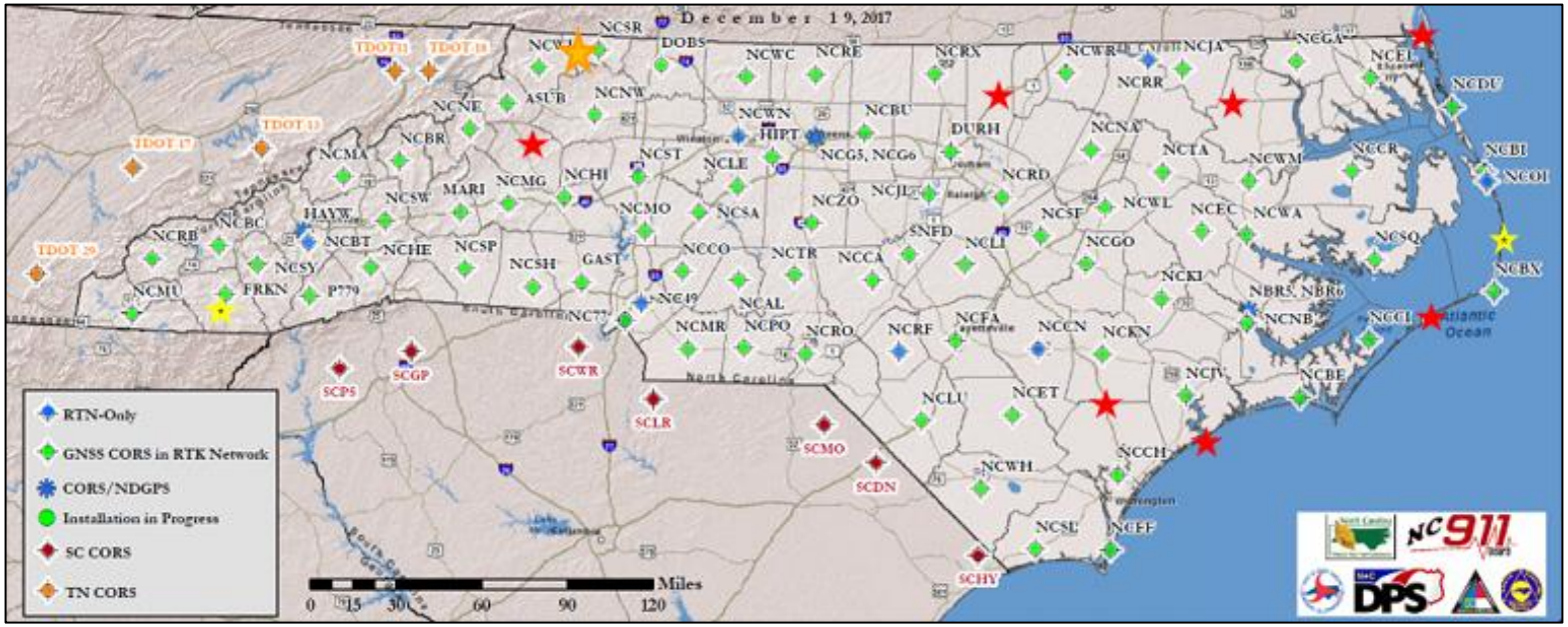
North Carolina Geodetic Survey (NCGS): Positioning NC today and for the future!

State Mapping Advisory Committee
January 11, 2023

Geodetic Control

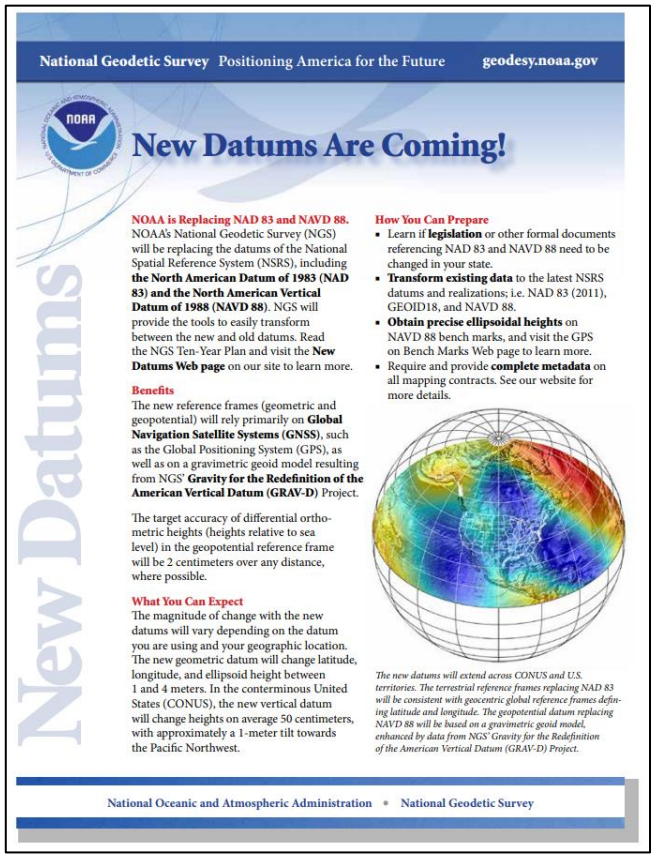
North Carolina (NC) Continuously Operating Reference Station (CORS) Network



Future CORS location = ★
CORS installed = ★
Earthquake CORS = ★

New CORS in Sparta

New Datums are Coming!
2024- 2025



National Geodetic Survey Positioning America for the Future geodesy.noaa.gov

New Datums Are Coming!

New Datums

NOAA is Replacing NAD 83 and NAVD 88. NOAA's National Geodetic Survey (NGS) will be replacing the datums of the National Spatial Reference System (NSRS), including **the North American Datum of 1983 (NAD 83) and the North American Vertical Datum of 1988 (NAVD 88)**. NGS will provide the tools to easily transform between the new and old datums. Read the NGS Ten-Year Plan and visit the **New Datums Web page** on our site to learn more.

Benefits

The new reference frames (geometric and geopotential) will rely primarily on **Global Navigation Satellite Systems (GNSS)**, such as the Global Positioning System (GPS), as well as on a gravimetric geoid model resulting from NGS' **Gravity for the Redefinition of the American Vertical Datum (GRAV-D)** Project.

The target accuracy of differential orthometric heights (heights relative to sea level) in the geopotential reference frame will be 2 centimeters over any distance, where possible.

What You Can Expect

The magnitude of change with the new datums will vary depending on the datum you are using and your geographic location. The new geometric datum will change latitude, longitude, and ellipsoid height between 1 and 4 meters. In the conterminous United States (CONUS), the new vertical datum will change heights on average 50 centimeters, with approximately a 1-meter tilt towards the Pacific Northwest.

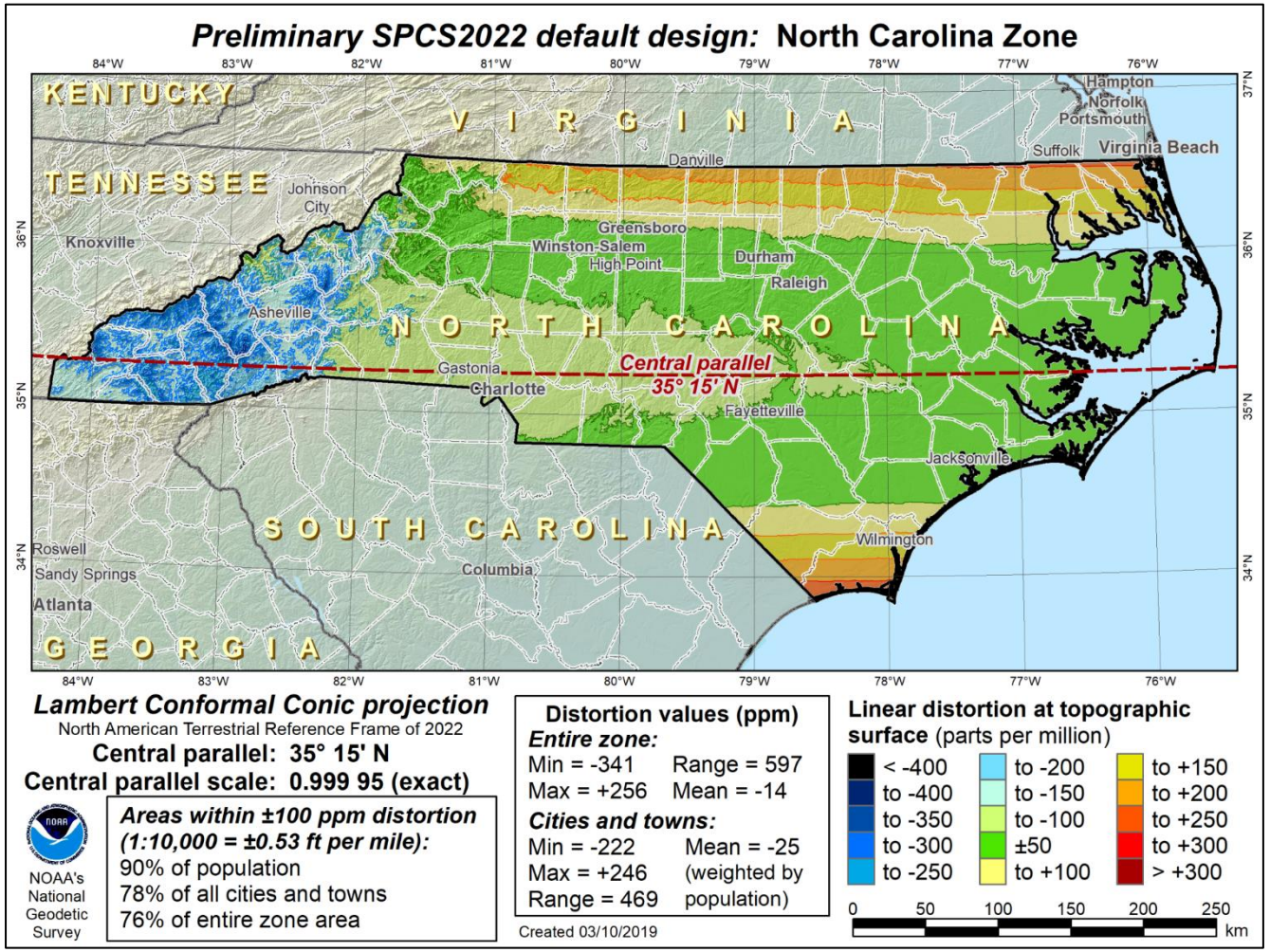
How You Can Prepare

- Learn if **legislation** or other formal documents referencing NAD 83 and NAVD 88 need to be changed in your state.
- **Transform existing data** to the latest NSRS datums and realizations; i.e. NAD 83 (2011), GEOID18, and NAVD 88.
- **Obtain precise ellipsoidal heights** on NAVD 88 bench marks, and visit the GPS on Bench Marks Web page to learn more.
- Require and provide **complete metadata** on all mapping contracts. See our website for more details.

The new datums will extend across CONUS and U.S. territories. The terrestrial reference frames replacing NAD 83 will be consistent with geocentric global reference frames defining latitude and longitude. The geopotential datum replacing NAVD 88 will be based on a gravimetric geoid model, enhanced by data from NGS' Gravity for the Redefinition of the American Vertical Datum (GRAV-D) Project.

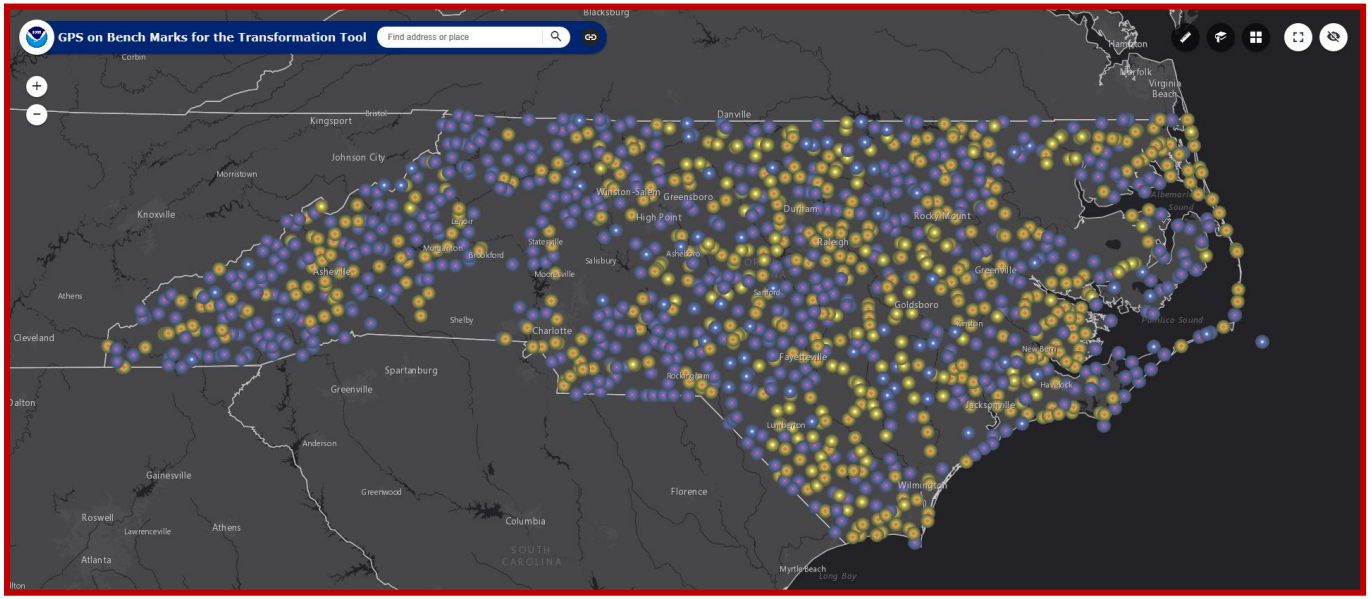
National Oceanic and Atmospheric Administration • National Geodetic Survey

Draft revisions to North Carolina General Statute 102 is being developed


Preliminary SPCS2022 default design: North Carolina Zone
KENTUCKY
VIRGINIA
TENNESSEE
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
Hampton
Norfolk
Portsmouth
Suffolk
Virginia Beach
Danville
Johnson City
Knoxville
Greensboro
Winston-Salem
High Point
Durham
Raleigh
Asheville
Gastonia
Charlotte
Central parallel
35° 15' N
Fayetteville
Jacksonville
Wilmington
Roswell
Sandy Springs
Atlanta
Columbia
84°W
83°W
82°W
81°W
80°W
79°W
78°W
77°W
76°W
37°N
36°N
35°N
34°N
Lambert Conformal Conic projection
North American Terrestrial Reference Frame of 2022
Central parallel: 35° 15' N
Central parallel scale: 0.999 95 (exact)
NOAA's National Geodetic Survey
Areas within ±100 ppm distortion (1:10,000 = ±0.53 ft per mile):
90% of population
78% of all cities and towns
76% of entire zone area
Distortion values (ppm)
Entire zone:
Min = -341 Range = 597
Max = +256 Mean = -14
Cities and towns:
Min = -222 Mean = -25
Max = +246 (weighted by
Range = 469 population)
Created 03/10/2019
Linear distortion at topographic surface (parts per million)
< -400
to -400
to -350
to -300
to -250
to -200
to -150
to -100
±50
to +100
to +150
to +200
to +250
to +300
> +300
0 50 100 150 200 250 km

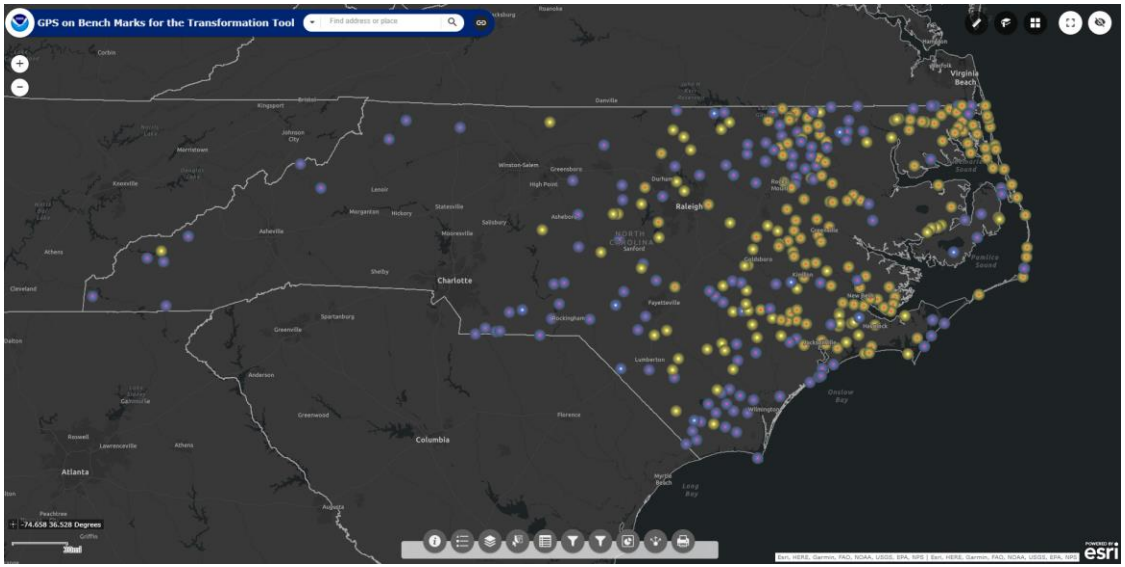
National Geodetic Survey Global Positioning System (GPS) on Bench Marks 2020

- 2020
  - NGS has prepared a list of geodetic monuments that we review for possible GNSS data collection



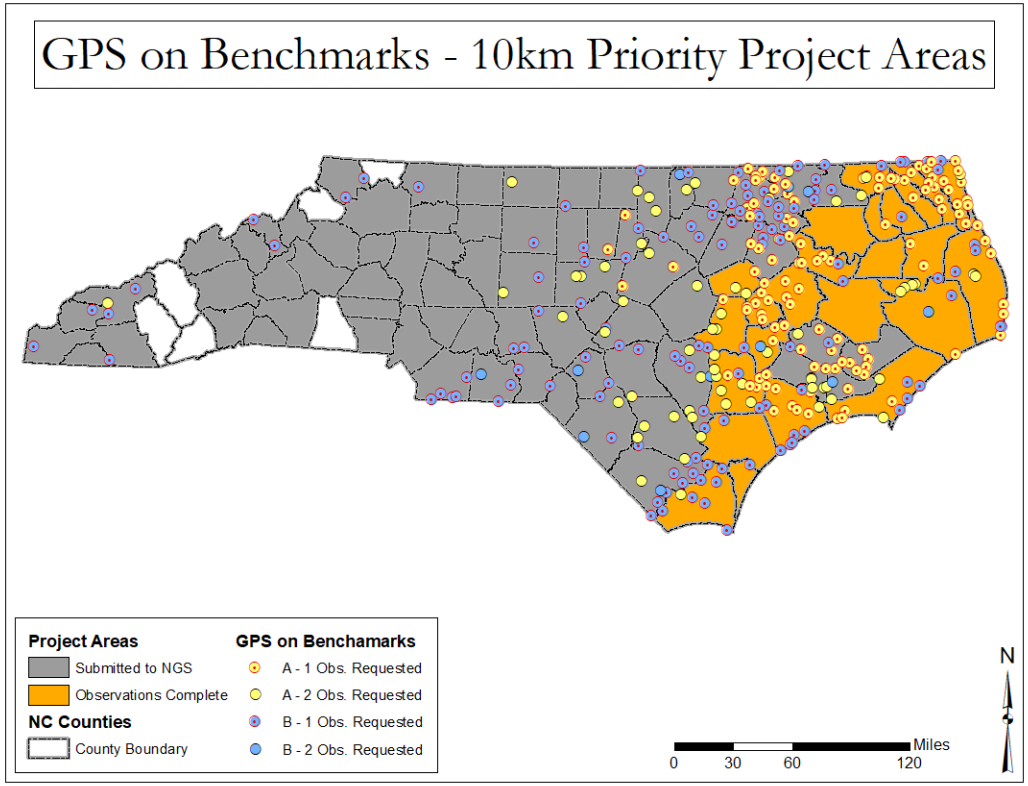
National Geodetic Survey GPS on Bench Marks

- Status of 12/31/2022



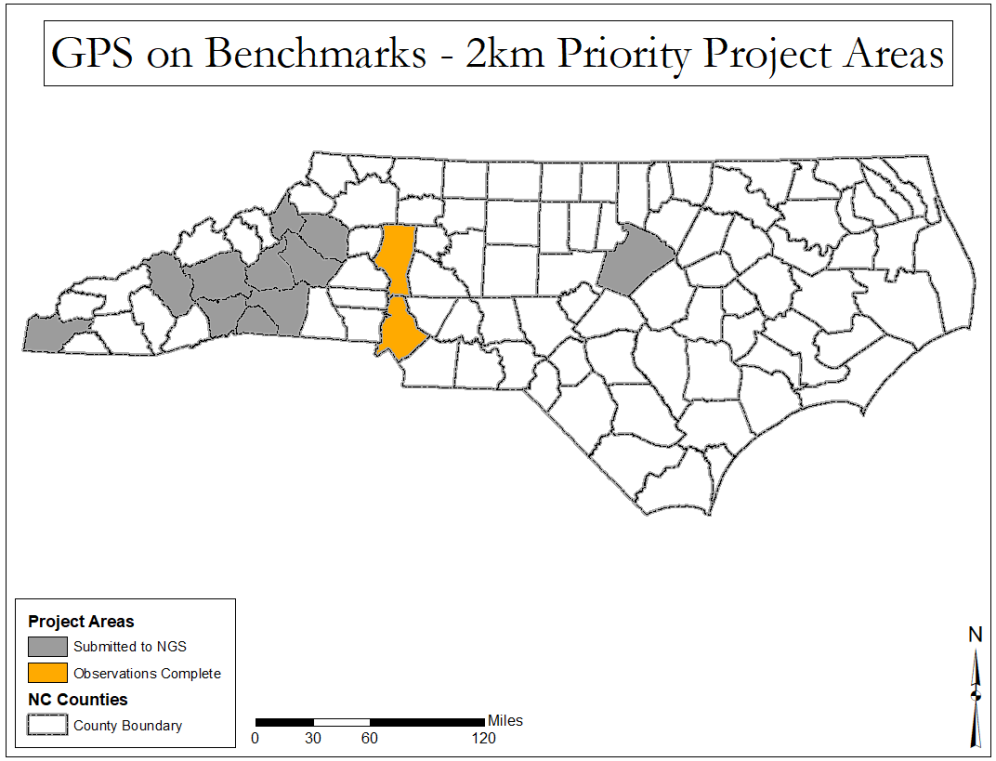
National Geodetic Survey GPS on Bench Marks

- Projects in progress

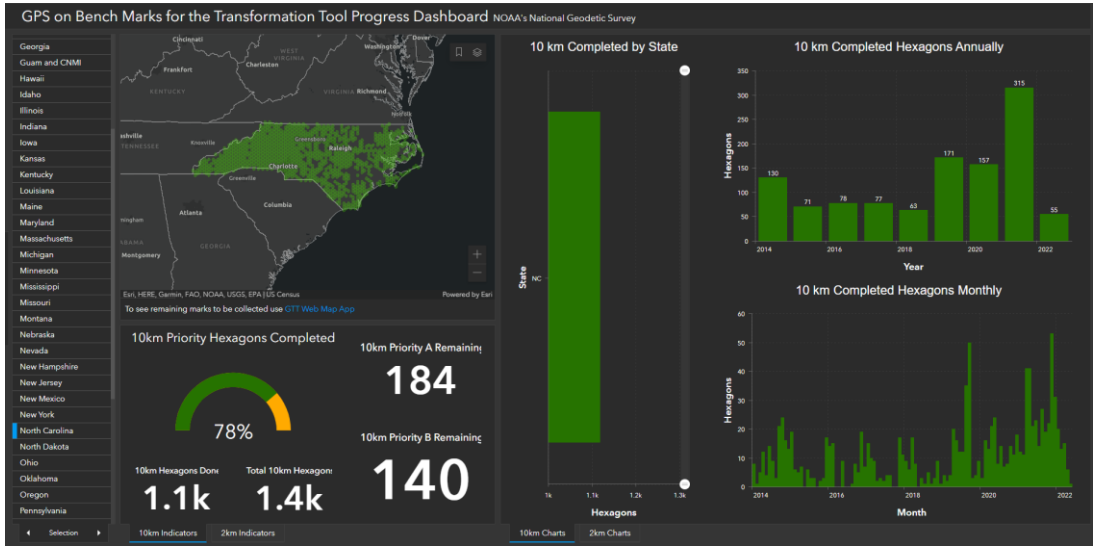


National Geodetic Survey GPS on Bench Marks

- Projects in progress



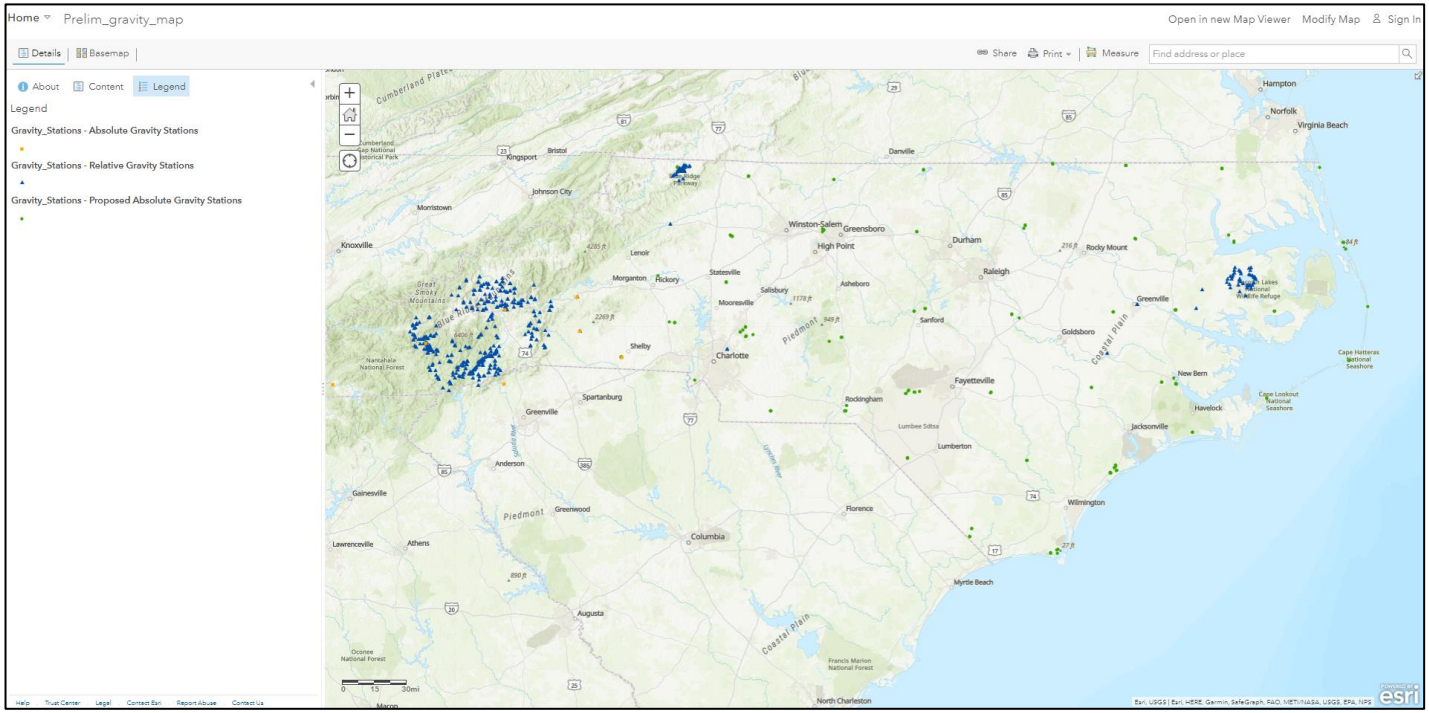
North Carolina's Progress Dashboard



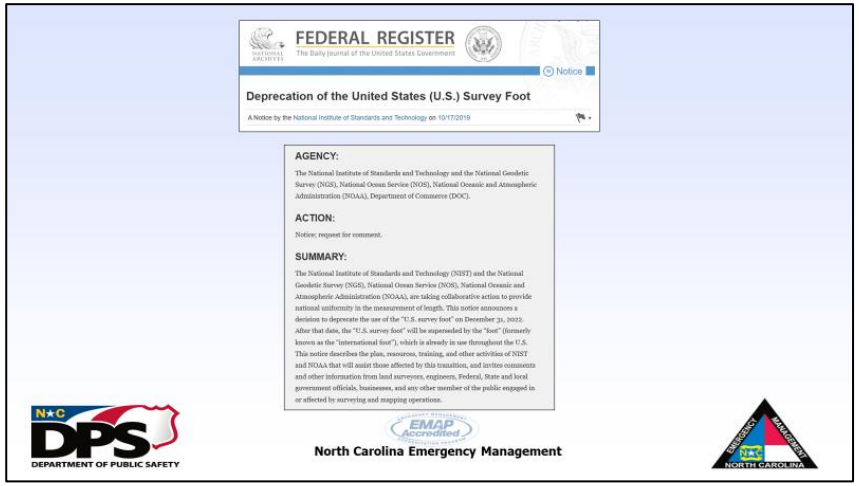
10km Priority A Remaining
24
10 Km Priority B Remaining
140 (100 in progress)

*** NOTICE: NGS has extended the December 31, 2022, cut-off date for GPS on Bench Mark submissions! The new cut-off date to submit GPS on Bench Mark data for use in the 2022 Transformation Tool is now September 30, 2023. ***

Gravity Data Collection



United States (U.S.) Survey Foot



FEDERAL REGISTER
The Daily Journal of the United States Government

Notice

Deprecation of the United States (U.S.) Survey Foot

A Notice by the National Institute of Standards and Technology on 10/17/2019

AGENCY:

The National Institute of Standards and Technology and the National Geodetic Survey (NGS), National Ocean Service (NOS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce (DOC).

ACTION:

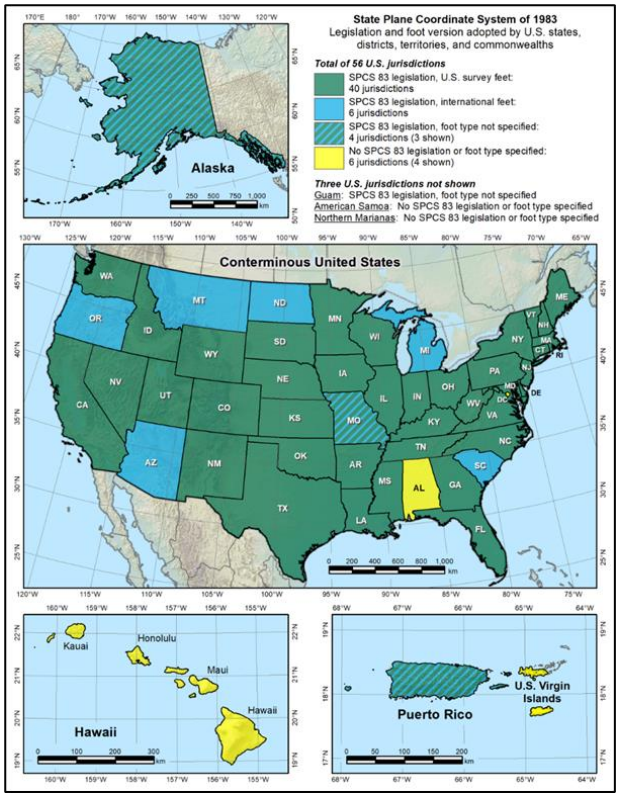
Notice; request for comment.

SUMMARY:

The National Institute of Standards and Technology (NIST) and the National Geodetic Survey (NGS), National Ocean Service (NOS), National Oceanic and Atmospheric Administration (NOAA), are taking collaborative action to provide national uniformity in the measurement of length. This notice announces a decision to deprecate the use of the "U.S. survey foot" on December 31, 2022. After that date, the "U.S. survey foot" will be superseded by the "foot" (formerly known as the "international foot"), which is already in use throughout the U.S. This notice describes the plan, resources, training, and other activities of NIST and NOAA that will assist those affected by this transition, and invites comments and other information from land surveyors, engineers, Federal, State and local government officials, businesses, and any other member of the public engaged in or affected by surveying and mapping operations.

DEPARTMENT OF PUBLIC SAFETY

North Carolina Emergency Management



Preparing U.S. Survey Foot press release