



**NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY**

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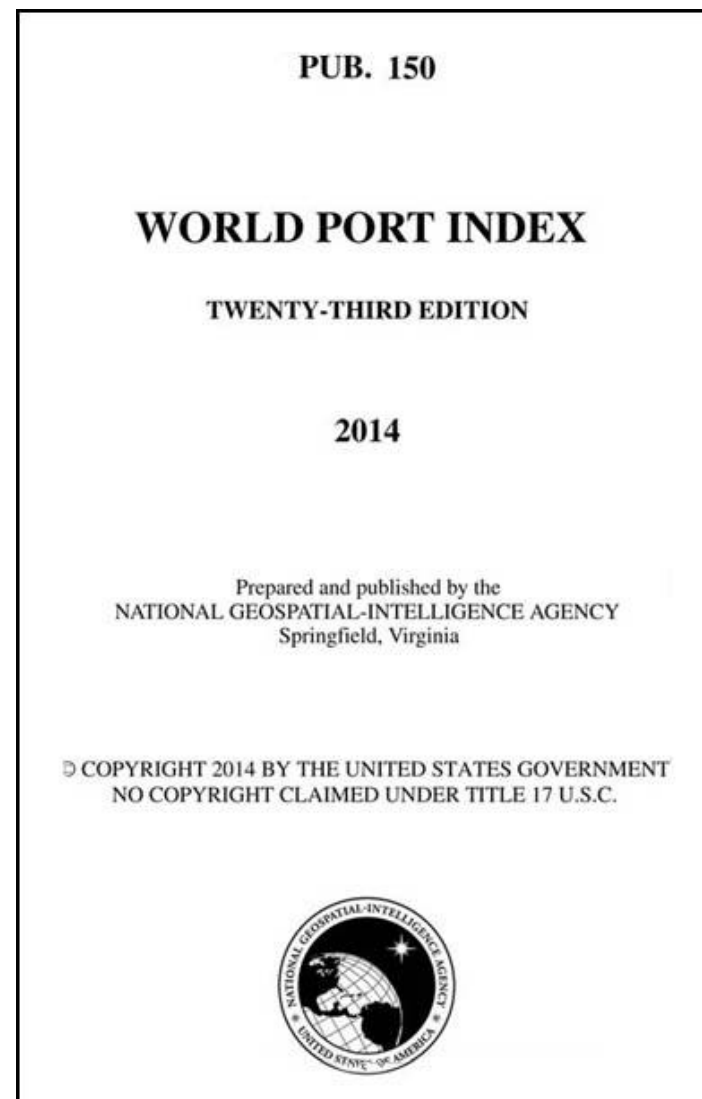
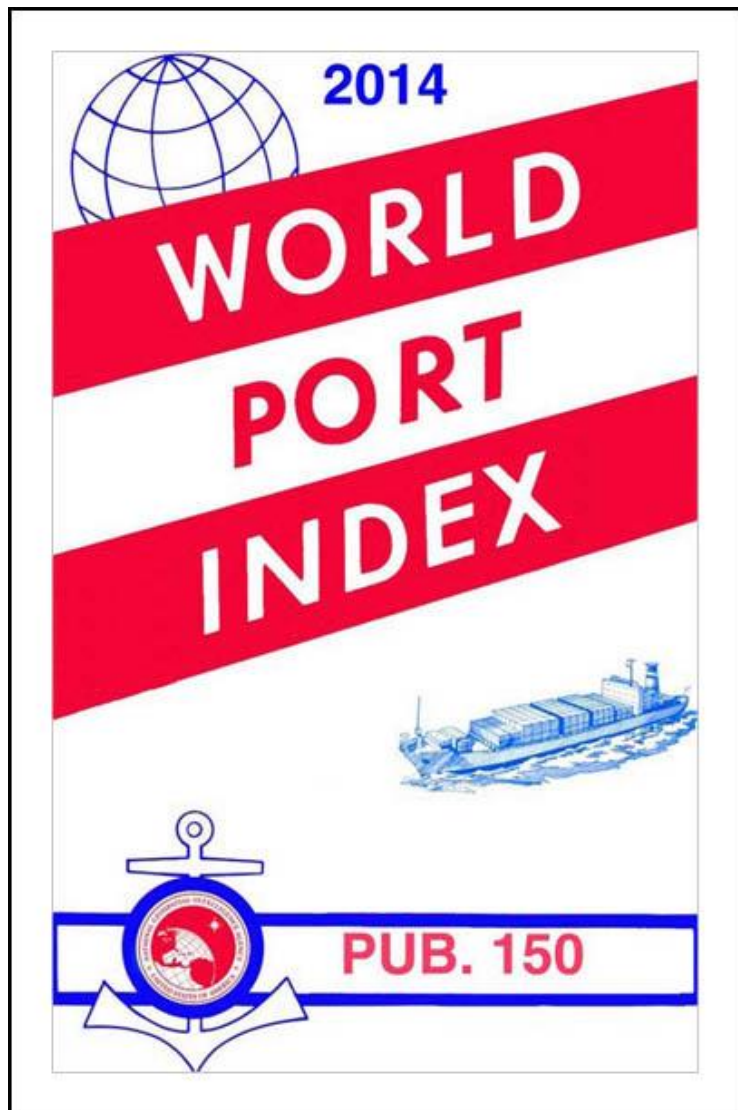
# **NGA World Port Index Modernization NIPWG 8**

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## **Purpose of the World Port Index (WPI)**

The World Port Index provides the location, characteristics, known facilities, and available services of a great many ports and shipping facilities and oil terminals throughout the world. The selection of these places is based on criteria established by NGA and are not random choices.

- Contains information on 3,629 ports, shipping facilities, and oil terminals.
- Location, characteristics, known facilities, and available services.
- Ports with a depth of at least 4 meters are listed.



## **Legacy Publication Limitations**

- Display format.
- PDF limitations.
- Access and availability.
- Search capabilities and results.
- Updating limitations.

**Bottom line—Difficult to display, difficult to maintain, and difficult to use**



## Display Format

- Tabular format.
- 31 information categories.
- 71 columns of information.
- Information displayed in the following manner:
  - Y for Yes.
  - N for No.
  - Blank for No Information.
  - Code Key letters to describe depths, harbor size, harbor types, shelter afforded, vessel length parameters, repairs available, and size of dry docks and marine railway.





CODE KEY

HARBOR SIZE	HARBOR TYPE	SHELTER AFFORDED	MAX SIZE VESSEL
L - Large	Cn - Coastal Natural	E - Excellent	L - Over 500'
M - Medium	Cc - Coastal Breakwater	G - Good	Harbor
S - Small	Ct - Coastal Tide Gate	F - Fair	M - Up to 500'
V - Very Small	Rn - River Natural	P - Poor	Length
	Rb - RIVER BASIN N - NONE	N - None	
	Rt - River Tide Gate		
	Lc - Lake or Canal		
	Or - Open Roadstead		
	Tb - Tidal Bay		

WORLD PORT INDEX

CODE KEY

REPAIRS	DRYDOCK AND MARINE RAILWAY
A - Major	
B - Moderate	L - Large
C - Limited	M - Medium
D - Emergency Only	S - Small
N - None	

INDEX NUMBER	1ST PORT OF ENTRY U.S. REPRESENTATIVE EN RESIDENCE	PLONAGE		TUGS SALVAGE TUGS ASSIST	GUARANTINE		COMMUNICATIONS				LOCAL MOOR UPLOAD	MEDICAL FACILITIES DISPOSAL DIRTY BALLAST	CRANES		LIFTS		SERVICES		SUPPLIES				REFUEL RAILWAY
		COMPULSORY AVAILABLE	NON-COMPULSORY AVAILABLE		PRINCEPALE SEC CERT	OTHER	TELEPHONE TELETYPE RADIO TEL	NAVY AIR	WHARVES ANCHOR RED MOOR BLACK MOOR ICE MOOR	FIXED MALE			FLOATING	10-100 TONS FLUR 25-40 TONS	0-24 TONS	LONGSHORE ELECT	STEAM NAVO EQUIP ELECT REPAIR	PROVISIONS WATER FUEL OIL DIESEL OIL ENGINE	PROVISIONS WATER FUEL OIL DIESEL OIL ENGINE				
70	NNY	YY		NY	Y		YYYYYY	YY		Y		Y	NN	Y		Y	Y		YYYYYY	C	S		
75	NNN	Y					YY	Y		Y		Y	N						YYYYYY	C	S		
80	Y Y	YY		Y			YYYYYY	YY		Y		Y	Y	Y	Y	Y			YYYYYY	B	M		
90		YY		Y	Y		YYYYYY	YY		Y		Y	NN						YYYYYY	C	S		
100	YYY	YY	Y	NY	YY		YYYYYY	Y		Y	Y	Y	Y	Y	Y	Y			YYYYYY	B	L		
105	NNN	YY					YYYYYY	Y		Y	Y	Y	N	Y	Y				YYYYYY	C	S		
160	NNN						Y	Y		Y		Y	NN		Y	Y			YYNNNN	C	S		
170	NNN				Y			Y		Y		Y	NN						YYNNNN	C	S		
185	NNN						Y	Y		Y		Y	NN						YYNNNN	C	S		
190	YNY	YY		NY	YY		YYYYYY	Y		Y	Y	Y	Y						YYYYYY	B	M		
230	NNN						Y	Y		Y		Y	NN		Y				YY				
240	NNN			NN				Y	Y	Y		Y	NN						YY	Y	Y		
250	NNY	Y		NN	Y		Y	Y	Y	Y		Y	NN						Y	NNNN	C	S	
260	NNY	YY		NY			YYYY	Y		Y		Y	N	NNN	NNNN				YYYYYY	B	S		
270	NNN			NN			Y	Y	Y	Y		Y	N			Y					S		
280		N		NN			Y	Y	Y	Y		Y											
310	NNY	NY		NN	YY		YY	Y	Y	Y		Y	N	YNN	Y				YYYY		CMS		
320	NNN	YY		NN	Y		Y	Y	Y	Y		Y	N			Y			YYYY				
330	NNN	Y		NN			Y	Y	Y	Y		Y	N	NNN					YYYY				
340	NNN	Y	Y	NN	Y		Y	Y	Y	Y		Y	Y	Y		Y	Y		YYYYYY	B			
380	NN		YY	NN			Y	Y	Y	Y		Y	N	Y		Y			YYYY		N		
400	YNN	Y		NN	YY		YYYYYY	Y	Y	Y		Y	NN	YY		Y			YYYY		B		
420	NNY	NY		NN	Y		NY	Y	Y	Y		Y	N	Y			Y	NNYY	YYYY		C		
430	NNN	Y		NN			Y	Y	Y	Y		Y	N	Y		Y	Y		YYYY		C		
450	NN			NN			Y	Y	Y	Y		Y	N			Y			YNY		C		
470	NNN	Y	Y	NN			Y	Y	Y	Y		Y	N				N		NN		S		
480	YNY	Y		NY	Y		Y	Y	Y	Y		Y	Y	Y					YY		C		
510	YNY	Y		NY			YYYYYY	Y		Y		YN	YY	Y		YY			YYYY		C		
542	NNN	N	N	N						Y		NNNN				N					N		
543	NNN	N	N	N								NN				N			Y		D		
560	NNY	Y		NN			YYY	YYY	YYY	Y		YN	N	YY		Y			YYY		C		
580	NNN	Y	Y	NN			YYY	Y	Y	Y		YN	N	YY		Y			YYY		C		
585	NNY	NY		NN			YYY	Y	YYY	Y		YN	N	Y		Y			YYY		S		
590	NNY	NN		NN			YYY	Y	Y	Y		YN	N	Y		Y			YYY		C		
605	NY	Y							Y	Y		YN							YYYY		C		
610	YNY	YYY	NN				Y	Y	Y	Y		YN	N	Y		Y			YYY		C		
630	NNY	Y	Y	YN			YYY	Y	Y	Y		YN	N	Y		Y	Y	Y	YYY		C		



## **PDF Limitations**

- Difficult to line up proper column and row.
- Column heading difficult to read.
- Must correlate letter codes for depths, vessel size, harbor types, shelter afforded, and repairs with Code Keys at top of page.
- Due to size restrictions of the PDF, adding a new information column requires the elimination of a current column.
- Search function almost non-existent.



## **Access and Availability**

The existing WPI can be downloaded from the NGA Maritime Safety web site in the following formats:

- Adobe PDF document file.
- Windows executable files (automatically installs Adobe PDF document file).
- Microsoft Access data base.
- Shape file.





## Search Capabilities and Results

Specific World Port Index entries can be accessed only by the following choices:

- By a specific World Port Index Number.
- By a range of World Port Index Numbers.
- By country.

A screenshot of the "World Port Index Query" web interface. The interface has a title bar with "World Port Index Query:" on the left and "Query Directions" on the right. Below the title bar is a large text area. In the bottom left corner, there is a "Retrieve:" label followed by a dropdown menu. The dropdown menu is open, showing four options: "by Specific Index Number" (selected), "by Specific Index Number", "by Index Number Range", and "by Country". To the right of the dropdown menu is a "Number:" label followed by a text input field. In the bottom right corner, there is a "Search" button.



## On-line Search Results

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(Code Keys)				
Country:	YEMEN	Latitude:	12° 47' N	
Geographic Region:	48143, YEMEN ADEN	Longitude:	44° 57' E	
Publication	172	Tugs Salvage	Lifts	
Chart	62098	Tugs Assist	Y	200 Tons +
Harbor Size	M	Quarantine		50-200 Tons Y
Harbor Type	CN	Pratique		25-49 Tons Y
Shelter Afforded	G	Deratt Cert	Y	0-24 Tons
Entrance Restrictions		Other		Services
Tide	Y	Communications		Longshore Y
Swell	N	Telephone	Y	Electrical Y
Ice	N	Telegraph	Y	Steam
Other	Y	Radio	Y	Navig Equip Y
Overhead Limits		Radio Tel	Y	Elect Repair
Channel Depth	G	Air	Y	Supplies
Anchorage Depth	D	Rail		Provisions Y
Cargo Pier Depth	F	Load/Offload		Water Y
Oil Terminal Depth	F	Wharves		Fuel Oil Y
Tide	1	Anchor	Y	Diesel Oil Y
Maximum Vessel Size	M	Med Moor	Y	Deck
Good Holding Ground	Y	Beach Moor		Engine
Turning Area	Y	Ice Moor		Repair A
First Port of Entry	Y	Medical Facilities	Y	Drydock L
U.S. Representative	N	Garbage Disposal	Y	Railway S
ETA Message	Y	Degauss		
Pilotage		Dirty Ballast	Y	
Compulsory	Y	Cranes		
Available	Y	Fixed	Y	
Local Assist	Y	Mobile	Y	
Advisable	Y	Floating	Y	

1. Easier to read than the PDF document.
2. Still need to use Code Keys to explain information.
3. Same limitations on adding new information as the PDF document.
4. No search capability beyond WPI number, range of WPI numbers, or country.



## Access Search Results

WPI Data

Index No. [ ] Region [60] Country [IS]

Port Name [KEFLAVIK]

Position

Lat [64] 0 [N] Long [22] 33 [W]

Publication [181] Chart [38604]

Harbor Size [V] Harbor Type [OR] Shelter [F]

Entrance Restrictions

Tide [N] Swell [N] Ice [Y] Other [Y]

Overhead Units [ ] Maximum Size Vessel [ ]

Channel [A] Good Holding Ground [Y]

Anchorage [A] Turning Area [Y]

Cargo Pier [H] 1st Port of Entry [N]

Oil Terminal [ ] U.S. Representative [N]

Tide [S] ETA Message [Y]

Pilotage

Compulsory [Y] Local Assistance [ ]

Available [Y] Advisable [ ]

Tugs

Tug Salvage [N] Tug Assistance [Y]

Quarantine

Pratique [Y] Dred Certificate [ ] Other [ ]

Communications

Telephone [Y] Radio [Y] Air [Y]

Telegraph [Y] Radio Telephone [Y] Rail [ ]

Load/Off Load

Wharves [Y] Med Moor [ ] Beach Moor [ ]

Anchor [Y] Ice Moor [ ]

Medical Facilities [Y] Degauss [N]

Garbage Disposal [ ] Dirty Ballast [N]

Cranes

Fixed [ ] Mobile [Y] Floating [ ]

Lifts

100 Tons Plus [ ] 25-49 Tons [ ]

50-100 Tons [ ] 0-24 Tons [Y]

Services

Longshore [Y] Steam [ ] Nav Equipment [ ]

Electrical [ ] Electric Repair [ ]

Supplies

Provisions [Y] Fuel Oil [Y] Deck [Y]

Water [Y] Diesel Oil [Y] Engine [Y]

Repair [C] Drydock [ ] Railway [S]

Query by Port Name [ ] Exit [ ]

Record: 1 of 3609 [ ] [ ] Unfiltered [ ] Search [ ]

1. Easier to read than the PDF document.
2. Still need to use Code Keys to explain information.
3. Same limitations on adding new information as the PDF document.
4. No search capability beyond port name, country, or region.



## **Shape File**

1. Shows location of each port.
2. Click on locations to display port data (similar to Access view).
3. Still need to use Code Keys to explain information.
4. Users need to be familiar with GIS software and its functionality to make use of the information.
5. No other search capability.



## Editing and Updating Limitations

- **Original**—Carbonized paper sheet filled out by hand and forwarded to a data entry contractor to update the data base. Limit of 71 columns of information over 31 categories due to PDF page width.
- **Current**—Paper sheet was converted to a computerized entry form which updated the data base in house. Same limit of 71 columns/31 categories due to PDF page width.



## **Modernization Goals**

- Database structure (currently Oracle—transitioning to Postgres).
- Improved visual display of information.
- More robust search options.
- Output options in CSV, JSON, Shapefile, and File Geodatabase.
- Crowdsourcing capabilities for updating.
- Better user experience.





## **Development Timeline**

- 2013/2014—Initial briefings at NGA Publications Branch level.
- 2014—NGA presentation at SNPWG 18 (Cadiz).
- 2015-2017—Several attempts to begin upgrading the WPI delayed by NGA production priorities and resource problems (personnel and financial).
- 2017—WENDWG 7 discussed limitations (positioning and updating/editing abilities) of the legacy WPI. Requested member states to submit changes to NGA. Italy and Croatia first to submit changes.
- 2019—At WENDWG 9, NGA would begin developing an updated web-based WPI where IHO member states would be able to directly submit additions, corrections, and deletions to the database.
- 2019—NGA began the FG MOD (FG Modernization) program to upgrade all NGA Maritime Safety functions. The WPI was part of this process although low on the priority timeline.



## **Development Timeline (continued)**

- 2019—NGA signed the FG MOD development contract with ESRI to upgrade all NGA Maritime Safety functions. The WPI upgrade is part of this process although low on the priority timeline.
- 2019—Full-time Marine Analyst assigned to lead WPI development team. Team included a Data Scientist, a Notice to Mariners Subject Matter Expert (SME), and a Sailing Directions SME.
- 2019-2021—Application development, web site development, and application testing phase conducted by ESRI and NGA
- February 2021—WPI applications go live beta testing by US Government customers..
- June, 2021—Tentative launch of ArcGIS Online (AGOL) workaround. Full WWW capabilities sometime afterwards, but no definite timeline.



## Three Web Applications

- **Viewer Application**—Available to anyone. View-only format (no updating/editing capabilities). Upgraded search and downloading functions.
- **Add-a-Port Application (Geoform)**—Trusted partners can submit a new port and its applicable information. Will be reviewed by NGA prior to being added to the WPI data base.
- **Editor Application**—Trusted partners can update information for an existing port in the WPI data base. Will be reviewed by NGA prior to updating the data base.

**Note**--Access to the WPI will be through the NGA Maritime Safety web site (<https://msi.nga.mil>).



# WPI Viewer Application (Including Major Search Tools)



## Search Tools

1. Ports Search Bar (search by port name or WPI Number).
2. WPI Data DownloadTool (link to Filter Tool and Geographic Areas of Interest Tool).
3. Filter Tool (access to all search attributes)
4. Attribute Table. (results shown in tabular format)



# WPI Data Download Tool and Filter Tool

WPI Data Download

Input

Output

File Format\*

File Geodatabase

File Name\*

wpi\_data\_download

Optionally filter the Ports you would like to download by using the Filter widget and/or drawing an area of interest on the map.

Filter Widget

Area of Interest

[Help](#)

Start Download

Filter

Refresh Filter Results

☒

Layer

World Port Index Viewer

Get features in the layer that match

All

of the following expressions

Harbor Size (String)

is

Medium

Country Code (String)

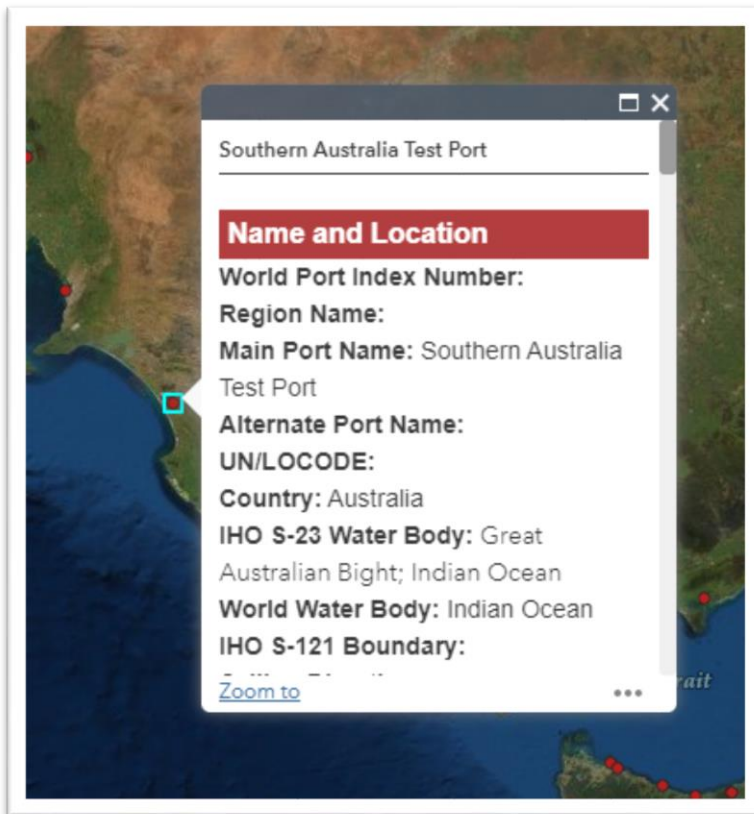
is

United States

+ Add Criteria



## Sample Port Data Display



- Better display of results.
- Data sorted by topics
- Latitude/longitude values are more accurate
- Numerical values are more accurate.
- Elimination of letter codes and Code Keys.





## WPI Sample Port Attribute Display

World\_Port\_Index\_Production

Options ▾ Filter by map extent Zoom to ☑ Clear selection Refresh

World Port Index Number	Region Name	Main Port Name	Alternate Port Name	UN/LOCODE	Country	IHO S-23 Water Body	World Water Body	IHO S-121 Boundary	Sailing Direction or Publication
31750	ENGLAND EAST COAST -- 31330	SEAHAM			United Kingdom				
31760	ENGLAND EAST COAST -- 31330	SUNDERLAND			United Kingdom				
31765	ENGLAND EAST COAST -- 31330	TYNEMOUTH			United Kingdom				
31820	ENGLAND EAST COAST -- 31330	BLYTH			United Kingdom				
31830	ENGLAND EAST COAST -- 31330	WARKWORTH HARBOUR			United Kingdom				

27 features 0 selected



## **More Robust Search Options**

- General—WPI Number, port name, harbor type, harbor size, etc.
- Geographic—Position, polygons, ocean basin, country, etc.
- Vessel parameters—Size, loa, draft, beam, etc.
- Port/pier/facilities information—Type of facility, alongside depth, etc.
- Pilotage, tugs, and communications requirements/availability.
- Approaches—VTS, TSS, ETA message.
- Services (longshoremen, electricity, medical, etc.) and services (water, fuel, provisions, repairs, etc.).
- Port restrictions—Channel depth, entrance restrictions, ice, etc.



# WPI Add-a-Port (Geoform) Application

**Add a Port**  
Use the form below to add a new port to the WPI database. Information entered is not saved until after the Submit button is clicked at the bottom of the form.

**1. Select Location**  
Specify the location for this entry by clicking/tapping the map or by using one of the following options.

Search

Valid formats include Decimal Degrees, Degrees Minutes, or Degrees Minutes Seconds (N/S, E/W, or +/-)

Latitude (°)

Longitude (°)

41°20'03.79"N 164°42'20.79"W

**2. Enter Information**

▶ Name and Location
▶ Depths
▶ Maximum Vessel Size
▶ Physical Environment
▶ Approach
▶ Pilots, Tugs, Communications
▶ Facilities
▶ Cranes
▶ Services and Supplies

**3. Complete Form**  
Add the port to the map. By clicking "Submit," I certify all information is true and correct to the best of my knowledge.

## Information Fields/Attributes

1. Name and Location—Name(s), UN/LOCODE, Country (4).
2. Depths (7).
3. Maximum Vessel Size (6).
4. Physical Environment—Harbor Information, Entrance Restrictions (12).
5. Approach—ETA, VTS, TSS, Quarantine (9).
6. Pilots, Tugs, Communications (13).
7. Facilities—Cargo Type, Moorings (19).
8. Cranes—Type, Lifting Power (8).
9. Services and Supplies (16).

**Note.**—Total number of attributes—94



# WPI Editor Application

Smart Editor

MaritimeType

Port

Maritime Resource Name

☐ Edit Geometry

Latitude (Y)

-37|254722

Longitude (X)

139.835556

Valid formats include Decimal Degrees, Degrees Minutes, or Degrees Minutes Seconds (N/S, E/W, or +/-)

By clicking "Submit," I certify all information is true and correct to the best of my knowledge.

Back

Delete

Submit

Filter

Refresh Filter Results

Layer

World Port Index Viewer

Get features in the layer that match All of the following expressions

Harbor Size (String)

is

Medium

Country Code (String)

is

United States

+ Add Criteria



## **End Result**

- Expanded information availability.
- More robust search options.
- Better visual display of information.
- Improved data input/update processes.
- Improved user experience.



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Questions?

Comments?

Suggestions?

Insight?





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