Deep draft navigation 106 miles from sea to Vancouver, WA

Another 12 miles up the Willamette River to Portland, OR

Channel is 600 feet wide – 43 feet deep
Willamette River is only 40 feet deep
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.
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
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
VERT LIFT BRIDGE
HOR CL 130 FT
VERT CL 39 FT DOWN (MHW)
VERT CL 74 FT UP (MHW)
FIXED BRIDGE (MAIN CHAIN)

HOR CL 1070 FT
VERT CL 193 FT
VERT CL 205 FT (ATCTR)
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
The outlined areas represent the limits of the most recent hydrographic 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.
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.
LEWIS & CLARK FIXED BRIDGE
HOR CL 1120 FT
VER CL 187 FT
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?
USACE holds staff gauge and runs parallel to NAVD88.
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
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?