



# Update on VDatum in the Gulf of Mexico

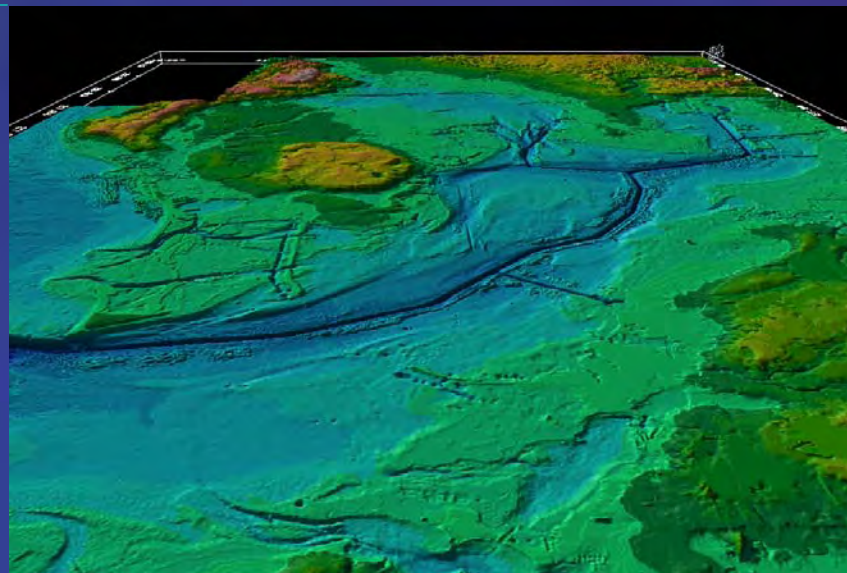
**NOAA's**

**National Geodetic Survey**

**Coast Survey Development Laboratory**

**Center for Operational Oceanographic Products and Services**

## *Mapping the Land-Sea Interface*

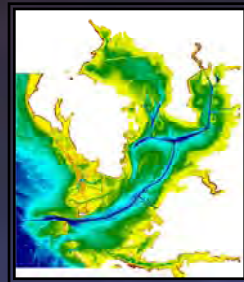
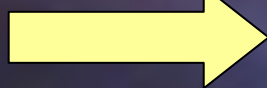
A screenshot of the 'Vertical Datum Transformation' software window. The window has a title bar with the NOAA logo and the text 'Vertical Datum Transformation'. Below the title bar is a menu bar with 'File' and 'Mode'. The main area contains several input fields and dropdown menus. On the left, there are four text boxes: 'Latitude' with '0.0', 'West Longitude' with '0.0', 'Input Height' with '0.0', and 'Output Height' with '0.0000'. On the right, there are four dropdown menus: 'Horiz. Datum' with 'NAD 83, WGS, ITRF', 'Input V-Datum' with 'MLW', and 'Output V-Datum' with 'NAD 83 (86)'. At the bottom right, there are four radio buttons: 'Meters' (unselected), 'Feet' (selected), 'Height' (unselected), and 'Soundings' (selected). A large 'Convert Vertical Datum' button is located at the bottom left of the form area.



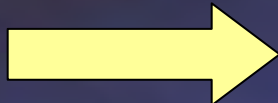
# VDatum Usage Supports



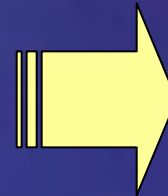
Topography



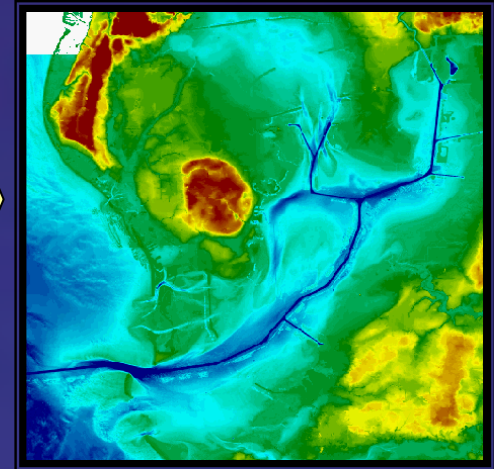
Bathymetry



## VDatum



Bathy/Topo  
Digital Elevation Model



- Inundation modeling from storm surge, tsunamis, and sea level rise.
- Erosion, accretion, renourishment
- Analyzing storm impacts
- Determining setback lines
- Determining local, state, and national boundaries
- Navigation Products and Services
- Habitat restoration
- Shoreline Change Analysis
- Analyzing environmental and natural resources
- Permitting



# All elevation data are referenced to a vertical datum.

**BUT** there are many different vertical datums in use

Relationship of vertical datums for Tampa Bay:

86.39 ft	WGS 84 (G873)	26.33 m
81.33 ft	NAD 83 (86)	24.79 m
0.792 ft	MHHW	0.241 m
0.409 ft	MHW	0.125 m
0.0 ft	NAVD 88	0.0 m
-0.535 ft	LMSL	-0.163 m
-0.850 ft	NGVD 29	-0.259 m
-1.495 ft	MLW	-0.456 m
-1.919 ft	MLLW	-0.585 m



WGS 84,  
NAD 83  
(86), 17  
others

## Ellipsoid Datums



## Orthometric Datums

(MSL)



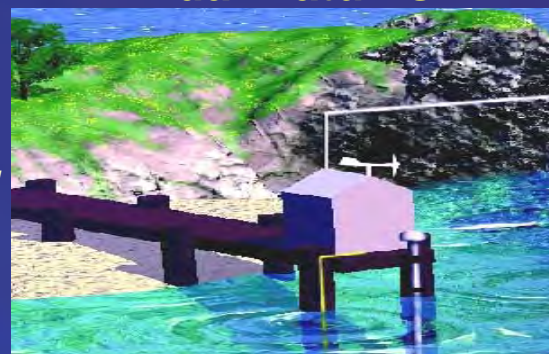
NAVD 88,  
NGVD 29



## Tidal Datums



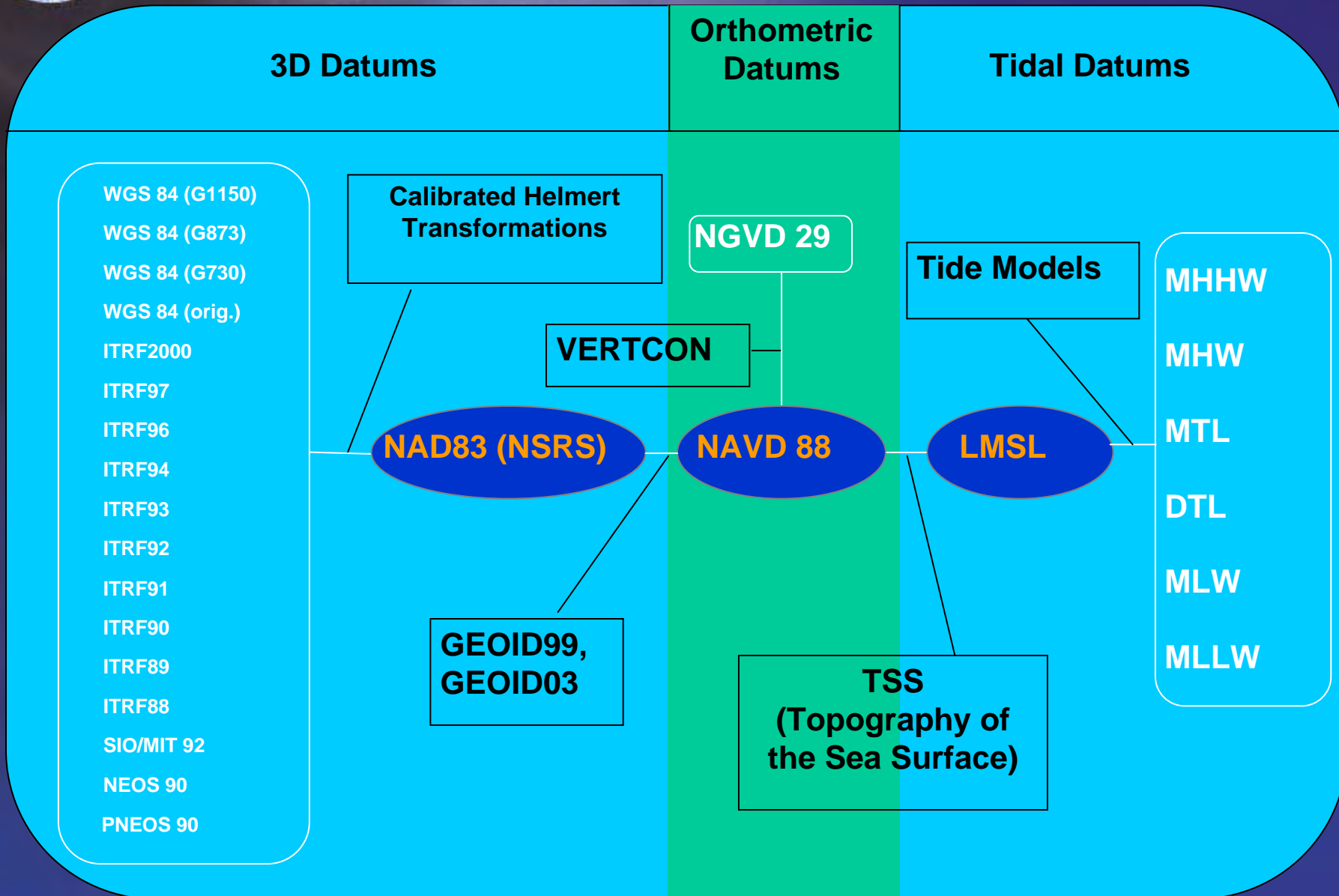
MHHW, MHW,  
MTL, DTL,  
LMSL,  
MLW, MLLW



For elevation data sets to be blended together they must be referenced to same vertical datum.



# Vertical Datum Transformation “Roadmap”



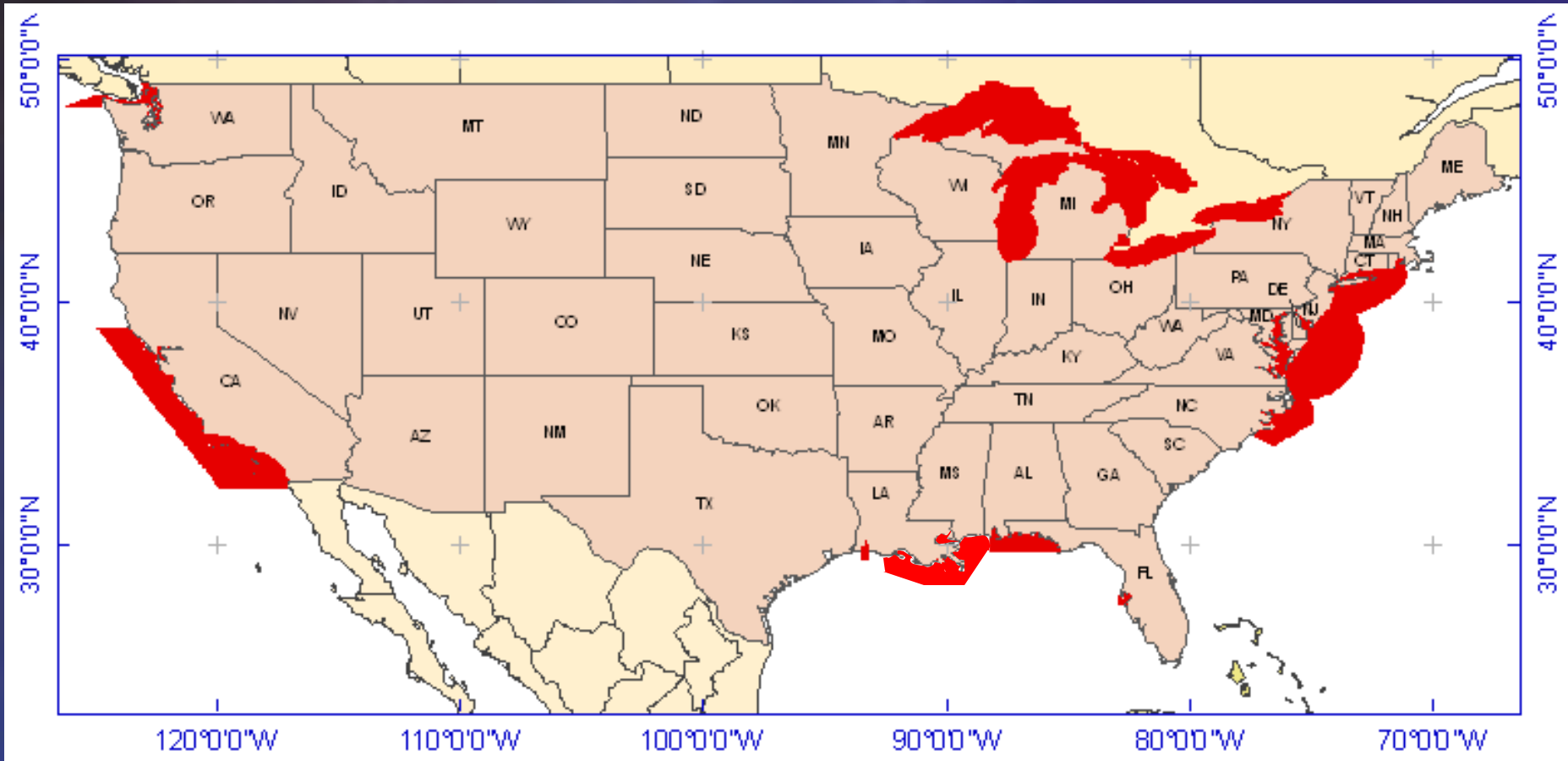


# Gulf of Mexico Issues

- **Need for updated gravity data in western Gulf**
- **Need for GPS ties (observations) at tidal benchmarks in western Gulf**
- **Once data are obtained, time is required to process data and release updated geoid model**

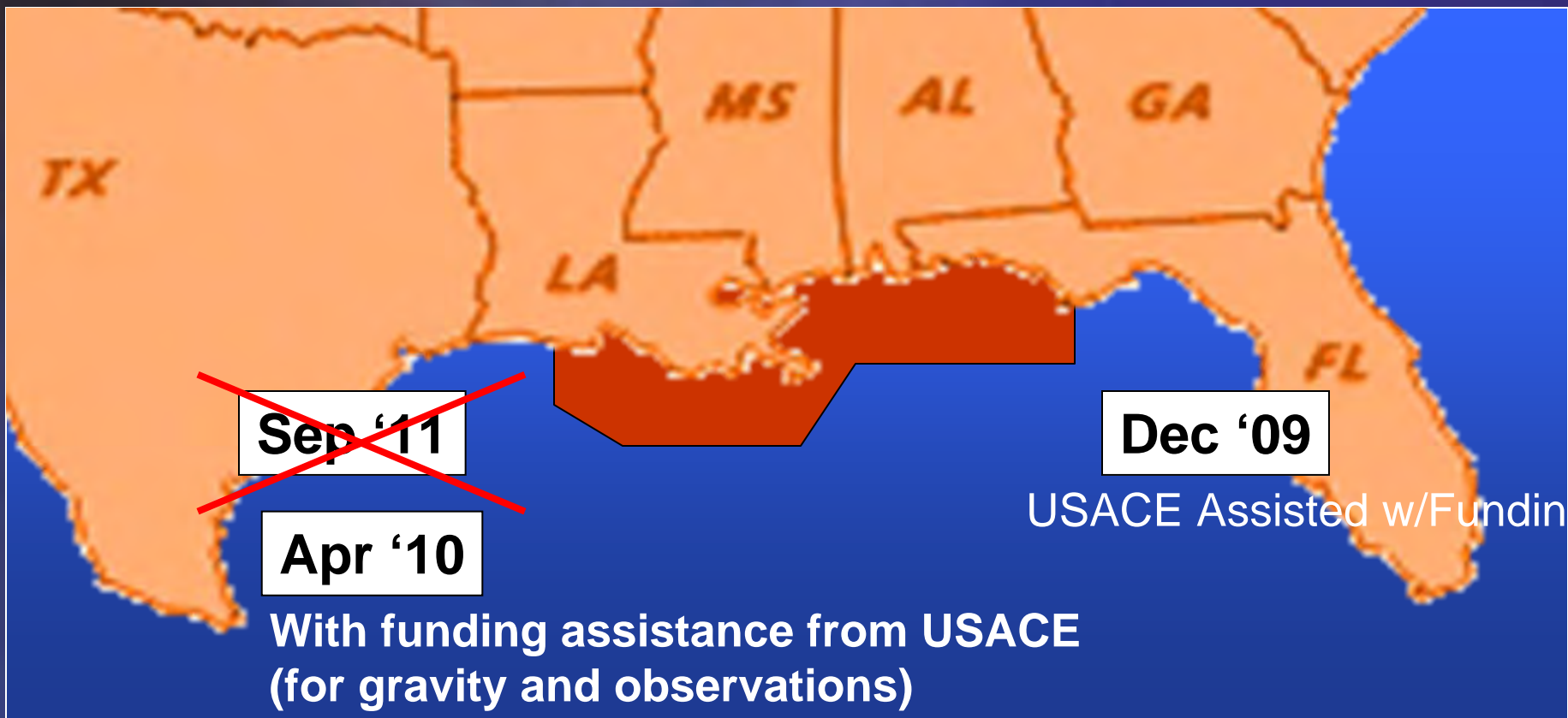


# VDatum Availability





# VDatum Availability





# New Website: [vdatum.noaa.gov](http://vdatum.noaa.gov)

**Vertical Datum Transformation**  
Integrating America's Elevation Data

Home About Download Education Development Contact Us

**Welcome to VDatum!**

Last updated on August 07th, 2008 **NEW!**

**Overview**

- What's New?
- VDatum Features
- Download VDatum now**
- Online User Guide

**The VDatum Demonstration Project in Tampa Bay, Florida**

NOAA Bathymetry      USGS Topography

**Converts the following:**

- Horizontal datums:** from NAD 27 or NAD 83(1986) to NAD 83(HARN). NAD83 (HARN) is currently considered as being equivalent to NAD 83 (NSRS2007/CORS96), WGS 84 or ITRF
- Vertical datums:** among three vertical groups: tidal datums, orthometric datums and ellipsoidal datums (i.e. three-dimension or 3-D datums), in which:
  - Transforms among ellipsoidal and orthometric datums are available throughout the United States;
  - The HTDP v2.9 is partially utilized to support conversions among ellipsoidal datums;
  - Current GEOID models such as GEOID 99, GEOID 03 and GEOID 06 are used to support direct conversions between the NAD 83 ellipsoidal datum and the NAVD 88 orthometric datum;
  - The VERTCON model is employed to support conversions between the NGVD 29 datum and the NAVD 88 datum;
  - The IGLD 85 model is employed to support conversions between IGLD 85 datum and the NAVD 88 datum;
  - Tidal datums are available in 27 areas.
- Input elevation data** in geographic (Latitude, Longitude) and UTM coordinates.

**A Little History**

VDatum was firstly introduced to produce a seamless bathymetric - topographic digital elevation model (DEM) for Florida's Tampa Bay region by merging the "best available" NOAA bathymetric data and USGS topography data. The best available bathymetric

**Choose input and output vertical datums:**

GTX Files Location: C:\Documents and Settings\Edward.Myers\My Documents\VDatum\NewSoftware

**Datum Information**

Horizontal Datum: NAD 83, WGS, ITRF

Vertical Datum: NAVD 88

New Vertical Datum: NAVD 88

Vertical Datum Unit:  Meter  Feet

Height/Sounding:  Height  Sounding

Geoid: Geoid 2003

**Coordinate Information**

Geographic  UTM Zone: 1

**Point mode**

	Input Point:	Output Point:
Latitude:	0.000	0.000
Longitude:	0.000	0.000
Height:	0.000	0.000

Reset Convert

**File mode**

Input File(s):

Output File(s):

Input File Format: (ASCII 3-column or 4-column)

(Key), Lat, Long, Height  (Key), Long, Lat, Height

Save output data as in geographic coordinate Convert

- Vertical Datum:
- NAVD 88
  - NAVD 88
  - NGVD 29
  - 
  - MLLW
  - MLW
  - LMSL
  - MTL
  - DTL
  - MHW
  - MHHW
  - 
  - NAD 83 (86)
  - WGS 84(G1150)
  - WGS 84(G873)
  - WGS 84(G730)
  - WGS 84(orig.)
  - WGS 72
  - ITRF2000(1997.0)
  - ITRF97(1997.0)
  - ITRF96(1997.0)
  - ITRF94
  - ITRF93
  - ITRF92
  - ITRF91
  - ITRF90
  - ITRF89
  - ITRF88
  - SIOMIT 92
  - NEOS 90
  - PNEOS 90

Geoid: Geoid 2003

- Geoid 1999
- Geoid 2003

**Choose a geoid model**

**Choose a horizontal datum**

Horizontal Datum:

- NAD 83, WGS, ITRF
- NAD 83, WGS, ITRF
- NAD 27



## Improvements to VDatum Currently in Development

- **Metadata**
- **Accuracy/uncertainty assessments**
- **Evaluating extending VDatum tidal datums inland**
- **Maintenance for tidal datum epoch, geoid and ellipsoid updates**
- **Analysis of bathymetry changes on tidal datum results**
- **Outreach and training**

## Future Developments

- **New web-based tools for interacting with VDatum results**
- **Improvements to downloadable software**



Questions?

...Discussion...

