

A brown-toned topographic map of a coastal region, likely Assateague Island, serves as the background. The map features contour lines and a coastline. A solid black horizontal bar is positioned at the top of the slide.

Enabling GPS Users in our National Parks

Neil Winn
GIS Specialist
National Park Service
Assateague Island National Seashore/
Resource Information Services Division

Our Mission

"....to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

1916 NPS Organic Act



Presentation Overview

- Reliance on GPS/GNSS
 - Increasingly Simple Data Collection
- Connecting data between users
- Managing position accuracy

Mount Rainier National Park - Washington



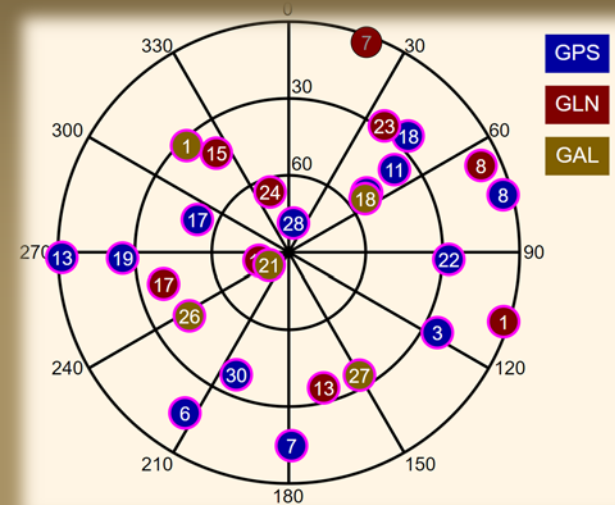
Reliance on GPS/GNSS



Acadia National Park - Maine

Simplified Data Collection

Death Valley National Park (Devil's Hole) - Nevada



18.09.20T11:44:14Z (UTC)

Jean Lafitte National Historical Park and Preserve - Louisiana



Simplified Data Collection



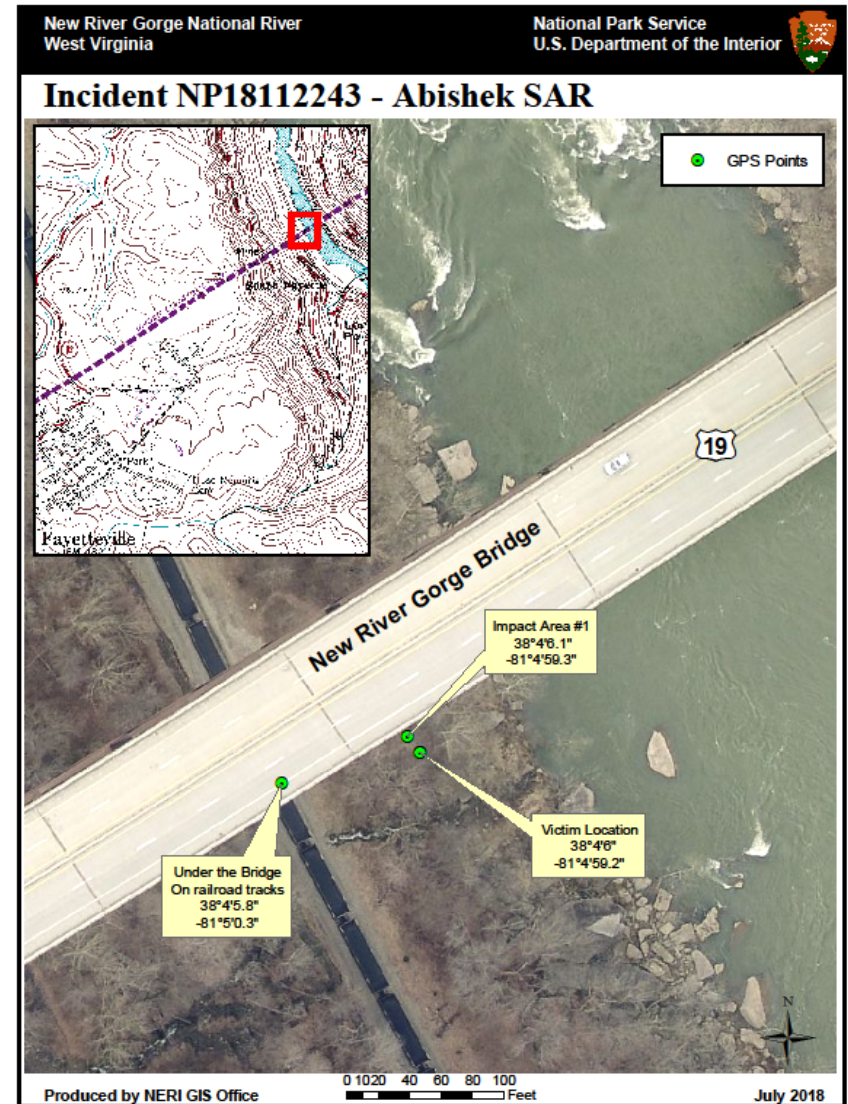
New River Gorge National River – West Virginia



Simplified Data Collection

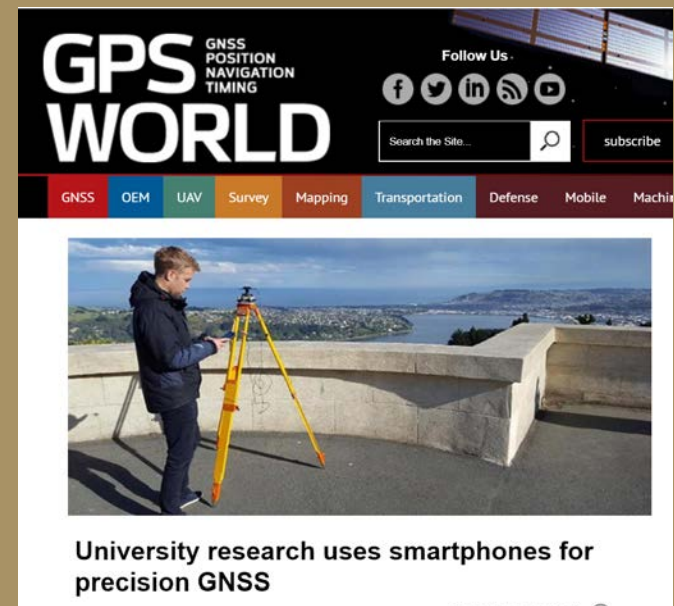


New River Gorge National River – West Virginia



Equipment Acquisition Change

- 2012 – Decimeter precision = \$11,200
- 2016 – Decimeter precision = \$1,500-\$7,500
- 2018 – US DOI credit card purchase limit increase from \$3,500-\$10,000



Data Connectivity – Field Data Collection



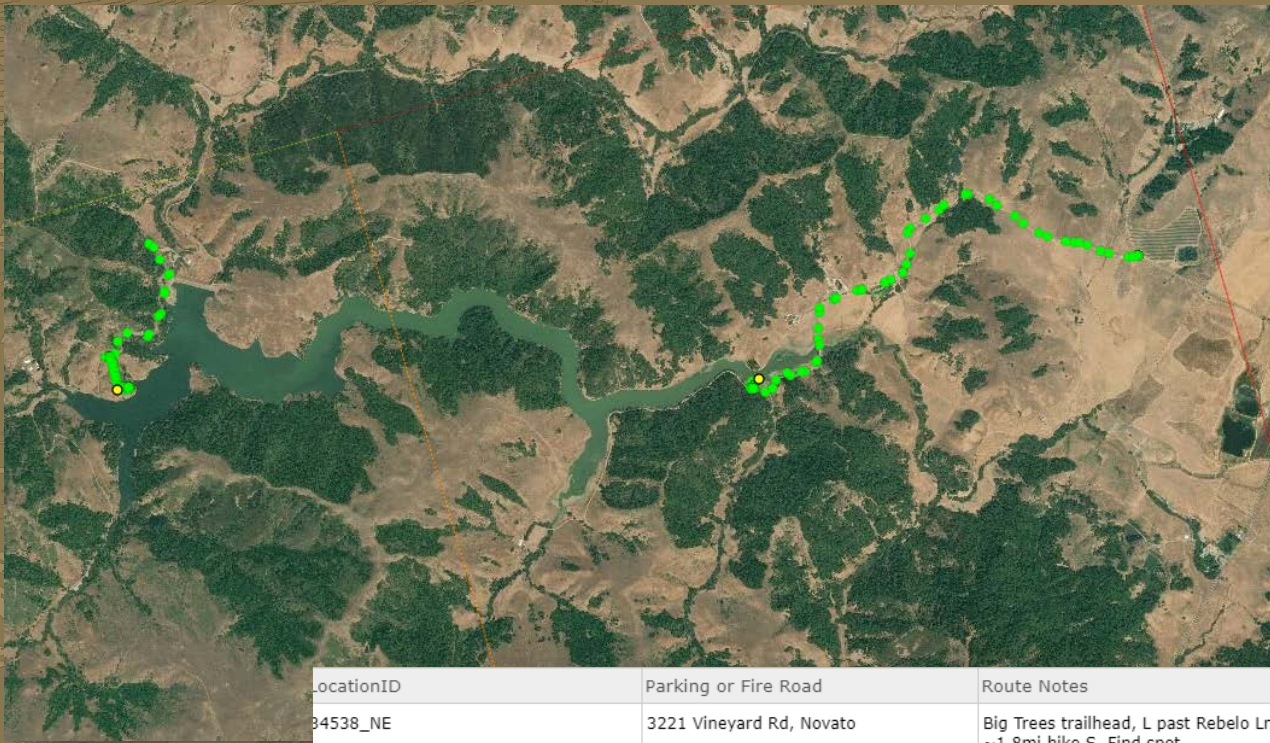
Cape Cod National Seashore - Massachusetts

Yosemite National Park – Ferguson Fire - California



Data Connectivity – Resource Management

Point Reyes National Seashore - California



LocationID	Parking or Fire Road	Route Notes	ETA_Truck To Detector	Distance in miles
84538_NE	3221 Vineyard Rd, Novato	Big Trees trailhead, L past Rebelo Ln ~1.8mi hike S. Find spot	55mins	4.76
84538_NW	Devil's Gulch Creek Trailhead	Access to fire road Z-key or hike NE 1mi	25mins	0.97
84538_SE	110 Nicasio Valley Rd	Nicasio Valley Rd. trailhead, .2mi E	5mins	0.23
84538_SW	Upper Peters Dam Rd. just before Shafter Bridge	.8mi from bridge. Find spot off trail	20mins	0.08
92050_NE	Muir Woods overflow lot	Walk NE along trail towards Visitor's Center cut back/down at trail towards creek Along Redwood Creek/trail, .3mi	6mins	0.85
92050_NW	Whitegate Ranch Trailhead	Walk E towards Webb Creek	10mins	1.17
92050_SE	Muir Beach Parking or Pelican Inn	Walk just S of Hwy 1 curve,	6mins	0.46
18154_SE	Turn OUT on platform road	tracklog from visit with Taylor. Bushwhacking	unknown	

Data Connectivity - Interpretation

https://isea.maps.arcgis.com/apps/MapSeries/index.html?appid=c418d8fecac641af9fbc2f613a7039d4



Top Invasive Plant Species at Sleeping Bear Dunes

A Story of Invasive Plants within Sleeping Bear Dunes National Lakeshore



About the Park and Project

Invasives at Sleeping Bear Dunes

Baby's Breath

Thistle (3)

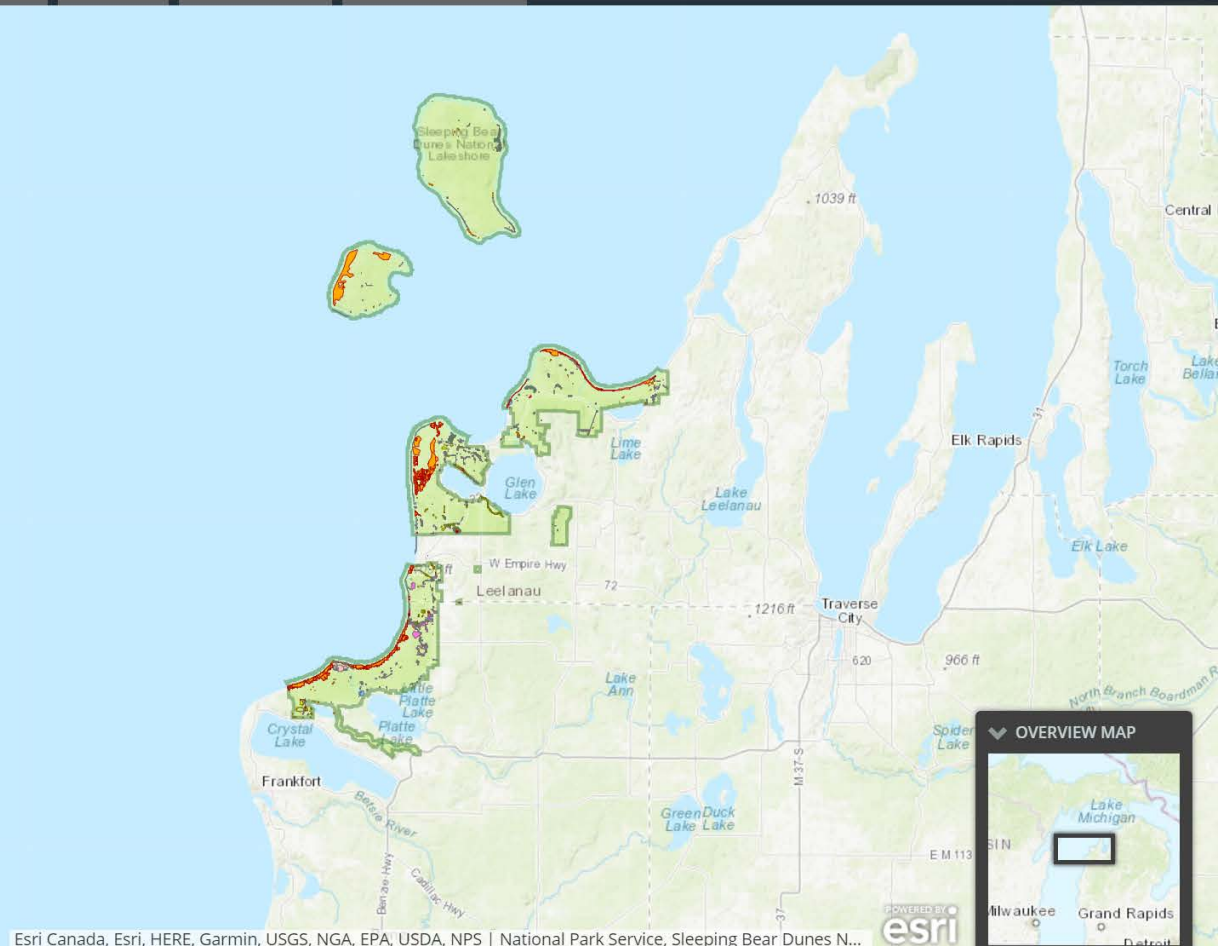
Garlic Mustard

How You Can Help



Rangers on the dunes

Invasive plants can be found throughout most environments at Sleeping Bear Dunes. However, the degree of negative impact by the invasive plants varies based on many factors such as time elapsed since the initial invasion, habitat conditions, and treatments. In the map to the right, our park boundaries are represented by the green shaded areas, and within those shaded areas, the most prevalent and abundant invasive plants recorded by our rangers are represented by **colored polygons**.



Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS | National Park Service, Sleeping Bear Dunes N...

POWERED BY esri

Data Connectivity – Public Information

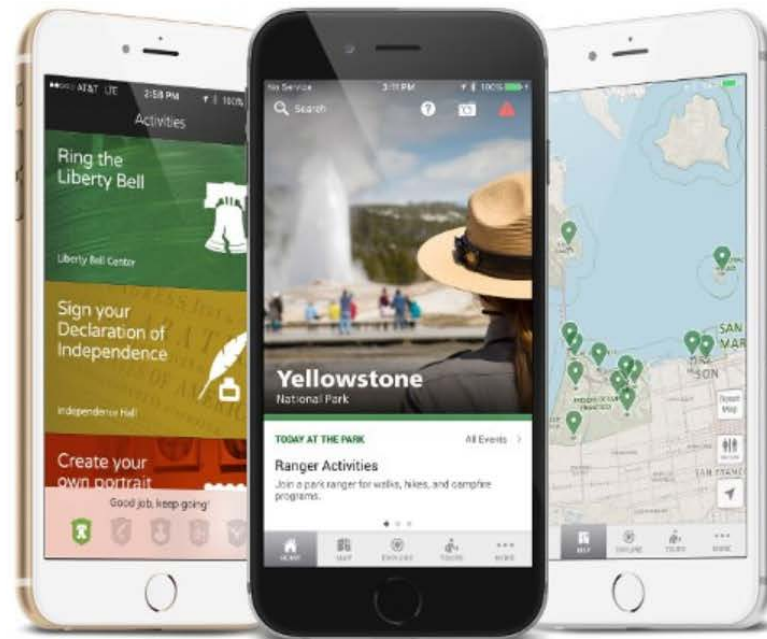
NPS.gov / Home / Apps

National Park Service Apps

Heading to a park and want to enhance your visit with your phone or tablet? You can download free iOS and Android apps to help plan your trip and discover the stories that make our parks special.

Here's a selection of parks that offer apps produced by the National Park Service. For a full list or to download these apps, visit the National Park Service [iTunes](#) or [Google Play](#) stores.

- Cape Hatteras
- Golden Gate
- Herbert Hoover
- Independence Junior Ranger
- Klondike Gold Rush
- National Mall
- Statue of Liberty & Ellis Island
- Yellowstone

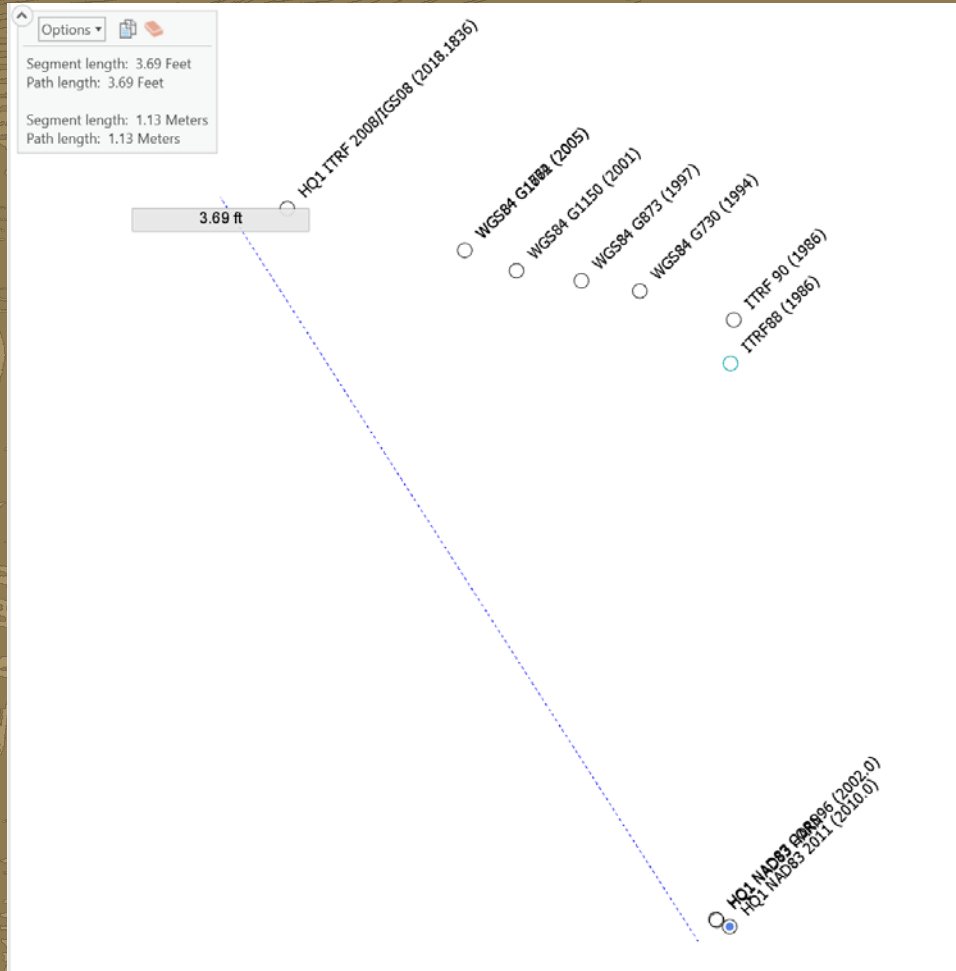


Several national parks offer apps available for free download.

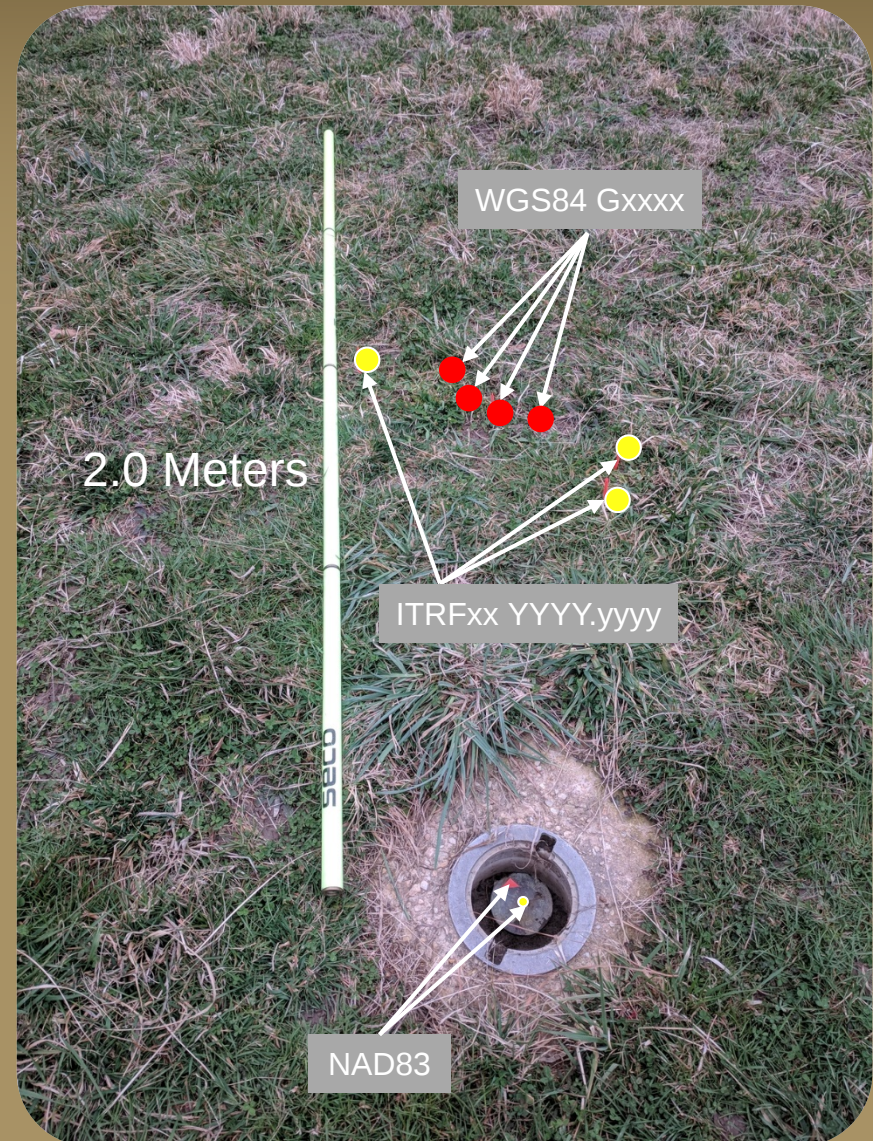
<https://www.nps.gov/subjects/digital/nps-apps.htm>

Managing Position Accuracy

Assateague Island National Seashore - Maryland



Datum Conversion Source: [HTDP](#)



Managing Position Accuracy



NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information: <https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>

USER: neil_winn@nps.gov

DATE: June 15, 2017

RINEX FILE: 0241153s.17o

TIME: 16:09:42 UTC

SOFTWARE: page5 1603.24 [master90.pl](#) 160321 START: 2017/06/02 18:38:00

EPHEMERIS: igr19515.eph [rapid] STOP: 2017/06/03 17:55:00

NAV FILE: brdc1530.17n OBS USED: 59086 / 61782 : 96%

ANT NAME: TRMR10 NONE # FIXED AMB: 197 / 217 : 91%

ARP HEIGHT: 1.7 OVERALL RMS: 0.017(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2017.4199)

X: -719099.726(m) 0.006(m) -719100.534(m) 0.006(m)

Y: -5618584.924(m) 0.013(m) -5618583.427(m) 0.013(m)

Z: 2921850.552(m) 0.011(m) 2921850.342(m) 0.011(m)

LAT: 27 26 34.59894 0.015(m) 27 26 34.61359 0.015(m)

E LON: 262 42 23.75194 0.008(m) 262 42 23.71583 0.008(m)

W LON: 97 17 36.24806 0.008(m) 97 17 36.28417 0.008(m)

EL HGT: -22.207(m) 0.006(m) -23.530(m) 0.006(m)

ORTHO HGT: 3.346(m) 0.016(m) [NAVD88 (Computed using GEOID12B)]

Padre Island National Seashore - Texas

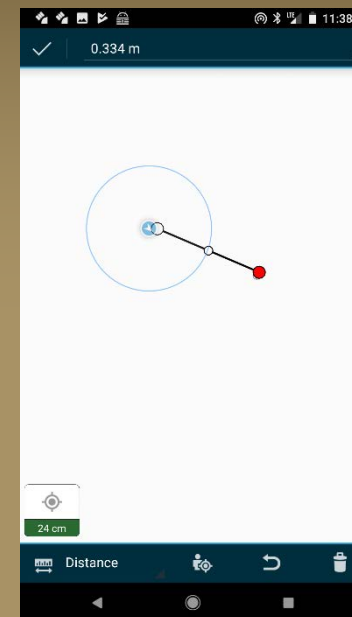
Managing Position Accuracy

VELOCITIES IN MM/YR RELATIVE TO ITRF2008 or IGS08/IGB08

HQ1

LATITUDE	=	38 14 55.28221 N	NORTH VELOCITY	=	4.28 mm/yr
LONGITUDE	=	75 9 25.14195 W	EAST VELOCITY	=	-14.31 mm/yr
ELLIPS. HT.	=	-34.446 m	UP VELOCITY	=	0.00 mm/yr
X	=	1284792.612 m	X VELOCITY	=	-14.51 mm/yr
Y	=	-4848004.367 m	Y VELOCITY	=	-1.10 mm/yr
Z	=	3927138.134 m	Z VELOCITY	=	3.36 mm/yr

Assateague Island National Seashore - Maryland



ITRF 2008 To NAD 1983 2011	108360	Coordinate_Frame	0.99343	-1.90331	-0.52655	0.02591467	0.00942645	0.01159935	0.00171504
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- This transformation converts NAD83 2011 (2010.0) to ITRF2008 (2005.0)
- WAAS reference frame = ITRF2008 (2018.5) ~ updated every six months
- 2018.5-2005.0 = 13.5 years
- 13.5 years x 1.493cm/yr = 20.155cm
 - TLDR – position moves within the circle

Managing Position Accuracy



*Jean Lafitte
National Historical Park and Preserve
Louisiana*

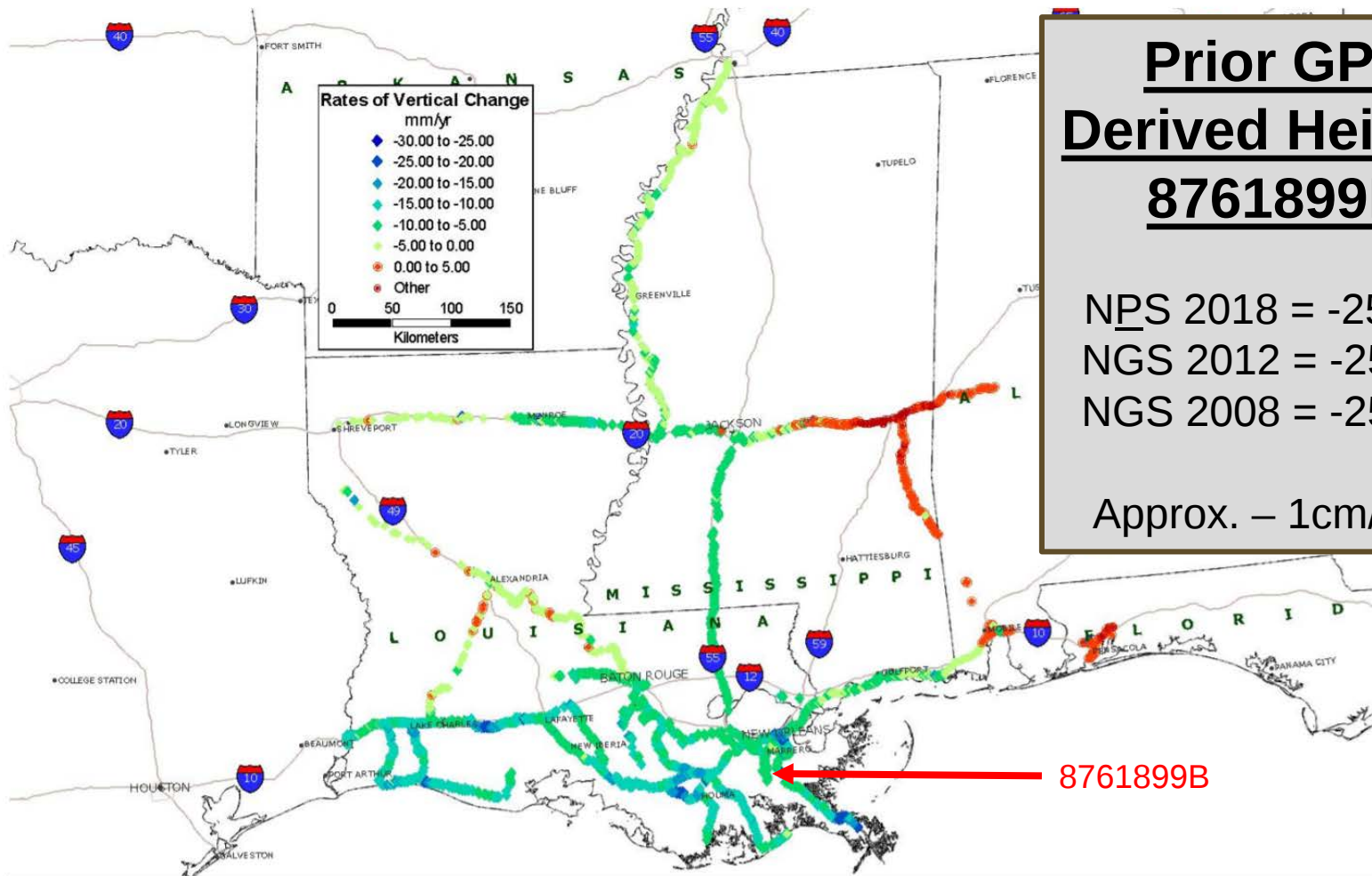
• 8761899B Tidal

Latitude:	N29°40'02.04328"
Longitude:	W90°06'33.55653"
Height:	-25.226

AU2310	*CURRENT SURVEY CONTROL					
AU2310						
AU2310*	NAD 83(2011)	POSITION-	29 40 02.04390(N)	090 06 33.55595(W)		ADJUSTED
AU2310*	NAD 83(2011)	ELLIP HT-	-25.189 (meters)	(06/27/12)		ADJUSTED
AU2310*	NAD 83(2011)	EPOCH	-	2010.00		

Managing Position Accuracy

NOAA NGS Technical Report 50



Prior GPS Derived Heights 8761899B

NPS 2018 = -25.226
NGS 2012 = -25.189
NGS 2008 = -25.136

Approx. – 1cm/year

Managing Position Accuracy



9/18/2018 11:06am EDT – 0.186m NAVD88

Assateague Island National Seashore - Maryland



9/18/2018 11:07am EDT – 0.189m NAVD88

Managing Position Accuracy – Survey Control

Shared Solution

PID: BBFW34

Designation: NCTC BM9

Stamping: 9

Stability: May hold, commonly subject to ground movement

Setting: Object driven into ground

Description: Mark is located on the USFWS National Conservation Training Center campus near Shepherdstown, WV. Mark location is in a field approximately 90m West of a parking lot, 130m North of NCTC BM1, and 3m Southeast of the nearest trail.

Observed: 2018-01-11T17:12:00Z

Source: OPUS - page5 1603.24



Close-up View

REF_FRAME: NAD_83(2011)		EPOCH: 2010.0000	SOURCE: NAVD88 (Computed using GEOID12B)		UNITS: m	SET PROFILE	DETAILS
LAT: 39° 29' 12.60146" ± 0.006 m							
LON: -77° 48' 24.64960" ± 0.001 m							
ELL HT: 92.769 ± 0.014 m							
X: 1041087.934 ± 0.004 m							
Y: -4818009.881 ± 0.015 m							
Z: 4034234.457 ± 0.006 m							
ORTHO HT: 126.813 ± 0.027 m							
			UTM 18 SPC 4701(WV N)				
			NORTHING: 4374564.923m 110927.691m				
			EASTING: 258605.860m 745644.515m				
			CONVERGENCE: -1.78573762° 1.07984716°				
			POINT SCALE: 1.00031750 0.99994368				
			COMBINED FACTOR: 1.00030294 0.99992913				

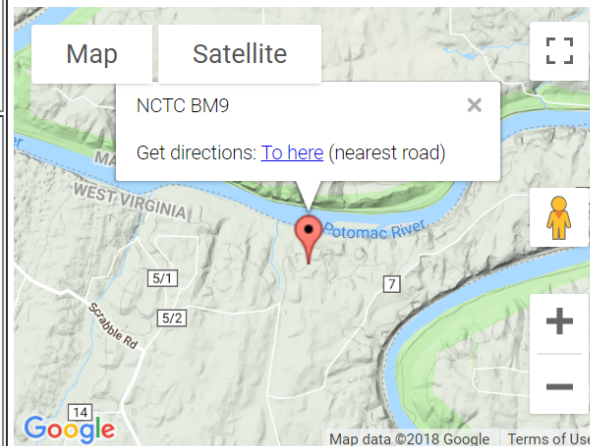
CONTRIBUTED BY

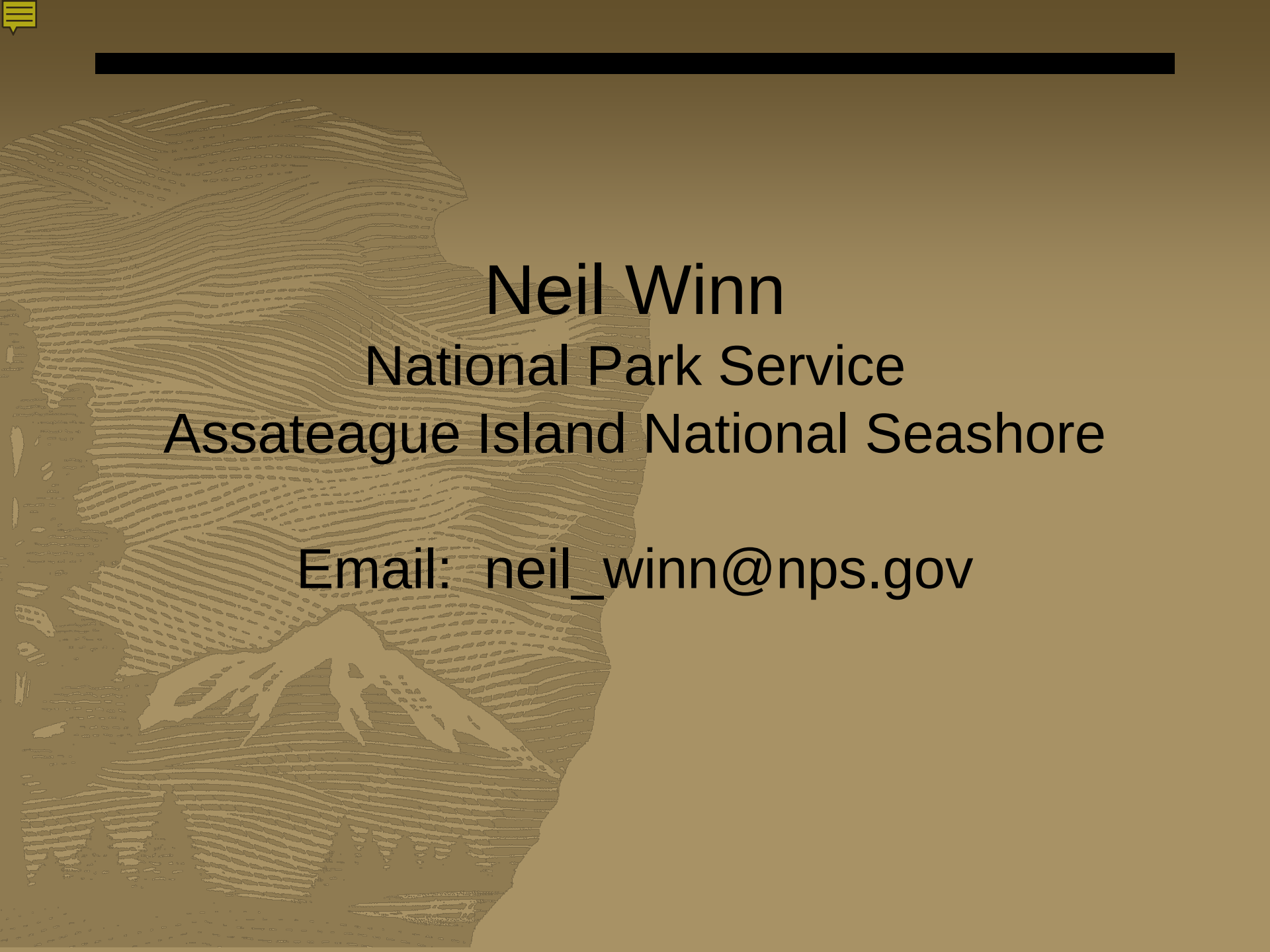
[neil_winn](#)

 [DOI National Park Service](#)



Horizon View



A detailed topographic map of Assateague Island, Maryland, showing the island's irregular coastline and internal contour lines. The map is rendered in a light tan color against a dark brown background. It features a prominent mountain range in the center, with several peaks and ridges. The surrounding area is mostly flat, with some smaller hills and valleys. The map is oriented with the island's long axis running from the top left to the bottom right.

Neil Winn

National Park Service

Assateague Island National Seashore

Email: neil_winn@nps.gov