



Sussex
**conservation
district**

PREPARE. PROTECT. PRESERVE.



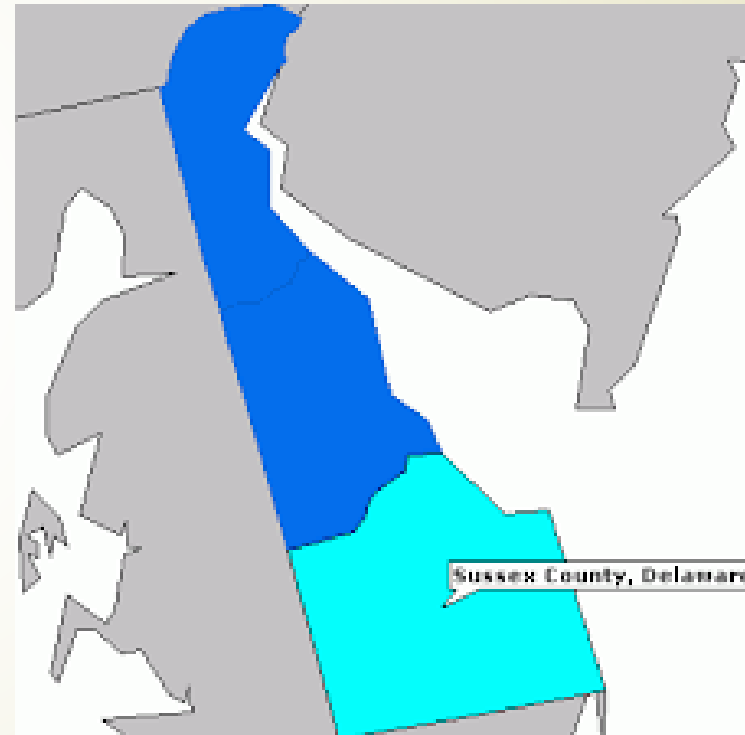
The Air Seeder

Establishing Cover Crops Early to Improve Water Quality and Soil Health



Sussex Conservation District

- ▶ Located in Sussex County, Delaware
- ▶ Formed by state law in 1944
- ▶ Political Subdivision of the State of Delaware
- ▶ Governed by an 8 member Board of Supervisors
- ▶ 3 in Delaware (each county)
- ▶ 50% of Sussex County is located in the Chesapeake Bay Watershed





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Mission

The Sussex Conservation District (SCD) serves Sussex County Delaware by providing technical guidance and financial assistance to enhance, maintain, protect and improve land and water resources throughout the County, State and Region.

A little history...

- ▶ SCD is a big proponent of cover crops
- ▶ Administered a Cover Crop Cost-Share Program for nearly 20 years
 - ▶ Approximately \$1.2 Million in Cost-Share annually
- ▶ Receive funding from state and federal sources



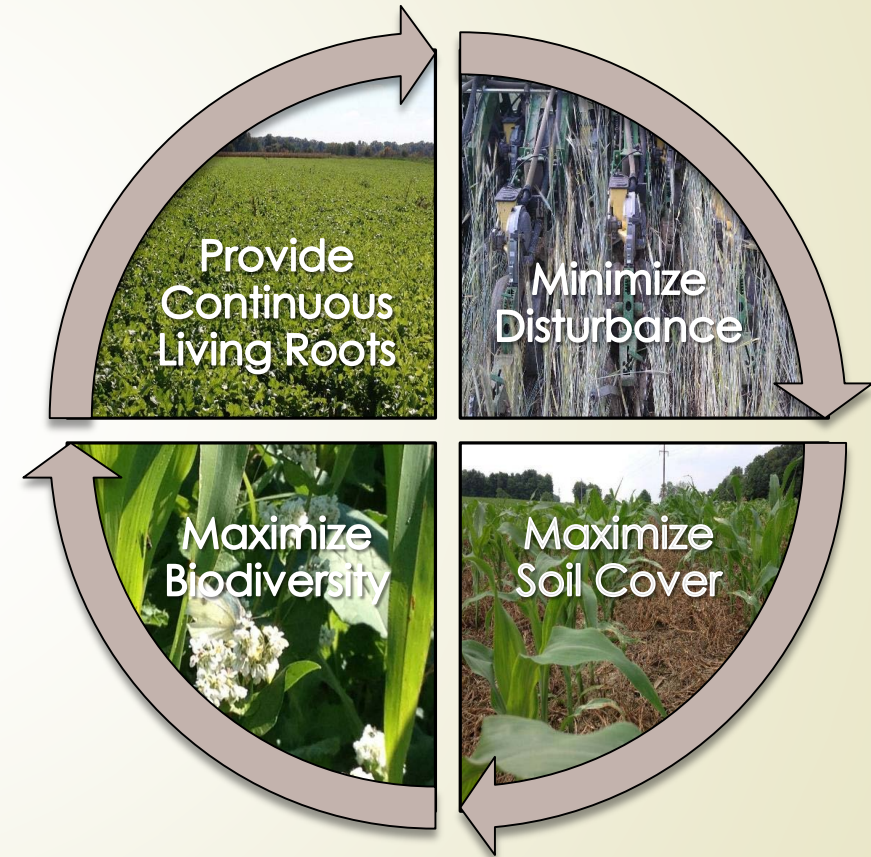
A little more history...

- ▶ The Sussex Conservation District attended the 2014 Cover Crop & Soil Health Forum at the Delaware NRCS State Office
 - ▶ Saw a video of an air seeder used in Ohio
 - ▶ There was conversation about how to promote cover crops and soil health in Delaware
 - ▶ *"We have to go out of state to get soil health information"*
 - ▶ *"We needed to change the mindset of farmers to plant cover crops for soil health instead of for the incentive payment"*



Sussex Conservation District's Soil Health Initiative

- ▶ National initiative through USDA, Natural Resources Conservation Service
- ▶ Soil Health can be improved by:
 - ▶ Provide continuous living roots and maximize soil cover by planting cover crops
 - ▶ Minimize disturbance by utilizing minimal tillage practices
 - ▶ Maximize biodiversity through multi-species mixes and crop rotation practices
- ▶ Practicing soil health management can decrease farm inputs, increase crop yields, therefore improving the bottom line.



Delaware Soil Health Partnership

- ▶ SCD established a local Soil Health Committee and the **Delaware Soil Health Partnership** was born
 - ▶ Met with several progressive, early adopters to find out what information they wanted and how best to share the information
 - ▶ Held soil health workshops and field days in conjunction with Delaware Ag Week and throughout Sussex County



**DELAWARE
SOIL HEALTH
PARTNERSHIP**

We DIG healthy soils!

Air Seeder Technology to Delaware

- ▶ The District began talking with members of the ag community and with the SCD Board.
 - ▶ Would it work in Delaware?
 - ▶ Would farmers be willing to run this equipment through their cash crops?
 - ▶ What are the benefits of early established cover crops?
- ▶ Researched its use in the Midwest
 - ▶ Widely used
 - ▶ Successful at early establishment of cover crops
 - ▶ Crop damage was minimal



Benefits of Early Established Cover Crops

- ▶ Crop benefits from longer growing degree days in the summer
- ▶ Cover crop is already established when cash crop is harvested
- ▶ Gives cover crop as much as a 30 to 90 day head start to establish a good root system
- ▶ Increases uptake of nutrients
- ▶ Improves water quality
- ▶ More biomass leads to increased organic matter
- ▶ Improved soil health



Grant request

- ▶ SCD submitted an NRCS Conservation Innovation Grant (CIG) – not approved
 - ▶ Give farmers the opportunity to try new technology with little or no risk
- ▶ SCD still believed in the idea
- ▶ It would help meet the Chesapeake Bay WIP and TMDL goals
- ▶ After several months of discussions by the Board of Supervisors, SCD decided to purchase the equipment



What is an Air Seeder?

- ▶ Miller Nitro high clearance sprayer with a 90' boom
 - ▶ Adapted with a specialized seed box
 - ▶ Allows farmers to plant cover crops while their cash crop is still in the field.
 - ▶ Drops seed below the canopy
 - ▶ Better seed to soil contact
 - ▶ More even seed distribution



Air Seeder Pilot Program

- ▶ SCD Developed a two year pilot program
- ▶ Took delivery of the air seeder on July 14
- ▶ Started planting on July 30 into corn
- ▶ Finished planting on October 15 into soybeans
- ▶ 24 farmers participated



Air Seeder planting into corn on July 30, 2015



Planting into sorghum in early September



Planting into soybeans in September





Tillage/forage radishes are one of the most popular cover crop choices

Radish measured 18.5" long



Radish and hairy vetch



Results after first year...SUCCESS!



- ▶ Program Success!!
- ▶ 4,017.6 acres were planted with the air seeder
 - ▶ Corn – 2,783.6 acres
 - ▶ Soybeans – 867 acres
 - ▶ Sorghum – 82 acres
 - ▶ Other vegetables – 285 acres

Air Seeder Participant Follow Up



- ▶ Met with nearly all of the participants and had them complete a survey to get feedback on the program
 - ▶ All but one producer said they will participate next year
 - ▶ The benefit from the early established cover crops outweighed any crop damage that occurred

Cover Crop Acres on the increase...

- ▶ Fall of 2015 – 39,374.7 acres planted in Sussex County alone
 - ▶ A countywide increase in acres of 21.4% from 2014
 - ▶ Chesapeake Bay - **33.8%** increase in acres planted from 2014
 - ▶ Only reflects acres cost-shared through SCD Program
- ▶ Why the increase this year?
 - ▶ Extra early acres planted with the air seeder
 - ▶ Soil Health workshops and field days
 - ▶ Commodity prices



Sussex Conservation District Soil Health and Air Seeder Goals for 2016

- ▶ Plant 8,000+ acres of cover crops with the air seeder
- ▶ Continue to promote cover crops and soil health practices through the Delaware Soil Health Partnership's workshops and field days



A photograph of a vast field of golden wheat in the foreground, with a row of houses and trees in the background under a clear sky. The text is overlaid on the image.

Delaware's Cropland Transect Survey We're Looking for Residue, Have You Seen Any?

Tyler Monteith
Delaware Dept of Natural Resources
Nonpoint Source Program

Why residue?

► Why is residue important?

- Increased water infiltration and storage
- Decreased soil erosion and soil-bound nutrient losses
- Increased nitrogen retention due to increased organic matter

► Why are we looking for it?

- Nutrient reduction credits from the Chesapeake Bay Program
- Currently underreported in Chesapeake Bay Progress Submissions
- Creation of new High Residue BMP



Adoption of CTIC Study and Goals

- ▶ Creation of consistent source of data for tillage practices
 - ▶ Source of a substantial portion of our load reductions in WIP
 - ▶ Include the incorporation of HRMSD practice for further reductions
- ▶ Adopted PA survey from CTIC
- ▶ Delawarized it!
 - ▶ Collect unaccounted cover crop data
 - ▶ Traditional vs. Commodity
 - ▶ Cost shared vs. Non-cost shared



Establishing a Statistically Valid Transect Procedure

- ▶ 110 miles along predominately cropland
- ▶ After majority of main crops planted, but before crop canopy closes
- ▶ “Windshield Observations”
- ▶ Driver, Navigator, Recorder, Observers
- ▶ QA/QC Team involving similar participants
- ▶ Need approximately 460 observations
- ▶ Make stops at specified intervals (.2-.5 miles) and observe both sides of road



Delaware



watersheds

CROPS	
corn	edible beans and peas
soybeans (full season)	barley
soybeans (double-cropped)	canola
winter wheat	forage crop (seeding year only)
oats	potatoes
grain (other)	sorghum
sunflowers	permanent pasture
vegetables and other crops	fallow
rye	hay
specialty crops (orchard, sod,..)	none

Cover Crops	
Annual Ryegrass (ARG)	Annual legume
Brassica (winter hardy)	Forage Radish
Triticale	Oats (winter hardy)
Rye (Ref. Species)	Annual Legume + Grass
Oats (winter killed)	Forage Radish + Grass

Cover Crop Planting Method	
Drill	Aerial
Broadcast	Other

Please contact Marcia Fox (302-739-9939) or Mark Dubin (###-###-####) with any questions en route or after. A list of survey team contact information may also be found on back.

LAND-USE KEY	
CODE	DESCRIPTION
AGRICULTURAL	
AFO	Animal feeding operations (barnyard)
PR	Pasture with riparian area (unfenced stream)
AP	All other pasture
ALF	Alfalfa (includes mixed with other seed combos)
GR	Grass (for hay)
AOC	All other crops (those not included in survey) (treefarm)
FCRP	Fallow and CRP
NON-AGRICULTURAL	
CM	Construction/mining
DI	Developed-impervious (over 30% impervious)
DP	Developed-pervious (under 30% impervious)
FOR	Forest (undisturbed)
FD	Forest- disturbed (more than one road or currently
WB	Water bodies

Don't forget to make notes... indicate (1) breaks in route, (2) route changes, (3) extended intervals to obtain observations or (4) other pertinent information on the line immediately following the most recent observation. Also make note on map of changes indicating reference point (ie. A-12 (page A, point 12) etc).





January – Progress meeting with EPA



March – Planning Meeting

Transect Data Collection Form 2002 Crop Year

Sample

Crop	No-till > 30% residue	Ridge-till > 30% residue	Mulch-till > 30% residue	Reduced-till 15-30% residue	Conv-till < 15% residue	Unknown	N/A
COYA	184.00Ac	111	1.26	25.36	2.86		
COYA	19,220Ac	2,200Ac	46,550Ac	52,100Ac	2,468Ac		
					6,370Ac		



May – App Development

February – Preliminary Partner Meeting

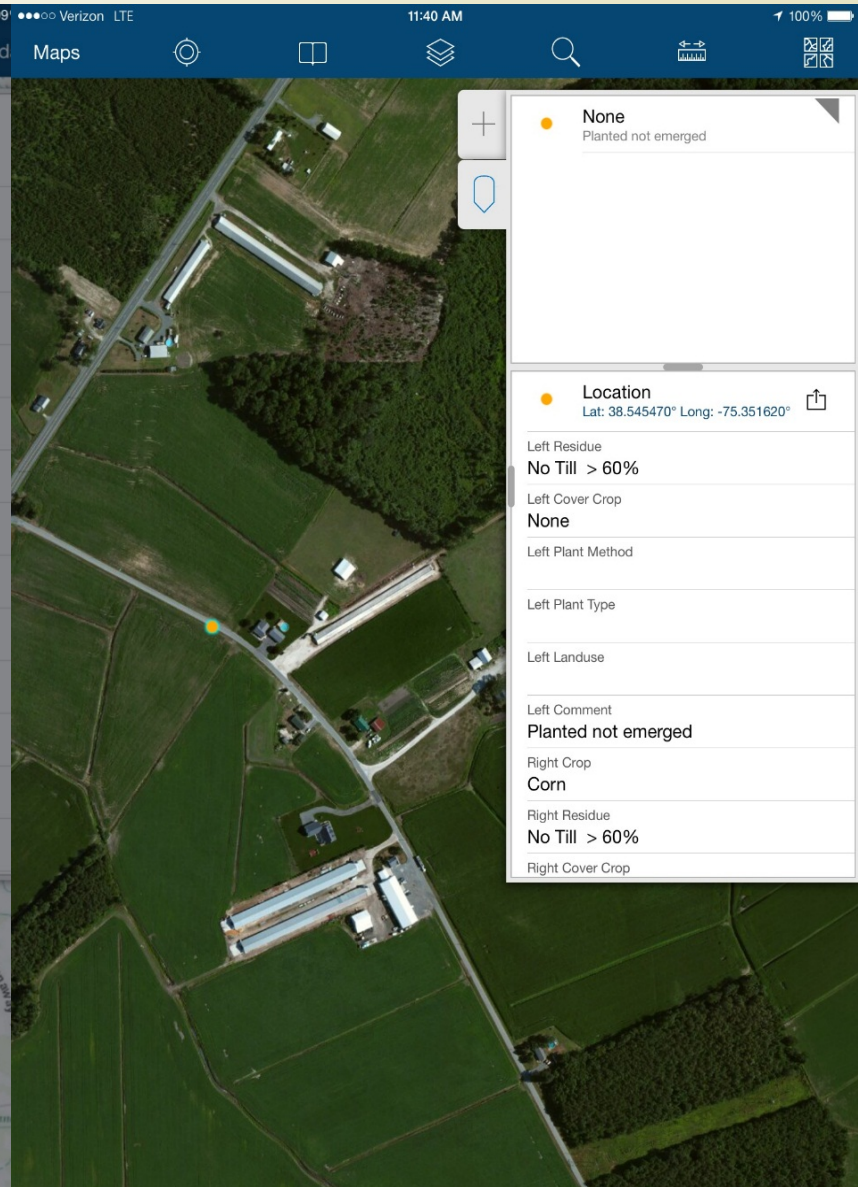
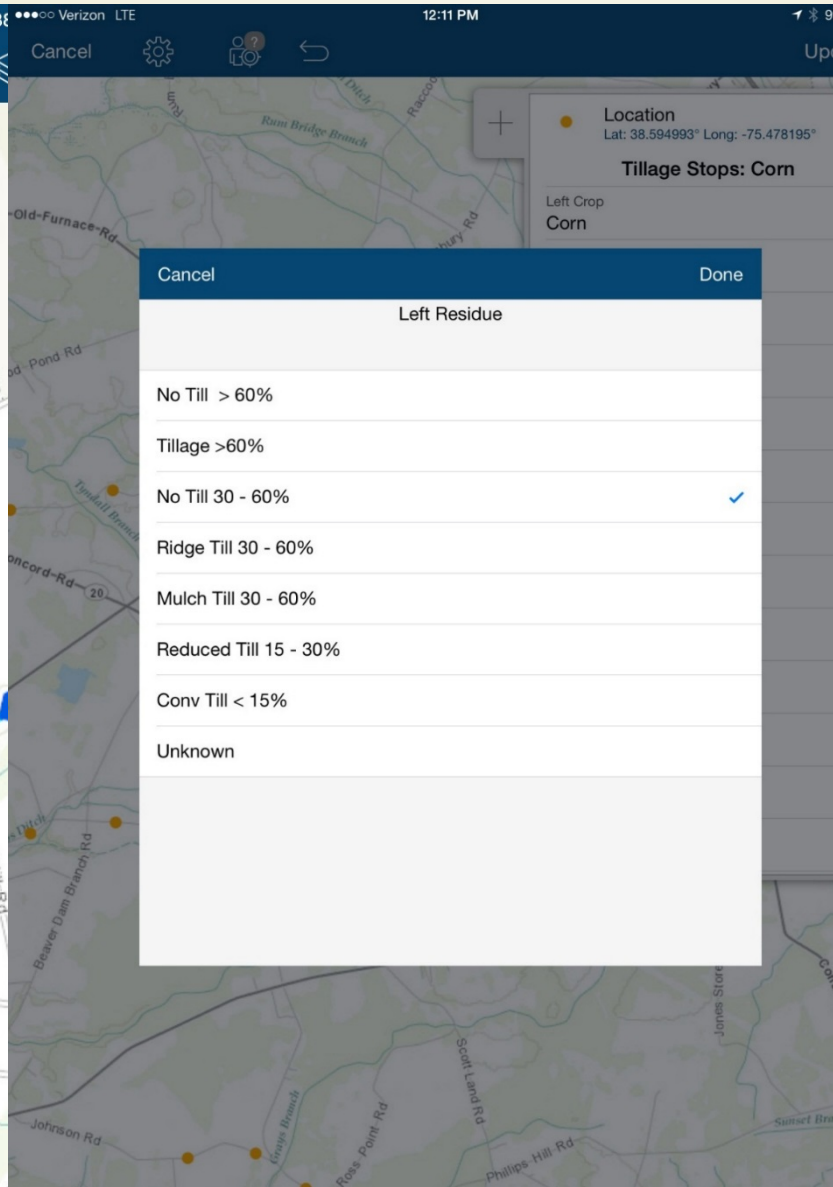
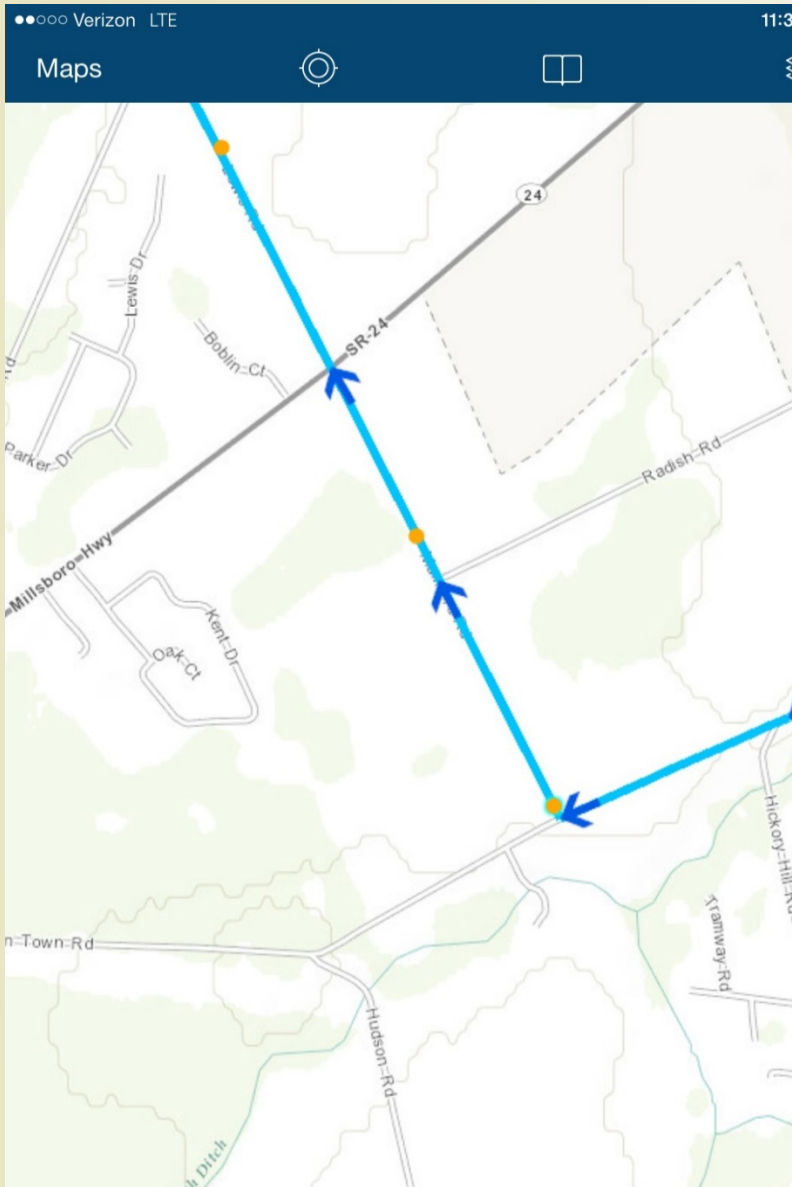


May – Group Training



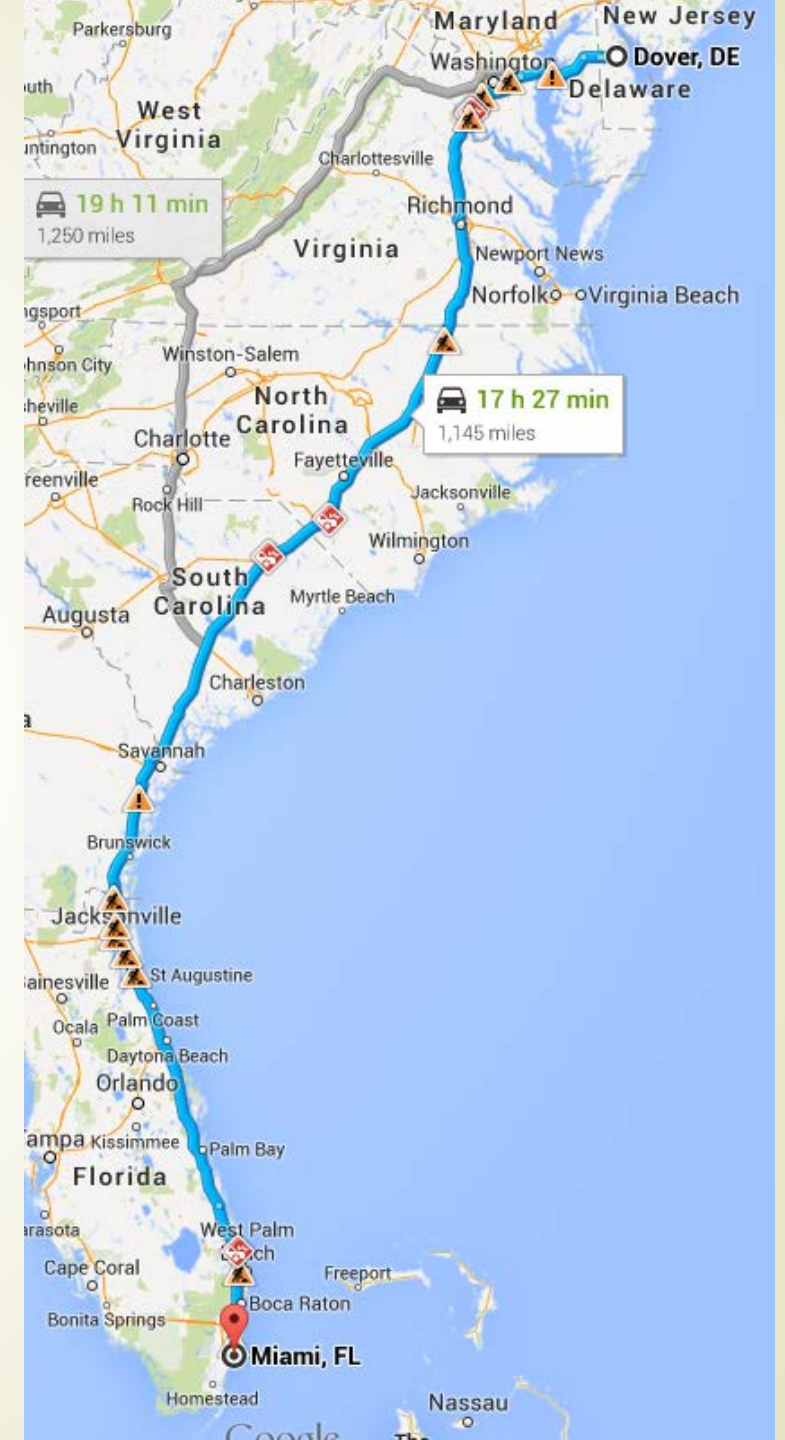
June – Survey Time!





Survey Stats

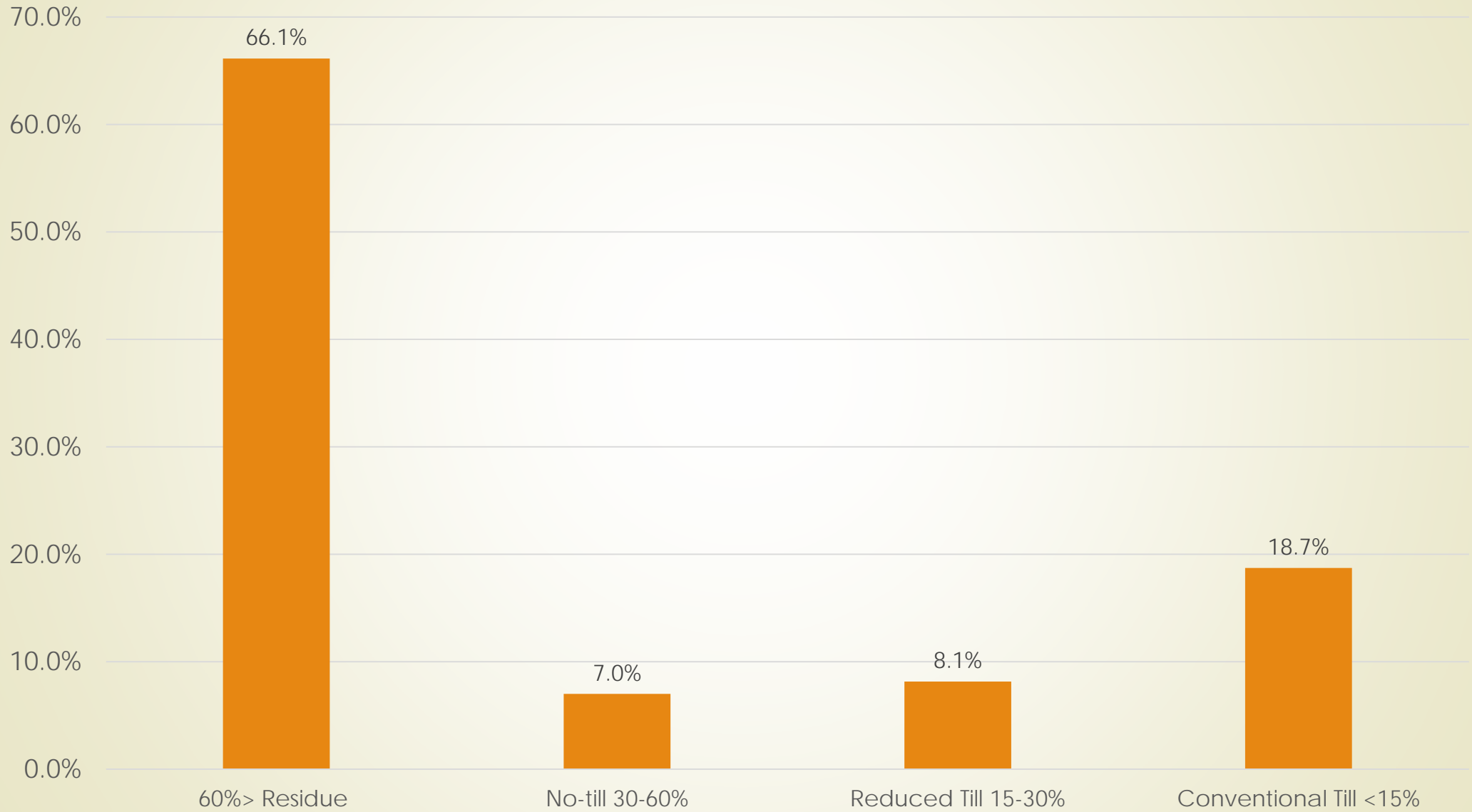
- ▶ Spent approximately 72 hours in the van over 6 days for the whole team (Observers & QA/QC)
- ▶ Drove 1,082 miles of strictly transect
 - ▶ Almost equivalent of driving from Dover, DE to Miami, FL
- ▶ Total of 1,974 vehicle stops



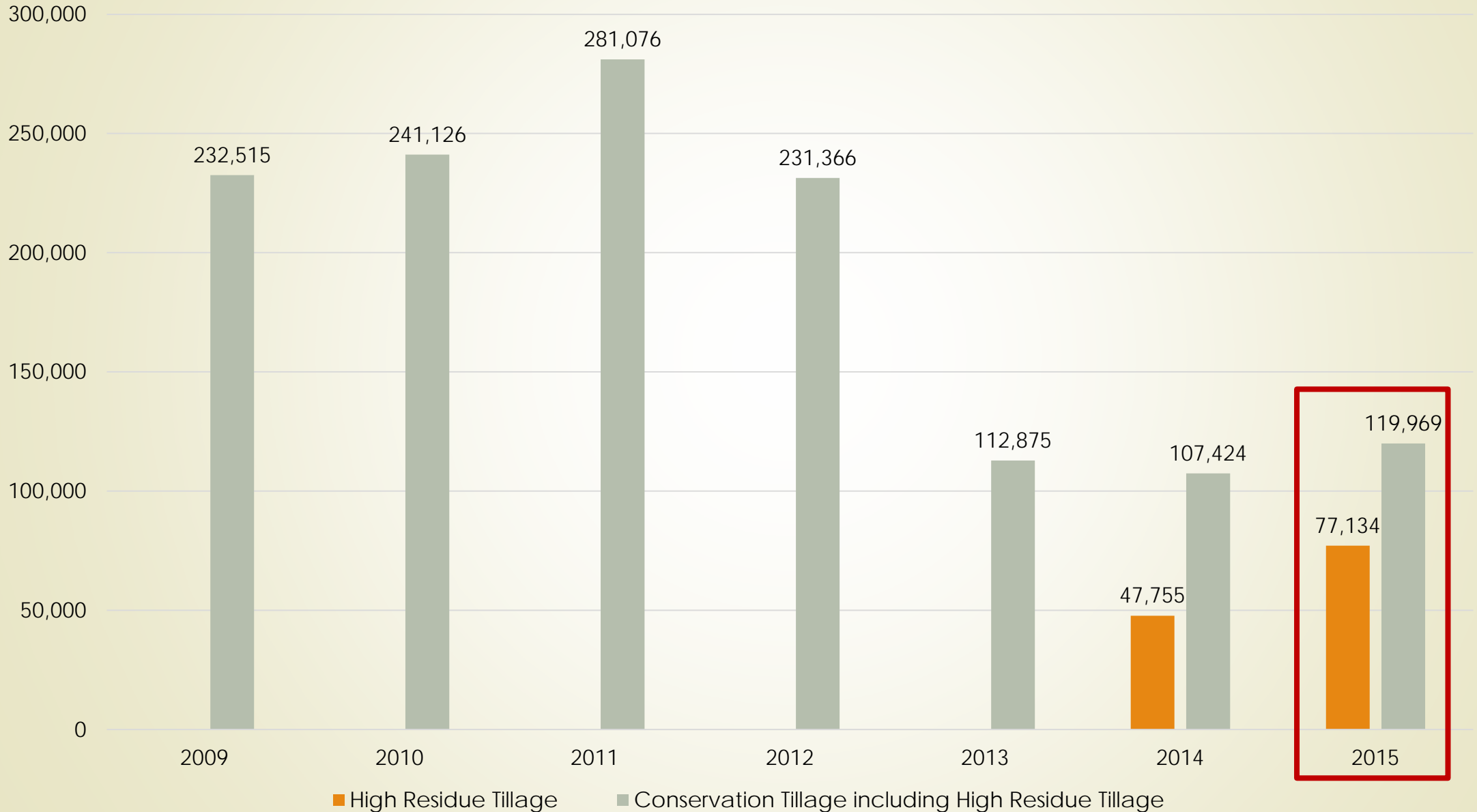




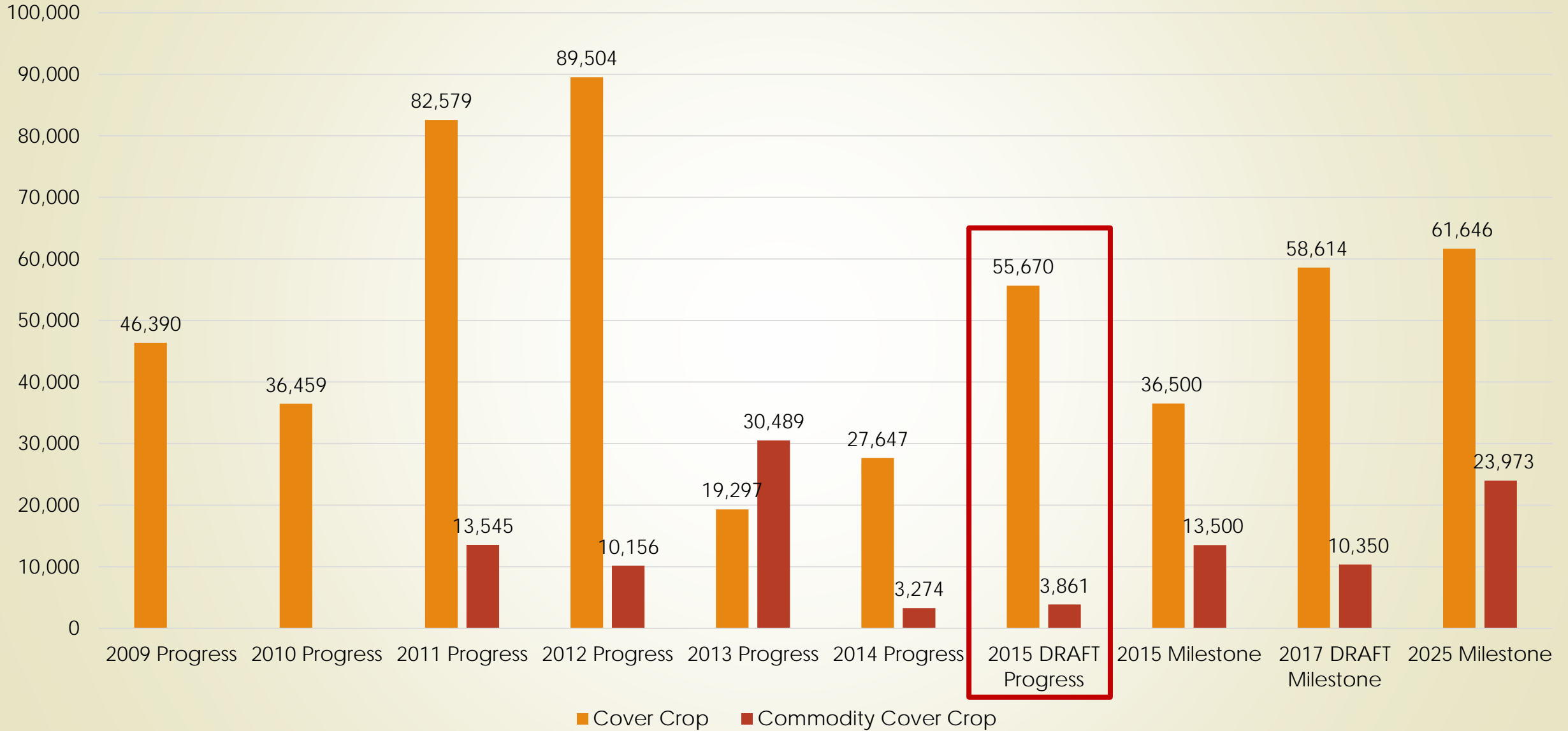
Statewide Observations



Credited Acres



Cover Crop Progress – Chesapeake Bay Watershed



Transect Survey Conclusions

- ▶ What does this all mean?
 - ▶ Many farmers are doing the right thing – not for the Bay or water quality but for their own benefit
 - ▶ Economics
 - ▶ Soil Health
 - ▶ We need to conduct annual surveys to capture on the ground changes
 - ▶ Data can be used to target programs for audiences (ie. vegetable growers or plain sect farmers)



For More Information, Please Contact:
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Tyler Monteith, Tyler.Monteith@state.de.us



Head Observers - Ben Coverdale (DDA) & Shawn Tingle (UD)

QA/QC Expert – Dr. Richard Taylor (UD)