North Carolina Pollinator Stewardship Working Group and Outreach Efforts

Honeybees and honey are an important part of North Carolina agriculture. While most beekeepers are small in scale, the state is home to several commercial beekeepers that provide pollination services and/or make artisan specialty honey from local crops and plants like clary sage and gallberry in the East to sourwood and black locust in the West.

As broad discussion about the status of honeybees and pollinators began nationally in 2014, due to an increase in hive overwintering deaths, stakeholders from our state's agricultural production community came together at a June meeting to discuss ways we could work together to protect North Carolina's pollinators. Many of the state's agricultural commodity associations and some beekeepers attended. It was there that we realized a working group to facilitate communication among stakeholders would be beneficial, and the idea for the North Carolina Pollinator Stewardship Working Group (NCPSWG) was formed.

NCPSWG is an interagency, cross-organization assembly of teams and individuals that work directly with North Carolina agricultural producers. The mission for NCPSWG is to facilitate and foster positive communication between beekeepers and farmers. Our working premise is that "Farmers need bees, and beekeepers need farmers."

Core members of the North Carolina Pollinator Stewardship Working Group include three Divisions within the North Carolina Department of Agriculture & Consumer Services (NCDA&CS), including the Plant Industry Division--Apiary Services, the Structural Pest Control and Pesticides Division, and the Marketing Division. A number of departments within the College of Agriculture and Life Sciences at North Carolina State University are involved, including Horticultural Science and Entomology, in addition to NC Cooperative Extension Service and the Southern Region Integrated Pest Management (IPM) Center. The state's largest general agricultural organization, North Carolina Farm Bureau Federation, through members of their Public Policy team for Specialty Crops and Row Crops, is also involved.

At this meeting in June we also discussed the new "neonicotinoid label language" that was initiated by EPA in the summer of 2013. This proposed label language included the 2013 New Bee Advisory Box and a clear notification by the use of a bee icon to draw more attention the Bee Advisory statements and Use Directions directly related to the protection of bees.

North Carolina agriculture covers some 8.3 million acres with 48,800 farmers. Production agriculture is present in all 100 counties. Valued at about $12.5 billion, roughly two-thirds of our state's farm gate is livestock production, while one-third is crop production.

Pollinators are most important for North Carolina's $520 million fruit and vegetable crops. The most important crops for pollination include apples, blueberries, blackberries, cucumbers, melons, peppers, raspberries, squash (including pumpkins) and tomatoes. While these crops represent less than ½ of 1% of the acreage, the estimated $200 million at farm gate generated make these crops vital to the rural economy in many counties. On top of that, farm stand apple sales during the fall positively compound the economic impacts of fall tourism in the mountains. Likewise, hundreds of small farm stands in Eastern North Carolina sell produce to tourists traveling to and from beaches throughout the summer.

Honeybees and some other pollinators may be attracted to other crops, but are not necessary for production. For instance, honeybees are attracted to, and may boost yields on, our state's 1.5 million acre soybean crop valued at $187 million; however production is not dependent on bees for pollination. Honeybees are also attracted to flowering cotton, a $180 million crop on 385,000 acres. Again, pollinators are not required for cotton production.

NCPSWG realized that outreach and communication with and among farmers producing crops that are directly dependent on pollinators and crops that may be attractive to pollinators is an important aspect of our work.

To help steer the efforts of NCPSWG members, we conducted outreach listening sessions in October 2014 in Greenville (Coastal Plain) and Raleigh (Piedmont) and in March 2015 in Fletcher (Mountains) to which commercial beekeepers, farmers, regulators and extension agents were invited to attend. Nearly 70 people showed up to discuss how agriculture can work together to protect honeybees.

Overwhelmingly, the attitude among both beekeepers and farmers in attendance at the meetings toward one another was positive. Both groups have understanding that honeybees are under significant pressure from a complex interaction that includes diseases and pests, loss of forage, stress and pesticides. Those farmers present that use contract honeybee pollination services spoke positively about their relationship with their beekeeper(s). Beekeepers also asserted that farmers do not set out to harm honeybees.

Beekeepers present at the meetings often reach out to farmers in their neighborhood, especially those that keep hives in a permanent location, to ensure the farmer knows the location of the hive(s). More than one beekeeper commented that dropping off a jar of honey with a business card goes a long way to fostering good neighbor relations.

NCPSWG meetings had several direct outcomes. First, the group developed an outreach plan to discuss honeybee and pollinator protection with the state's crop growers, pesticide dealers and agricultural consultants. The plan was implemented by NCPSWG members in 2015 and 2016 at dozens of meetings spanning more than six months across the entire state. PowerPoint presentations developed by NCDA&CS Pesticide Division includes basic information on honeybee and pollinator protection and the new neonicotinoid bee language on pesticide labels that everyone could adapt to their audience.

Based on the NCPSWG meetings in 2015, we developed a series of brochures to facilitate communication with target audiences. Content was based on similar communication from Mississippi's Honeybee Stewardship Program. NCPSWG's "*Know Your….*" brochures are used by working group members as a handout during presentations. They are also distributed to target audiences at trade shows, expos and through County Farm Bureaus, among other locations. Most of the brochures were printed with funding provided by the Pesticide Environmental Trust Fund as approved by the NC Pesticide Board. To date, thousands of these brochures have been distributed to various bee chapters and other organizations. They may be found at http://www.ncagr.gov/pollinators/ under the appropriate tab (Beekeeper, Homeowner, & Farmer) or individually at the url's listed below.

The NCPSWG "*Know Your…*" Brochure series includes:

- *Know your Beekeeper for Farmers*, http://ncagr.gov/spcap/bee/documents/KnowYourBeeKeeperforFarmers_000.pdf

- *Know your Farmer for Beekeepers*, http://ncagr.gov/spcap/bee/documents/KnowYourFarmerforBeeKeepers_000.pdf
- *Know your Beekeeper for Landscapers*, http://ncagr.gov/spcap/bee/documents/KnowYourBeeKeeperforLandscapers_000.pdf
- *Know your Landscaper for Beekeepers*, http://ncagr.gov/spcap/bee/documents/KnowYourLandscaperforBeekeepers.pdf
- *Be Aware of Pollinators for Homeowners,* http://ncagr.gov/spcap/bee/documents/beehomeowner.pdf

NCDA&CS Outreach and Surveys

In February 2015, NCDA&CS began its extensive outreach to local bee chapters and the North Carolina State Beekeepers Association (NCSBA) meetings. In the early meetings, we discussed the new neonicotinoid label language, the bee advisory box, the Presidential Memorandum – Creating a Federal Strategy to Promote the Health of Honeybees and Other Pollinators, and State Managed Pollinator Protection Plans (MP3). During these meetings, we also discussed parts of other state plans that would seem appropriate for NC.

To better design NC's MP3 and to update the requirements for notifying Registered Apiaries, we began an extensive survey of beekeepers and applicators across the State. The survey was used to measure responses of several questions addressing the type of notification preferred for pesticide applications, the feasibility of flags to denote pollinator protection areas, and whether they preferred a voluntary registration system or a mandatory system to aid in pesticide notification. The survey questions are listed below:

1) Do you consider yourself a:

☐ Commercial Beekeeper ☐ Hobby Beekeeper

2) Do you contract hives out for pollination?

3) How many hives do you maintain?

☐ 1-5 ☐ 6-10 ☐ 11-25 ☐ 26-100 ☐ >100

4) Would you voluntarily submit your apiary's GPS location to be included on a website to allow growers to identify your hive locations and notify you of possible insecticide applications?

5) Would you allow NCDA&CS Staff to collect the GPS Points for submission to a website to allow growers to identify your hive locations and notify you of possible insecticide applications?

6) Would you support a mandatory apiary registration process that would gather GPS Points for submission to a website to allow growers to identify your hive locations and notify you of possible insecticide applications?

7) Do you think the bee flag awareness program is a sufficient means of identifying apiary locations for pesticide application notification?

8) What other means of notification would be acceptable?

☐ Phone Call ☐ E-Mail/Text Message

☐ Oral Notification ☐ Note left at residence

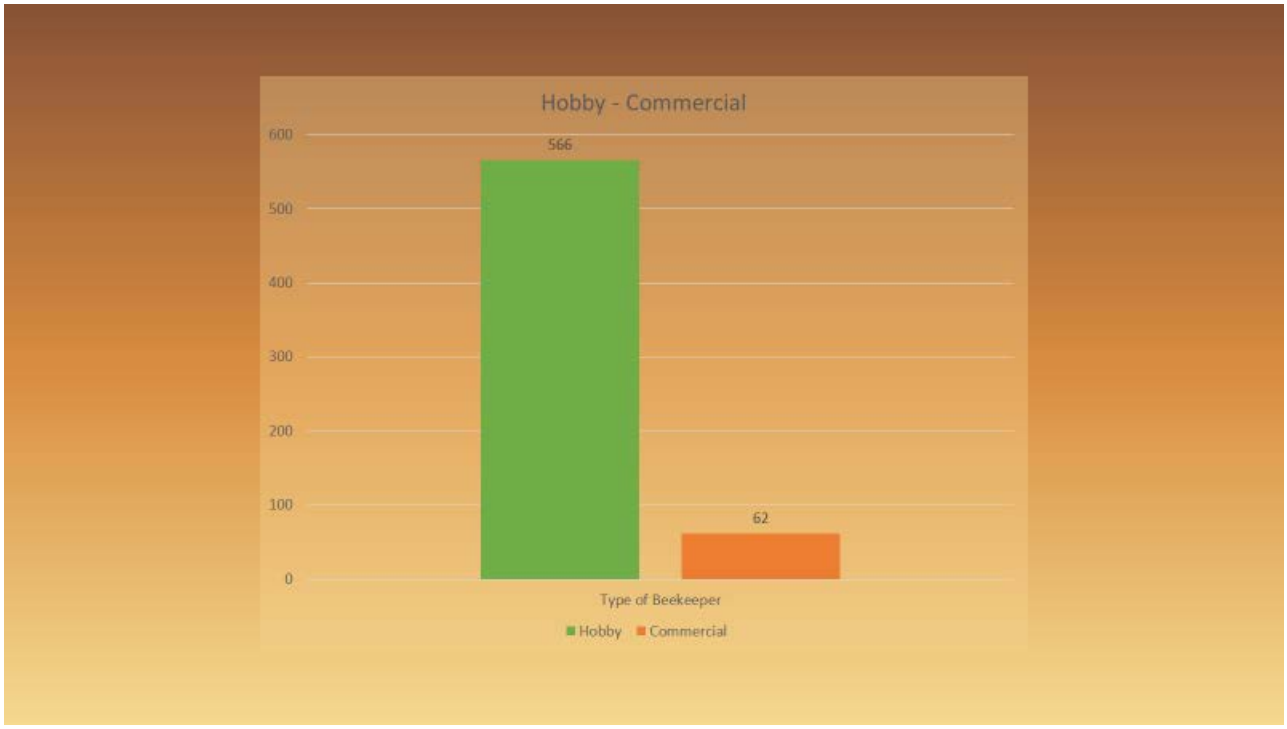
9) Do you have any other ideas concerning pollinator protection initiatives for NC?

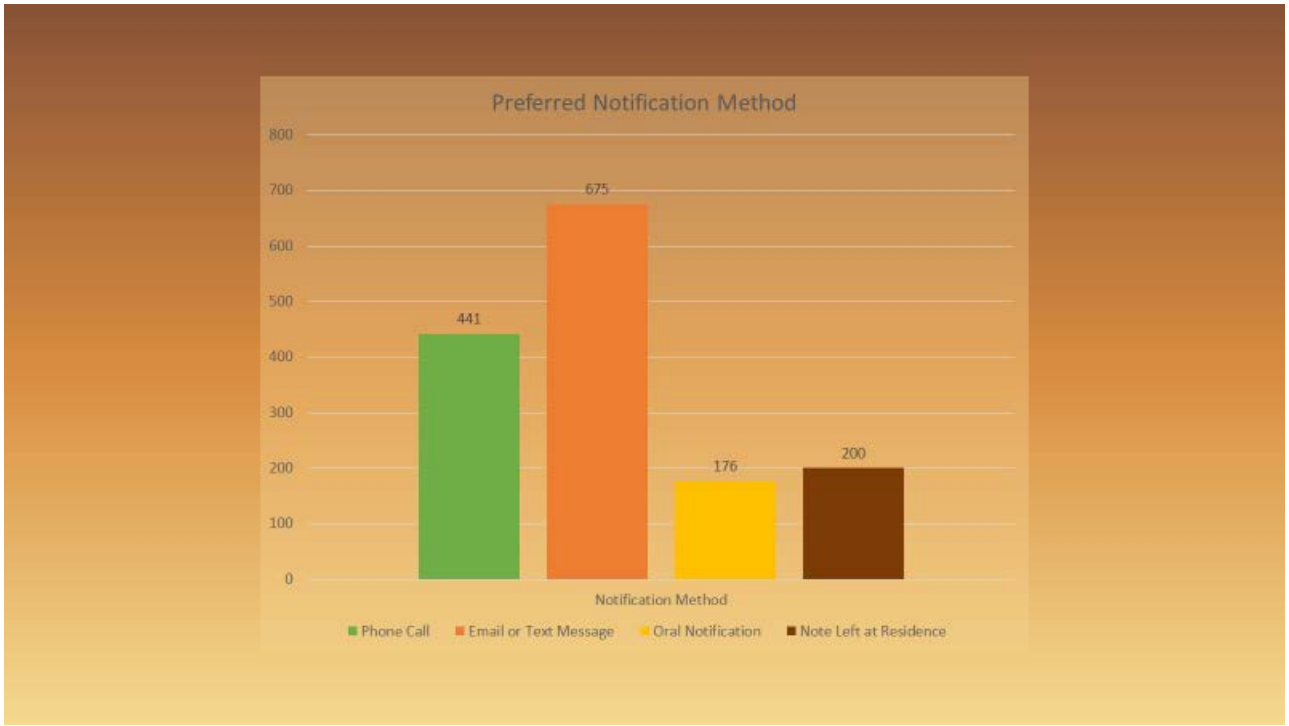
A survey was also created for growers to track their preferences of types of notification and method of denoting pollinator awareness zones. We also asked questions about their awareness of pollinator protection labeling and apiaries in their area. The grower questions are listed below:

1) Are you aware of the new pollinator protection labels on certain insecticides, such as the neonicotinoids (See examples listed below)?
2) Do you contract with beekeepers for pollination services?
3) Do you have hobby beekeepers on or near your farm to pollinate crops or produce honey?
4) What method would you prefer to assist you in identifying "pollinator awareness zones" near your crops?
   - ☐ A flag used by the beekeeper
   - ☐ Website with a bee icon for each location
5) What means of notification would you be willing to use to notify beekeepers of upcoming insecticide applications that may be toxic to bees?
   - ☐ Phone Call
   - ☐ E-Mail/Text Message
   - ☐ Oral Notification
   - ☐ Note left at residence
5) Do you have any other ideas concerning pollinator protection initiatives for NC?

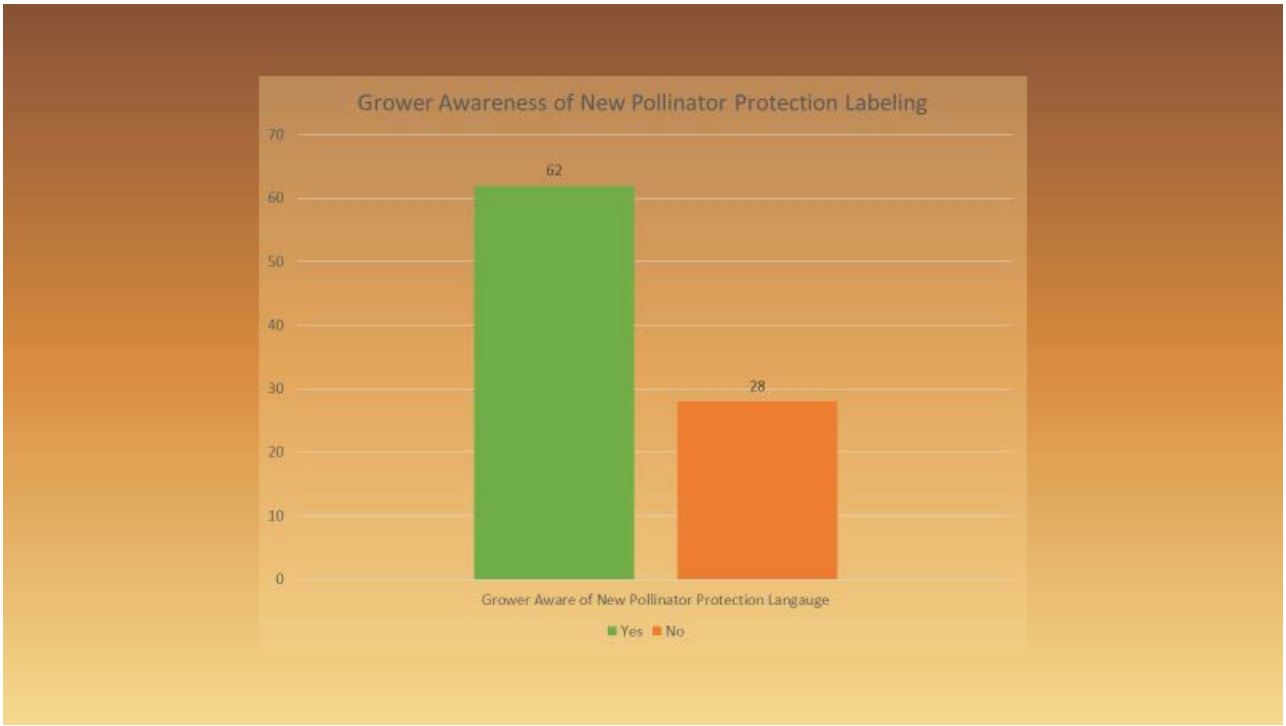
Both surveys were placed on the NCDA&CS Webpage, and were advertised in press releases. To encourage discussion and response from beekeepers, the beekeeper questions were inserted into PowerPoint presentations and responses were gathered with TurningPoint response clickers. Overall, we had good response to the surveys with 984 responses from beekeepers and 94 responses from growers. Beekeepers had a greater response to the survey due to two NCSBA Conferences and local chapters who meet monthly (many chapters filled in surveys and mailed them in) plus NCDA&CS Staff attended 16 county chapter meetings in addition to a greater response to the on-line survey. During the period of the survey from February thru the summer months, we did not have grower meetings scheduled which generated less activity for growers.

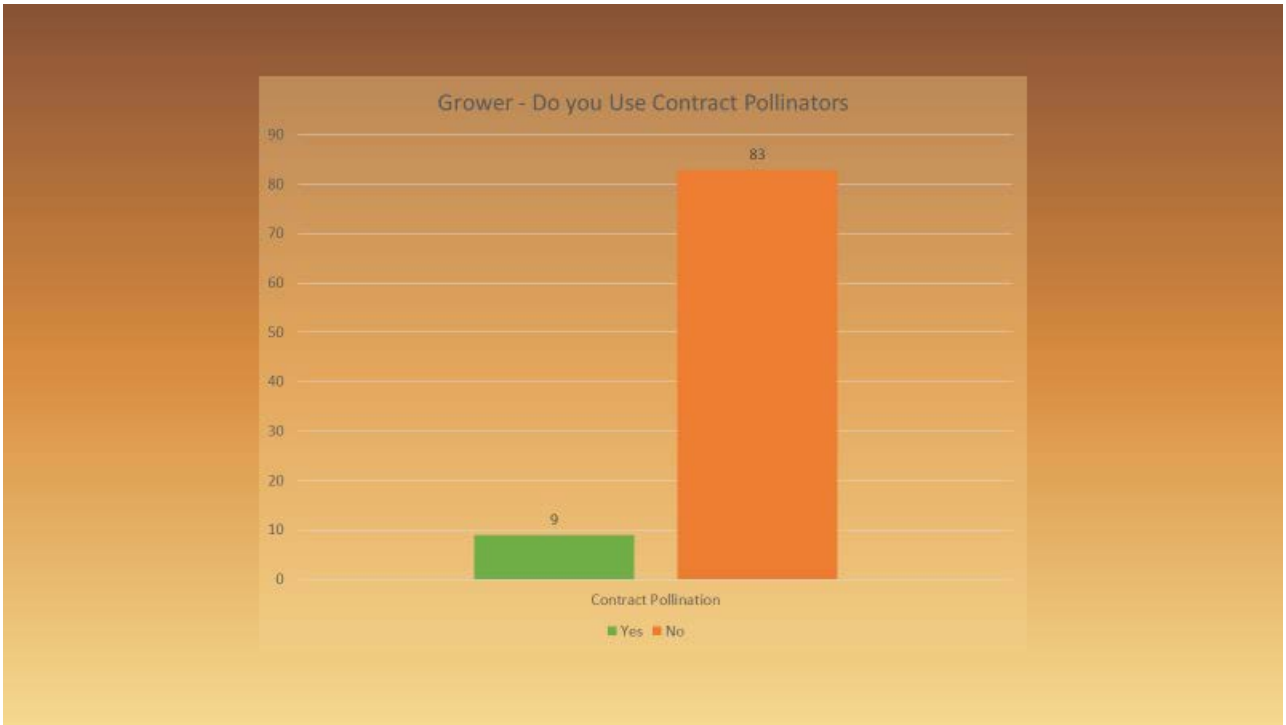
Beekeeper Response Summary:

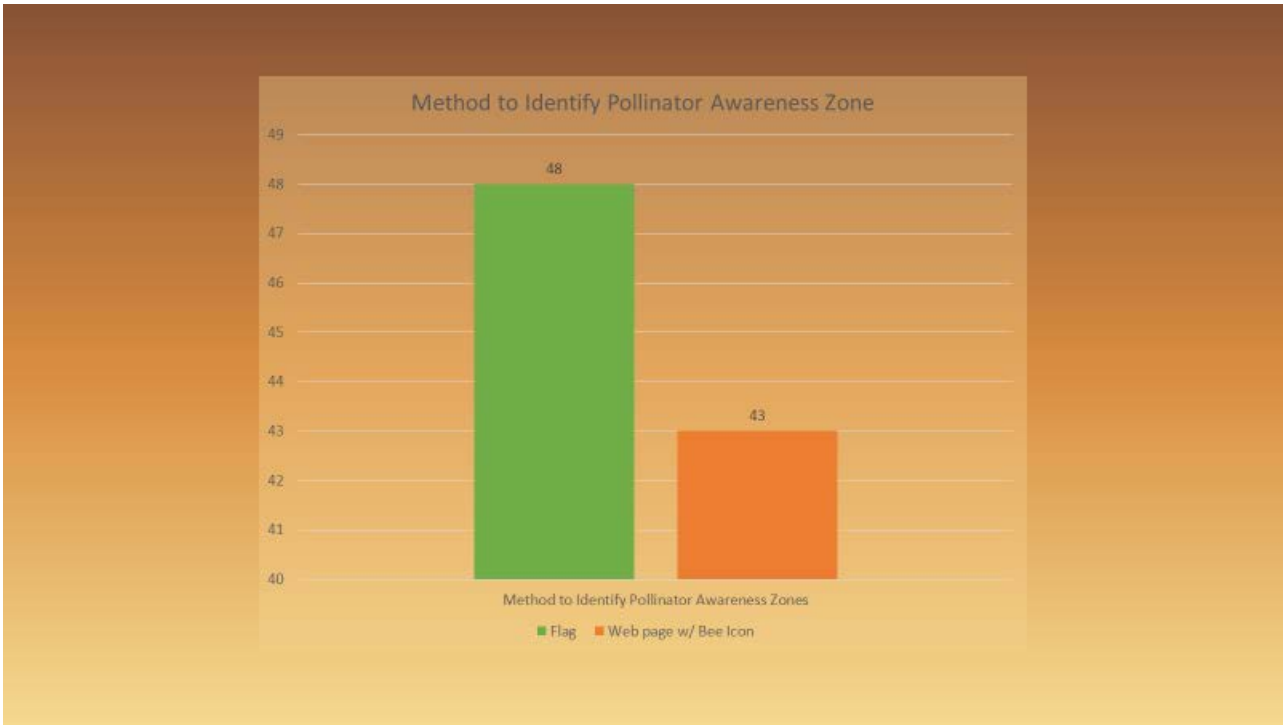


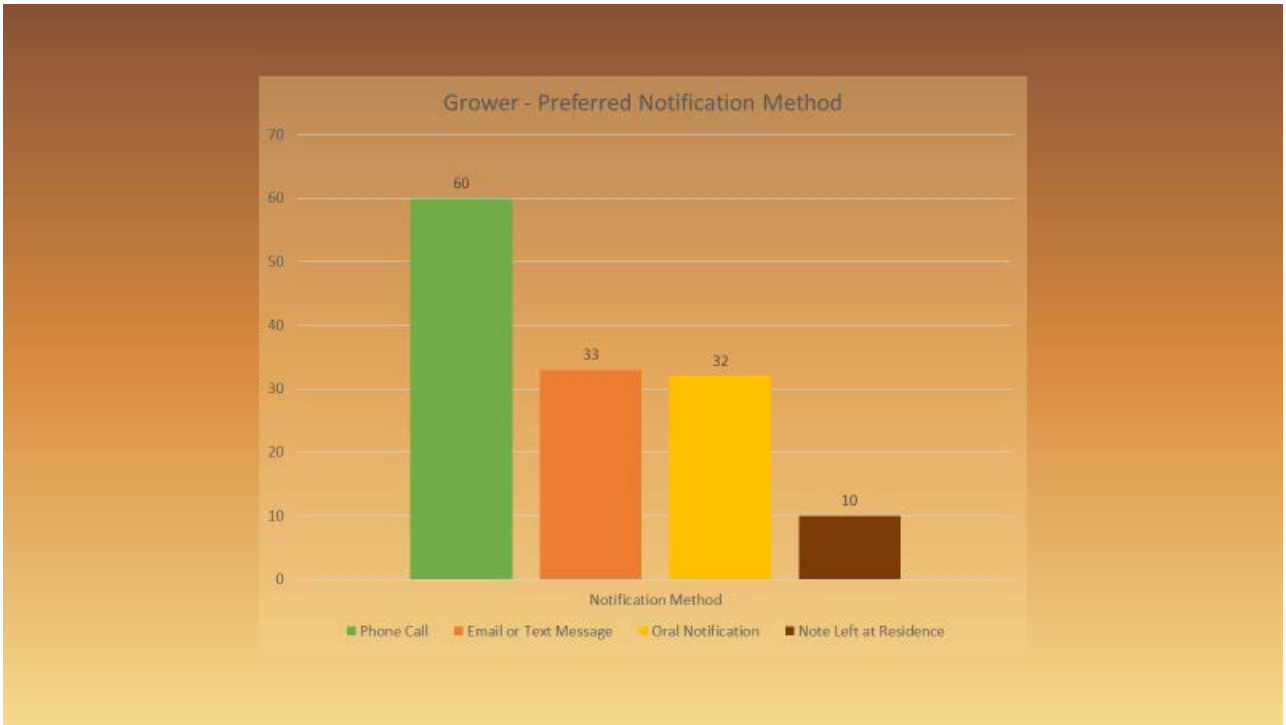




Grower Response Summary:




Grower - Do you Use Contract Pollinators
90
80
70
60
50
40
30
20
10
0
83
9
Contract Pollination
Yes
No


Method to Identify Pollinator Awareness Zone
49
48
47
46
45
44
43
42
41
40
48
43
Method to Identify Pollinator Awareness Zones
Flag
Web page w/ Bee Icon




In summary, the beekeepers surveyed were 90% hobbyist and 10% commercial. Beekeepers preferred a voluntary registration of apiaries (86%) over a mandatory registration. Less than 14% of those surveyed supported a mandatory registration. Beekeepers also preferred email or text notification method for pesticide applications (45%), followed by phone call (30%), note left at residence (13%), and oral notification was the least preferred (12%) (percentage of all responses given – surveys could have multiple choices).

The grower's survey showed that most of the farmers were aware of the new pollinator protection labeling at 68%, and about 10% used contract pollinators. There was no clear preference for the method of identifying pollinator awareness zones for farmers with a flagging method slightly ahead at 53% and a web based bee icon at 47%. Growers seemed to prefer a more personal notification for pesticide applications. Their preferences were phone call, followed by email and text. A note left at the residence was the least preferred method.

At the county bee meetings, we discussed portions of other state's pollinator protection plans. Most beekeepers did not prefer a flag as the stand-alone method for awareness, and they did not particularly care for the black and yellow striped flag. They preferred something that more clearly denoted bees. Beekeepers seemed to prefer the FieldWatch BeeCheck Flag over other alternatives. Bee flags and signs may be purchased from the FieldWatch website http://www.fieldwatch.com/ after registering as a beekeeper or producer of a specialty crop. Currently flags cost $9.00 and signs cost $12.00. Local bee chapters may order in bulk to save on shipping cost if a registered user of FieldWatch orders the signs and flags.


*BeeCheck flag offered by FieldWatch*

*Bee flag used by other States*


*Plastic corrugated sign offered by FieldWatch*

NCDA&CS Pesticide Section has continued an extensive pollinator protection outreach schedule. We have participated in over 70 events since 2015, including NC State Beekeepers Association Conferences, local bee chapters, county pollinator events, field days and others. If you would like for someone from the Section to attend your County Bee Chapter, please contact the Section at (919) 733-3556. We would be glad to discuss our pollinator protection efforts, EPA's current pollinator protection strategy and labeling requirements, bee kill investigation process, and many other topics.

Apiary Registration in North Carolina

Prior to the use of FieldWatch and BeeCheck, North Carolina only had one type of Apiary Registration, which is carried out in coordination with the Apiary Services Section of the Plant Protection Division and the Pesticide Section of the Structural Pest Control and Pesticides Division. Notification from the grower is mandatory, when they contract with an aerial applicator to apply any product labeled as toxic to bees within the notification area of any "registered apiary". Within this registration system, the Apiary Section mails a list of all registered apiaries to all aerial applicators, aerial contractors and apprentices licensed in North Carolina on a quarterly basis. In addition, the Pesticide Section notifies all farmers listed on the "Apiary Registration Form" plus any certified applicator that we can visually denote within 3 miles of the apiary. Now with the use of FieldWatch and BeeCheck, the Pesticide Section also adds any registered apiaries to the BeeCheck map with a red skep designation.

Based on the survey results and the request of North Carolina Dept. of Agriculture and Consumer Services, in January 2016, the North Carolina Pesticide Board adopted changes to the "Notification of Apiaries" section found at 02NCAC 09L .1109. This section was somewhat outdated as it had not been updated since January of 1985. In the new changes, the NC Pesticide Board extended the notification area to a one mile radius instead of ½ mile, required notification in no less than 48 hours prior to application (to coincide with new EPA labeling requirements) instead of the prior 24 hours, and added digital communication to the notification methods to include electronic mail (email) and instant messaging.

The new section now reads with the updated portions in red:

02 NCAC 09L .1009 NOTIFICATION OF APIARIES

Any person who hires the services of an aerial applicator to apply a pesticide labeled as toxic to bees, shall notify, based on available listings of registered apiaries, the owner or operator of any registered apiary located within one mile of the target area not less than forty-eight (48) hours nor more than ten days prior to the beginning of a single application or a seasonal spray schedule, giving the approximate time of day of application and type of pesticide to be used. Notification may be either oral or written. Notification for the purposes of this Paragraph is defined as follows:

1) written communication by:
   (a) U.S. mail,
   (b) Notification left at residence, or
   (c) Notification left at alternate as designated on the honeybee registration list.
(2) oral communication by:
   (a) telephone,
   (b) personal communication, or
   (c) verbal communication with an alternate as designated on the honeybee registration list.
(3) digital communication by:
   (a) electronic mail
   (b) instant messaging

The Pesticide Section will distribute new registrations of beekeepers and their alternates by U.S. mail on the first of each quarter (January 1, April 1, July 1, and October 1) to all farmers growing crops within one mile of the apiaries that are identified on the "Apiary Registration Form" of the Plant Industry Division. The list of revised registered apiaries will become effective on the fifth day of the first month in the quarter stated in this Rule. The registration of apiaries shall be effective for the calendar year that they are registered.

FieldWatch Comes to NC

Also, based on the early findings of the survey, The Pesticide Section sought out web-based voluntary registration mapping systems. There was much discussion about constructing a NC-only website, but in the end, it seemed that FieldWatch was the best selection, plus it also offered a specialty crop registration. In July of 2015, the NC State Beekeepers Association approved of the FieldWatch selection as did the NCPSWG. In September of 2015, the NC Pesticide Board granted funding thru the Pesticide Environmental Trust Fund to purchase the FieldWatch software and to aid in publication and outreach for NC Pollinator Protection Efforts. On April 4, 2016, North Carolina became the 13th state to become a member of FieldWatch.

FieldWatch is a non-profit company that promotes communication between producers of specialty crops, beekeepers and pesticide applicators in support of ongoing stewardship activities. DriftWatch™and BeeCheck™ are programs of FieldWatch and are FREE voluntary mapping tools that connect pesticide applicators, beekeepers and specialty crop growers to promote awareness and stewardship activities on the ground. DriftWatch is not intended to be a crop registry for homeowners or sites less than half an acre. You can add bees as a crop in DriftWatch. However, beekeepers with no specialty crops are encouraged to use BeeCheck to map their hives.

These sites feature an easy-to-use Google Maps™ interface that clearly shows pesticide applicators the locations of registered areas so they can utilize the information in their ongoing stewardship activities before they spray. It's important to remember that the lines on the maps are not property lines; they merely indicate approximate

positions of specialty crops and beehives submitted from the agricultural producer.

DriftWatch was designed by the Purdue University Agricultural and Biological Engineering Department with input and support from Purdue University Cooperative Extension. It launched in 2008 and has been very well accepted by the growers and applicators in the mid-west. It is now operated by FieldWatch, Inc, a non-profit company created in collaboration with interested agricultural stakeholder groups.

Commonly Asked Questions About FieldWatch:

What is FieldWatch?
FieldWatch, Inc. is a non-profit company created to develop and expand the operation of the DriftWatch Specialty Crop Site Registry. To support the rapid growth of DriftWatch outside of Indiana, Purdue University collaborated with other agricultural stakeholder groups in the creation of a non-profit corporation called FieldWatch in December 2013. The new company, which is located off-campus at the Purdue Research Park in West Lafayette, IN, has fully assumed the operational responsibilities of DriftWatch and developed a national platform for the website.

What is DriftWatch?
DriftWatch is a voluntary online specialty crop site registry and mapping program created by Purdue's Agriculture Department. The University's successful web based program, launched in Indiana in 2008, has been effective in allowing both farmers and applicators to identify, map and communicate where high-value pesticide-sensitive crops are being grown as part of ongoing stewardship activities. DriftWatch has quickly caught the attention of other states and provinces in Canada. As a primary stakeholder, the respective state departments of agriculture provide a key leadership role in implementing, administering and financially supporting this effective stewardship communication tool.

What is the difference between FieldWatch and DriftWatch?
FieldWatch is a company. DriftWatch is the online mapping and registry tool the company operates.

How does DriftWatch work?
Producers of high-value specialty crops, such as tomatoes, fruit trees, grapes and vegetables, register and map their sites online with an easy-to-use mapping tool and provide contact information about their operation. Likewise, commercial beekeepers register and map their hives the same way. Pesticide applicators access the site to help determine the scope and location of specialty crops and beehives in their trade areas. Registered applicators can sign up for email notifications when new fields or beehives are added to their designated state, county or areas. DriftWatch provides the platform to facilitate better awareness, communication and interaction between all parties as one part of ongoing stewardship activities.

Who can use DriftWatch?
DriftWatch is free and the site locations are viewable by the public, but not just anyone can register sensitive sites or fields. The tool is for specialty crop producers, beekeepers and pesticide applicators. Only managers and owners of specialty crop fields that are used for commercial production and at least a half-acre will have fields approved. It is not intended for homeowners.

Why should I join as a voluntary member of FieldWatch?
FieldWatch is a non-profit company that relies on donations and sponsor to keep DriftWatch operational, up-to-

date and a useful tool for producers and growers. Because DriftWatch is free to use, the voluntary membership is a means to generate revenue from companies, organizations and individuals that want to get involved and demonstrate their support of the DriftWatch registry. Different member benefits are being developed and will be provided, such as direct data feed subscriptions to member applicators.

FieldWatch has been well received by North Carolina beekeepers. Within one year of launching FieldWatch/ BeeCheck, North Carolina has over 1300 apiaries registered which includes 5,778 hives. NC's specialty crop growers are also seeing the benefit of registering their crops. One of the best benefits of the voluntary mapping system is that it allows out of state applicators and those who are not familiar with the area that they will be operating in a chance to see the location of the specialty crops and apiaries. Also, applicators who are not even registered can view the map and see where these areas are located and make pesticide application decisions to better protect bees and specialty crops.

Bee Kill Investigations

The Apiary Section and Pesticide Section continues to coordinate their efforts on bee kill investigations. Over the years, we have investigated many bee kills. Below is a summary of the last five years of case history:

| Investigation Type | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|
| Aerial | 9 | 6 | 6 | 9 | 7 |
| Aerial/Hum. Ill. | 2 | | 2 | 5 | 1 |
| Dealer | 4 | 7 | 5 | 7 | 4 |
| Disposal | 3 | 3 | | | 1 |
| Fire/Spill/Flood | 5 | 5 | 2 | 4 | 2 |
| Ground | 32 | 36 | 35 | 35 | 3 |
| Bee | 3 | 3 | 2 | 13 | 7 |
| Fish | | | | 2 | 1 |
| Human Illness | 2 | 8 | 5 | 2 | 8 |
| License | 7 | 6 | 6 | 6 | 8 |
| ROW | 6 | 7 | 6 | 5 | 6 |
| WPS | 7 | 6 | 3 | 1 | 2 |
| Residue | 1 | | 1 | 1 | 2 |
| Sale | | 4 | | 2 | |
| Vandalism | 2 | 2 | | 1 | 1 |
| Cat | 1 | | | | |
| Wildlife | | | | | 2 |
| Dog | 3 | | | 1 | 1 |
| Storage | 1 | | | | |
| Registration | 13 | | | | |
| Total | 101 | 93 | 79 | 94 | 94 |

If you have hives that have suffered a significant loss, please do not hesitate to notify either of the two Sections. The Pesticide Section can be reached at (919) 733-3556 or our webpage for Field Compliance contacts may be

found at http://www.ncagr.gov/SPCAP/pesticides/insp.htm and the Apiary Services phone number is (919) 707-3753. The Apiary Field Services webpage is found at http://www.ncagr.gov/plantindustry/Plant/apiary/apiarymp.html

Once contact to either Section is made, our field staff will contact you to set an appointment. If the Apiary Section responds to your inquiry, once they suspect a pesticide may be involved with the bee kill, they will notify the pesticide inspector in your area. Working cooperatively, we will obtain samples of fresh dead bees, pollen, and nectar. A portion of the dead bees will be analyzed by the Apiary Services Section for known pests, Varroa mite counts, and diseases. Portions of the bees may also be sent to the Bee Lab at NCSU. Official samples will also be sent for analysis at the Food and Drug Protection Division residue lab for suspected pesticides. Pesticide Inspectors may also obtain other types of samples such as alcohol swab samples from the hive tops or front of hives, to determine if pesticides contacted the hive. They may also obtain soil and vegetation samples from your property to determine if pesticides drifted onto your property from the application.

Pesticide Inspectors will also speak to pesticide applicators who may have applied products in your area during the time of the hive decline. This may include farmers, landscapers, mosquito control applicators and others. The pesticide inspectors will review the pesticide labels of all products utilized during the decline and determine if the applicator followed all mandatory label requirements. Upon completion, the bee kill investigation report is forwarded to the District Supervisor for review.

The District Supervisor examines the case file for completeness, reviews all sample results and pesticide labels and then decides if any violation of the North Carolina Pesticide Law of 1971 and/or Regulations have occurred and determines if regulatory action is warranted. The Regulations adopted by the North Carolina Pesticide Board are very specific statutes that prohibit drift from pesticide applications causing adverse effect, including adverse effect to bees.

Regulatory action could range from a formal Notice of Warning to a civil money penalty that must be approved by the North Carolina Pesticide Board. All funds generated from the civil penalties are sent to the county school system where the violation occurred. The beekeeper will then be notified of any action taken in the case. Sample results may be made available before the case is closed on all samples from the beekeeper's property.

Violations cited in cases include those applications not in compliance with one of the label statements prohibiting the application of a pesticide to areas where bees are foraging/visiting. These may occur if groundcover or field borders are in bloom and attracting bees during the time of the application. Other violations may include failure to notify a registered apiary or a pesticide application drifting onto a bee yard or forage and causing an adverse effect.

## Looking Ahead

The Pesticide Section will continue to work cooperatively with NCSU, The Apiary Section of the NCDA&CS Plant Industry Division, NC Farm Bureau, NCSBA and local chapters to promote its pollinator protection efforts across North Carolina, provide education on the proper use of pesticides to minimize adverse effects to bees, and to update its pollinator protection strategy as needed to address shifts in labeling and measures of success.