



# North Carolina Geodetic Survey Update NCAFPM



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# Summary

- State and County Boundary Surveys
- New 2022 Datum(s)
- NCGS Unmanned Aircraft System
- High Water Mark Applications



# Project to Re-establish NC-SC State Line



**Completed!!!**

Line	NC-SC State Line Segments	Miles
A - B	Commissioners Rock to Indian Camp Mt.	10
B - C	Indian Camp Mt. to Block House	54
C - D	Block House to ...	67
D - E	Center line of ...	8
E - F	Lancaster to North Corner	30
F - G	North Corner to 1905 Marlboro County Break Point Monument	64
G - H	Marlboro County SE - NW Line	18
H - I	Dillon County Line	31
I - J	Horry County Line	42

Total 334 miles

## May 6, 2013 Status

- Re-established boundary approved by the NC-SC Joint Boundary Commission 82 miles
- Re-established boundary tentatively approved by the NC-SC Joint Boundary Commission 252 miles

# NC-SC Boundary Project

- 334-mile NC-SC boundary project complete
- Plats have been recorded in all border counties
- GIS Data is available from NCGS
  - [watson.ross@ncdps.gov](mailto:watson.ross@ncdps.gov)
- Beginning work on NC-VA Boundary
- County boundary surveys in progress



Source: WikimediaCommons



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# NCGS Cinema

<https://www.youtube.com/watch?v=EJXGpK1wQCs>



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# County Boundary Surveys

## Plats Recorded:

- Mitchell-Yancey
- Greene – Lenoir

## Reports Submitted to the Counties

- Alamance – Guilford
- Hoke – Robeson
- Cabarrus – Rowan
- McDowell – Mitchell
- Chatham – Harnett – Wake
- Union - Mecklenburg



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# County Boundary Surveys

## Survey in Progress

- Jackson – Macon
- Davie – Yadkin
- Bladen – Columbus – Brunswick
- Granville – Franklin
- Rutherford – Polk
- Chowan – Perquimans



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# North Carolina/Georgia boundary (a line defined by 2 survey teams that didn't meet)

- 1818 survey led by Mr. Hugh Montgomery

Proceeded east from Georgia's NW corner for 40 miles along what he thought was the 35th parallel until a point near Pine Knob where he set the "Montgomery's Corner" monument, but was 4,813 ft south of the 35th parallel

- 1819 survey led by Mr. Love of North Carolina and Mr. Terrell of Georgia

Proceeded west from the terminus of the 1815 survey (i.e. Commissioners Rock) for 30 miles where they set the 30 mile stone, which was 1,983 ft north of Montgomery's Corner.

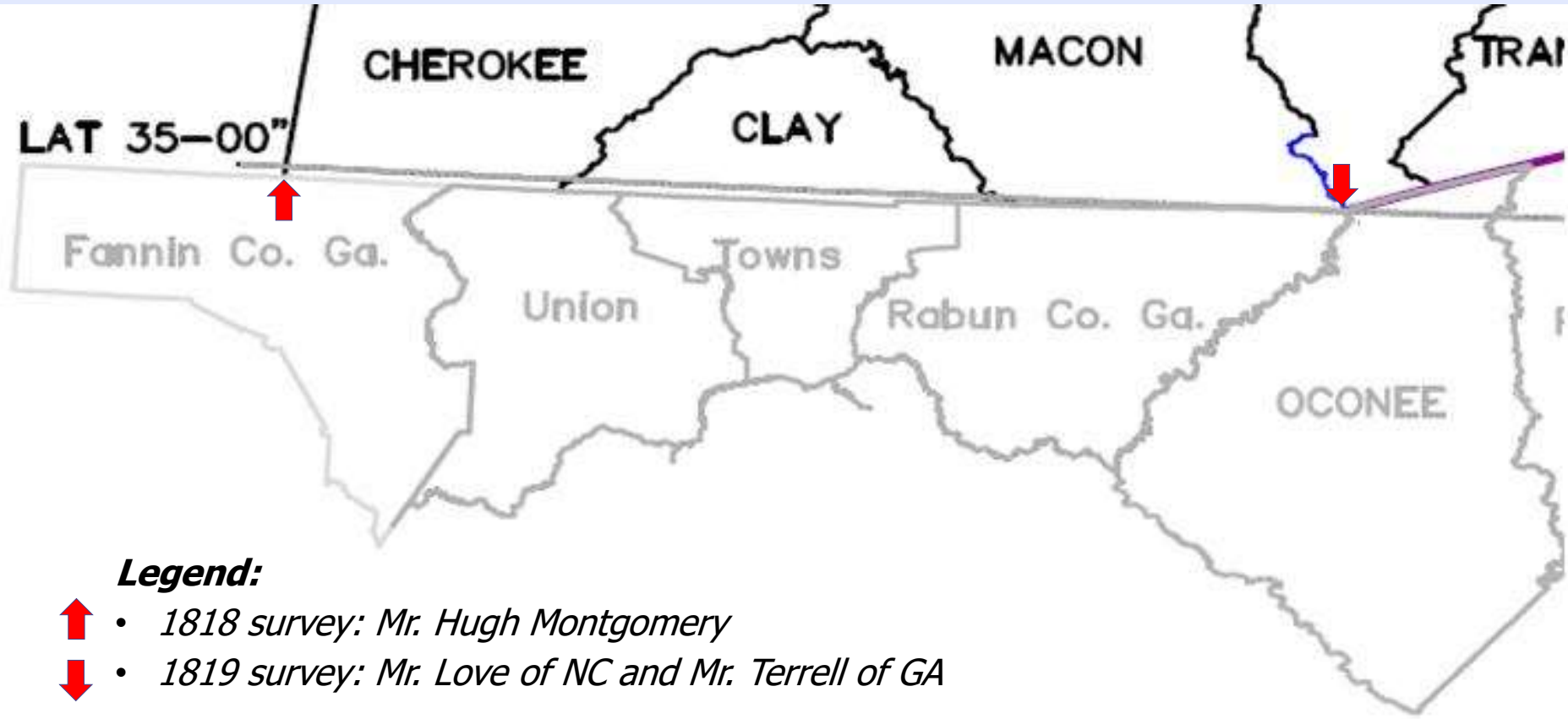


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# How did North Carolina get its shape?



**Legend:**

- ↑ • 1818 survey: Mr. Hugh Montgomery
- ↓ • 1819 survey: Mr. Love of NC and Mr. Terrell of GA



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Round Top Mt ▲

Pine Knob ▲

35th parallel

Monument set by Love & Terrell

Montgomery's Corner

© 2011 Google

Hightower Bald ▲



Imagery Date: Jun 18, 2008

34°59'31.02" N 83°37'10.79" W elev 3524 ft

©2010 Google

Eye alt

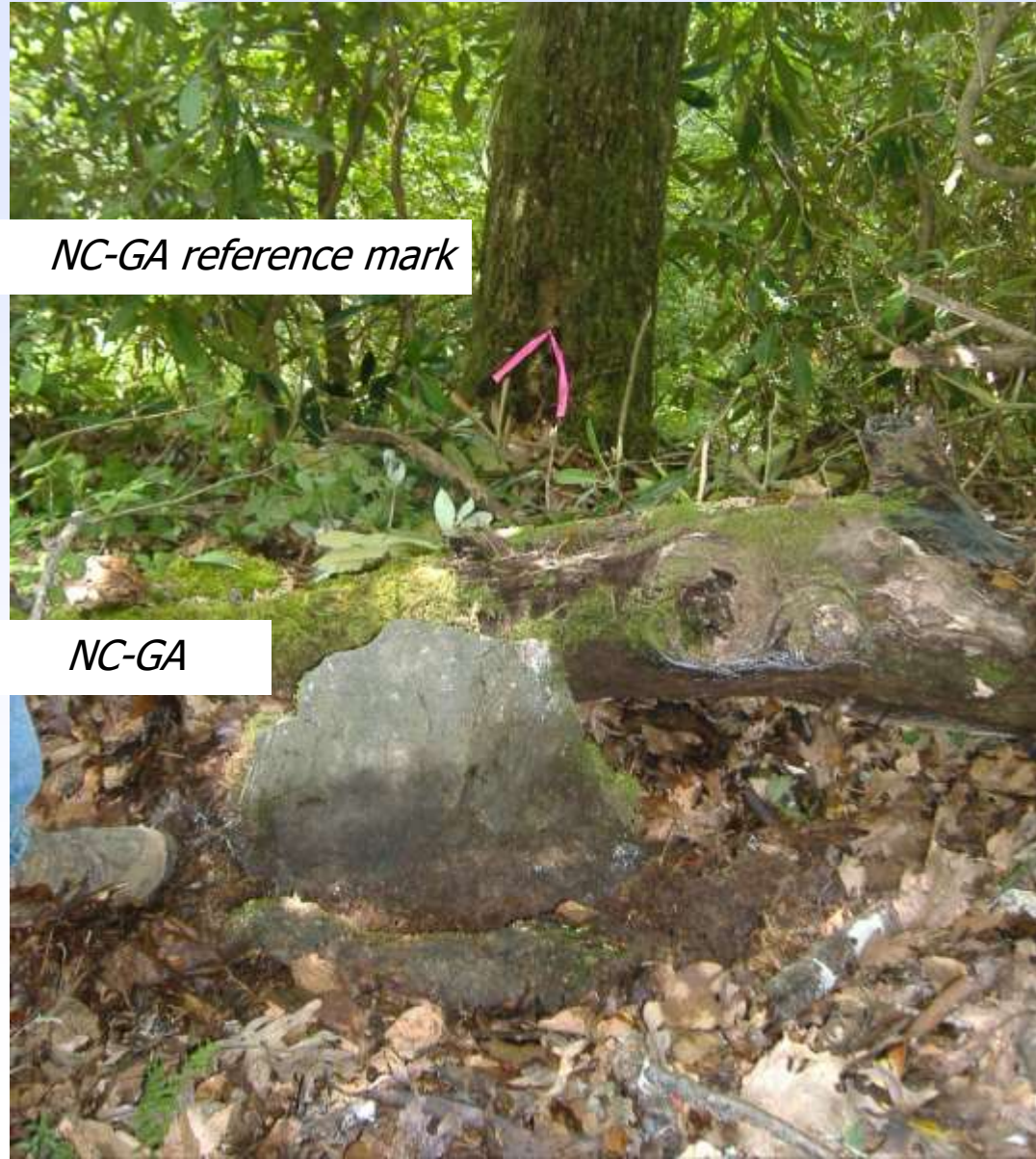




1819 Survey Monument



# 1818 Survey Monument



*NC-GA reference mark*

*NC-GA*

# NC - GA Stone

Set at the 16-mile mark on the 1819 (Love & Tyrrell) survey.





34 59 46.56108N 83 17 48.77496W

© 2014 Google

Google earth

N  
DEF





© 2014 Google

© 2014 Google

Google earth

DE





# New Datums Are Coming in 2022!

- Created a 2022 Datum Working Group to develop implementation recommendations
- Partnering with UNCC on an NSF grant proposal to purchase an absolute and relative gravity meter
- Working with SC Geodetic Survey to develop common implementation plans
- Obtaining precise ellipsoidal heights on NAVD88 bench marks
- [gary.thompson@ncdps.gov](mailto:gary.thompson@ncdps.gov)

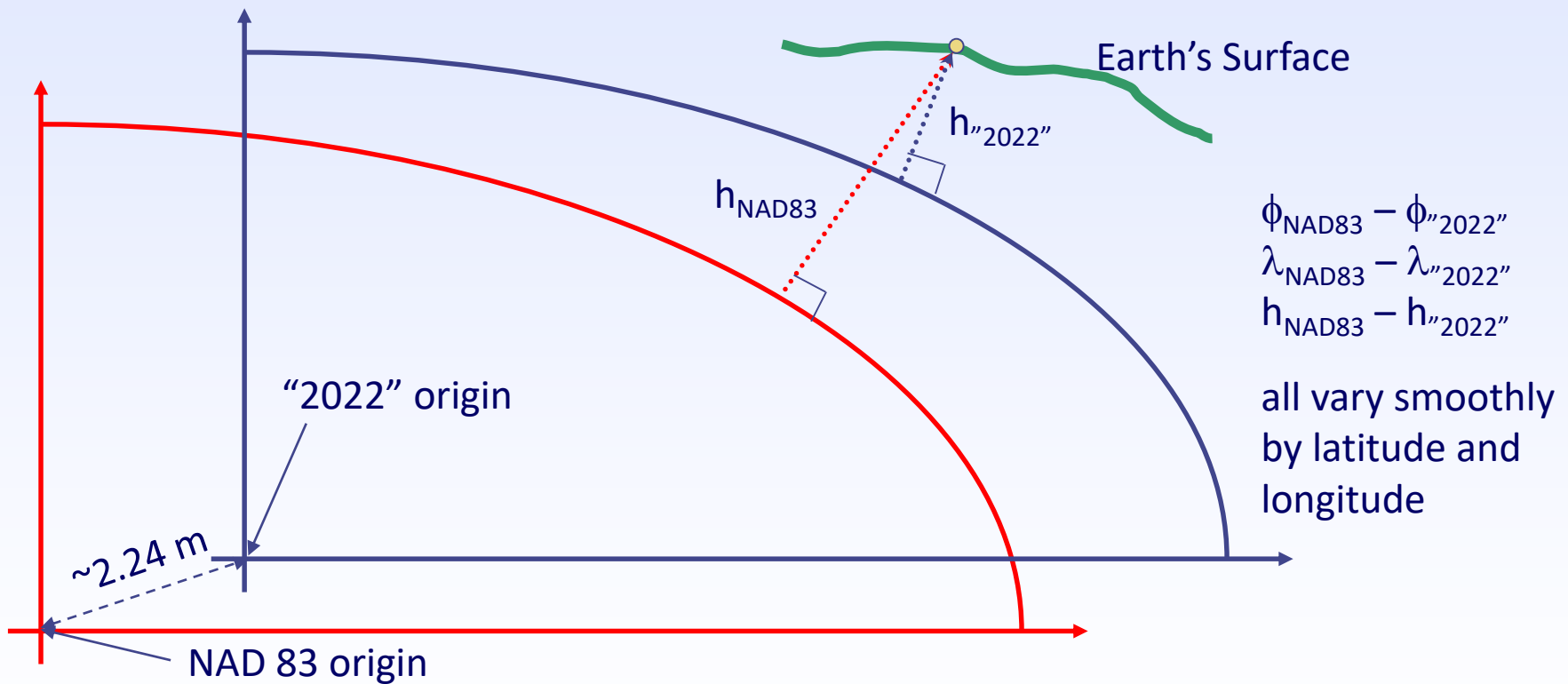


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# Replace NAD 83

## Simplified concept of NAD 83 vs. "2022"



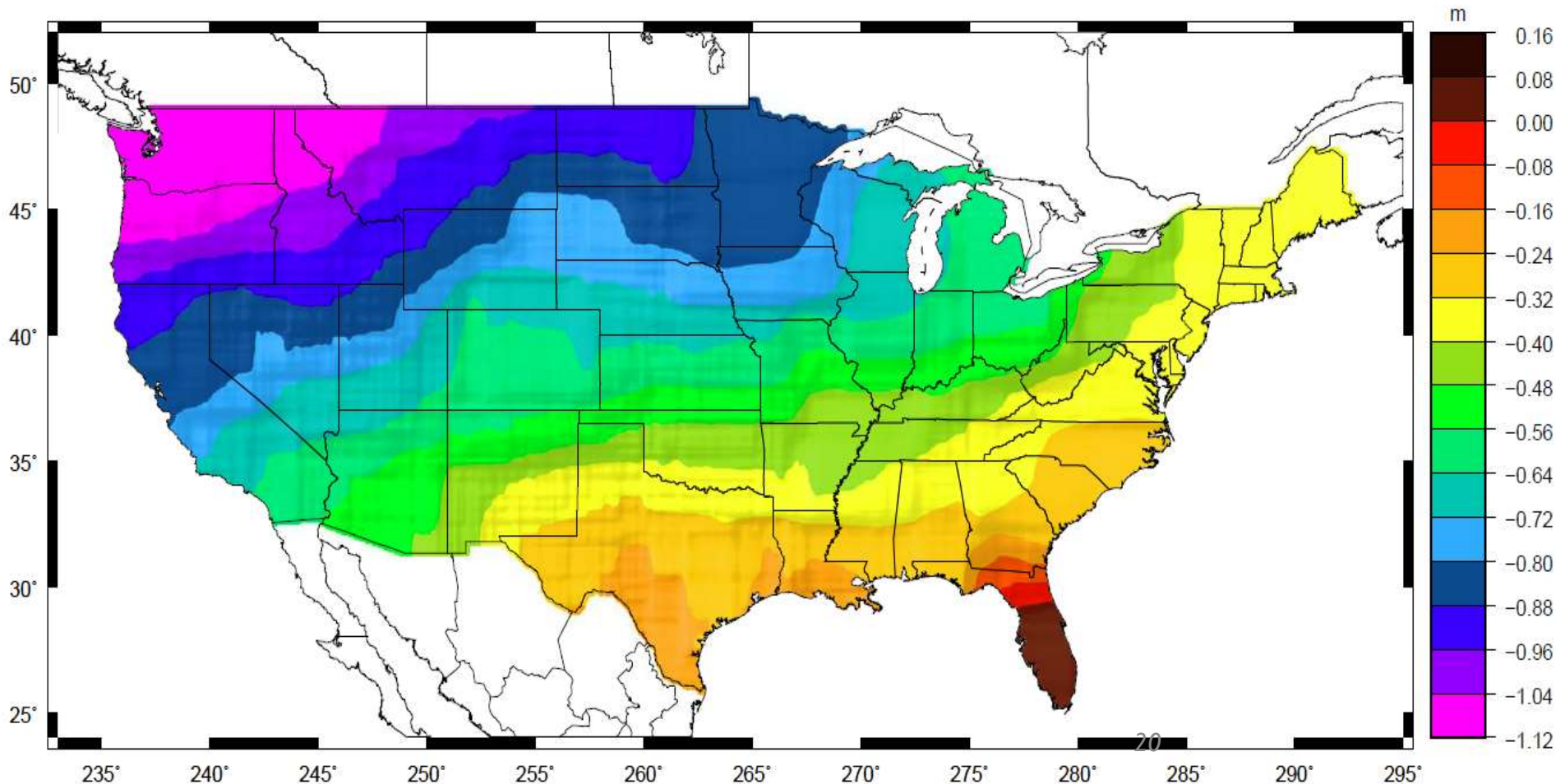
# New Reference Frame Names

- NAD 83 becomes:
  - North American Terrestrial Reference Frame (NATR2022)
  - Caribbean Terrestrial Reference Frame (CTRF2022)
  - Mariana Terrestrial Reference Frame (MTRF2022)
  - Pacific Terrestrial Reference Frame (PTRF2022)
- NAVD88 becomes:
  - North American-Pacific Geopotential Datum of 2022 (NAPGD2022)
- Realized by GEOID2022



# Orthometric Heights

- Approximate expected shift
- Does not include local subsidence issues



# Unmanned Aircraft Systems (UAS)

- Four UAVs
- Eight Pilots
- [curt.johnson@ncdps.gov](mailto:curt.johnson@ncdps.gov)



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# Unmanned Aircraft Systems (UAS)

- Next Generation Air Transport (NGAC)
  - Performing test flights at Lake Wheeler
- NC A & T State University (School of Technology/Geomatics)
  - Performing test flights at the NC A & T State University farm
  - Determine the accuracy of imagery collected with a UAV
- NC Forest Service (DuPont State Forest)
  - MOA signed
  - Site will be used for multi-rotor test flights
- Public Safety Blanket COA approved by FAA
  - Performed operational flights to support:
    - Hurricane Matthew
    - Western NC forest fires



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# Hurricane Matthew Unmanned Aircraft Vehicle (UAV) Imagery



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# NC UAS Regulations

UAS operator to pass a test covering the following NC General Statutes:

- Chapter 63 – Aeronautics
  - §63-95 Training required for operations of UAS
  - §63-96 License required for commercial operation of UAS
- Chapter 15A – Criminal Procedure
  - §15A-300.1 Restrictions on use of UAS
  - §15A-300.2 Regulation of launch and recovery sites
- Chapter 14 – Criminal Law
  - §14-7.45 Crimes committed by use of UAS
  - §14.280.3 Interference with manned aircraft by UAS
  - §14.401.24 Unlawful possession and use of UAS (Weapon attached)
  - §14.401.25 Unlawful distribution of images
- Chapter 113 – Conservation and Development
  - §113-295 Unlawful harassment of persons taking wildlife resources



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# Benefits of a High Water Mark (HWM)

- Are the best resource to document a flood event
- HWM information can be used in a variety of mitigation and planning efforts
- HWM data is perishable and time of the essence



# HWM Documentation

- Type of mark – e.g. mud line, seed line
- Location of mark – lat/long, distance from a well-defined point
- Type of flagging used e.g. nail through bottle cap
- Quality of the mark
- Miscellaneous important notes
  - Landowner contact info
  - Logistics/safety information
- Noting mark location on a map/site sketch is helpful
- Date stamped digital photo of marks is helpful

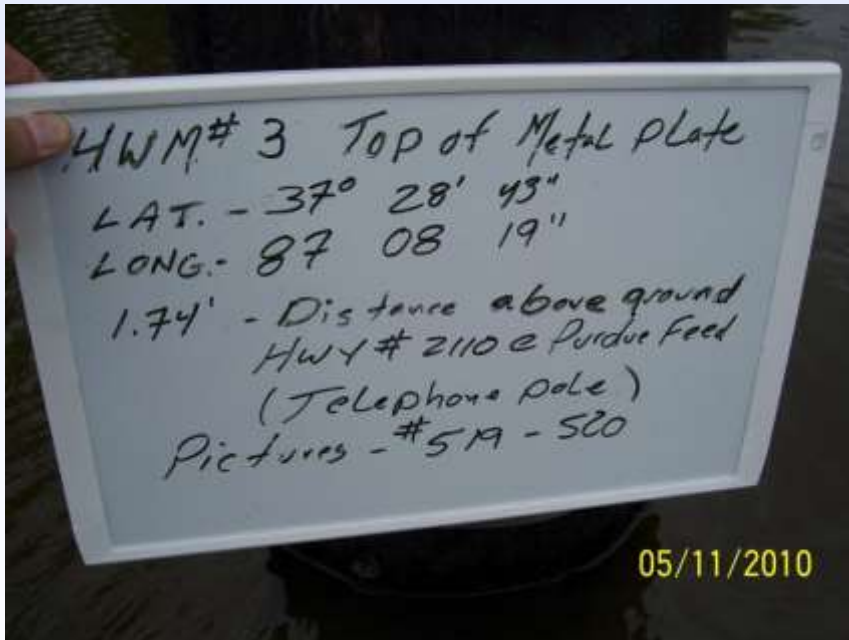


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# Get at least 2 pictures of each HWMK

- One up close with description visible
- One with background in frame





# High Water Mark (HWM) Photo Application: <http://arcg.is/1vurCX>

## High Water Mark Location

Please Mark the location of the building or object that exhibits a high water mark from flooding. Search for your location by using the buttons provided below, or use the zoom and pan tools to move the map to your exact location. Attach a photo to help surveyors locate the mark.


### 1. Enter Information

Name of Collector

Photo Type

High Water Mark

Notes (<150 char)

 Attach a photo of the high water mark

Select File

# High Water Mark (HWM) Photo Application: <http://arcg.is/1vurCX>

## 2. Select Location

Please select a location for your submission.

Specify the location for this entry by clicking/tapping the map or by using one of the following options.

Search


Lat/Lon

Latitude (Y)

35.32991

Longitude (X)

-78.93490

 Set Location



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<http://arcg.is/1vurCX>

Latitude: 33.12172, Longitude: -80.59340



### 3. Complete Form

Add this information to the map.

Submit High Water Mark location

View Submissions

# NCFMP Contact Information

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