Pesticide Applicator Certification Manuals

Collaboration Opportunity

Presentation Outline:

1. Who I am
2. Importance of Certification Manuals
3. National Manuals in print
4. Public Health manual and the PSEP IMI website
5. Forest Pest Management Manual for Participating SE States
6. Collaboration Teams and Basecamp
7. Discussion

2022 CTAG Presentation

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- MS and PhD, Entomology, Purdue Univ.
- PSEP Coordinator, NC State for 24 years!
- AAPSE, PPDC, CTAG 1.0
- Coordinate PSEP-IMI Resources website and pesticidestewardship.org.
- NPSEC Educational Facilitator for IPM in PSE

Levi Bear Kunasek

My introduction to PSE at the **1998 AAPCO meeting**

"There are 50 states and 50 ways of doing things. But you need not worry, in this business, we shamelessly steal from one another"

M. Grodner, LSU

Jett Reeves Biddle

The Importance of Good Certification Manuals

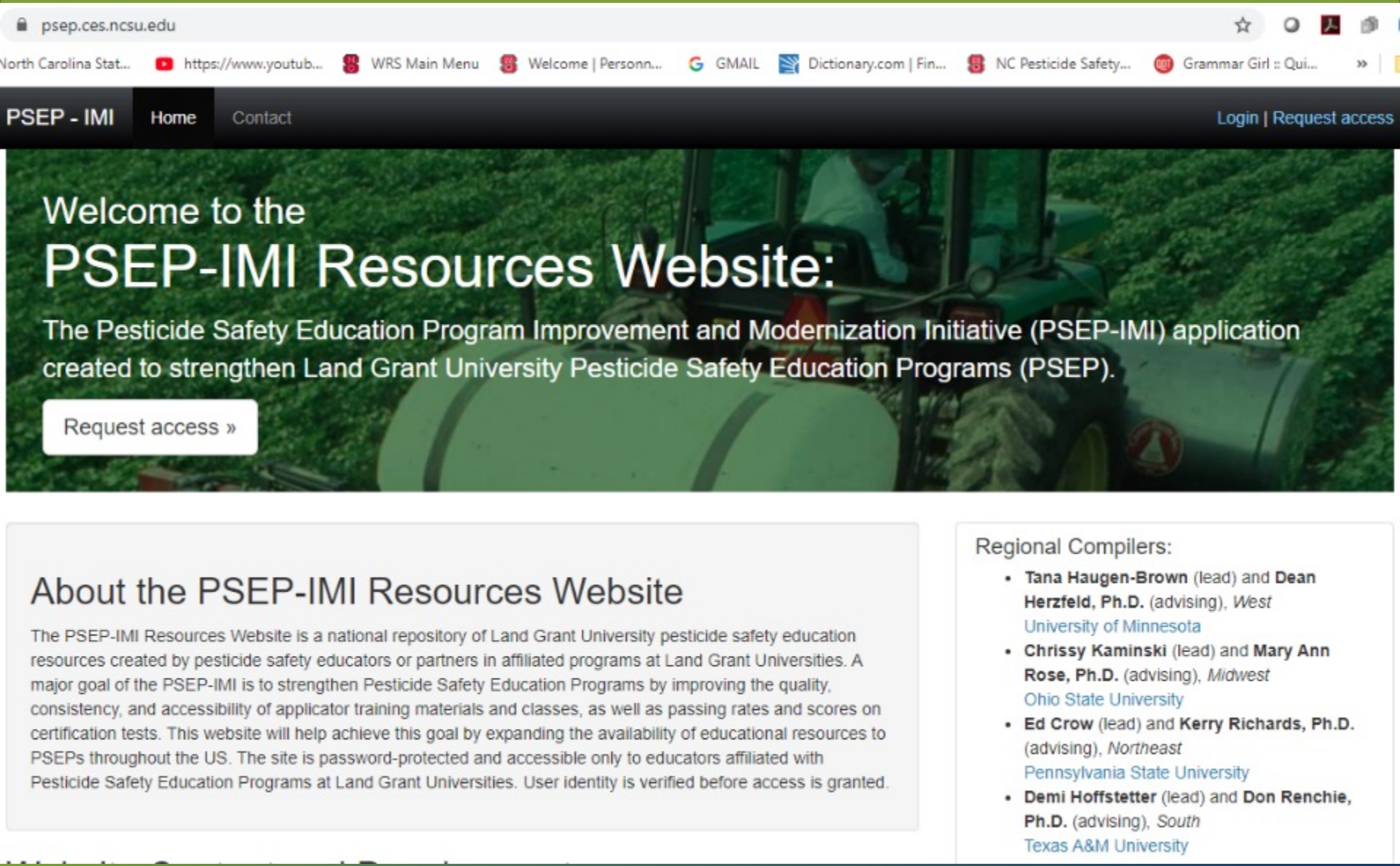
- Chief and initial means of communicating pesticide safety and use
- "Introduction" to the state PSEP, or *bigger* yet, Cooperative Extension (1st impressions!)
- Basis for certification exams
- Reflective of the industry/knowledge base in the state
- For many applicators, it's the "only book on the shelf"
- Revenue generator
- Reciprocity criterion?

National manuals from AZ…NASDARF…PERC

SEED TREATMENT
A National Pesticide Applicator
Study Manual

PSEP-IMI Resources Website

psep.ces.ncsu.edu (password protected)



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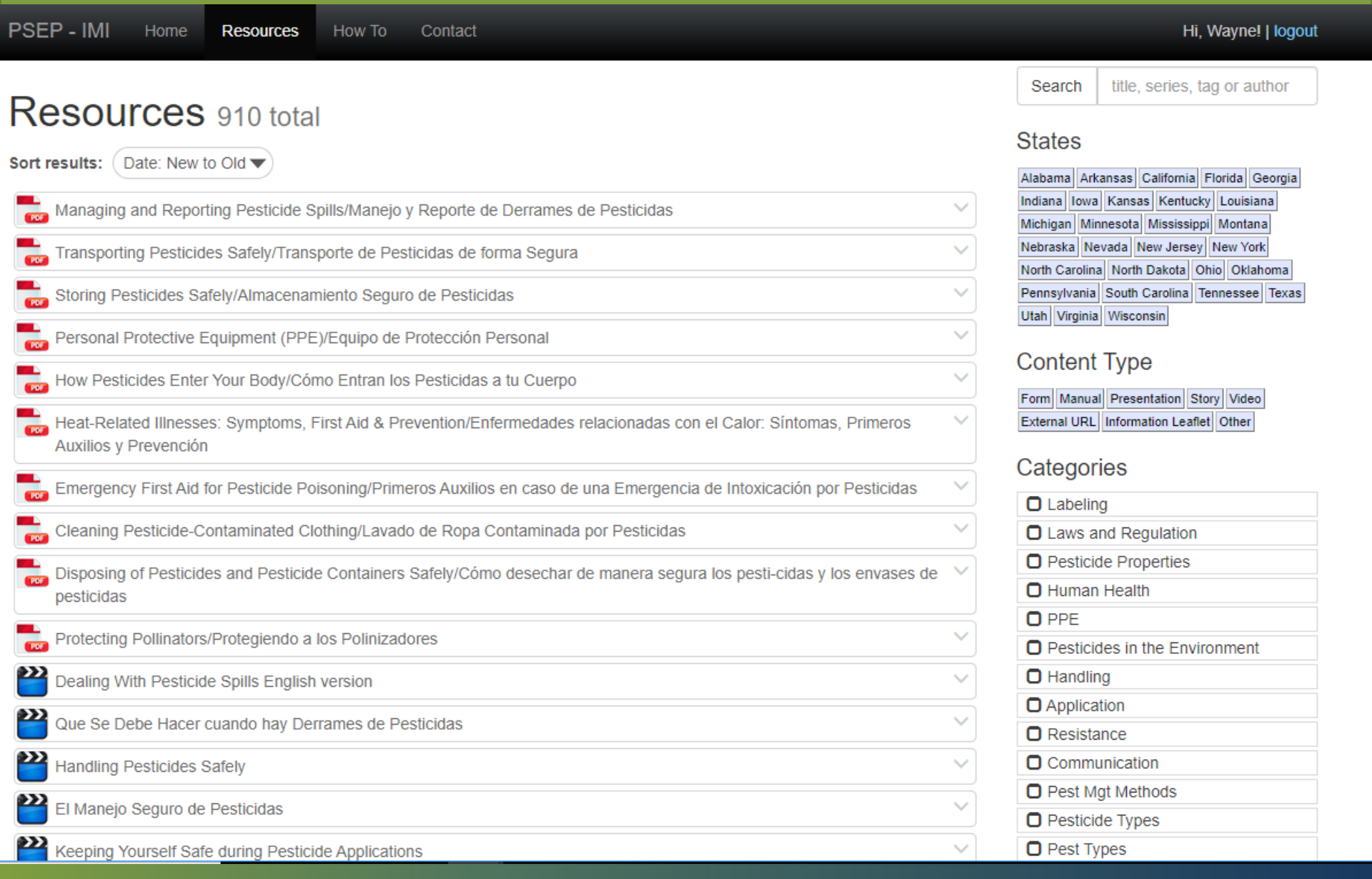

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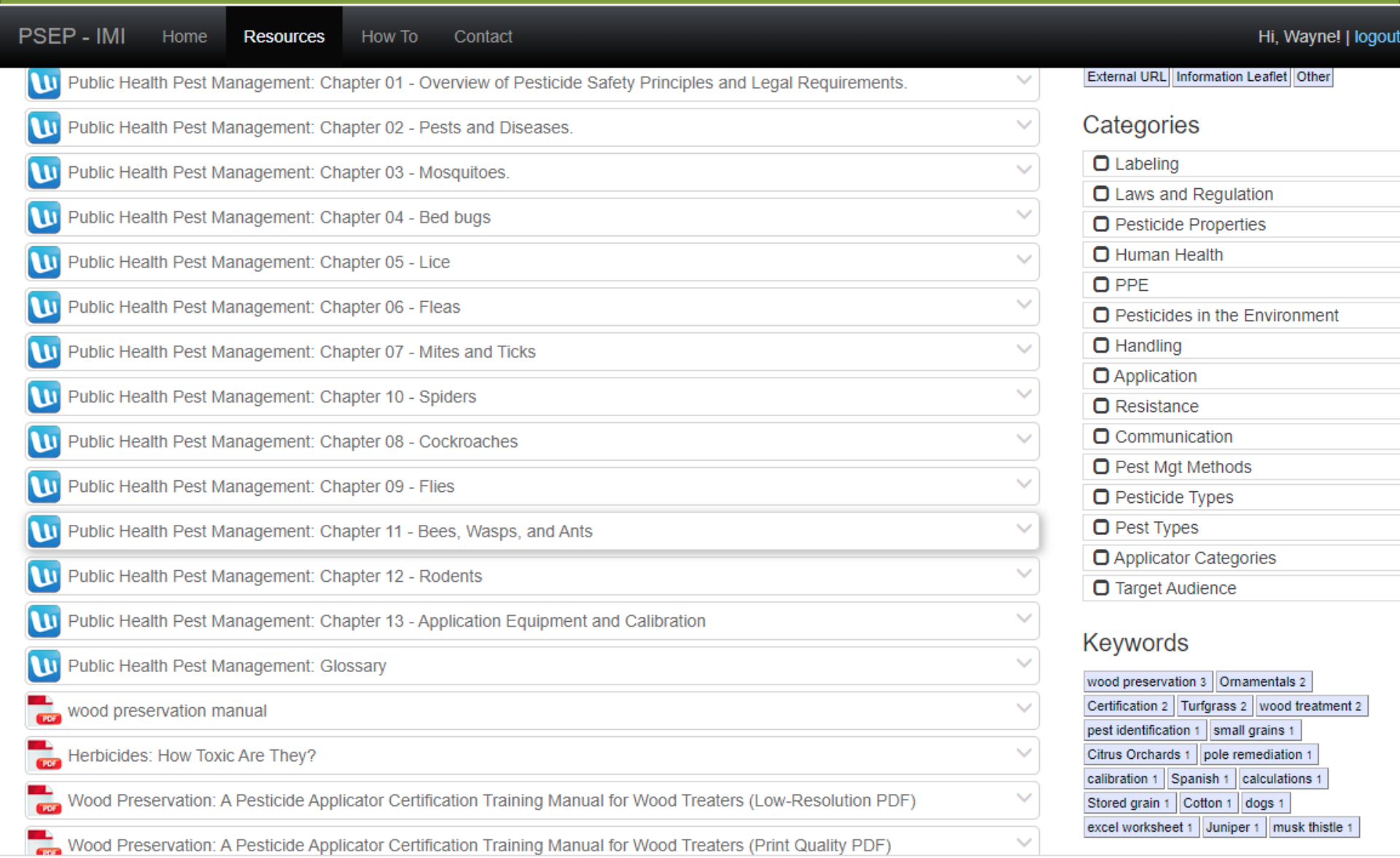

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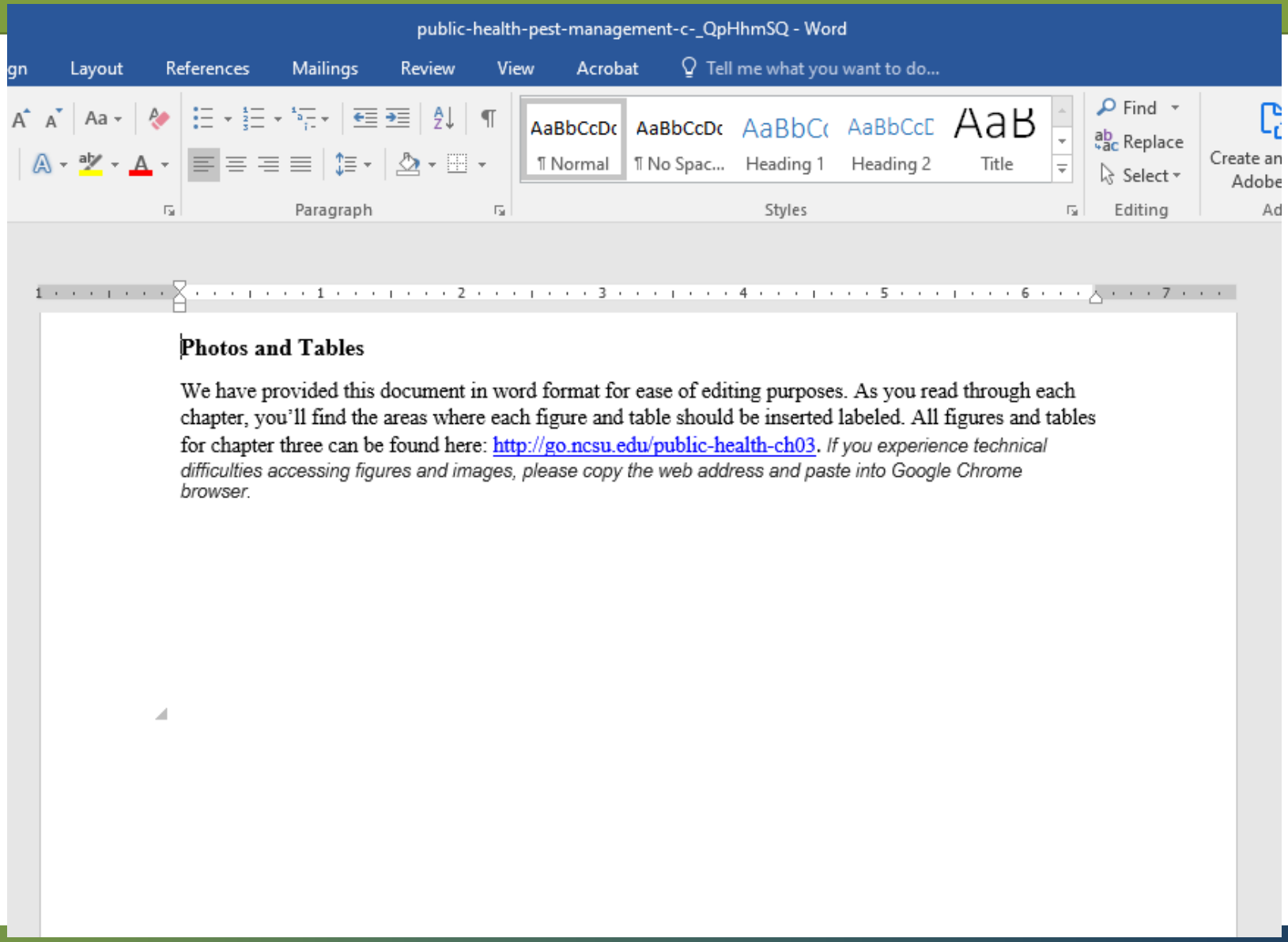

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Chapter 3: Mosquitoes

Original content compiled by: Michael Waldgovel and Eleanor Spicer

Learning Objectives:

After studying this chapter, you should be able to:

- Describe the stages in the life cycle of a mosquito
- Explain the need for water in mosquito reproduction
- Explain the behavior of each stage in the life cycle
- List the differences and similarities you will find with breeding sites
- List three commonly used mosquito surveillance options and explain the differences with each
- Discuss arbovirus and how it affects public health
- Explain arbovirus surveillance and all the factors this type of surveillance monitors
- Explain the role of sentinel birds in arbovirus detection
- Discuss three different pesticide treatment options and the benefits of each
- Discuss the differences between ULV and fogging
- List two methods to reduce drift when making pesticide applications for mosquito control
- Discuss your role in pollinator protection as a licensed pesticide applicator
- Explain timing of pesticide applications for mosquito control and why it is so important
- List two options for biological control of mosquitoes and explain both

Life Cycle & Behavior

Mosquitoes are both an annoyance and a potential health risk to humans and other animals. Their bothersome biting can diminish the quality of outdoor activities. As potential carriers of disease organisms, they pose a risk both to people and domestic animals. Mosquito-borne diseases such as malaria and yellow fever, are no longer a health concern in the U.S., but persist elsewhere in the world. Mosquitoes are linked to the more recent transmission of West Nile virus in the U.S. They also can transmit parasites to domestic animals, including potentially lethal heartworm to dogs.

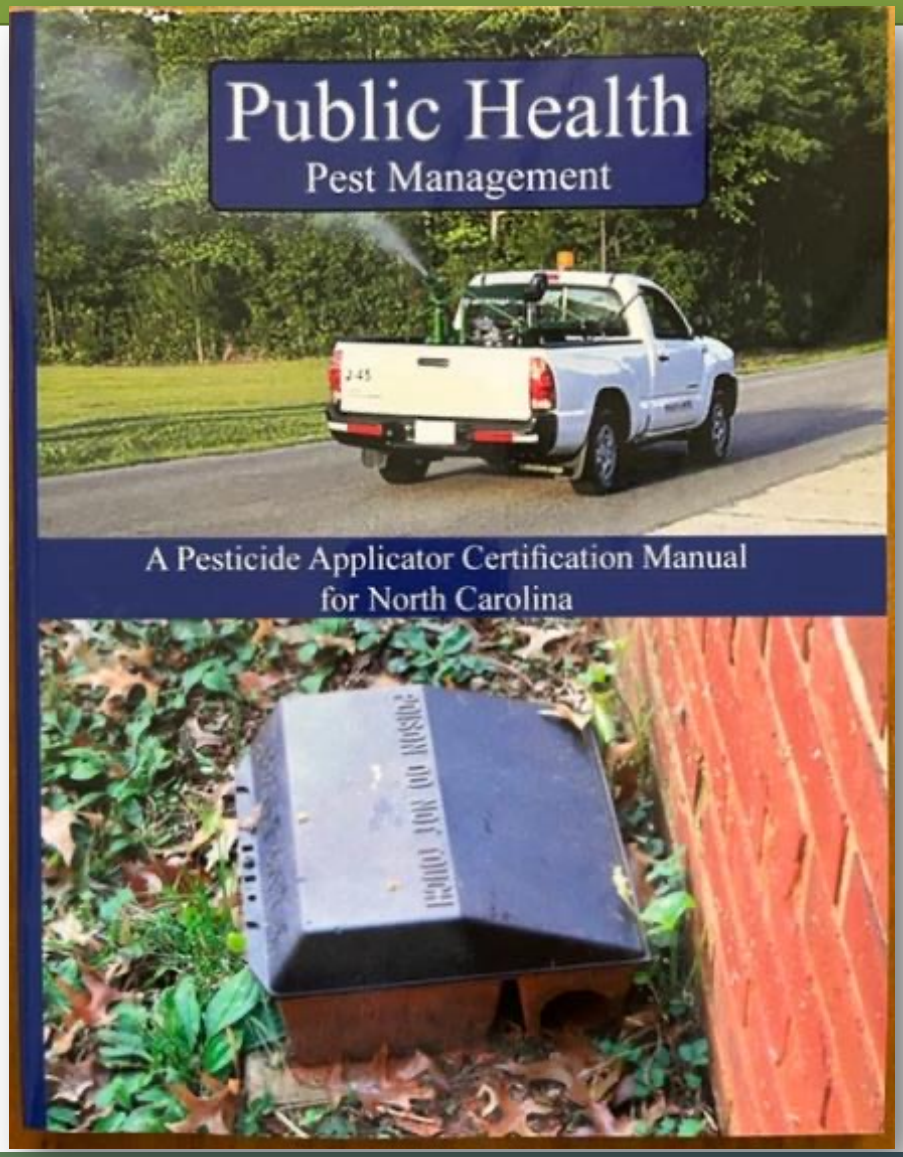
Female mosquitoes bite humans and other animals to draw blood needed to produce eggs. Males do not feed on blood but live only on nectar and other plant juices. Females also use nectar for metabolism and to power their flight.

Insert Figure 3.1

Mosquito life cycle illustration. Illustration by: Garo Goodrow, Artwork by Garo

Mosquitoes need water to breed, and have complete metamorphosis. Three of the four stages of the mosquito's life cycle – egg, larva, and pupa – must be completed in water, with only the fourth, or adult, stage characterized as a flying insect. Most mosquitoes are active between dusk and dawn, although some species will bite during the daytime. Mosquitoes that find breeding places in water-filled containers around homes tend to be active during the day. Some species of mosquitoes can survive cold winter weather as adults by entering into a hibernation-like state called diapause. Females do not feed or reproduce during this time, instead they live off fat stored in their bodies. Mosquitoes in diapause can overwinter for several months if they find warm places to stay, like storm drains, so they do not freeze.

NC Public Health Certification Manual



A manual for Forest Pest Management in the SE

Contents

A manual for Forest Pest Management in the SE

Overview

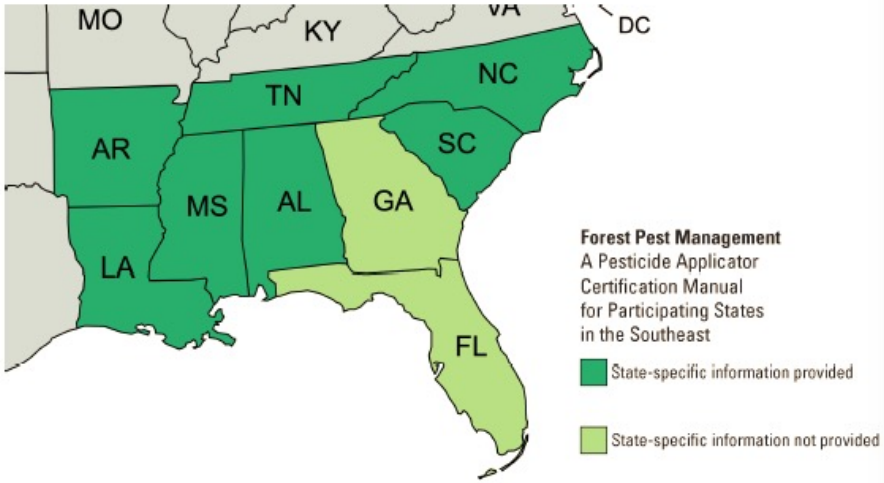


Image credit: **https://mapchart.net/usa.html**: *CC BY-SA 4.0*

Manual Purpose

The purpose of this manual is to prepare pesticide applicators for the Forest Pest Control certification examination in the states of Alabama, Arkansas, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee. You will need to know and understand the information presented in this manual when applying pesticides in a forested system. Although pest species and management practices may be similar to Christmas tree production, this manual and the Forest Pest Control certification exams administered by the states mentioned above do not include this crop. Instead, Christmas tree growers are considered private pesticide applicators.

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A manual for Forest Pest Management in the SE

Chapter 1: Forests of the Southeastern U.S. and Their Management

*Note: Important terms are shown in **bold text** and defined in the Glossary.

LEARNING OBJECTIVES

By the end of this chapter, you should be able to do the following:

- compare the differences between natural and managed forest systems
- state the basic principles in forest integrated pest management
- understand pesticide usage and its importance in forest management
- explain the difference between
  - primary and secondary pests
  - non-native and native species
  - invasive and non-invasive species
- define tree stand improvement
- list and describe four tree stand improvement techniques

Forests provide many important benefits in the Southeastern U.S. They stabilize the climate, enrich the soil with nutrient recycling, serve as a natural storm water management system, and provide recreation, wildlife habitat, timber, fiber products, and property value enhancements. Figure 1.1 is a visual representation of North America's eastern deciduous forest ecosystem. This forest system spans north and south across 26 states from Florida to southern Canada. From east to west, it extends from the Atlantic coastline as far west as Texas and Minnesota.

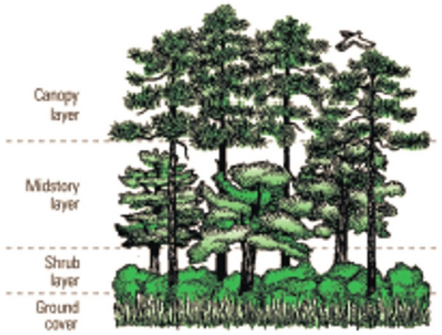


Figure 1.1. A forest with well-developed vertical structure includes ground cover, shrub, midstory, and canopy layers. Image credit: Developing Wildlife-Friendly Pine Plantations, Woodland Owner Notes, North Carolina State Extension, WON-38.

of overtopping trees. Unless these trees are released from shading, they will struggle to survive and likely die.

If chemical site preparation was not performed or was unsuccessful, woody release (removal of undesirable woody species) should be performed within the initial two to five years to control hardwoods in pine stands. After this point, the competitive impact of undesirable stems has a permanent negative effect on pine growth and rotation length (length of time until trees are harvested). Later release operations should be implemented in conjunction with thinning or another TSI technique.

Exercise caution when releasing desirable hardwood trees in hardwood stands because herbicide sprays can kill both desirable and undesirable hardwoods. Injection is the most appropriate method for release in hardwood stands. **Flashback** (described in Chapter 2) is a possible outcome of injected herbicides, so use caution in selecting and using herbicides.

Crop Tree Release

Crop tree release is a specific type of release or an intermediate stand management strategy that singles out and releases trees with desired qualities, regardless of their spacing or location (Figure 1.4). This release requires the removal of undesired trees that are in direct competition with crop trees. Crop tree release applies a common practice of "crown touching release"—removing or killing all trees with crowns that interfere with crop trees. This management strategy is likely to result in an unequal distribution of crop trees throughout the stand.

With crop tree release, the landowner must inventory the property, determine the species considered to be crop trees, decide on the number of crop trees to be released per acre, and choose the specific trees to be cut. To help make these decisions, landowners will often use the "free-to-grow" rating, which determines the space needed for each crop tree to grow.

Figure 1.4. (A) Pre-commercial thinning in a sapling stand of longleaf pine. (B) Commercial thinning in an old pine stand. Image credits: (A) Bob Farrish, USDA Forest Service, CC BY 3.0 US, Bugwood.org; (B) Dave Powell, USDA Forest Service, CC BY 3.0 US, Bugwood.org.

A manual for Forest Pest Management in the SE

Summary

Good forest stand management practices promote healthy crop trees that have enough open space to grow, contain few damaged or diseased trees, are easily accessible, and are well-protected against fires. Implementing sound forest pest management strategies to control common weed, insect, disease, and vertebrate pests described in this manual will optimize the wildlife habitat, aesthetics, recreation, or timber production capabilities of a well-managed forest.

Table 1.1. Summary of Timber Stand Improvement (TSI) Techniques

Method	Description/Benefit	Requirements
Release	Practice of selecting individual trees to remain in a stand until maturity, with removal of competing trees to allow seedlings to take hold.	Inject herbicides to selectively eliminate undesirable woody species within 2–5 years.
Crop Tree Release	Flexible technique that can be applied to even-aged or uneven aged stands to improve growing conditions through the removal of crown competition around selected trees. Differs from traditional thinning in that the crop tree can refer to the value of either the remaining trees or those removed, and can include ecological or economic benefit.	• Determine space needed for each crop tree to grow using "free to grow" rating for tree selection. • Released trees may be cut/felled and used for firewood and fence posts, girdled and left standing, or killed using a selective herbicide.
Pre-Commercial Thinning	In dense stands of immature trees, removal of trees to reduce competition and improve rate of growth for remaining trees. Can result in 10 to 20 percent gains in young pine stands.	• Often delayed until culled trees are large enough to be used as firewood or fence posts to reduce waste. • Smaller trees removed by hand cutting, mechanical means, or herbicide applications.
Prescribed Burning	Use of fire under specific environmental conditions to achieve forest management goals that favor desirable trees. Promotes forest health and helps reduce environmental and human safety risks by reducing fuel for wildfires.	Performed under controlled conditions.

Review Questions for Chapter 1

1. _____forest types mainly consist of broadleaved tree species that produce a fruit or nut and often go dormant during the winter.

   A. Coniferous
   B. Hardwood
   C. Softwood

2. _____ forest types mainly consist of conifers or trees with needle-like leaves that produce seeds in cones.

   A. Oak
   B. Hardwood
   C. Softwood

3. _____ contain trees of different ages, types, and composition and are often more resilient to pests and disease because of such diversity.

   A. Natural forests
   B. Managed forests
   C. Nurseries

4. _____ typically consist of trees of similar age, species, and spacing. Because of this uniformity, they are prone to pest outbreaks, allowing insect pests and plant diseases to move quickly from one tree to the next.

   A. Natural forests
   B. Managed forests
   C. Hardwood forests

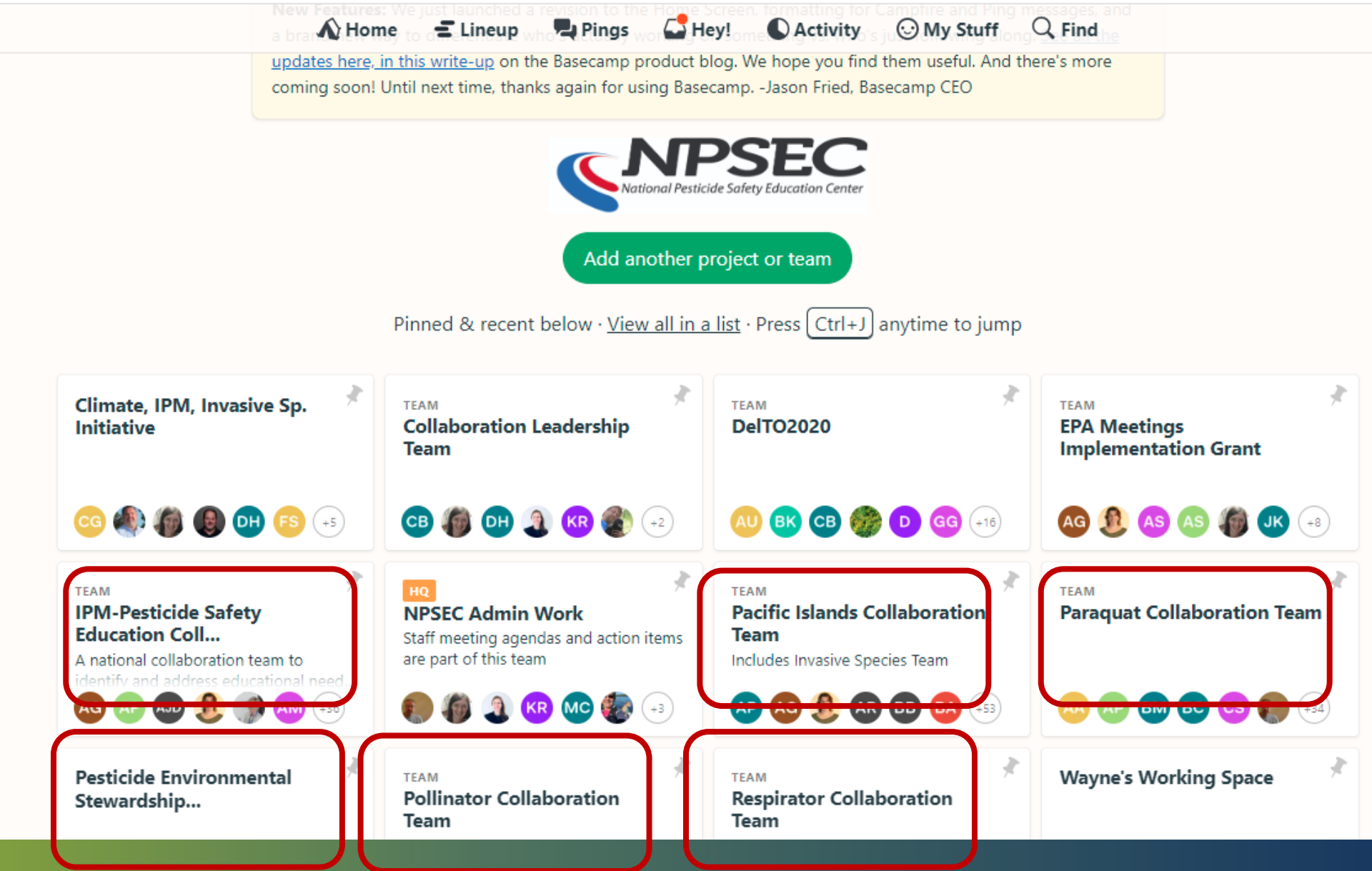
5. Which timber stand improvement method requires the removal of non-crop trees in direct competition with desired trees?

   A. Crop tree release
   B. Pre-commercial thinning
   C. Prescribed burning

6. _____ is the most appropriate herbicide application method for release in hardwood stands.

   A. Foliar spray
   B. Injection
   C. Fumigation

Collaboration Teams – EPA/MSU meetings grant

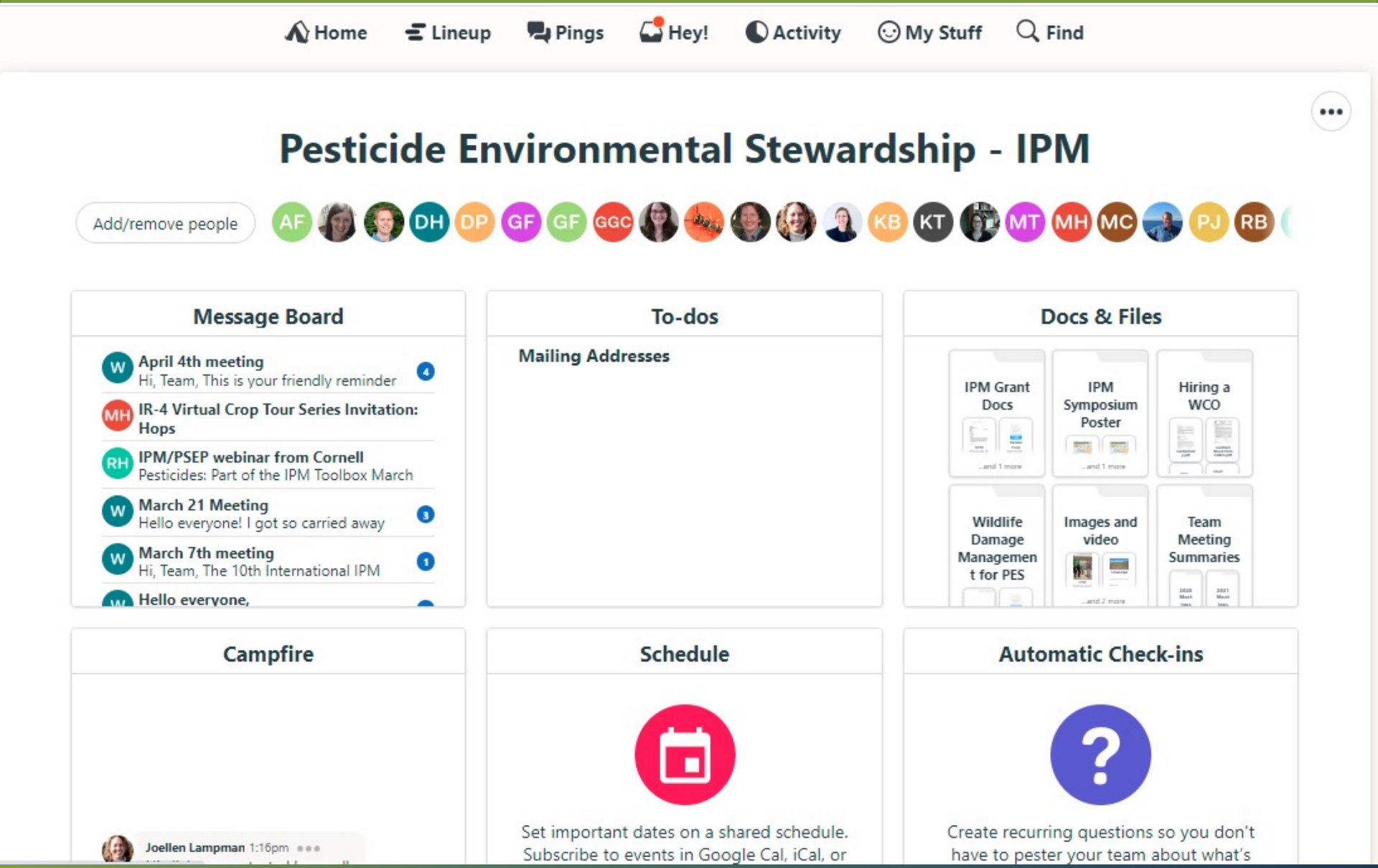


International IPM Symposium, March 2022

The **IPM-Pesticide Safety Education Collaboration Team** is a networking group composed of 36 people. Its mission is to identify and address educational needs and issues where IPM and Pesticide Safety education and outreach overlap.

The IPM PSE CT is supported by US EPA cooperative agreement **X8-83927401** with Michigan State University titled 'Engaging All Stakeholders' for pesticide applicator certification, the Worker Protection Standard and pesticide safety education. The Migrant Clinicians Network (MCN) and the National Pesticide Safety Education Center (NPSEC) are sub-contractors under Michigan State University for the cooperative agreement.

IPM Pesticide Environmental Stewardship Project Team (Basecamp)



Basecamp “Operations”