
The Columbia River Pilots
Protecting the Great River of the West since 1846


Skamokawa
Astoria
Wauna
Beaver Army Terminal
5
Washington
Longview
30
Kalama
Woodland
Pacific Ocean
Oregon
St. Helens
Deep draft navigation 106 miles from sea to Vancouver, WA
26
5
Another 12 miles up the Willamette River to Portland, OR
205
I5
Vancouver
Channel is 600 feet wide – 43 feet deep
Portland
Willamette River is only 40 feet deep
84

River Levels and Under Keel Clearance

Transits

- Ships are loaded to a maximum draft of 43 feet
- Loaded ships arrive and depart based on tides and river levels
- Safety Requires a minimum of 2 feet of UKC
- Ships must arrive on the bar at an appropriate stage of the tide determined by the bar pilots
- Inbound we can ride up on one tide
- Downbound, we pass through 3 tide changes
- We must strategically use tides and river levels to our advantage.

Loadmax - Predicting River Levels

- We rely on Loadmax for route planning
- Load Max predicts river levels at 7 strategic locations for several days in advance
- We use this to determine where we will have the least amount of UKC
- This helps to establish the best arrival or departure times for loaded vessels

Knowing River Levels

- The sensors at these 7 locations record and broadcast real time river levels and meteorological data which can be accessed by our laptops and by phone

- We can determine how closely the predictions match what we actually experience and if it is safe to proceed

Knowing River Levels

- If we **cannot** be reasonably certain that we will have at least 2 feet of UKC - we are forced to implement **Draft Restrictions**
- This can be devastating to the regional economy
- Very costly to carriers and shippers

River Levels and Overhead Clearance

Overhead Clearances

- Traditionally not a problem on the Columbia River
- Size of ships continue to become larger and larger
- Recent changes in regional commerce
- Ultra large containerships may soon be calling on the CR
- Large cruise ships already coming into the shipyard in Portland
- Clearances have been reduced to just a few feet

Overhead Clearances

- We have discovered that determining our air gaps is almost impossible to do
- Too many different sets of data points
- True clearances cannot be found easily
- When done correctly it is very expensive

Overhead Clearances

- This first became apparent when the Port of Portland ordered two large cranes for their container terminal
- Route planning took months
- Many conflicting reports on the overhead clearance for the bridge at Longview, WA
- Ultimately, we had a surveyor taking real time measurements as we passed under the bridge with little room to spare.


Port of Portland
振华1
ZHEN HUA 1
FOSS


ZPMC

Overhead Clearances

- Cruise ships transiting to the shipyard in Portland have the same, if not less, amount of clearance as the cranes

- The best solution for bridge clearances would be to install real time air gap sensors

Data Confusion

OREGON - WASHINGTON

COLUMBIA RIVER

PACIFIC OCEAN TO HARRINGTON POINT

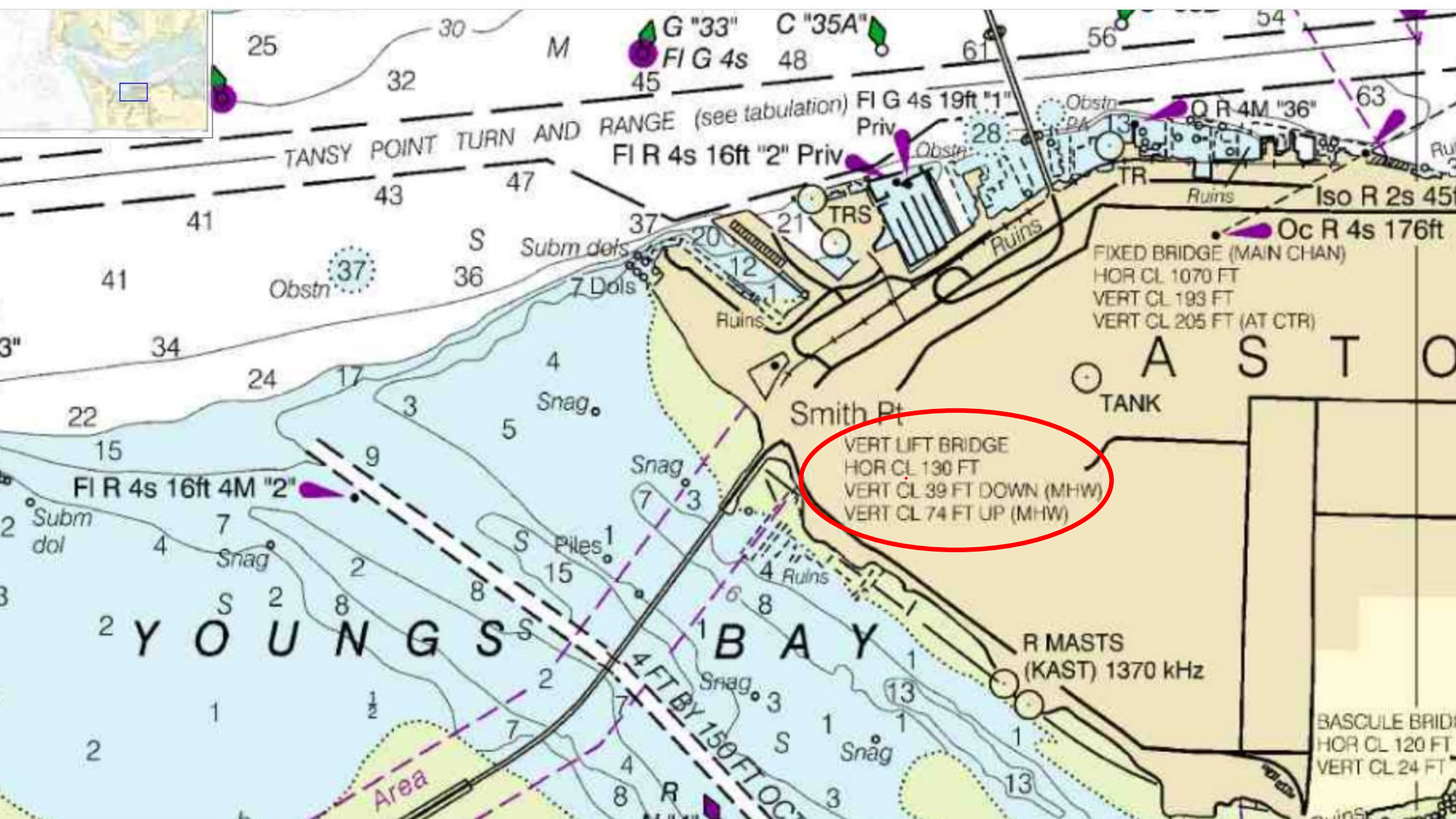
Mercator Projection
Scale 1:40,000 at Lat 46° 13'

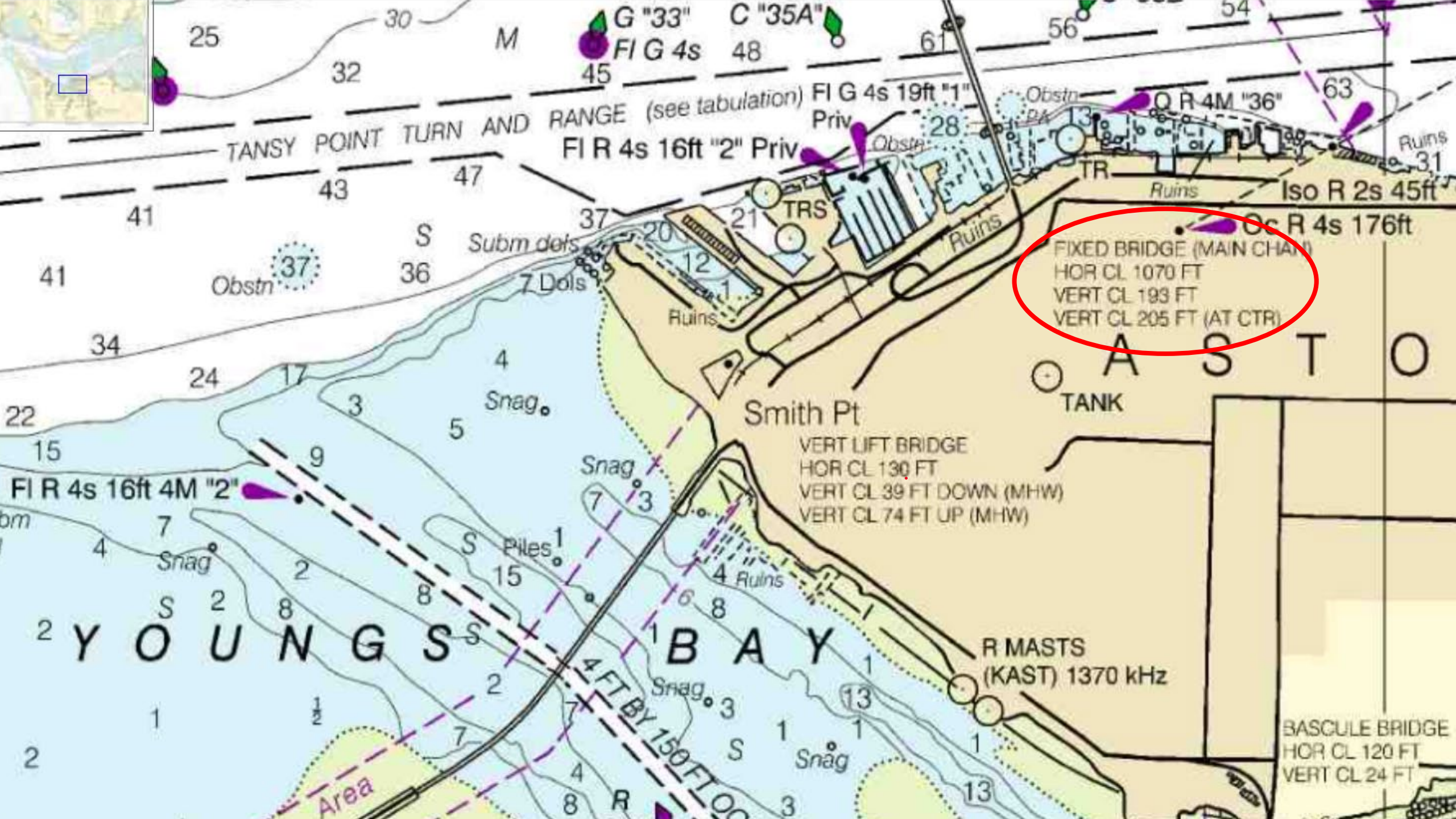
North American Datum of 1983
(World Geodetic System 1984)

SOUNDINGS AND CLEARANCES OF BRIDGES
AND OVERHEAD CABLES IN FEET
AT MEAN LOWER LOW WATER

Additional information can be obtained at nauticalcharts.noaa.gov.

SCALE 1:40,000


G "33"
Fl G 4s
C "35A"
TANSY POINT TURN AND RANGE (see tabulation)
Fl R 4s 16ft "2" Priv
Fl G 4s 19ft "1" Priv
Q R 4M "36"
Iso R 2s 45f
Oc R 4s 176ft
FIXED BRIDGE (MAIN CHAN)
HOR CL 1070 FT
VERT CL 193 FT
VERT CL 205 FT (AT CTR)
VERT LIFT BRIDGE
HOR CL 130 FT
VERT CL 39 FT DOWN (MHW)
VERT CL 74 FT UP (MHW)
Smith Pt
TANK
Fl R 4s 16ft 4M "2"
R MASTS
(KAST) 1370 kHz
4 FT BY 150 FT OC
BASCULE BRID
HOR CL 120 FT
VERT CL 24 FT
Subm dols
Obstn
Ruins
Snag
Piles
Area
TRS
TR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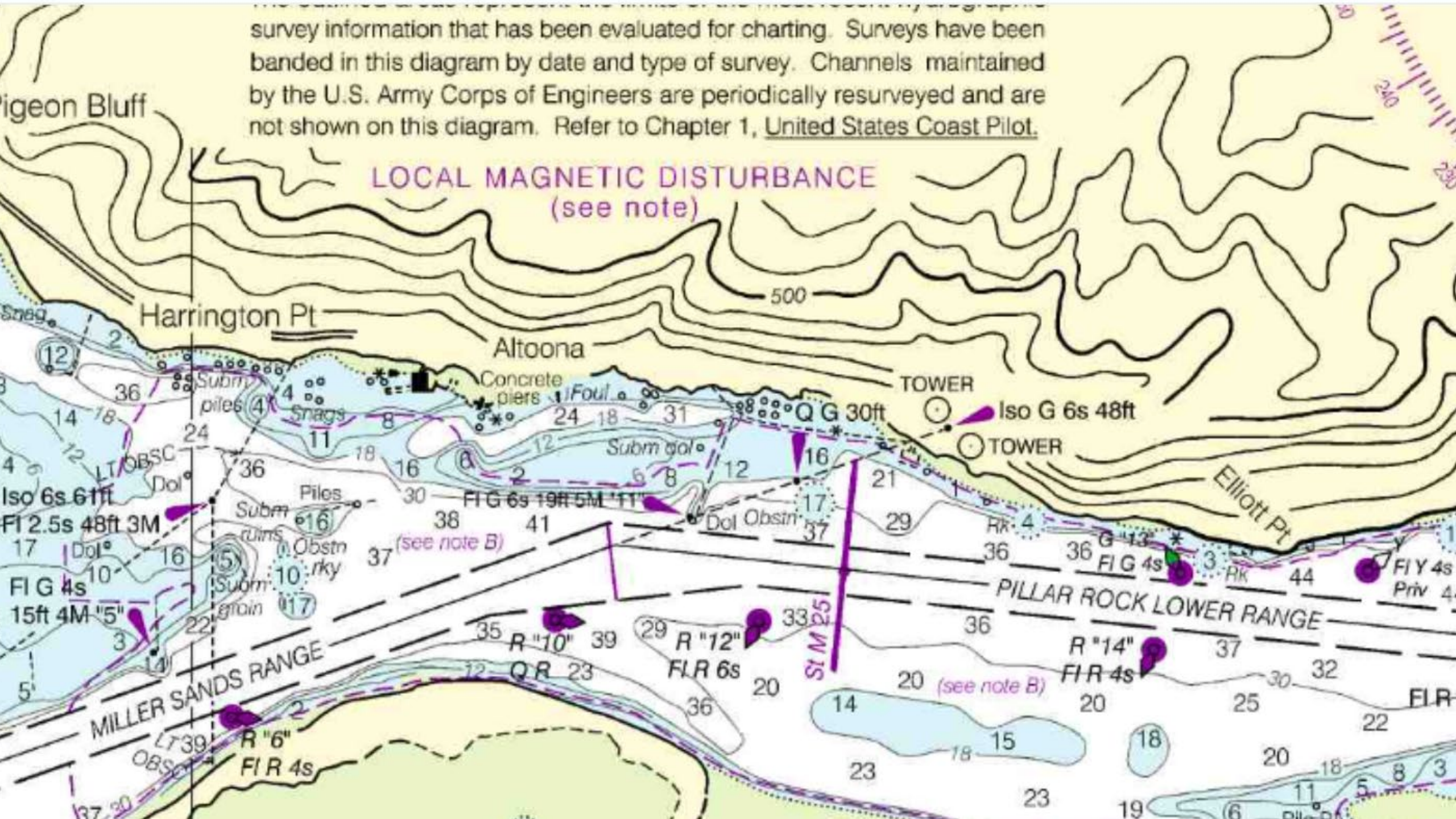
4 FT BY 150 FT CO
R MASTS
(KAST) 1370 kHz
BASCULE BRIDGE
HOR CL 120 FT
VERT CL 24 FT
Area

Confusing Data

- Columbia River Bar Pilots do not trust charted information
- Bridge has never been properly surveyed
- Clearances are taken from construction drawings from 1966
- These were based on tidal information from 1946
- Needs to be accurately surveyed to provide vital information to ultra large ships


survey information that has been evaluated for charting. Surveys have been banded in this diagram by date and type of survey. Channels maintained by the U.S. Army Corps of Engineers are periodically resurveyed and are not shown on this diagram. Refer to Chapter 1, United States Coast Pilot.
LOCAL MAGNETIC DISTURBANCE
(see note)
Pigeon Bluff
Harrington Pt
Altoona
Elliott Pt
500
240
Snag
Subm piles
Snags
Concrete piers
Foul
Subm gol
TOWER
Q G 30ft
Iso G 6s 48ft
TOWER
LT OBSC
Dol
Iso 6s 61ft
Fl 2.5s 48ft 3M
Piles
Subm ruins
Obstn rky
Fl G 6s 19ft 5M "11"
(see note B)
Dol Obstn
Fl G 4s
15ft 4M "5"
Subm grain
PILLAR ROCK LOWER RANGE
G "13"
Fl G 4s
Rk
Fl Y 4s
Priv
MILLER SANDS RANGE
R "10"
Q R
R "12"
Fl R 6s
St M
R "14"
Fl R 4s
(see note B)
LT OBSC
R "6"
Fl R 4s
Fl R

THE NATION'S CHARTMAKER SINCE 1807

UNITED STATES – WEST COAST

OREGON – WASHINGTON

COLUMBIA RIVER

CRIMS ISLAND TO SAINT HELENS

Mercator Projection
Scale 1:40,000 at Lat. 46°02'

North American Datum of 1983
(World Geodetic System 1984)

SOUNDINGS AND CLEARANCES OF BRIDGES AND OVERHEAD CABLES IN FEET AT COLUMBIA RIVER DATUM

(MEAN LOWER LOW WATER DURING LOWEST RIVER STAGES)

Additional information can be obtained at nauticalcharts.noaa.gov.

nautical miles from the antenna site, but can be as much as 100 nautical miles for stations at high elevations.

Astoria, OR	KEC-91	162.400 MHz
Portland, OR	KIG-98	162.550 MHz
Olympia, WA	WXM-62	162.475 MHz

higher stages of the river.

Dec 2006

PROJECT DEPTHS

Channel legends and tabulations, where indicated, reflect the U.S. Army Corps of Engineers (USACE) project depths. The channel may be significantly shoaler, particularly at the edges. For detailed channel information and minimum depths as reported by USACE, use NOAA Electronic Navigational Charts. USACE surveys and channel condition reports are available at http://navigation.usace.army.mil/Survey/Hydro.

HEIGHTS

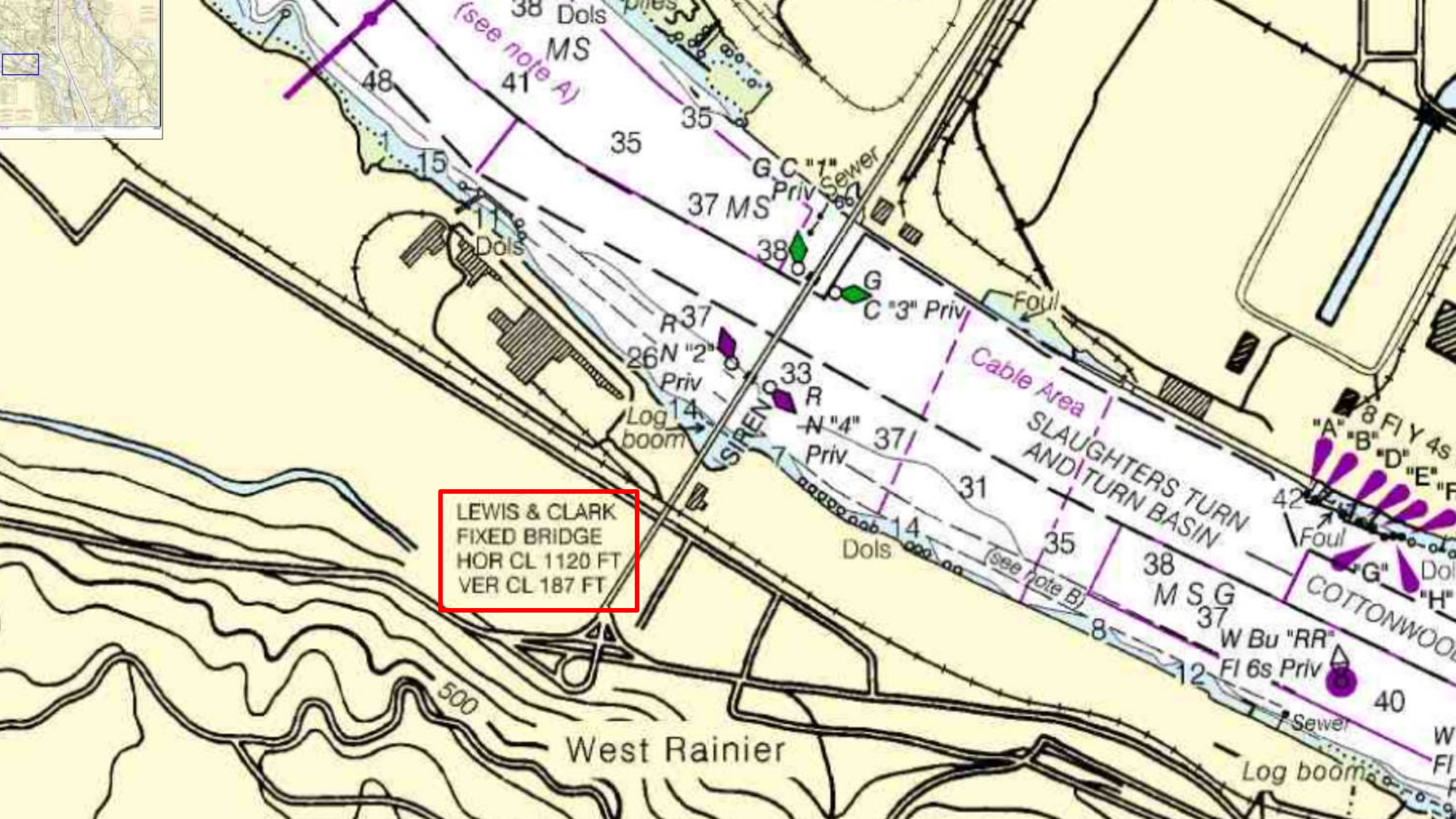
Heights in feet above Mean High Water.

AUTHORITIES

Hydrography and topography by the National Ocean Service, Coast Survey with additional data from the Corps of Engineers, Geological Survey and U.S. Coast Guard.

HORIZONTAL DATUM

The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83), which for charting purposes is considered equivalent to the World Geodetic System 1984 (WGS 84). Geographic positions referred to the North American Datum of 1927 must be corrected an average of 0.578" southward and 4.360" westward to agree with this chart.


LEWIS & CLARK
FIXED BRIDGE
HOR CL 1120 FT
VER CL 187 FT
West Rainier
SLAUGHTERS TURN AND TURN BASIN
Cable Area
COTTONWOOD
(see note A)
(see note B)
Log boom
SIREN
Foul
Dols
Sewer
MS
G C "1" Priv
G C "3" Priv
R N "2" Priv
R N "4" Priv
W Bu "RR" Fl 6s Priv
8 Fl Y 4s
"A" "B" "D" "E"
"G" "H"
500

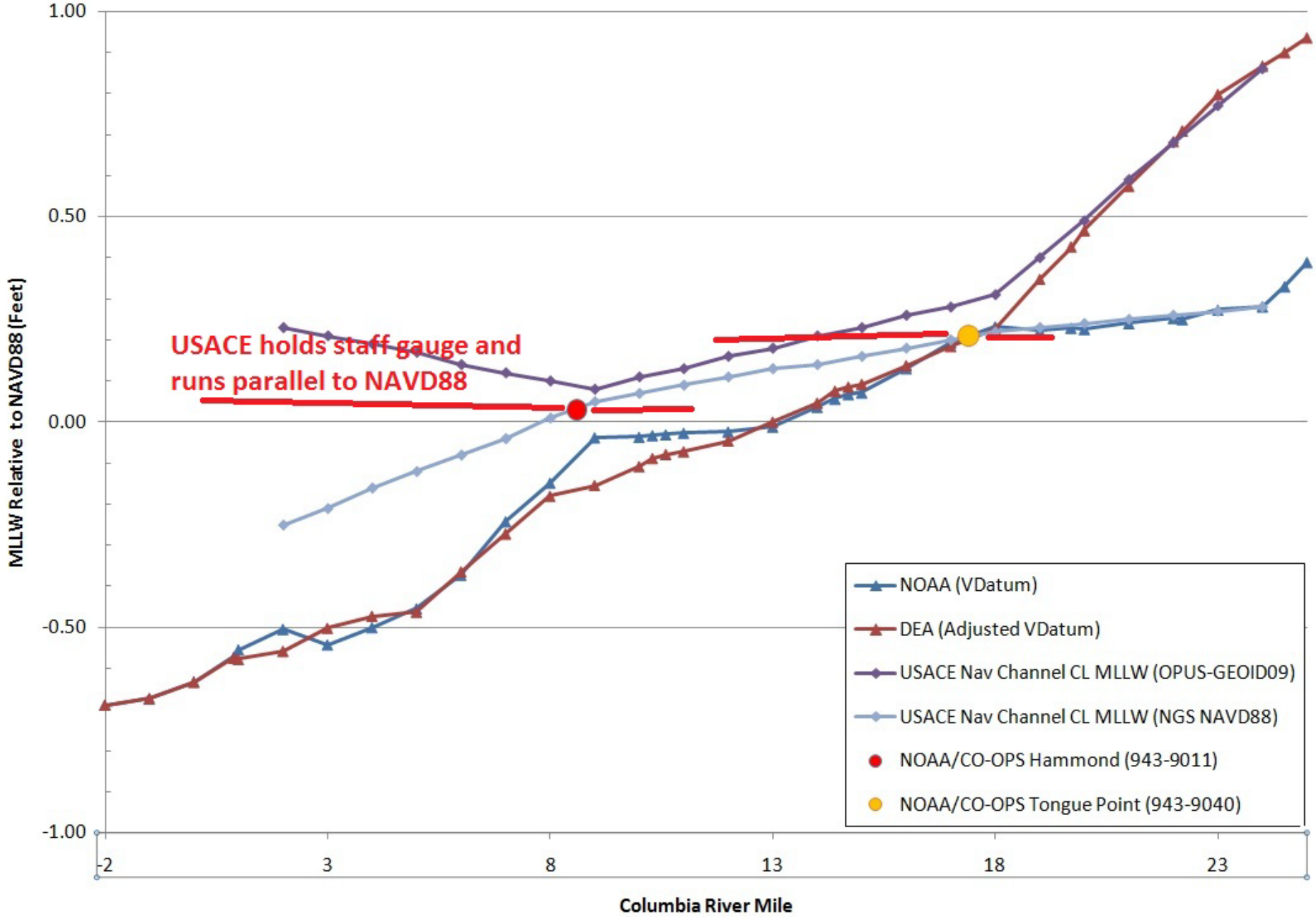
Confusing Data

- Whose information/which data set does the mariner use?
- What information do we trust?

Confusing Data

- The root of the problem is that not all data sources share the same starting point for “zero”
- Where is “zero” gauge?

NAVD88 - MLLW Separation Model Comparison



Confusing Data

- The Columbia River Pilots received a 1 million dollar grant from the State of Oregon to do a Dynamic UKC study
- To conduct the study, we needed to find “zero” gauge
- Most, if not all, of the funding would be needed to find “zero”
- That was not the stated purpose of the grant
- As a result, we had to forfeit the money
- “Zero” needs to be the same point for everyone

Confusing Data

- Accurate data is vital to the river system
- Mariners, ports, shippers and carriers need easily accessible, reliable information
- Inability to determine UKC and air gaps can be destructive to local and regional economies

Conclusion

The Columbia River is a powerful and dynamic river. It may be impossible to get it 100% right, 100% of the time, but we need to do better than we are now.

I believe that is an achievable goal

Questions?