultural and Biological Alternatives

Method	Pros	Cons	Comments

Research Needs:

Need 1
Need 2
Need 3
Etc.

Regulatory Needs:

Need 1
Need 2
Need 3
Etc.

Education Needs:

Need 1
Need 2
Need 3
Etc.

Perennial broadleaf weeds

Acres Affected:

Yield Losses:

Currently Registered Pesticides

Pesticide	Efficacy	Pros	Cons	Comments
active ingredient: Brand name				

footnotes

Cultural and Biological Alternatives

Method	Pros	Cons	Comments

Research Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Regulatory Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Education Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Potential biological, market, or regulator challenges related to weeds

Challenge	Possible responses

Key Vertebrates and other pests

Key vertebrate and other pest #1

Acres Affected:

Yield Losses:

Currently Registered Pesticides

Pesticide	Efficacy	Pros	Cons	Comments
active ingredient: Brand name				

footnotes

Cultural and Biological Alternatives

Method	Pros	Cons	Comments

Research Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Regulatory Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Education Needs:

- Need 1
- Need 2
- Need 3
- Etc.

Potential biological, market, or regulator challenges related to Vertebrate pest

Challenge	Possible responses

Repeat for other key vertebrate pests.

Table header colors for different pest groups:

- Insects and Mites – tan**
- Diseases – light green**
- Weeds – light yellow**
- Vertebrates – light turquoise**

All of these colors are on the default color palette in Word.

IV. Appendices

- Note: The national PMSP database does not allow vertical text in table headers.
- Use Abbreviations (i.e. CPB for Colorado Potato Beetle) for pest names. Put the abbreviations with the full pest names in a legend below the table. The legend should also explain codes used for efficacy ratings, i.e. 4 = excellent, 3 = good, etc.
- Put the pests in alphabetical order by code letters.
- Put the pesticides in alphabetical order by active ingredient. Active ingredient names are not capitalized. Brand names are capitalized. See example for azinphosmethyl.
- To add or delete columns or rows, select a cell inside the table, go to Table on the Word menu bar, and then select Insert or Delete.
- If you have more than 13 pests to rate, duplicate the table and put the additional pests in the second table. Do not try to squeeze more than 13 pest columns into one table.
- **Please delete empty rows or columns.** Use the cursor to highlight the rows or columns not needed. Go to Table on the menu bar and select Delete.

Nonchemical Insect and Mite Pest Control Timing												
Pest A												
Pest B												
Pest C etc.												
Diseases Key Activity & Monitoring Periods												
Pest A												
Pest B												
Pest C etc.												
Fungicide - Bactericide Application Timing												
Pest A												
Pest B												
Pest C etc.												
Nonchemical Disease Control Timing												
Pest A												
Pest B												
Pest C etc.												
Herbicide Application Timing												
Annual grasses												
Perennial grasses												
Annual broadleaves												
Perennial broadleaves												
Nonchemical Weed Control Timing												
Annual grasses												
Perennial grasses												
Annual broadleaves												
Perennial broadleaves												
Vertebrate Pest Control Timing												
Method A												
Method B												
Method C												

***** Delete or add columns to fit number of pests being rated. If you have more than 10 pests, split into two tables. See apple example below.

Pesticide and Nonchemical Methods Efficacy for Insect and Mite Pests

active ingredient or Method	Brand name(s)	XYZ	pest #2						
phosmet	Imidan								

Key to pest name abbreviations:
***** Example: ABB = Alphabet beetle *****
* footnotes

Potential New Pest Management Technologies for Insect and Mite Pests

Material or Method	Source	Status	Pests Affected and Comments

Example – Note that common chemical names are not capitalized, brand names are capitalized.

Pesticide Efficacy for Apple Insect and Mite Pests

Pest Names Abbreviations

- AA = Apple aphid and spirea aphid
- EAS = European apple sawfly
- PLH = Potato leafhopper
- RAA = Rosy apple aphid
- RLH = Rose leafhopper
- WAA = Wooly apple aphid
- WAL = White apple leafhopper

Efficacy ratings:

- 0 = not effective, 1 = poor, 2 = fair, 3 = good
- ? = not rated for this pest or insufficient information
- z = not registered for use at appropriate time for pest
- blank = not used for this pest, presumably no activity
- * = See comment below table

Pesticide		Aphids			Apple Maggot	Dog-wood Borer	Codling Moth	EAS	Green Fruit-worm	Leaf-hoppers	
		AA	RAA	WAA						PLH	WAL
Active ingredient	Brand name	AA	RAA	WAA	Apple Maggot	Dog-wood Borer	Codling Moth	EAS	Green Fruit-worm	PLH	WAL
abamectin	Agri-Mek	?	?		?	?	?	?	?	2	2
acetamiprid	Assail	?	?	?	?	?	?	?	?	?	?
azadirachtin	Aza-Direct, Neemix	2	2	?	?	?	2	?	?	2	2
azinophos-methyl ^{OP}	Guthion, Azinophos-M	1	1	1	3	?	3	3	1	1	1
B.t. endotoxin	Agree, Dipel, Javelin, MVP, Xentari	0	0		0		2	0	3	0	0
bifenazate	Acramite										
carbaryl ^{Carb}	Sevin, Carbaryl	1	1	1	3		2	2	1	3	3
chlorpyrifos ^{OP}	Lorsban	2	3	?	z	3	z	3	3	1	1
cinnamaldehyde	Valero	?	?	?							
clofentazine	Apollo										
diazinon ^{OP}	Diazinon	1	2	3	3		3	2-3	2	1	1
difocol	Kelthane										
dimethoate ^{OP}	Digon, Dimate	2	2	2-3	3		3	1	2	3	3
disulfoton ^{OP}	Di-Syston	?	?	?							

endosulfan	Thiodan, Phaser	3	3	2	0	?	0	?	3	3	3
esfenvalerate	Asana	2	3	1	3		3	3	3	3	3
fenbutatin oxide	Vendex										
fenpropathrin	Danitol	2	2	1	3		3	3	3	3	3
formetanate HCl	Carzol	0	0		z		z		0	z	z
hexythiazox	Savey										
imidacloprid	Provado	3	1		?		?	?		3	3
indoxacarb	Avaunt	1	0		2		2	2-3	?	3	3
insecticidal soap	M-Pede, Safer's	2-3	1	?	0		0	?	0	1	1
kaolin clay	Surround	1*	0		2*		2*		2*	?	?
methidathion	Supracide		3								
methomyl ^{Carb}	Lannate	2	1	1	2		3	2	3	3	3
methoxychlor	Methoxychlor						?				
methoxyfenozide	Intrepid						3		3		
oil (dormant and summer)	Damoil, Sunspray, Volck, etc.	?	?				1				
oxamyl ^{Carb}	Vydate	2	2	1	1		0	?		2	2
permethrin	Ambush, Pounce	2	3	1	z		z	3	3	z	Z
phosmet ^{OP}	Imidan	1	1	1	3		3	3	1	1	1
pyrethrin	Pyrenone	2-3*	1-2*		1*		1?*		1*	2-3*	2-3*
pyridaben	Pyramite	0	?		?		?	?		2	2
pyriproxyfen	Distance, Esteem	0	3	?	0		2		0	0	0
rotenone	Rotenone	2-3*	1-2*		1*		1*		1*	2-3*	2-3*
spinosad	SpinTor	0	0		2		2	?	3	0	0
tebufenoxide	Confirm	0			0		2		3	0	0
thiamethoxam	Actara	1	3	?			1	2-3		?	3

*Kaolin clay ratings are for repellence effect from multiple applications. Pyrethrin and rotenone ratings are based on ratings for the two combined in one product, ratings may not apply to each ingredient used alone. Thiamethoxam and methoxychlor are no longer sold for use on apples in New England.

^{OP} =Organophosphate, ^{Carb} =Carbamate

Pesticide Efficacy for All Major Insect and Mite Pests

continued

Pest Names Abbreviations

ERM = European red mite

MPB = Mullein plant bug

SJS = San Jose scale

TPB = Tarnished plant bug

TSSM = Twospotted spider mite

Efficacy ratings:

0 = not effective, 1 = poor, 2 = fair, 3 = good

? = not rated for this pest or insufficient information

blank = not used for this pest, presumably no activity

z = not registered for use at appropriate time for pest

Pesticide		Leafminers	Leafrollers		Mites		MPB	Plum curculio	SJS	TPB
Active ingredient	Brand name		Oblique-banded	Red-banded	ERM	TSSM				
abamectin	Agri-Mek	3	?	?	3	2	?	?	?	?
acetamiprid	Assail	?	?	?			?	?	?	?
azadirachtin	Aza-Direct, Neemix	3*	?	?		?	?	0	?	?
azinophos-methyl ^{OP}	Guthion, Azinophos-M	1*	2	3			0-1?	3	2	1
B.t. endotoxin	Agree, Dipel, Javelin, MVP, Xentari	0	2	3				0		0
bifenazate	Acramite				3	3				
carbaryl ^{Carb}	Sevin, Carbaryl	1*	2	1			1-2?	2		1
chlorpyrifos ^{OP}	Lorsban	1*	z	z		z	3	z	?	1
cinnamaldehyde	Valero				?	?				
clofentazine	Apollo				3	2				
diazinon ^{OP}	Diazinon	?	2	0			2-3?	2	?	?
difocol	Kelthane				1-2	1-2				
dimethoate ^{OP}	Digon, Dimate	1*	1	0			?	2		3
disulfoton ^{OP}	Di-Syston									
endosulfan	Thiodan, Phaser	1*	1	2			2?	0		1

esfenvalerate	Asana	3*	3	2	?	?	2-3?	3		3
fenbutatin oxide	Vendex				2	2				
fenpropathrin	Danitol	3*	2-3	3	3	3	?	3	3	3
formetanate HCl	Carzol	3*	0	0	2	z	3	z		1
hexythiazox	Savey				3	z				
imidacloprid	Provado	3	?	?			2-3?	?		?
indoxacarb	Avaunt	2*	2	2			?	3	0	3
insecticidal soap	M-Pede,	0	0	0	2	2	?	0	1	0
	Safer's									
kaolin clay	Surround	2*	1	1				2*		
methidathion	Supracide								3	
methomyl ^{Carb}	Lannate	3	3	3			?	2		1
methoxyfenozide	Intrepid	3	3	3						
oil*	Damoil,	1*	?	?	3/3*	z/1*			3	
	Sunspray, Volck, etc.									
oxamyl ^{Carb}	Vydate	3	?	?	2	2		0		1
permethrin	Ambush,	3*	2-3	3				3, z after bloom	1	3
	Pounce									
phosmet ^{OP}	Imidan	1*	2	3				3	2	1
pyrethrin	Pyrenone	1-2*	1*	1*				1*	1-2*	1*
pyridaben	Pyramite		?	?	3	2		?		
pyriproxyfen	Distance,	2	3	?				0	3	0
	Esteem									
rotenone	Rotenone							1*		?
spinosad	SpinTor	2	3	3				0	?	0
tebufenoxide	Confirm	1*	3	3				0	0	0
thiamethoxam	Actara	2*	0	0			3	3	0	3

* Efficacy ratings for oil against mites are split into prebloom and postbloom application timing.

Leafminer ratings with * are for adults, only unstarred ratings apply against larval mines.

Kaolin clay ratings are for repellence effect from multiple applications.

Pyrethrin and rotenone ratings are based on ratings for the two combined in one product, ratings may not apply to each ingredient used alone.

Thiamethoxam and methoxychlor are no longer sold for use on apples in New England.

^{OP} = Organophosphate, ^{Carb} = Carbamate

Example – Check for duplicate entries in information copies from databases and other sources. As this table is for new approaches that are not currently available, you can delete entries listed as “Registered” unless there are variations under development. (See Bt in table below for example.)

IR-4 tables are not always up to date. Check to make sure that “Pending” products have not since become registered. If so, delete them (except if further variants are in progress).

Note that common chemical names are not capitalized. Brand names and genus names for biocontrol agents are capitalized

Potential New Pest Management Technologies for Apple Insect and Mite Pests

Method	Source	Status	Pests Affected
acequinocly/TM 413	IR4	Pending	Broad spectrum mite control (no rust mite activity). Unique mode of action. Easy on beneficials with long residual activity.
Bacillus thuringiensis	IR4	Registered	New strains of Bt are being discovered that have activity against numerous pests.
Beauveria brongniarti	IR4	Potential	Targeted for soil dwelling pests.
bistrifluron	IR4	Potential	Active against Lepidopteran pests, whitefly. It acts by inhibiting chitin synthesis (Insect Growth Regulator).
buprofezin	IR4	Pending	Good activity for nymphal stages of leafhoppers, plant hoppers, scales, mealybugs, psylla and whiteflies. Very safe to bees.
canola oil	Pipeline	Registration Approved	Mites, apple red bug, plant bugs, scales, whiteflies, aphids, leafhoppers, phylloxerans, sawflies, caterpillars, fruittree leafroller
chromafenozide	IR4	Potential	Specific to Lepidopteran pests, novel ecdyosone agonist
clothianidin	IR4	Pending	Contact and stomach activity. It controls plum curculio, aphids, leafhoppers, apple maggot, leafminers, leafrollers, codling moth, and pear psylla.
deltamethrin	IR4	Pending	Beetles, bugs, Lepidoptera.
emamectin benzoate	IR4	Potential	Effective on larval Lepidoptera. (Beet/fall armyworms, cabbage webworms, corn earworms, imported cabbage worm, cabbage looper.) and leafminers
etoxazole	IR4	Pending	Insecticide/acaricide for control of Panonychus spp and Tetranychus spp, including hexythiazox resistant mite strains. Inhibition of molting, effective on eggs, larvae, & nymphs.

fenoxycarb	IR4	Pending	Fire ants and a wide range of other insects.
fenpyroximate	IR4	Pending	Controls mites, including two-spotted, European red, and citrus rust mite and psylla.
fipronil	IR4	Potential	Controls Coleoptera, Lepidoptera, Diptera, Homoptera, Isoptera, and Thysanoptera. Systemic activity with long residual control.
flonicamid	IR4	Pending	Effective against aphids, thrips, leafhoppers, plant bug and other sucking pests. Provides rapid antifeeding activity. Non-toxic to beneficials.
fluacrypyrin	IR4	Potential	Acaricide.
flufenzin	IR4	Potential	Acaricide.
lambda-cyhalothrin	IR4	Pending	Broad spectrum insect control.
metarhizium anisopliae	IR4	Potential	Controls whitefly, thrips, and mites.
milbemectin	IR4	Pending	Excellent miticide and also controls aphids, leafminers, thrips, leafhoppers.
novaluron	IR4	Pending	Effective against Lepidoptera, leaf miner, and some mites. Strictly a contact material, no systemic activity.
Pavois granulosis virus	IR4	Potential	Product controls two generations of susceptible insects.
spirodiclofen	IR4	Potential	Acaricide that is very active on eggs, larvae, and quiescent stage of Panonychus, Phyllocoptruta, Brevipalpus, Tetranychus species.
thiacloprid	IR4	Pending	Broad spectrum systemic control of sucking and chewing pests; specifically, aphids, whiteflies, leaf hoppers, plant bugs, pear psylla, weevils, fruit flies, oriental fruit moth, leafminers, and Codling Moth. Very safe to bees.
tolyfluanid	IR4	Potential	Broad spectrum contact fungicide with good acaricidal effectiveness. Particularly suitable for control of resistant pathogen populations.

End of example

Pesticide Effect on Beneficials

active ingredient	Brand name(s)	Predatory Insects	Predatory Mites	Para- sitoids	Lower impact timing or delivery method available?
alphanetacide	Superduperine	H	M	L	Y
					N

Key to abbreviations:

H = High mortality, > 70%

M = Moderate mortality, 30-70%

L = Low mortality, < 30%

Y = Yes, N = No

Pesticide or Nonchemical Method Efficacy for Vertebrate and other pests

active ingredient or Method	Brand name(s)	Vert. pest #1	pest #2			

Key to pest name abbreviations
 * footnotes

Potential New Pest Management Technologies for Vertebrates

Material or Method	Source	Status	Pests Affected

V. Acknowledgements

Strategic Plan Meeting Participants

You will be using email addresses send draft for review, so if you did not get participant email addresses before the meeting, get them at the meeting. If participant does not have email, you will need to send them paper copy of draft by U.S. mail. To protect privacy of private sector participants, their mailing, phone and email address are not included in the document published online. For University and government employee participants, their office address/phone/email are already in public domain, and are professional not personal information, so they are included the published document.

To protect privacy of private sector participants, their mailing, phone and email address are not included in the published document.

Connecticut

For private sector participants:

First Last

Affiliation (farm name, business)

For University or government participants:

First Last

University / Agency

Mailing address

Phone

Email

Maine etc. same as for CT

Massachusetts

New Hampshire

Rhode Island

Vermont

Regional

References

Cite sources for pesticide ratings, and other publications used to create the draft PMSP. This should usually include the NEPMNet survey summary and crop profile for the commodity, and key New England regional Extension pest management publications. You can probably copy most of these from the crop profile. Since you will usually have references for an IPM tactic survey and the New England Ag Statistics Service, I have included those two references as examples below. No need to number references.

Publication name in italics. Author or Editor. Year published. Publisher (e.g. University of XXX Cooperative Extension for regional pest management publications). Web address if source is online.

New England Cropname Pest Management Tactic Survey, author, year, PRONewEngland Pest Management Network, <http://PRONewEngland.org/....etc>.

Report Name, New England Agricultural Statistics Service, <http://www.nass.usda.gov/nh/....etc>.

Resource publication name in italics. Author or Editor. Year published. Publisher (e.g. University of XXX Cooperative Extension for regional pest management publications). Web address if source is online.

Key Contacts and Resources

You can copy most of this section from the crop profile. Identify commodity experts in New England. Include their mailing address, phone number and email address.

Use same bibliographic format as above for publications. List the print and online publications - including Extension bulletins, newsletters, and websites – that are the major information sources for people managing pests on this crop in New England. Also, include key educational events for practitioners, industry personnel, and University staff.

For example, entries for a vegetable crop, cite the annual New England Vegetable Production Guide and the annual New England Vegetable and Small Fruit Growers Meeting. State level entries would be the contact information for the Extension vegetable IPM program in each state, and a list of the basic program activities in each state (e.g. newsletter, pest hotline phone number, winter meeting, summer field day and/or twilight meetings etc.).

The intent is to give the reader an overview the core components of the New England Extension IPM programs and other IPM resources for the crop.

State

- Name
- Affiliation
- Address
- Telephone
- Email

Reviewers

You must have a reviewer from each state. The strategic plan is not done until you have received an approval from an expert contact or the network state liaison for each New England state. Receiving no response is not adequate to assume that approval is implicit. Until you have an approval from each state, you must send reminders to the state liaison until you have an approval.

If the strategic plan author does have of an expert contact to provide review for a state, it is the responsibility of the state liaison to provide review and approval, or to find someone in their state qualified to do so.

Format for listing reviewers is shown below. The names of state liaisons are placed here as a convenience as the default reviewer for each state. But only list people who indicate they actually went through the draft crop profile to check for accuracy and clarity.

State

- Name
- Affiliation
- Address
- Telephone
- Email

Connecticut

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PRONewEngland Pest Management Network Pest Management Strategic Plan Checklist

6 months before meeting

1. Hotel arrangements

- Meeting room
- Lodging for guests
- Meals
- Contract

2. Participants

- 6–10 growers
- 5–8 commodity production and pest management experts
- IR-4 representative attending and notified about compiling relevant list of pipeline materials
- Facilitator arranged

Four weeks before meeting

3. **Contact participants.** Send meeting agenda, travel directions, copies of survey summary and crop profile to participants.

4. **Call hotel.** Confirm hotel arrangements for guest rooms, meeting room, meals. Call the hotel just before final room release date to finalize number of guest rooms and meal counts.

5. **Create draft PMSP document.** Use the template. Complete appendix tables for pesticide efficacy, new technologies, and if possible, toxicity to beneficials.

6. **Create folder for participants.** If you are going to give a thank you gift to participants, get them.

At the meeting

7. _____ **Room set-up.** U-shaped table. Enough lighting to keep people alert but without washing out the screen.

8. _____ **Equipment:** Laptop, external storage (disk/memory stick), projector, g, extension cord, power strip, second laptop for wireless web browsing.

9. _____ **Facilitator welcome**

10. _____ **Project, review and get comments on appendix tables**

11. _____ **Go through each key pest.**

Fill out the table for acres affected, yield losses and any other comments about its significance.

For each pesticide, rate efficacy (feel free to change or annotate rating copied from Extension guides used to create draft PMSP). Generate PRO and CON statements for each material.

Do the same for cultural and biological methods table for each pest.

Create 'To Do' lists for Research, Education, and Regulatory needs. Keep moving ahead!

12. _____ **Crop priority lists.** Generate candidate items for each list. Vote on priority ranking for each list.

13. _____ **Set timeline for finalizing and review of the document.**

After the meeting, and Document content

14. _____ **Send thank you letters to participants.**

15. _____ **Complete the Word document.** Write the Executive Summary and Summary sections. Clean up content and formatting errors made in haste at PMSP meeting. Import additional reference information.

RUN THE MS WORD SPELLING/GRAMMAR CHECKER. Fix typos and other errors found.

Check cover page, table of contents, tables, references and other acknowledgements for consistency with template format. Check for places where inserting page breaks will help keep related content on the same page, and to minimize page breaks within tables or paragraphs.

Make sure all the following content requirements have been met:

Introduction:

_____ Production statistics, PMSP process, intended use for the plan

Summary:

- _____ Highest rated strategic issues for key pests
- _____ Highest rated strategic issues for specific pest management tactics
- _____ Highest rated research, regulatory, and education priorities

Strategic Issues for each key pest: Include a table for each important pest that lists each management tactic (usually a pesticide) for that pest, with its Pros and Cons, and any comments about characteristics that constrain, increase, or arise from its use.

- _____ Insects and Mites
- _____ Diseases
- _____ Weeds
- _____ Vertebrates

Appendices:

- _____ Pesticide and Nonchemical Method Efficacy table for Insect and Mite Pests
- _____ New Pest Management Technologies for Insect and Mite Pests (IR-4 list)
- _____ Pesticide Effect on Beneficials
- _____ Pesticide and Nonchemical Method Efficacy for Diseases
- _____ New Pest Management Technologies for Diseases (IR-4 list)
- _____ Pesticide and Nonchemical Method Efficacy for Weeds
- _____ New Pest Management Technologies for Weeds (IR-4 list)
- _____ Pesticide and Nonchemical Method Efficacy for Vertebrate pests
- _____ If available, New Pest Management Technologies for Vertebrate pests

Acknowledgements

- _____ List of PMSP meeting participants
- _____ References
- _____ Reviewers
(you can't complete this section until after the review process)
- _____ Other Key Contacts and Resources

16. _____ Send draft Word file to each PRONewEngland Pest Management Network state liaison, to subject experts, and to each person who participated in the PMSP meeting, for them to review and add comments.

17. _____ Incorporate review comments received. Add list of Reviewers to the end of the document. Send electronic copies of the final document to meeting participants, reviewers, and to Glen.

18. _____ Glen posts the document on PRONewEngland.org, and submits it to the Northeastern IPM Center for their approval and submission to the National Pest Management Strategic Plan database. Upon acceptance into the national database, the link on PRONewEngland.org is changed from the local file to the national database and PMSP author is notified.

19. _____ Author informs all meeting participants and other contributors that the project is complete.