

**Enclosure 1 to the Port Access Route Study:
The Pacific Coast from Washington to California – Vessel
Traffic Coastal Analysis**

Analysis conducted by LT Nicholas Buch
District Eleven Prevention Waterways (D11 dpw)
May 2022

Table of Contents

List of Tables	3
1. Background	4
2. Materials and Data	4
A. Data	4
B. Tools and Software	5
3. Methodology	5
A. Study Area	5
B. Track-Line Creation	5
C. Track-Line Composition	6
D. Mapping Vessel Densities	6
E. Passage Line Analysis	6
4. Analysis Results	6
A. All Vessels	8
B. Ship-Type Categories	8
a. Fishing Vessels	8
b. Tug/Tow Vessels	9
c. Recreational Vessels	9
d. Passenger Vessels	10
e. Cargo Vessels	10
f. Tanker Vessels	11
g. ‘Other’ Vessels	11
h. Null/Unavailable Vessels	11
C. Summary	12
References	13
Attachment 1 – Study Area and Existing Routing Measures	14
Attachment 2 – Traffic Composition Results	17
Attachment 3 – Vessel Density Results	45
Attachment 4 – Passage Line Results	104
Attachment 5 – Vessel Length, Draft, and Tonnage Results	116

List of Tables

TABLE 1. THE BREAKDOWN OF SHIP-TYPES AND ASSOCIATED CODES USED TO CATEGORIZE VESSELS FOR THE COASTAL ANALYSIS.....	5
TABLE 2. AIS STATISTICS FOR EACH SHIP-TYPE CATEGORY. THIS TABLE PROVIDES A SUMMARY OF STATISTICS BASED ON A ‘PER VESSEL’ TOTAL OF TRACKS AND TRANSIT DISTANCES.	7

1. Background

The Pacific Coast Port Access Route Study (PAC-PARS) evaluated traditional, and industry agreed upon shipping routes to include current fairways and International Maritime Organization (IMO) adopted routing measures. This requires an understanding of how vessels currently operate and how they will likely operate in the future. United States Coast Guard Pacific Area Command (PACAREA) reviewed the increased demand for access and use of Pacific Coast waters under U.S. jurisdiction using Automatic Identification System (AIS) transmission data. 33 CFR § 164.46 lists the various AIS carriage requirements for vessels in U.S. navigable waters, as defined in 33 CFR § 2.36. In addition to these requirements, Safety of Life At Sea (SOLAS) (SOLAS, 1974) AIS carriage requirements remain applicable to select vessels outside of U.S. waters.

2. Materials and Data

A. Data

The coastal analysis used AIS datasets made available on MarineCadastre.gov. Marine Cadastre provides ocean and spatial planning data for federal, state, and public consumption. The AIS data published on MarineCadastre.gov originates from U.S. Coast Guard (USCG) Nationwide Automatic Identification Systems (NAIS). Data for this study was compiled for the calendar years 2012, 2015, and 2017–2021. These years were selected in order to determine the average activity over the last 5-years, as well as 3-year snapshots beginning in 2012 to showcase changes given various AIS carriage requirement and environmental regulation shifts over the last decade. AIS data contains fields that require user-defined information to be input for each vessel's transmission. These information fields include characteristics such as the vessel name, ship type, cargo type, draft, dimensions, and destination. If the vessel user fails to input the above information, then it limits the information available in the collected data. This leads to metrics such as length and draft representing only a portion of the total data collected.

AIS data prior to March of 2016 is potentially limited based on historical AIS carriage requirements in the U.S. and limited accessibility for voluntary installation within the recreational boater community. Not all vessels are required to broadcast AIS. Despite these limitations, AIS data is a suitable representation of where AIS carrying vessels are operating and what changes are occurring over time for each ship-type category in the study area. Null/unavailable ship-type codes tend to have a large diversity in transit types and distances. This is due to all missing or incorrect entries defaulting to this category. The "Other" ship-type represents those vessels that fall into a group not defined by the other ship-type codes available. Table 1 shows the breakdown of ship-type codes and groupings used in this study. It is not inclusive of all ship-type codes available to be programmed.

AIS Ship-Type Code	Vessel Group
0/Null	Null/Unavailable
30	Fishing
31, 32, 52	Tug/Tow
36, 37	Recreational
60-69	Passenger
70-79	Cargo
80-89	Tanker
90-99	Other

Table 1. The breakdown of ship-types and associated codes used to categorize vessels for the coastal analysis.

B. Tools and Software

The tools and software utilized for this process were:

- a. ArcGIS Desktop, ArcPro 2.9 by ESRI, was used to produce and view all map visualizations, vessel densities and associated calculations, and overlays.
- b. Marine Cadastre’s Track Builder Pro 1.0 toolbox created the track-lines used in this analysis.

3. Methodology

A. Study Area

The Pacific Coast – Port Access Route Study (PAC-PARS) is described as all waters of the Pacific Ocean from the baseline of Washington, Oregon, and California extending to the outer boundary of the United States Exclusive Economic Zone (EEZ). The PAC-PARS focused on the outer Traffic Separation Schemes (TSS) interaction with port and coastal routing to include IMO recommended, industry-agreement, and historically used vessel routes. This study will only address individual TSS if there is a need to examine how they interact with coastal routing. The study area and existing vessel routing measures can be found in Attachment 1.

B. Track-Line Creation

Coastal track-lines were created using Marine Cadastre’s Track Builder Pro 1.0 toolbox. This toolbox uses AIS transmission data to construct the tracks based on the timestamp and Maritime Mobile Service Identity (MMSI). The AIS data was filtered to an area bound by the following lines of latitude and longitude: 30°N, 50°N, 130°W, and 116°W. This data was used to construct track line routes based on a track-break separation of either no greater than six hours or no more than 90 nautical miles between data points.

C. Track-Line Composition

Three metrics were determined from track-line data: ‘unique’ vessels (the count of individual MMSI) and track count (based on the above track line creation criteria). Additional metrics associated with the vessel MMSI included: length, draft, and tonnage. The metrics were subdivided into four zones: 0-12 nautical miles (nm), 12-24 nm, 24-200 nm, and 0-200 nm from the baseline of the U.S. The zones can be seen in the Study Area map provided in Attachment 1.

D. Mapping Vessel Densities

Vessel densities were created using the track-line data in ArcGIS software. The output calculation was a raster of values representing the summed length of transits per square kilometer (km/km²). Vessel densities were created for all vessels, the selected ship-type groups, and the first and third quarters of the calendar year to visualize any seasonal shifts. The annual vessel densities were averaged for the years 2017-2021 to create a single representation of the primary routes used for each ship-type. The quarterly densities were averaged over the years 2017-2021 to ensure that any seasonal changes represent ongoing trends and not a single year’s variation. Annual densities were included at three-year intervals to show changes over time. These included 2012, 2015, 2018, and 2021. The symbology for the resultant vessel densities was a stretch function applied to the raster. The individual years’ vessel densities all share their respective 2021 map’s symbology to show changes relative to the same scale. This means that while different ship-type densities cannot be directly compared, different years within the same category can. The same was done for quarterly densities, where the third quarter’s symbology was applied to the first quarter. Similar to the annual densities, different ship-types cannot be directly compared.

E. Passage Line Analysis

A passage line analysis involves selecting specific areas and placing lines or polygons that intersect perpendicular to traffic flow. Those vessels and transits that intersect are counted to better understand traffic patterns and the concentration of vessels within a specific area. These passage lines do not contribute to the overall traffic composition and were used for local evaluation of a particular region for the comprehensive analysis. While some vessels may intersect one or more lines, there are still transits operating in the study area between each line that remains uncaptured.

4. Analysis Results

Hundreds of thousands of track lines were recorded every year in the PAC-PARS study area. These were captured and enumerated for each zone outlined in the track-line composition section. While each zone shares much of the same traffic, they provided a breakdown of generally how far vessels operated offshore (<12nm, 12-24nm, >24nm). Null/Unavailable ship-types were removed from the number of unique vessels, track count, and transit distance data metrics to ensure trends seen were represented by those vessels with identifiable characteristics.

Table 2 shows the breakdown of the AIS data statistics for 2012, 2015, and 2017-2021, calculated on the transit length and track count totals of each individual MMSI.

	Vessel Count		Track Count Per Vessel		
	Unique Vessels	Max	Median	Avg	
2021					
Unavailable	727.00	13,958.00	3.00	30.83	
Fishing	784.00	247.00	9.00	16.08	
Tug/Tow	242.00	178.00	6.00	12.84	
Recreational	4,046.00	273.00	7.00	10.95	
Passenger	299.00	280.00	19.00	44.63	
Cargo	3,272.00	402.00	2.00	9.64	
Tanker	600.00	221.00	3.00	8.46	
Other	375.00	304.00	8.00	19.99	
Total	10,345.00				
2020					
Unavailable	1,359.00	953.00	2.00	7.86	
Fishing	702.00	232.00	7.00	14.39	
Tug/Tow	220.00	150.00	5.00	12.24	
Recreational	3,390.00	310.00	5.00	10.83	
Passenger	276.00	262.00	11.00	38.14	
Cargo	2,520.00	192.00	2.00	6.51	
Tanker	475.00	185.00	2.00	9.84	
Other	334.00	286.00	7.00	18.01	
Total	9,276.00				
2019					
Unavailable	1,085.00	1,755.00	2.00	6.57	
Fishing	698.00	305.00	7.00	13.88	
Tug/Tow	223.00	118.00	5.00	10.00	
Recreational	3,218.00	181.00	5.00	8.64	
Passenger	337.00	353.00	9.00	43.66	
Cargo	2,486.00	228.00	2.00	2.97	
Tanker	584.00	202.00	2.00	3.44	
Other	367.00	279.00	7.00	16.35	
Total	8,998.00				
2018					
Unavailable	853.00	225.00	2.00	4.46	
Fishing	674.00	485.00	8.00	15.72	
Tug/Tow	218.00	117.00	6.00	13.43	
Recreational	2,761.00	113.00	5.00	8.49	
Passenger	311.00	312.00	11.00	43.32	
Cargo	2,775.00	227.00	2.00	2.94	
Tanker	582.00	212.00	2.00	3.74	
Other	364.00	319.00	7.00	17.92	
Total	8,538.00				
2017					
Unavailable	1,131.00	308.00	3.00	7.81	
Fishing	524.00	298.00	8.00	16.40	
Tug/Tow	216.00	225.00	7.00	13.82	
Recreational	1,895.00	170.00	5.00	10.09	
Passenger	296.00	324.00	13.00	41.86	
Cargo	3,055.00	242.00	2.00	2.85	
Tanker	638.00	318.00	2.00	4.34	
Other	357.00	334.00	6.00	15.93	
Total	8,112.00				
2015					
Unavailable	714.00	423.00	4.00	10.73	
Fishing	395.00	69.00	8.00	15.19	
Tug/Tow	218.00	105.00	8.00	12.50	
Recreational	1,449.00	26.00	6.00	9.82	
Passenger	184.00	123.00	11.50	39.11	
Cargo	2,962.00	167.00	2.00	3.05	
Tanker	559.00	8.00	2.00	4.18	
Other	306.00	46.00	5.00	17.76	
Total	6,787.00				
2012					
Unavailable	1,099.00	312.00	6.00	11.55	
Fishing	162.00	58.00	4.00	8.74	
Tug/Tow	210.00	180.00	9.00	17.60	
Recreational	136.00	224.00	4.00	8.68	
Passenger	78.00	297.00	4.00	23.92	
Cargo	3,095.00	102.00	2.00	3.47	
Tanker	471.00	45.00	3.00	6.47	
Other	117.00	109.00	3.00	11.12	
Total	5,368.00				

Table 2. A summary of the trackline data for each ship-type category. This table provides the number of unique vessels, the maximum, median, and average number of tracks belonging to a single vessel within each ship-type.

A. All Vessels

Based on the graphs included in Attachment 2, the number of unique vessels and total tracks in the study area increased between 2012 and 2021. In addition, there was a decrease in the rate of growth of the number of unique vessels operating in 2019 and 2020. This could have been due to COVID-19, supply chain disruptions, or other unknown factors beyond the scope of this study. The quarterly plots showed a notable seasonality in all three metrics across all years. The highest levels of activity were repeatedly seen in CY quarter three, and the lowest activity was seen in CY quarter one.

The vessel length distribution represents those vessels that had length values associated with their AIS broadcast data. Given all AIS data collected between 2012 and 2021, 80.1% of vessels had this characteristic. The draft distribution represents those vessels that had draft values associated with their AIS broadcast data. Given all AIS data collected between 2015 and 2021, 40.3% had this characteristic. The vessel tonnage distribution represents those vessels that were associated to a USCG Authoritative Vessel Identification Service (AVIS) dataset. Given the AIS data collected between 2015 and 2021, 44.6% of vessels were able to be associated with a tonnage value.

Annual vessel densities saw vessels operating in all regions within the study area. Notable areas of high density included: the entrances of Puget Sound and the Columbia River, San Francisco, the regions surrounding Santa Barbara and the Channel Islands, Los Angeles/Long Beach, and San Diego. There is indication of transits along the coast occurring approximately 25-45 nm and 50-75 nm off of northern California, Oregon, and appearing to terminate at Puget Sound. Some vessels appear to generally follow the IMO recommended routes extending south from San Francisco towards the Channel Islands. The Santa Barbara TSS appeared to include the vast majority of traffic in the region, but it is noted that there are transits showing moderate intensity extending through the Channel Islands, and western extending transits directly south of the Channel Islands. It appeared that coastal transits shifted closer to shore over time, with more western-extending transits occurring in recent years. The quarterly densities saw large shifts in the vessel density of various regions along the coast, most notably the coastal waters off of Oregon and Washington.

The passage lines were placed in the most heavily transited areas according to the vessel densities. The results of the passage line analysis revealed that on average the most activity was seen in southern California along the Santa Barbara TSS and transiting between the Santa Barbara TSS and San Francisco. Complete results can be found in Attachment 4.

B. Ship-Type Categories

a. Fishing Vessels

Fishing Vessels included all AIS ship-type codes defined in Table 1. Based on the graphs included in Attachment 2, the number of unique fishing vessels and total tracks in the study area increased between 2012 and 2021. In addition, there was a decrease in the rate of growth of the number of vessels operating in 2019 and 2020. Similar to ‘all vessels’, this could have been due to COVID-19, supply chain disruptions, or other unknown factors beyond the scope of this

analysis. The CY quarterly plots showed a notable seasonality across all years. The highest levels of activity were repeatedly observed in CY quarter three, and the lowest activity was seen in CY quarter one.

Annual vessel densities saw fishing vessels operating more off the coasts of Washington and Oregon. This activity extended farther offshore than activity seen in California, where the vessel activity generally stayed within 25 nm of shore. California was observed to have increased vessel density surrounding Humboldt Bay, San Francisco, Monterey, the Channel Islands, and San Diego. Quarterly vessel densities saw an overall increase in activity in CY quarter three when compared to CY quarter one.

The passage lines were not placed specifically for fishing vessels, as their activity showed no apparent indications of coastal routing and covered large regions. Of those lines placed, the number of fishing vessels and tracks were enumerated and can be found in Attachment 4.

b. Tug/Tow Vessels

Tug and tow vessels included all AIS ship-type codes defined in Table 1. Based on the graphs included in Attachment 2, the number of unique tug and tow vessels in the study area saw very little annual change over time. There was no observed seasonality in the CY quarterly plots.

Annual vessel densities saw tug and tow vessels operating along the entire study area. The entrances to Puget Sound and the Columbia River, San Francisco, Los Angeles/Long Beach, and San Diego all displayed higher tug and tow densities. Washington and Oregon saw defined near-shore transits with the most intensity north of Coos Bay. These likely follow the crabber-towboat lane agreement (Washington, 2020). Transits seen south of San Francisco appear to follow the shortest path between ports, with notable traffic within the Santa Barbara TSS and south of the Channel Islands. Across the entire study area, it is evident that there are three groupings of tug and tow transits between ports at various distances from shore: <25nm, 25-50nm, and >50nm. These can best be seen extending out of San Francisco. Quarterly densities appeared saw a notable shift where tug and tow vessels were transiting between Columbia River and Coos Bay. In CY quarter one, the transits pushed farther from shore, while CY quarter three had the transits remaining near-shore. Other changes observed included an overall drop in vessel density in CY quarter one when compared to CY quarter three.

Passage lines were placed on commonly seen tug and tow vessel transits occurring along the coast. The results of these passage lines can be found in Attachment 4.

c. Recreational Vessels

Recreational vessels included all AIS ship-type codes defined in Table 1. Recreational vessels less than 65 feet in length per the requirements set forth in 33 CFR § 164.46 are not required to broadcast with AIS. Despite this, the graphs included in Attachment 2 indicate the number of unique recreational vessels using AIS in the study area rapidly increased between 2012 and 2021. The quarterly plots displayed a seasonality for this ship-type category. The highest activity was seen in CY quarter three, and the lowest activity was seen in CY quarter one.

Annual vessel densities showed recreational vessels operating along the entire study area, primarily near shore with minimal offshore activity. The greatest activity was seen near San Francisco and the region surrounding the Channel Islands. Puget Sound and Columbia River saw some activity in their immediate vicinity, but it quickly dissipated offshore. Other changes observed included an overall drop in vessel density in CY quarter one when compared to CY quarter three.

No passage lines were specifically placed to capture recreational vessel activity. Of those lines placed, the number of recreational vessels and tracks were enumerated and can be found in Attachment 4.

d. Passenger Vessels

Passenger vessels included all AIS ship-type codes defined in Table 1. Based on the graphs included in Attachment 2, the number of unique passenger vessels and total tracks in the study area increased between 2012 and 2019. Passenger vessels saw a decrease in the number of unique vessels and tracks in 2020, likely due to restrictions caused by COVID-19. The quarterly plots appeared to have an inconsistent seasonality for the number of vessels operating within the study area, but the total track count saw a notable seasonality. In general, it was observed that the highest passenger vessel activity was in CY quarter three, and the lowest activity was in CY quarter one.

Annual vessel densities showed passenger vessels operating along the entire length of the study area. Only four areas were noted to show higher activity: the northern approaches and departures to Puget Sound, Los Angeles/Long Beach, the region surrounding the Channel Islands, and San Diego. Quarterly densities saw less overall activity in CY quarter one when compared to CY quarter three. Most of the activity north of San Francisco disappears in CY quarter one, with CY quarter three closely resembling the average annual density.

Passage lines were placed on commonly seen passenger vessel transits occurring along the coast. The results of these passage lines can be found in Attachment 4.

e. Cargo Vessels

Cargo vessels included all AIS ship-type codes defined in Table 1. Based on the graphs included in Attachment 2, the number of unique cargo vessels in the study area varied between 2012 and 2021, with the highest activity observed in 2021. The track count saw a decline between 2012 and 2019, but began increasing significantly in 2020 and 2021. The quarterly plot for the number of vessels saw inconsistent seasonal changes. Similar to the annual track count, 2020 and 2021 saw increased track counts occurring near CY quarter three of each respective year.

Annual vessel densities showed cargo vessel activity present throughout the study area. Many western-extending transits occurred from Puget Sound, Columbia River, San Francisco, the western termination of the Santa Barbara TSS, and the southern termination of the Los Angeles/Long Beach TSS. Additional western-extending transits occur at other nearby locations, but do not appear to be as prominent. In addition, the densities indicated transits occurring outside of the TSS between the western termination of the Santa Barbara TSS and the southern

San Francisco TSS. Cargo vessels appear to follow common transits along the coast approximately 25-40 nm off of the coastline of California and then follow a north-south transit extending to Puget Sound. Other changes observed included an overall drop in vessel density in CY quarter one when compared to CY quarter three.

Passage lines were placed on commonly seen cargo vessel transits occurring along the coast. The results of these passage lines can be found in Attachment 4.

f. Tanker Vessels

Tanker vessels included all AIS ship-type codes defined in Table 1. Based on the graphs included in Attachment 2, the number of unique tanker vessels operating in the study area varied between 2012 and 2021. The track count saw a decline between 2012 and 2019, but significantly increased in 2020. The quarterly plot for the number of vessels saw inconsistent seasonal changes. Similar to the annual track count, quarterly plots saw increased track counts occurring near CY quarter three of 2020 and 2021.

Annual vessel densities showed tanker vessel activity present throughout the study area. Similar western-extending transits could be seen for tanker vessels that were present for cargo vessels, but with less overall activity. Areas of higher traffic outside of any TSS appeared to follow north-south bound transits from Puget Sound to San Francisco and the Channel Islands. The most prominent tanker vessel traffic appeared to remain approximately 50-75 nm offshore unless making an approach to a port. Other changes observed included an overall drop in vessel density in CY quarter one when compared to CY quarter three.

Passage lines were placed on commonly seen tanker vessel transits occurring along the coast. The results of these passage lines can be found in Attachment 4.

g. 'Other' Vessels

'Other' vessels included all AIS ship-type codes defined in Table 1. Based on the graphs included in Attachment 2, the number of unique 'other' vessels operating in the study area increased annually from 2012 to 2019. A decline was seen in 2020 and continued to increase again in 2021. The track count saw a similar trend, except 2019 and 2020 saw a decline before increasing again in 2021. Quarterly plots saw an inconsistent seasonality. The quarterly plot of the total track count saw consistent seasonality between 2018 and 2021. The data prior to 2018 indicated some seasonality, but were observed to be less consistent year-to-year.

Annual vessel densities show 'other' vessels operating throughout the entire study area, but with few locations indicating prominent offshore activity. The most notable areas include approaches and departures to: Puget Sound, Columbia River, San Francisco, Monterey, Santa Barbara and the Channel Islands region, Los Angeles/Long Beach, and San Diego. The majority of activity is seen in southern California. Other changes observed included an overall drop in vessel density in CY quarter one when compared to CY quarter three.

No passage lines were specifically placed to capture 'other' vessel activity. Of those lines placed, the number of 'other' vessels and tracks were enumerated and can be found in Attachment 4.

h. Null/Unavailable Vessels

Null/Unavailable vessels included all AIS ship-type codes defined in Table 1. Based on the graphs included in Attachment 2, the number of null/unavailable vessels and tracks in the study area varied from 2012 through 2021, but was highest in 2020.

A five-year average vessel density was created for this ship-type category to showcase the variable activity within this group. Patterns characteristic to the other defined ship-type categories' vessel densities were present in the null/unavailable density. In addition, there were areas of irregularly high activity throughout the study area.

C. Summary

This analysis provided a breakdown of AIS vessel characteristics for 2012, 2015, and 2017-2021 at a coastal scale. The results for fishing, recreational, passenger, and 'other' ship-type categories had observable growth through 2018. Fishing, passenger, and 'other' ship-types saw 2019, 2020, or both years declining in activity. A recovery was observed for each of the ship-types in 2021, with fishing and 'other' vessels having activity greater than that seen in 2018. Tug and tow vessels saw little change over time, with only 32 vessels in 2021 than in 2012. Cargo and tanker vessels had varying activity, but each was noted to see an increase in activity for 2021.

Viewing this data at a different scale may provide more insight into where these vessels are operating, and how they are changing year-to-year. The above results summarized only some of the data collected.

References

Background:

SOLAS. (1974). *International Convention for the Safety of Life at Sea*. International Maritime Organization (IMO).

International Maritime Organization (IMO). (2019). *Ships' Routeing*. London: IMO

Data:

Marine Cadastre. (2022). *Vessel Traffic Data*. Retrieved from MarineCadastre.gov:
<https://marinecadastre.gov/ais/>.

NOAA Office of Coast Survey. (2022). *ENCIRECT*. Retrieved from <https://encdirect.noaa.gov/>.

Washington, S. G. (2020). *Crabber/Towboat Lane Agreement*. Retrieved from University of Washington; College of the Environment: <https://wsg.washington.edu/community-outreach/outreach-detail-pages/crabbertowboat-lane-agreements-download-charts-data-and-meetings/>

Attachment 1 – Study Area, Existing Routing Measures, and Industry
Agreed Shipping Routes

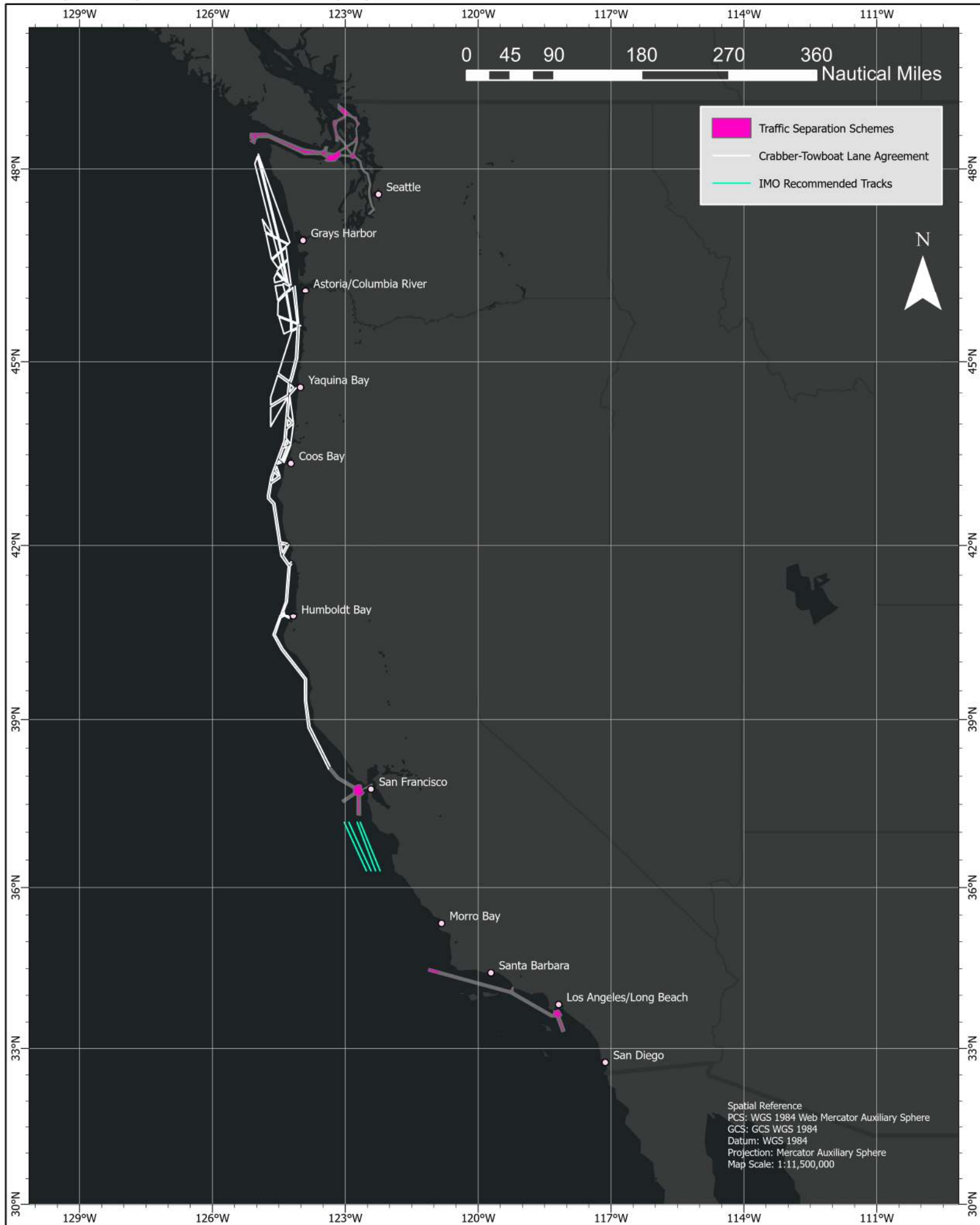
Pacific Coast Port Access Route Study Area (PAC-PARS) with zones (0-12 nm, 12-24 nm, 24-200 nm)



Spatial Reference
PCS: WGS 1984 Web Mercator Auxiliary Sphere
GCS: GCS WGS 1984
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere
Map Scale: 1:11,500,000

Basemap: Esri, HERE, Garmin, FAO, NOAA, USGS, EPA. Overlays: USCG. Additional overlay information documented in the Pacific Coast Port Access Route Study (PAC-PARS).

Existing Routing Measures and Industry Agreements



Attachment 2 – Traffic Composition Results

LIST OF FIGURES

FIGURE 1. THE ANNUAL NUMBER OF ‘ALL VESSELS’	2-2
FIGURE 2. THE ANNUAL TOTAL TRACK COUNT OF ‘ALL VESSELS’	2-2
FIGURE 3. THE AVERAGE TRACKS PER VESSEL BASED ON ‘ALL VESSELS’	2-3
FIGURE 4. THE QUARTERLY NUMBER OF ‘ALL VESSELS’	2-3
FIGURE 5. THE QUARTERLY TOTAL TRACK COUNT OF ‘ALL VESSELS’	2-4
FIGURE 6. THE ANNUAL NUMBER OF ‘FISHING VESSELS’	2-5
FIGURE 7. THE ANNUAL TOTAL TRACK COUNT OF ‘FISHING VESSELS’	2-5
FIGURE 8. THE AVERAGE TRACKS PER VESSEL BASED ON ‘FISHING VESSELS’	2-6
FIGURE 9. THE QUARTERLY NUMBER OF ‘FISHING VESSELS’	2-6
FIGURE 10. THE QUARTERLY TOTAL TRACK COUNT OF ‘FISHING VESSELS’	2-7
FIGURE 11. THE ANNUAL NUMBER OF ‘TUG/TOW VESSELS’	2-8
FIGURE 12. THE ANNUAL TOTAL TRACK COUNT OF ‘TUG/TOW VESSELS’	2-8
FIGURE 13. THE AVERAGE TRACKS PER VESSEL BASED ON ‘TUG/TOW VESSELS’	2-9
FIGURE 14. THE QUARTERLY NUMBER OF ‘TUG/TOW VESSELS’	2-9
FIGURE 15. THE QUARTERLY TOTAL TRACK COUNT OF ‘TUG/TOW VESSELS’	2-10
FIGURE 16. THE ANNUAL NUMBER OF ‘RECREATIONAL VESSELS’	2-10
FIGURE 17. THE ANNUAL TOTAL TRACK COUNT OF ‘RECREATIONAL VESSELS’	2-11
FIGURE 18. THE AVERAGE TRACKS PER VESSEL BASED ON ‘RECREATIONAL VESSELS’	2-12
FIGURE 19. THE QUARTERLY NUMBER OF ‘RECREATIONAL VESSELS’	2-12
FIGURE 20. THE QUARTERLY TOTAL TRACK COUNT OF ‘RECREATIONAL VESSELS’	2-13
FIGURE 21. THE ANNUAL NUMBER OF ‘PASSENGER VESSELS’	2-14
FIGURE 22. THE ANNUAL TOTAL TRACK COUNT OF ‘PASSENGER VESSELS’	2-14
FIGURE 23. THE AVERAGE TRACKS PER VESSEL BASED ON ‘PASSENGER VESSELS’	2-15
FIGURE 24. THE QUARTERLY NUMBER OF ‘PASSENGER VESSELS’	2-15
FIGURE 25. THE QUARTERLY TOTAL TRACK COUNT OF ‘PASSENGER VESSELS’	2-16
FIGURE 26. THE ANNUAL NUMBER OF ‘CARGO VESSELS’	2-17
FIGURE 27. THE ANNUAL TOTAL TRACK COUNT OF ‘CARGO VESSELS’	2-17
FIGURE 28. THE AVERAGE TRACKS PER VESSEL BASED ON ‘CARGO VESSELS’	2-18
FIGURE 29. THE QUARTERLY NUMBER OF ‘CARGO VESSELS’	2-18
FIGURE 30. THE QUARTERLY TOTAL TRACK COUNT OF ‘CARGO VESSELS’	2-19
FIGURE 31. THE ANNUAL NUMBER OF ‘TANKER VESSELS’	2-20
FIGURE 32. THE ANNUAL TOTAL TRACK COUNT OF ‘TANKER VESSELS’	2-20
FIGURE 33. THE AVERAGE TRACKS PER VESSEL BASED ON ‘TANKER VESSELS’	2-21
FIGURE 34. THE QUARTERLY NUMBER OF ‘TANKER VESSELS’	2-21
FIGURE 35. THE QUARTERLY TOTAL TRACK COUNT OF ‘TANKER VESSELS’	2-22
FIGURE 36. THE ANNUAL NUMBER OF ‘OTHER VESSELS’	2-23
FIGURE 37. THE ANNUAL TOTAL TRACK COUNT OF ‘OTHER VESSELS’	2-23
FIGURE 38. THE AVERAGE TRACKS PER VESSEL BASED ON ‘OTHER VESSELS’	2-24
FIGURE 39. THE QUARTERLY NUMBER OF ‘OTHER VESSELS’	2-24
FIGURE 40. THE QUARTERLY TOTAL TRACK COUNT OF ‘OTHER VESSELS’	2-25
FIGURE 41. THE ANNUAL NUMBER OF ‘NULL/UNAVAILABLE VESSELS’	2-26
FIGURE 42. THE ANNUAL TOTAL TRACK COUNT OF ‘NULL/UNAVAILABLE VESSELS’	2-26
FIGURE 43. THE AVERAGE TRACKS PER VESSEL BASED ON ‘NULL/UNAVAILABLE VESSELS’	2-27

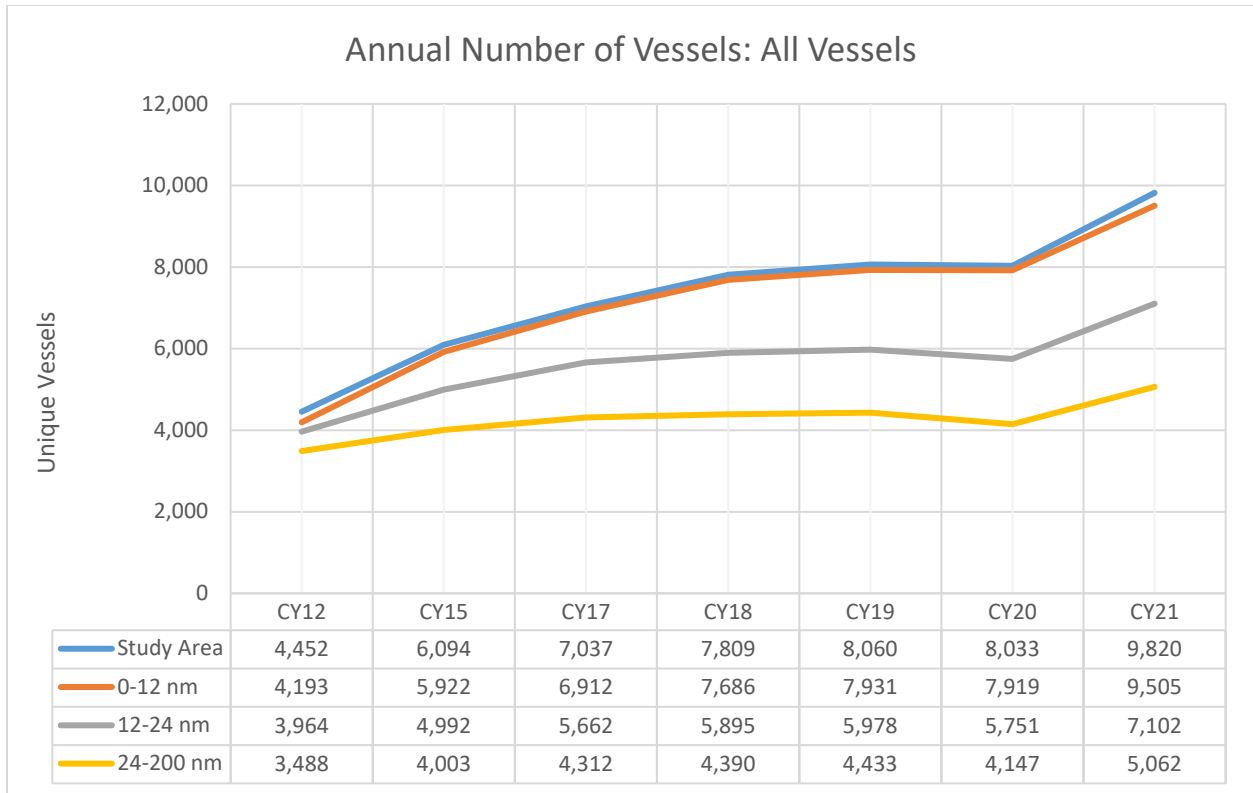


Figure 1. The annual number of 'All Vessels'.

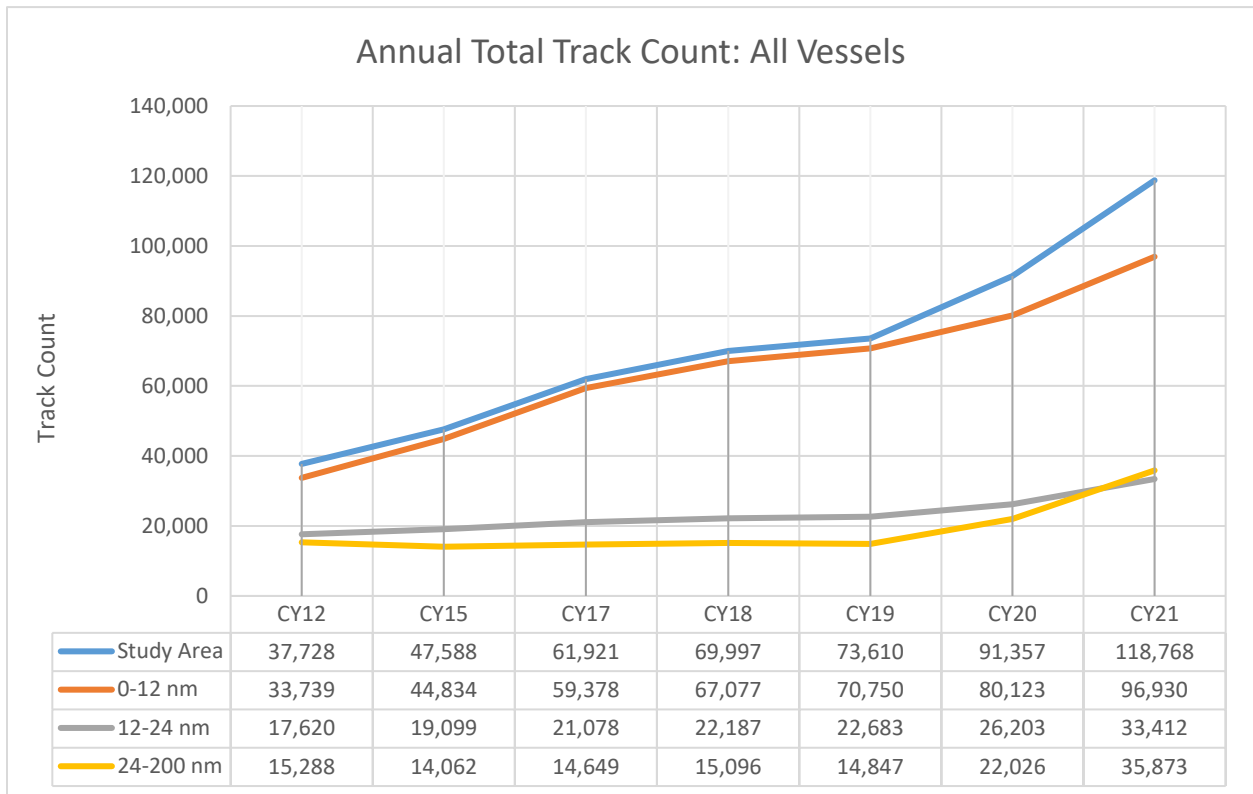


Figure 2. The annual total track count of 'All Vessels'.

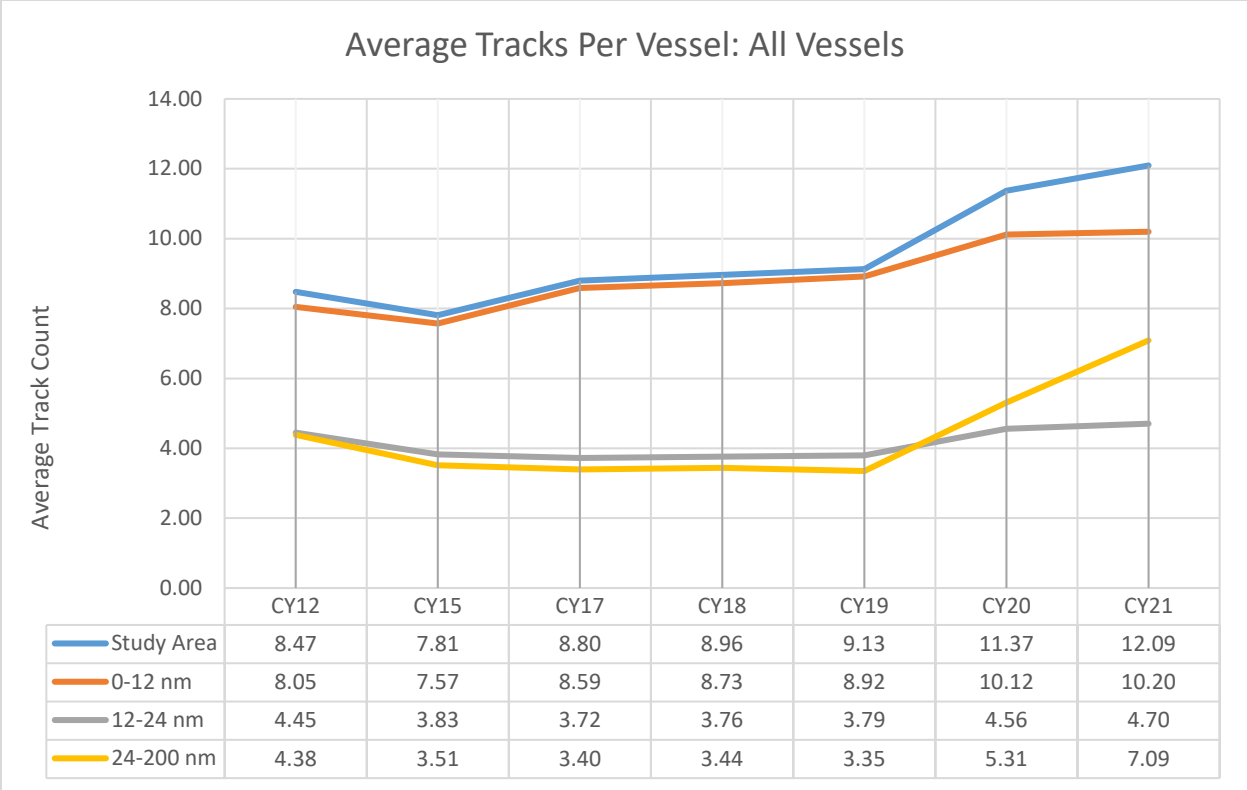


Figure 3. The average tracks per vessel based on 'All Vessels'.

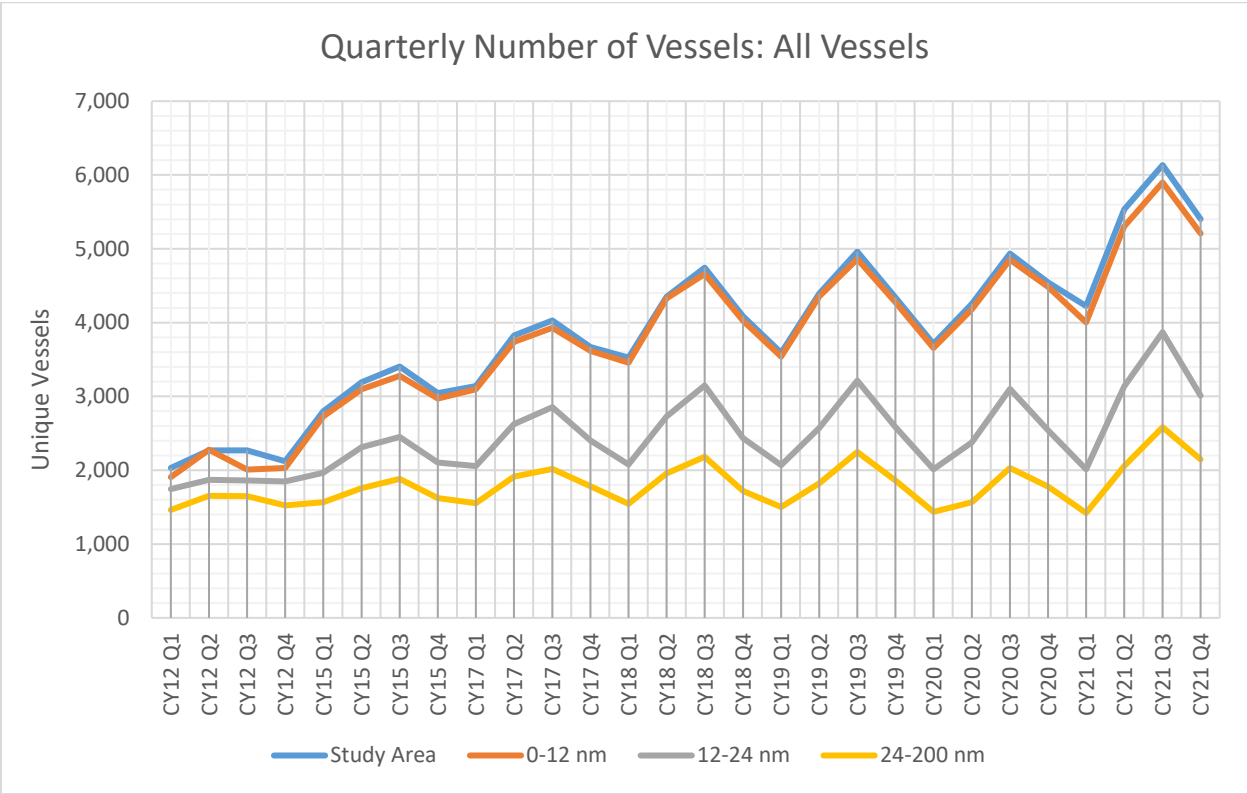


Figure 4. The quarterly number of 'All Vessels'.

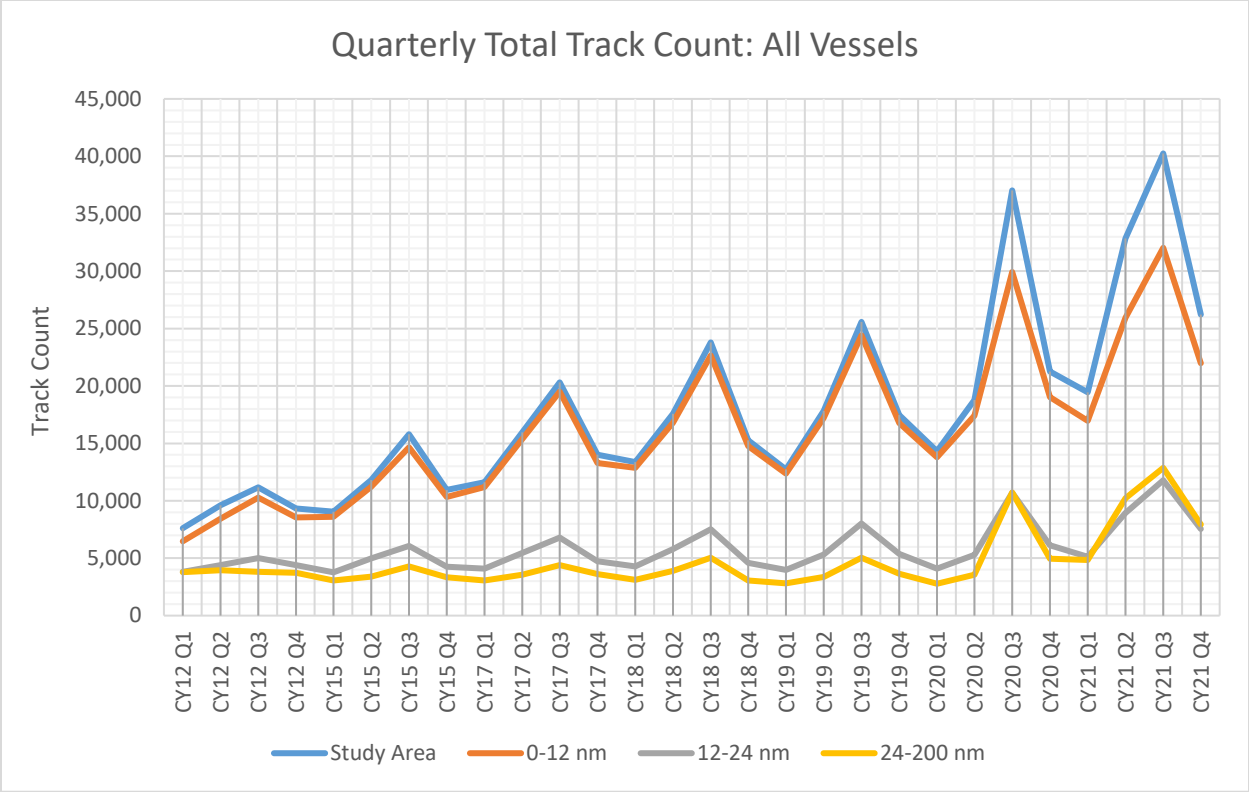


Figure 5. The quarterly total track count of 'All Vessels'.

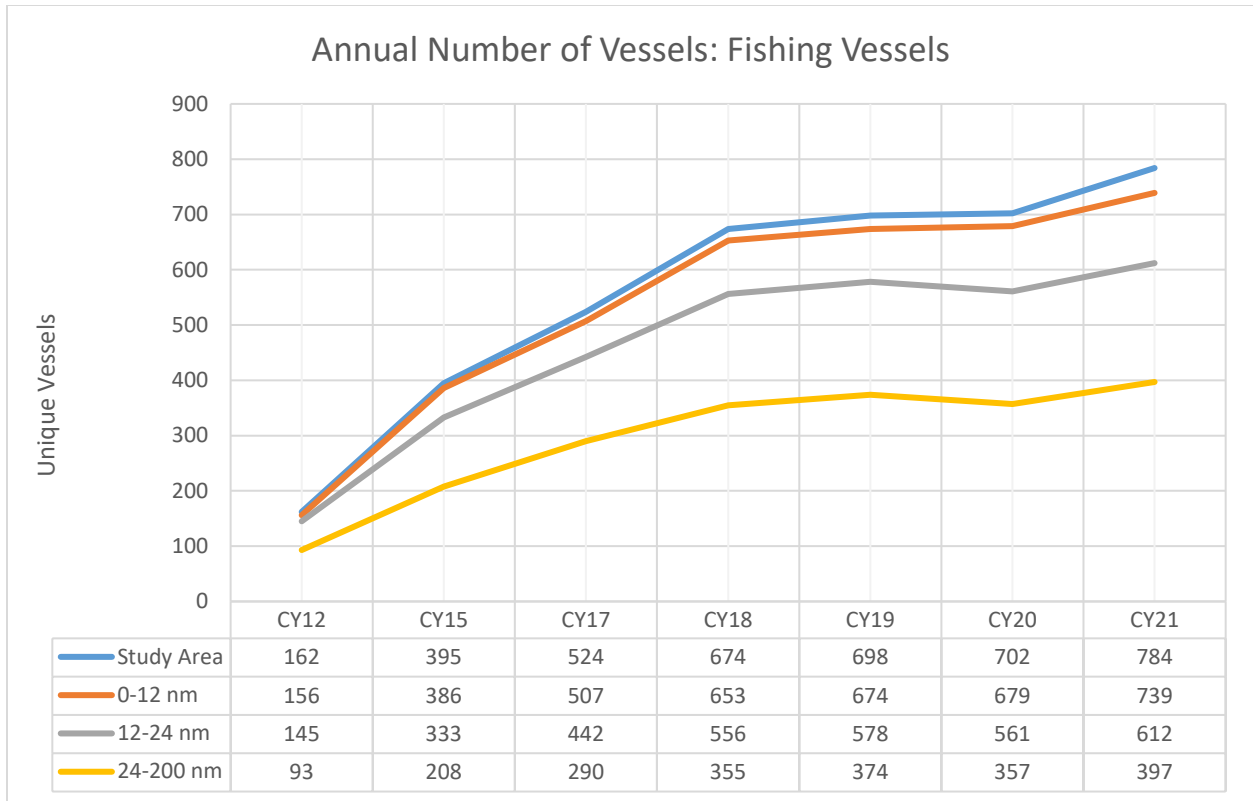


Figure 6. The annual number of 'Fishing Vessels'.

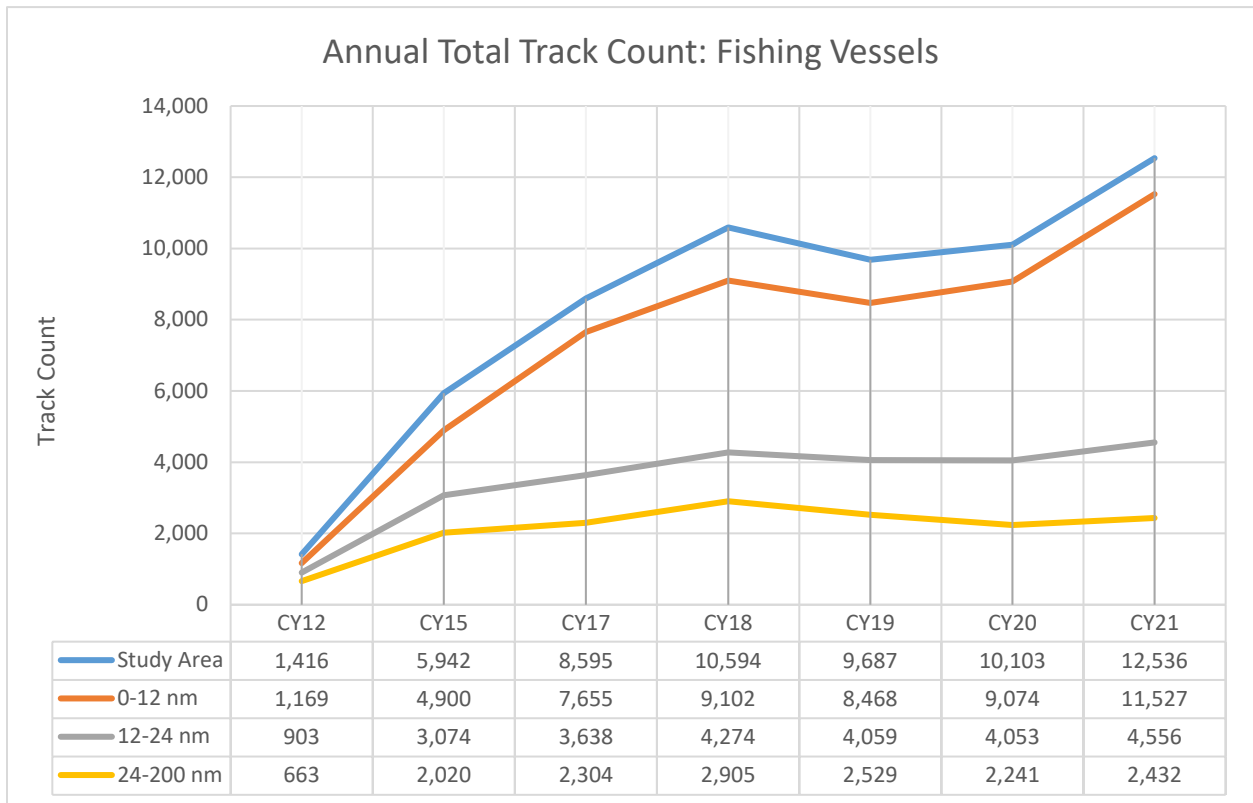


Figure 73. The annual total track count of 'Fishing Vessels'.

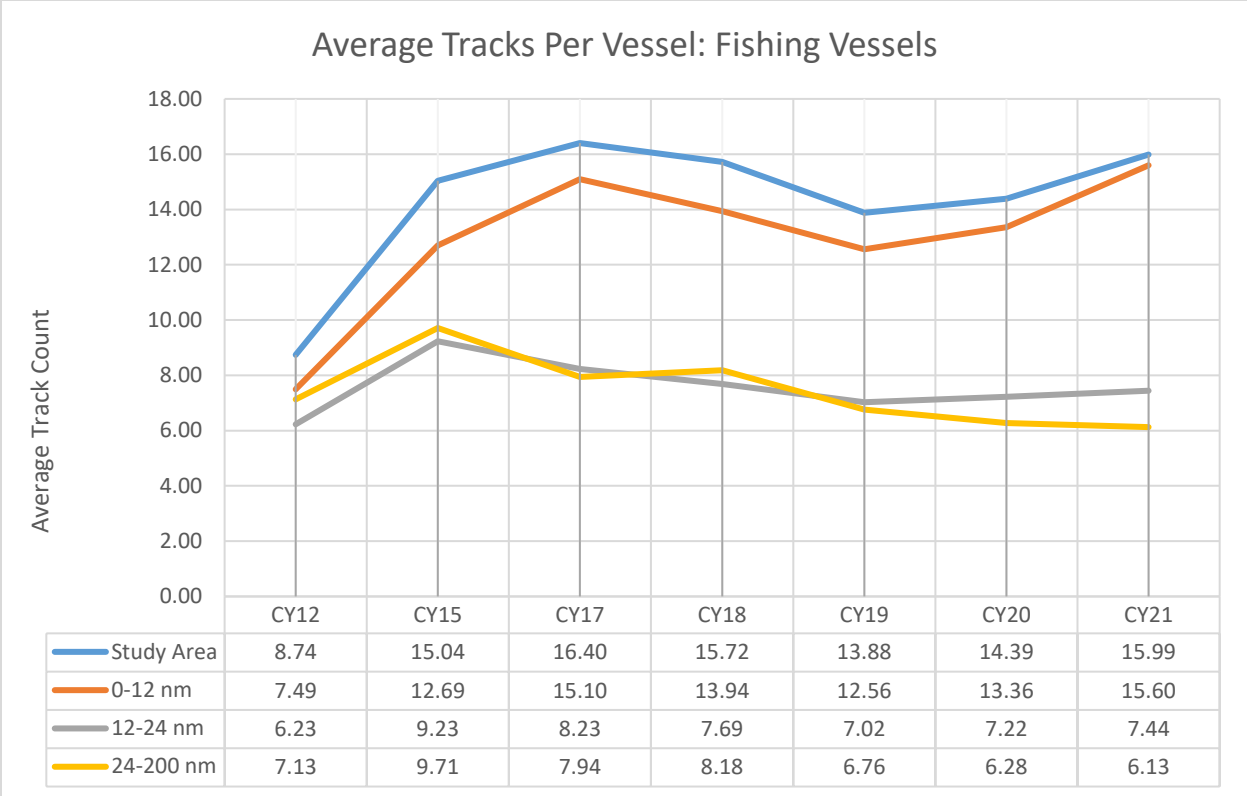


Figure 8. The average tracks per vessel based on 'Fishing Vessels'.

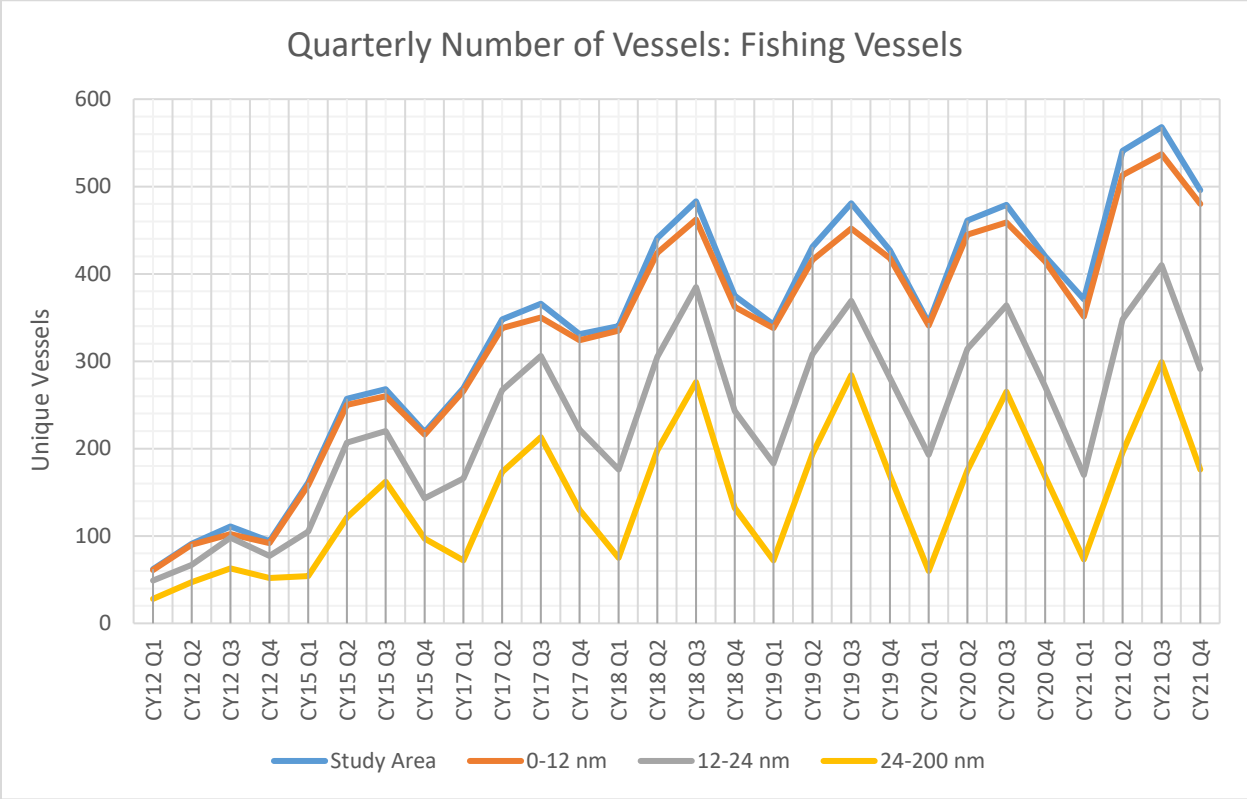


Figure 9. The quarterly number of 'Fishing Vessels'.

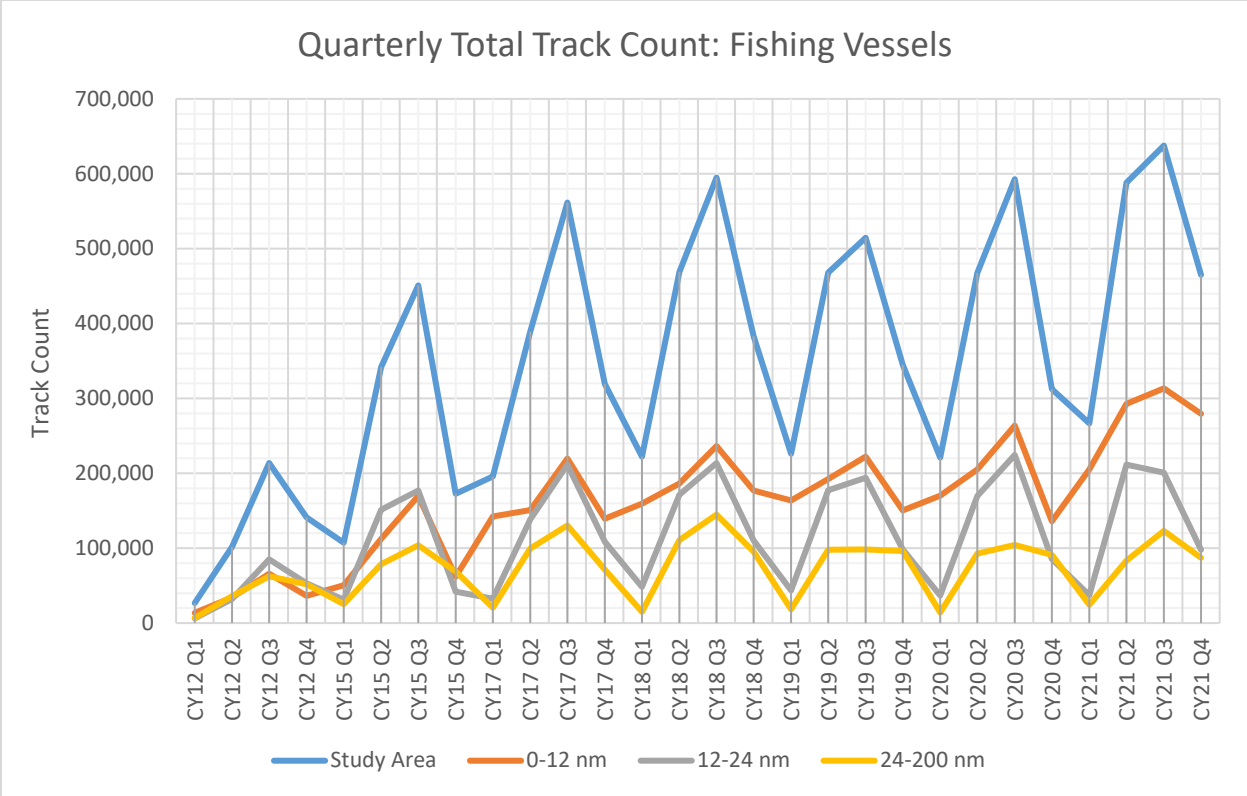


Figure 10. The quarterly total track count of 'Fishing Vessels'.

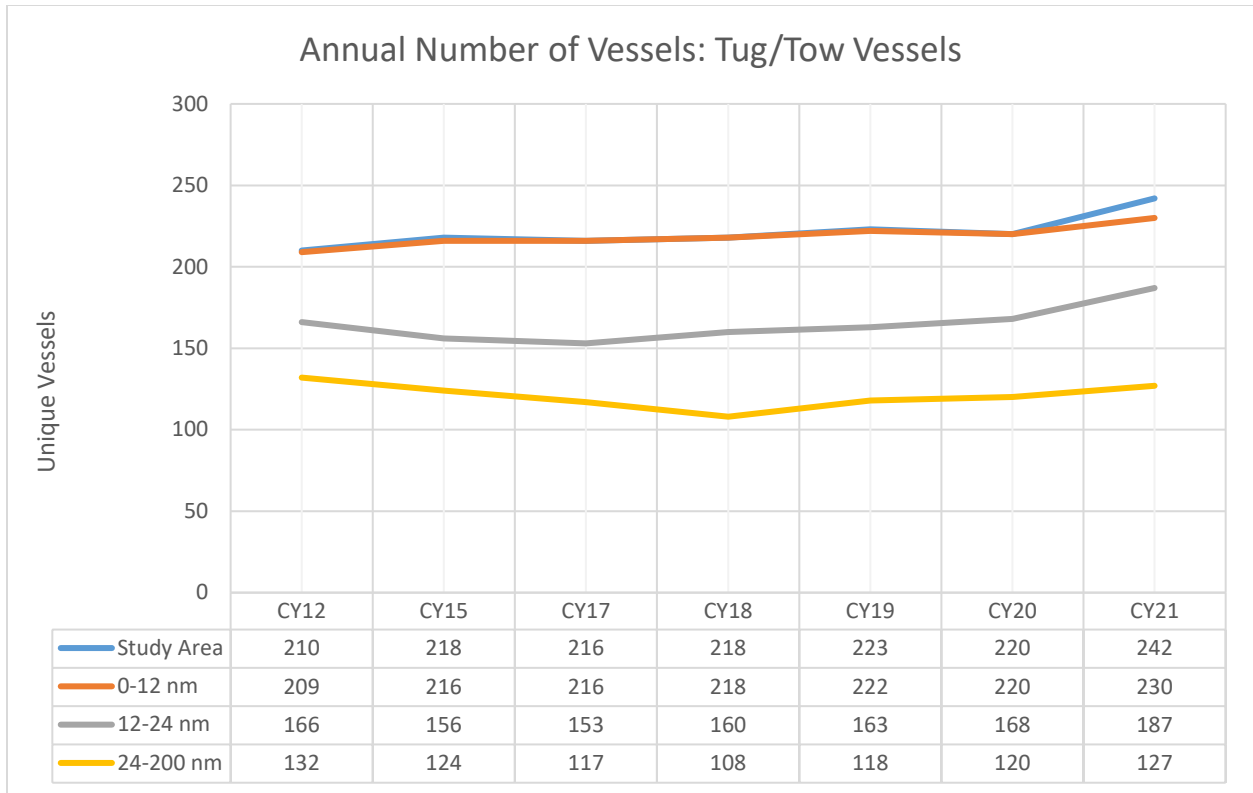


Figure 11. The annual number of 'Tug/Tow Vessels'.

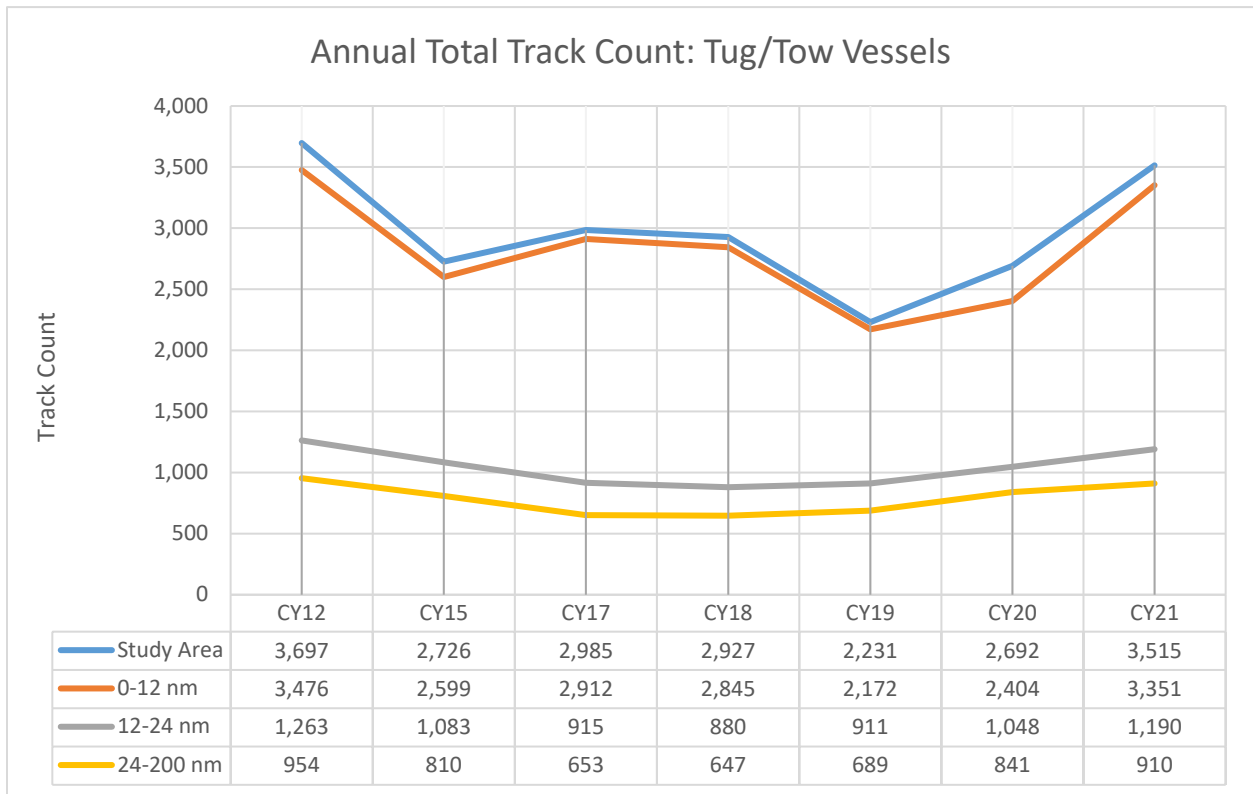


Figure 12. The annual total track count of 'Tug/Tow Vessels'.

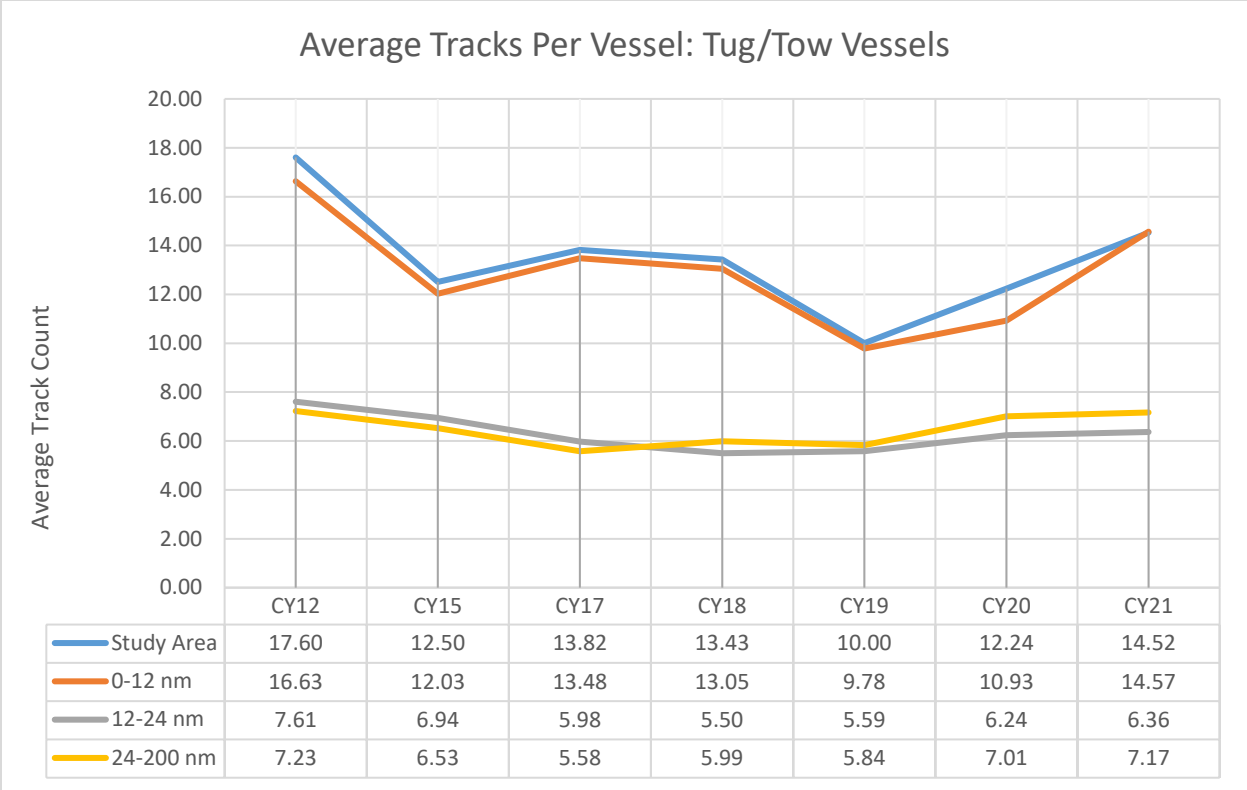


Figure 13. The average tracks per vessel based on ‘Tug/Tow Vessels’.

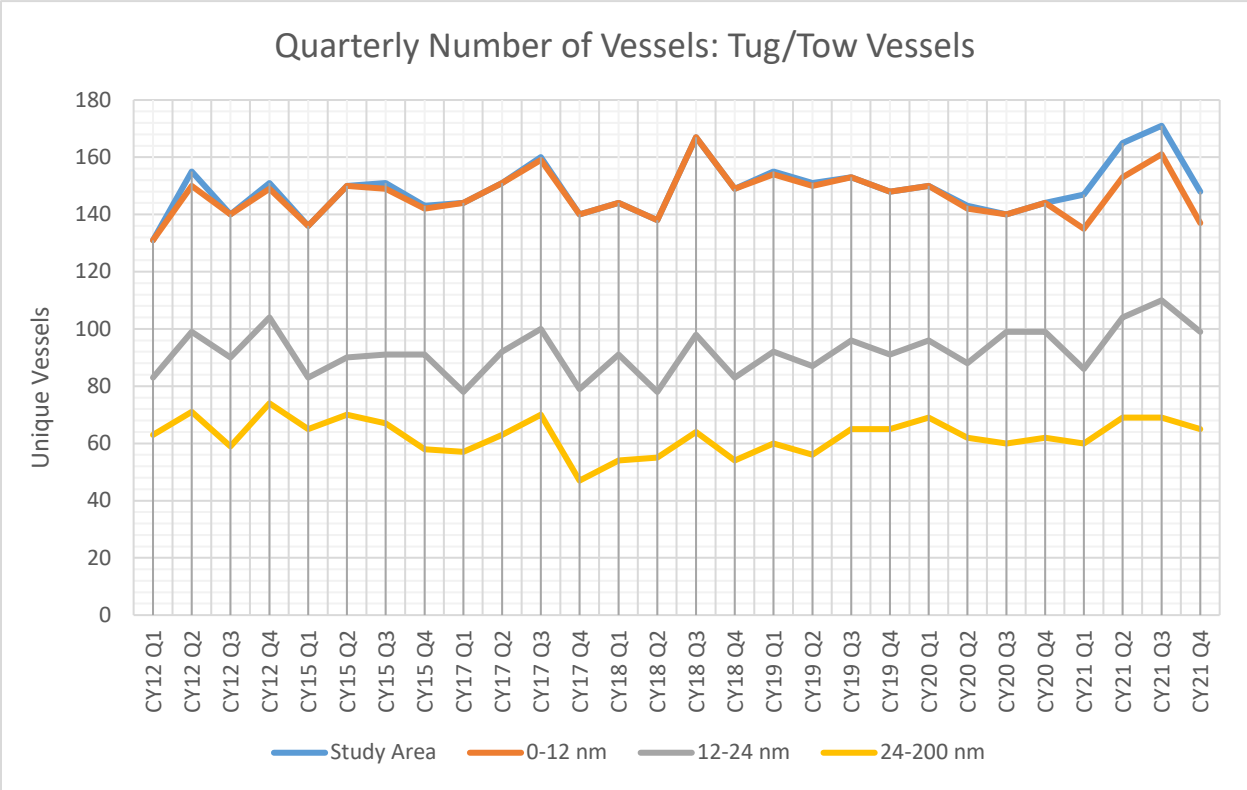


Figure 14. The quarterly number of ‘Tug/Tow Vessels’.

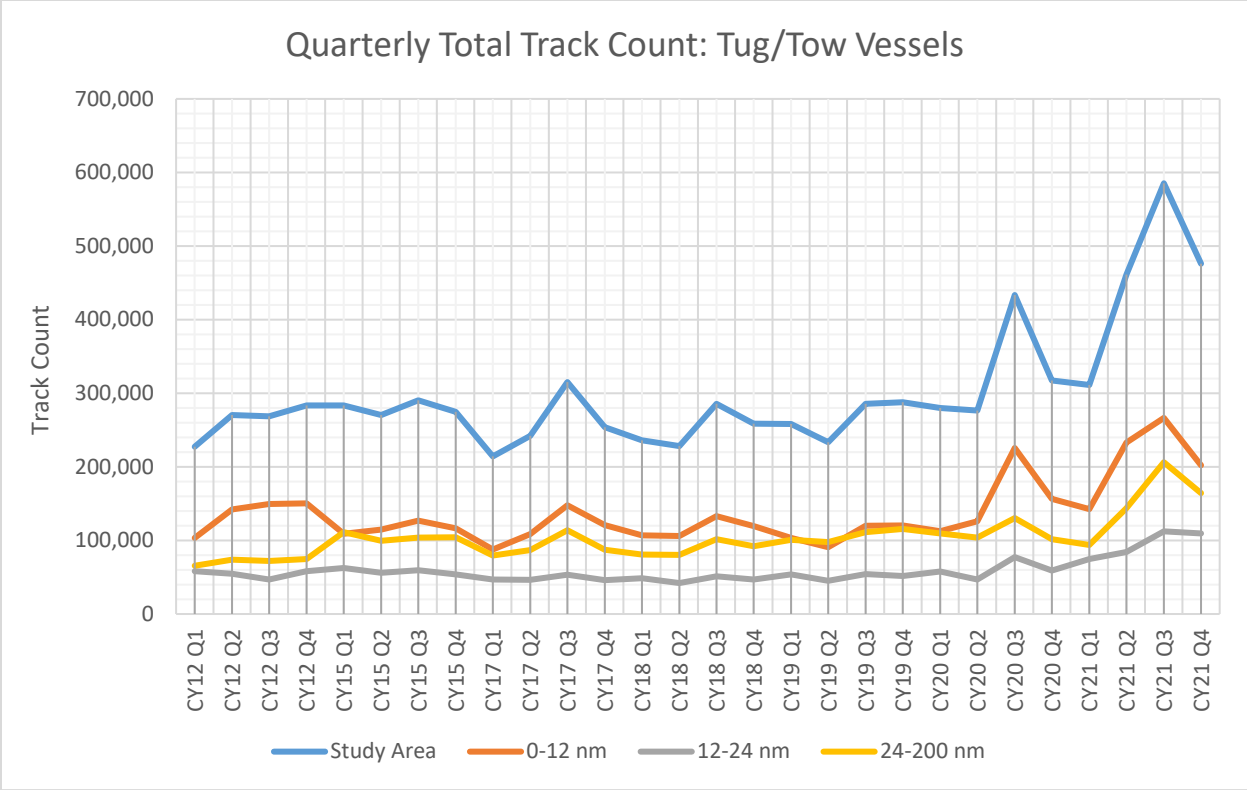


Figure 15. The quarterly total track count of 'Tug/Tow Vessels'.

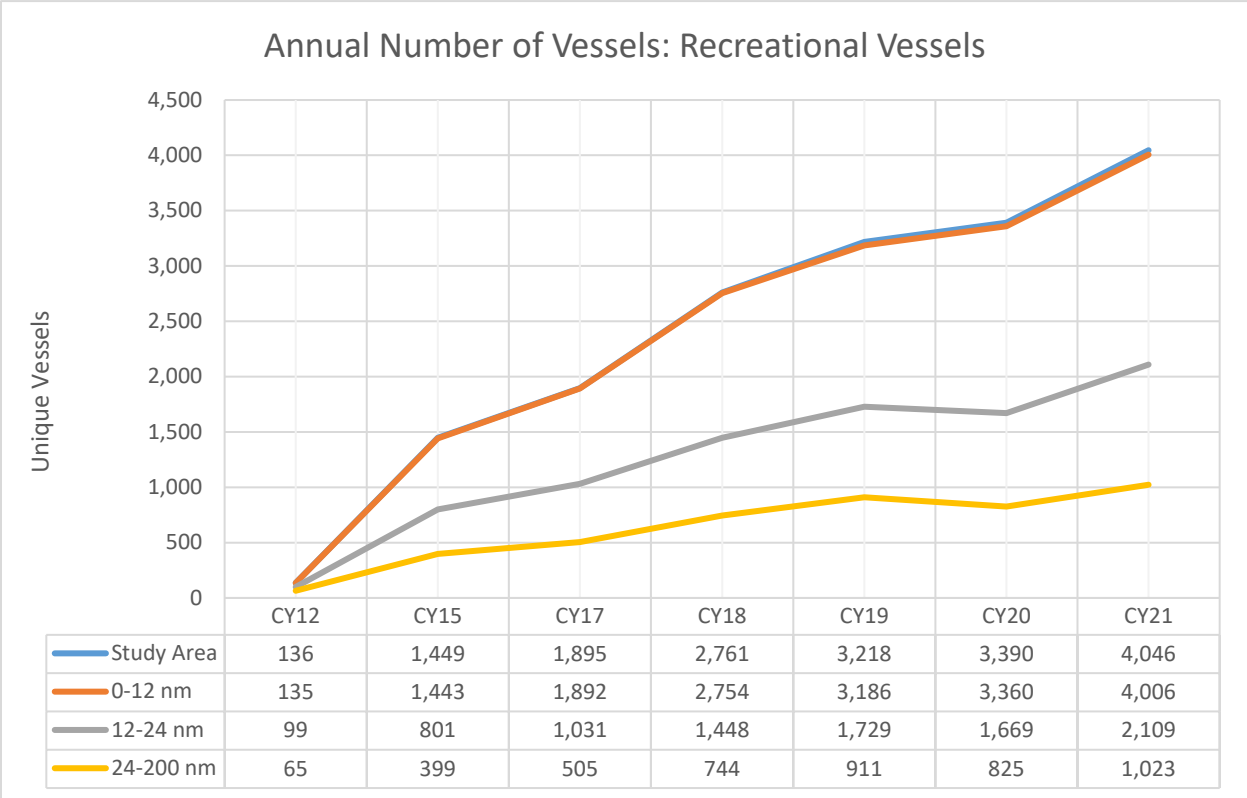


Figure 16. The annual number of 'Recreational Vessels'.

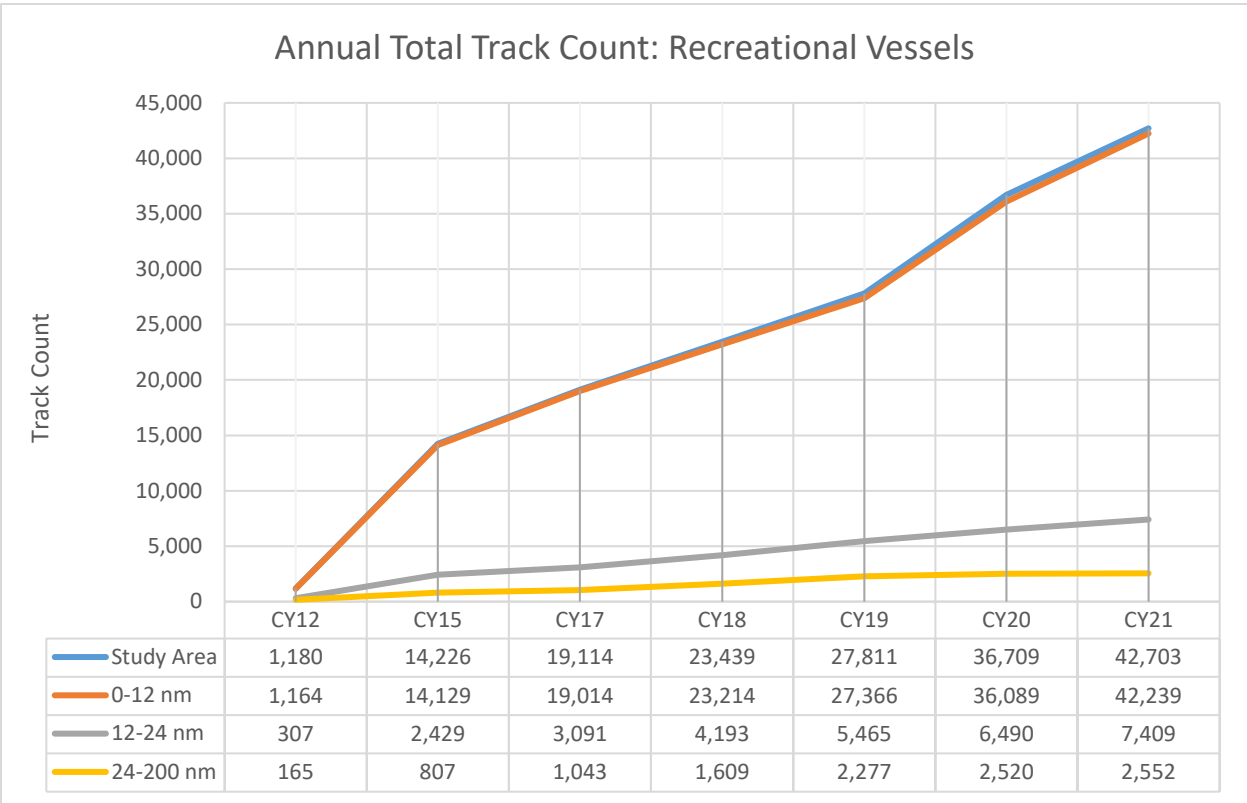


Figure 17. The annual total track count of 'Recreational Vessels'.

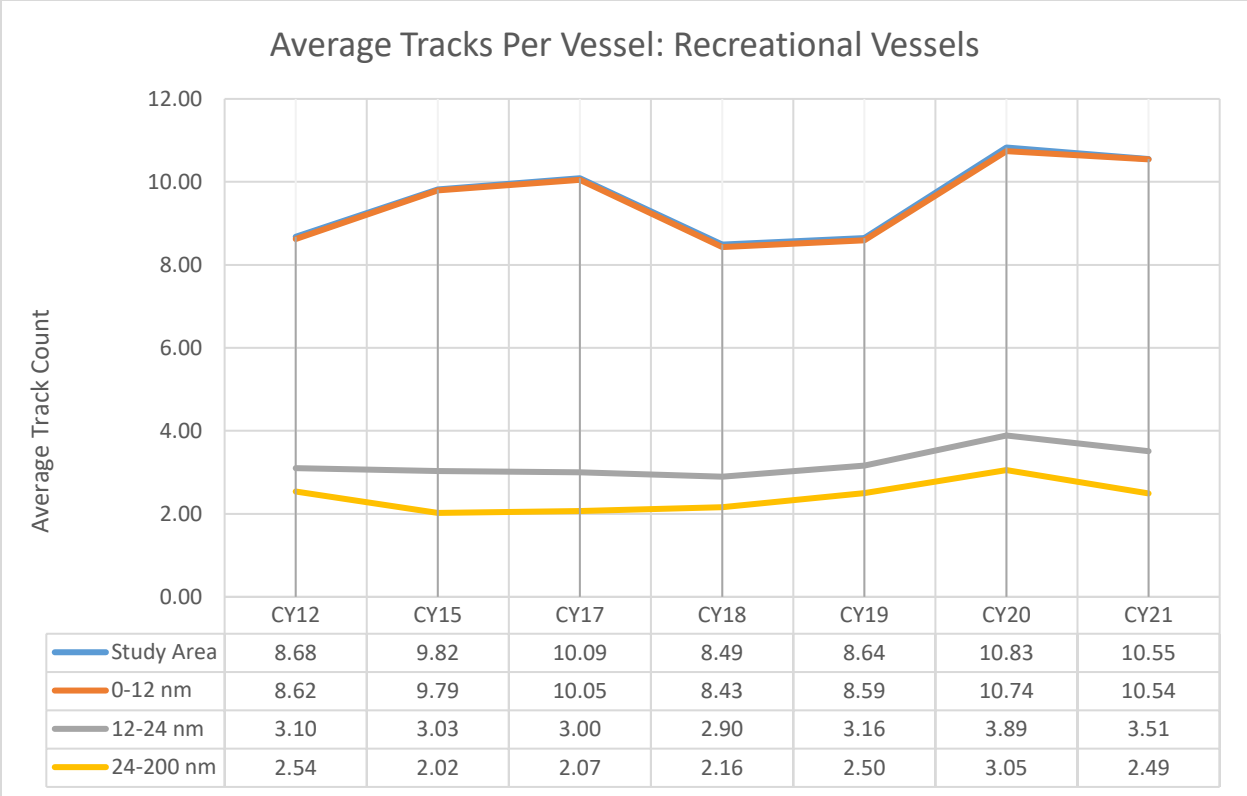


Figure 18. The average tracks per vessel based on 'Recreational Vessels'.

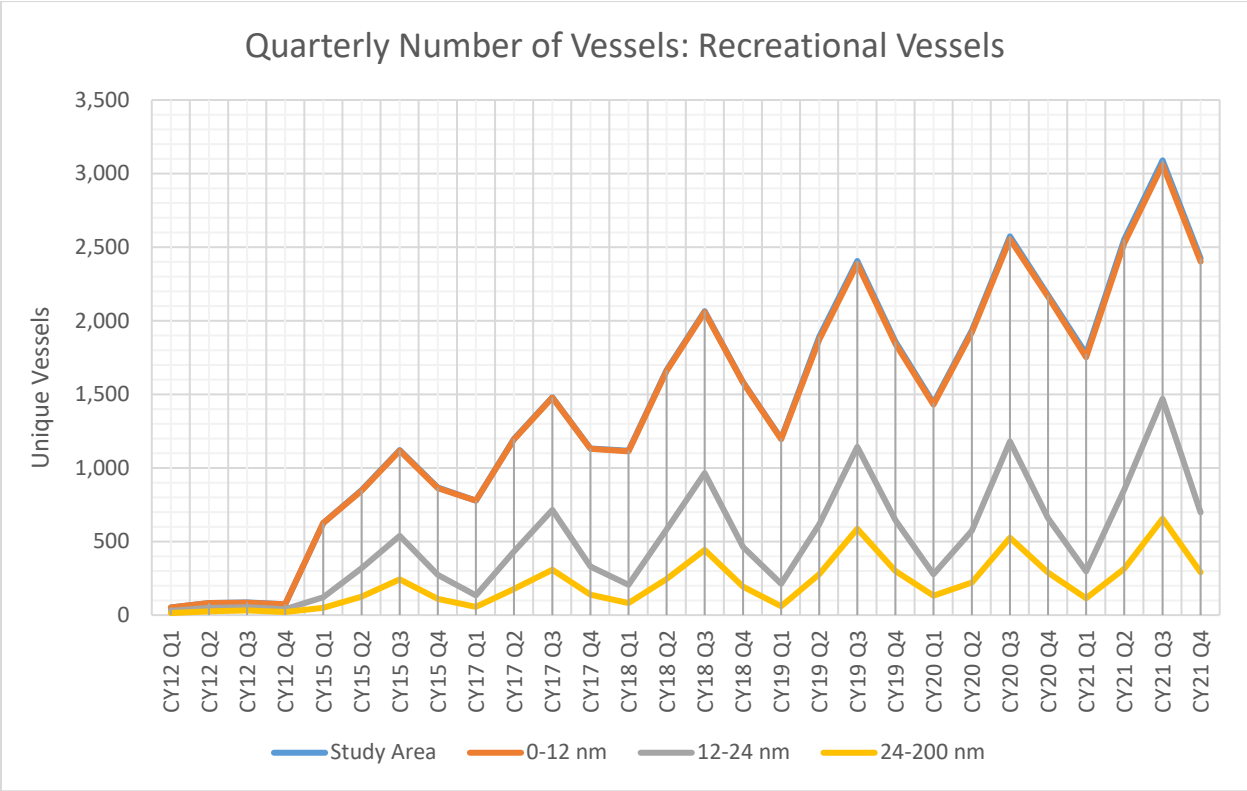


Figure 19. The quarterly number of 'Recreational Vessels'.

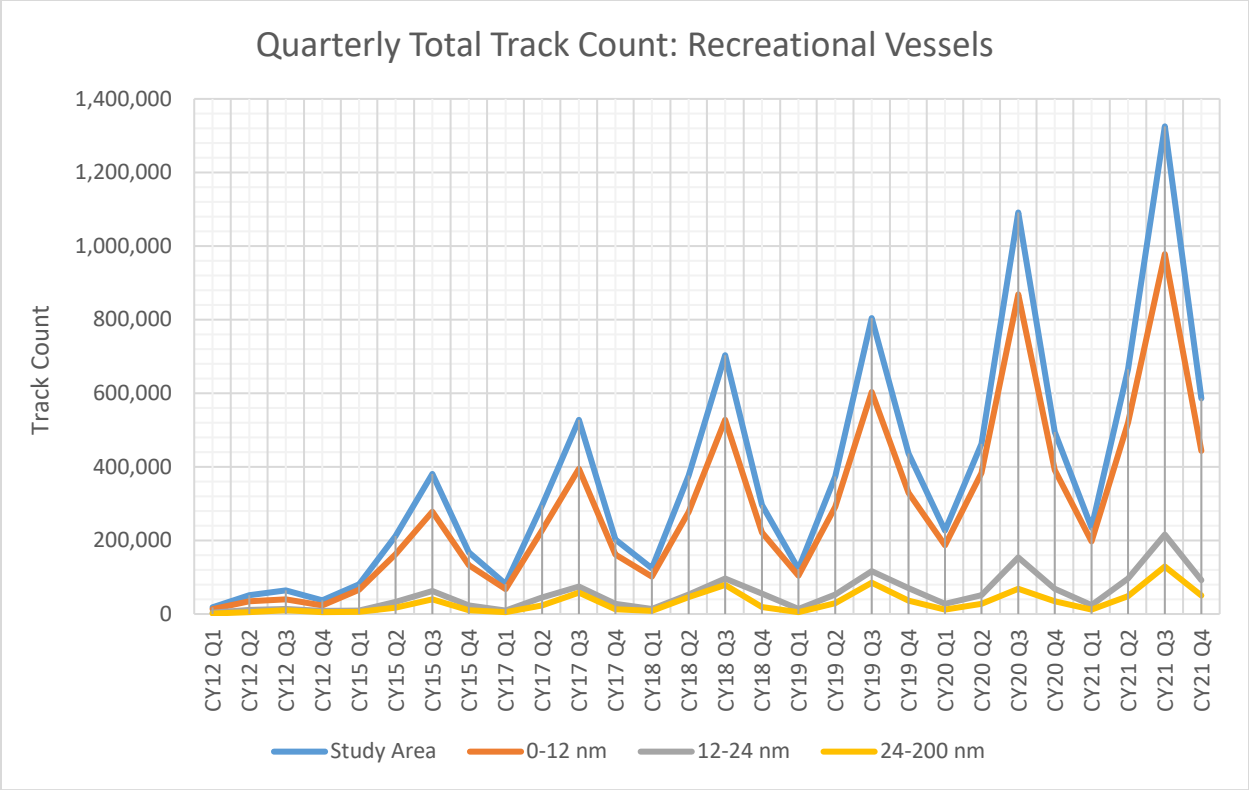


Figure 20. The quarterly total track count of 'Recreational Vessels'.

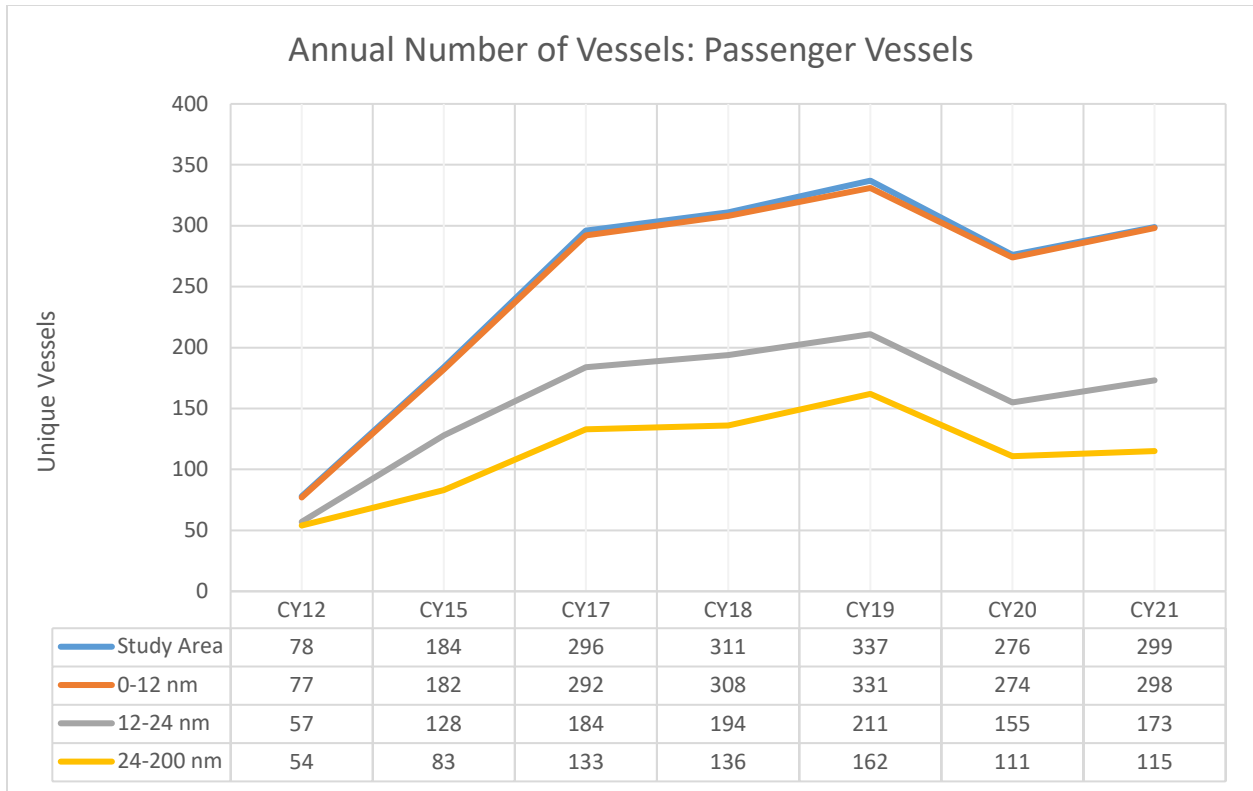


Figure 21. The annual number of 'Passenger Vessels'.

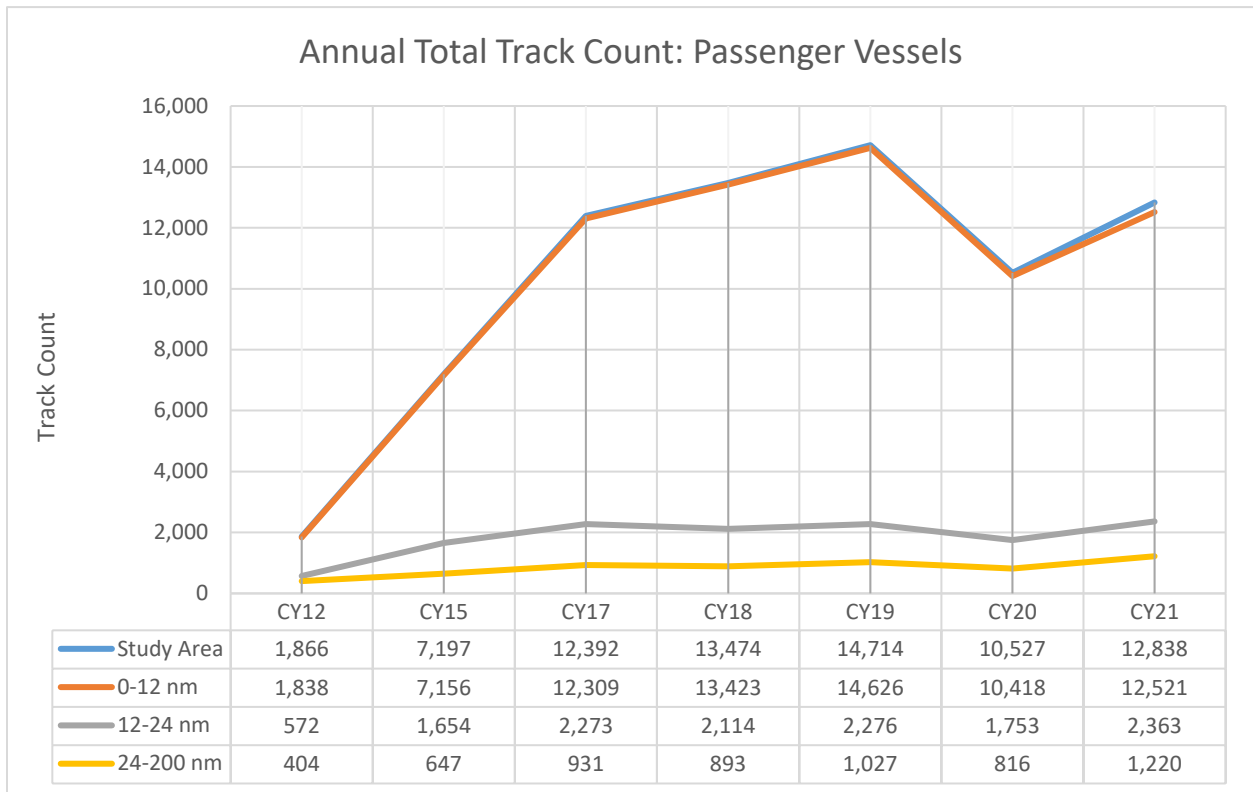


Figure 22. The annual total track count of 'Passenger Vessels'.

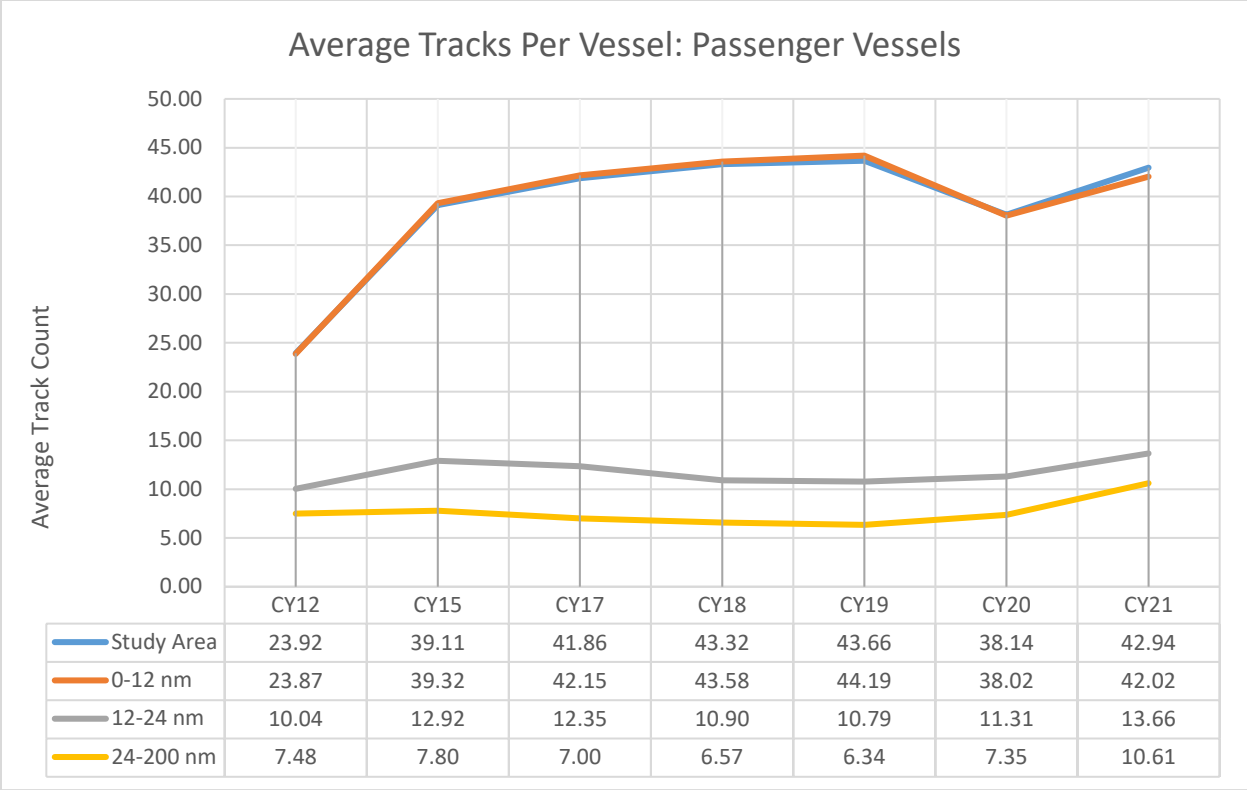


Figure 23. The average tracks per vessel based on 'Passenger Vessels'.

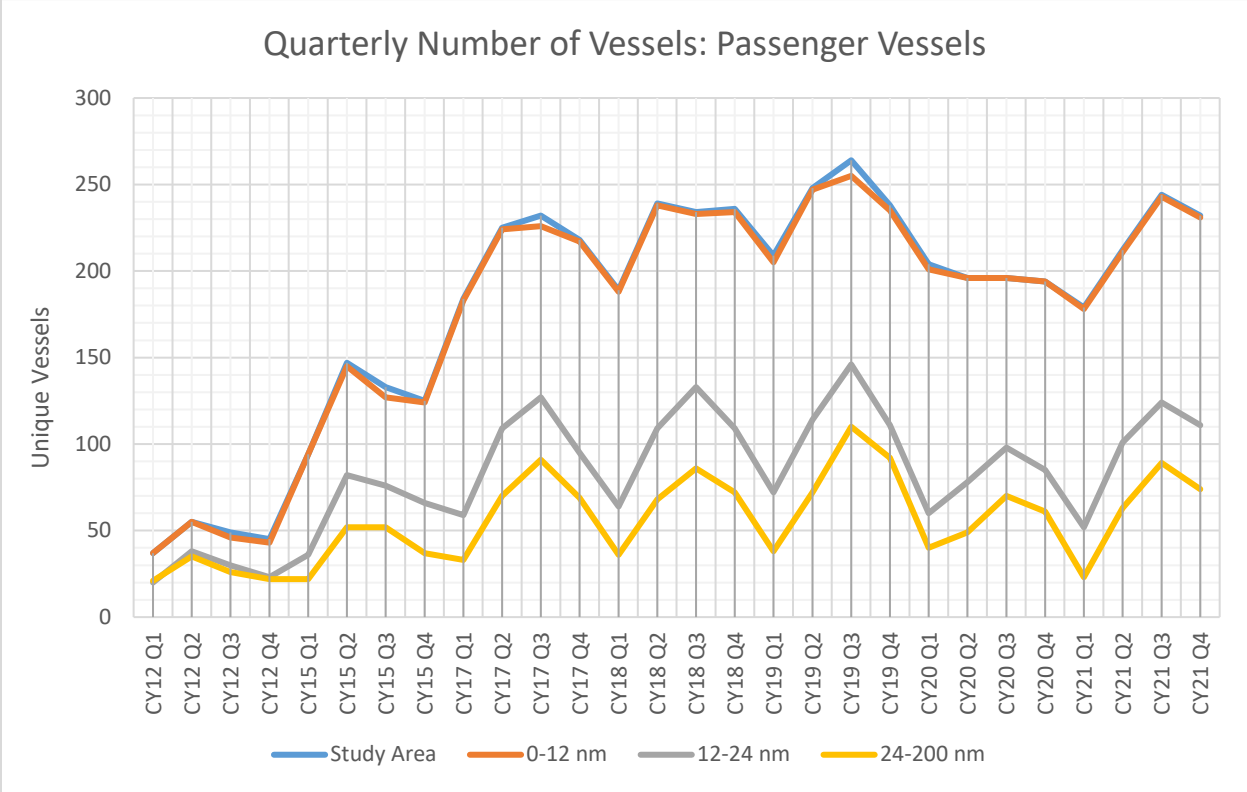


Figure 24. The quarterly number of 'Passenger Vessels'.

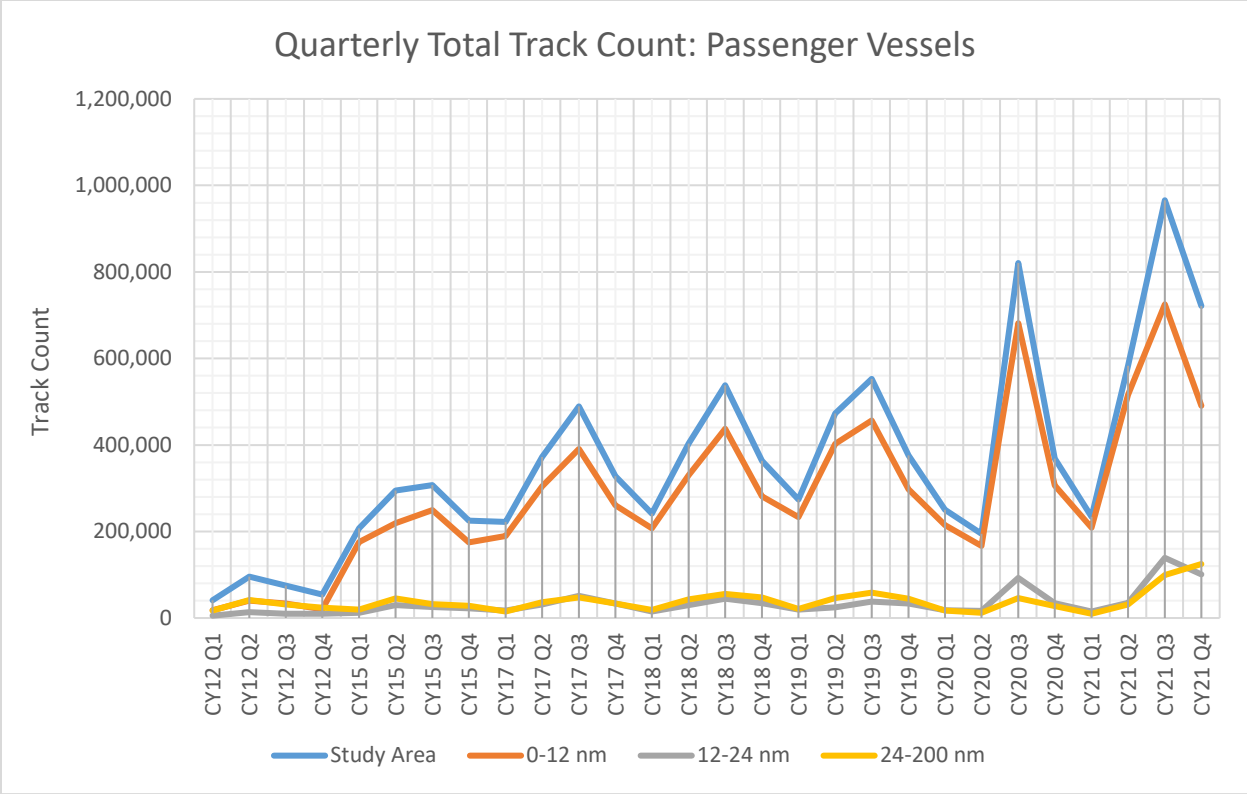


Figure 25. The quarterly total track count of 'Passenger Vessels'.

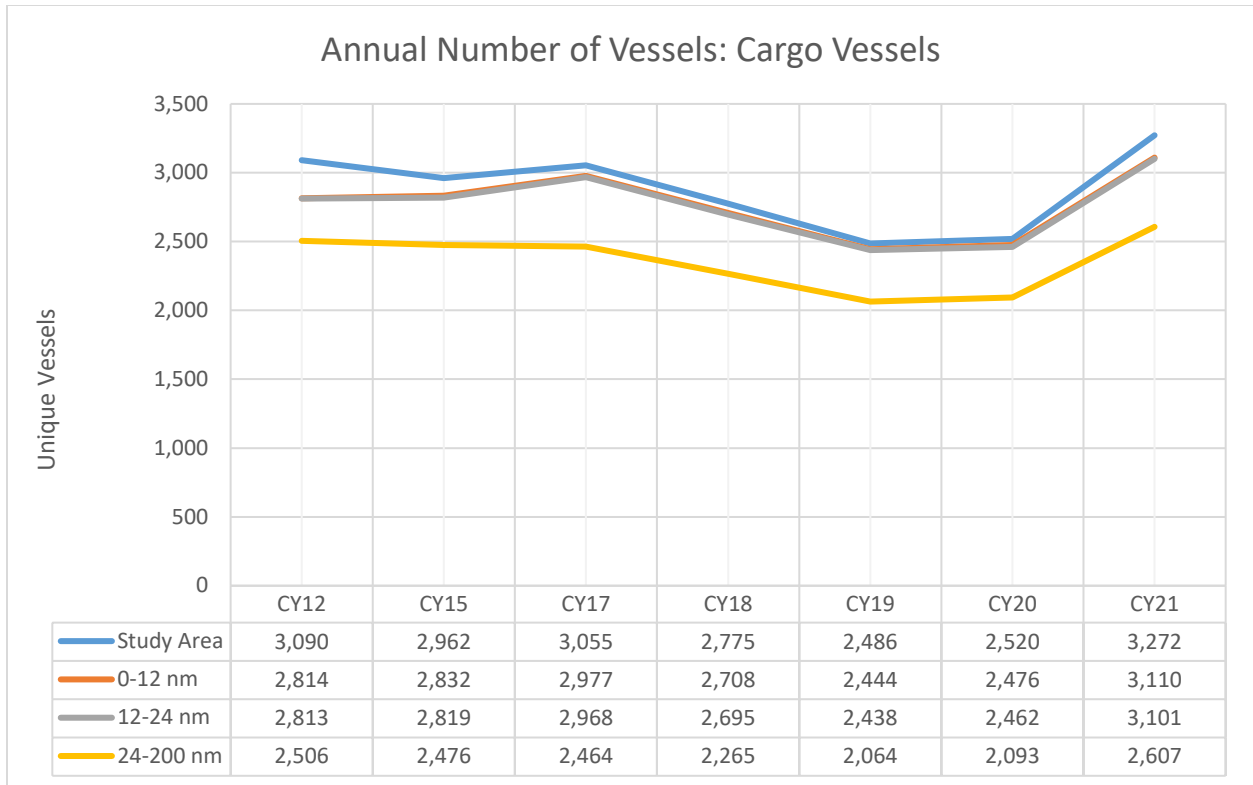


Figure 26. The annual number of 'Cargo Vessels'.

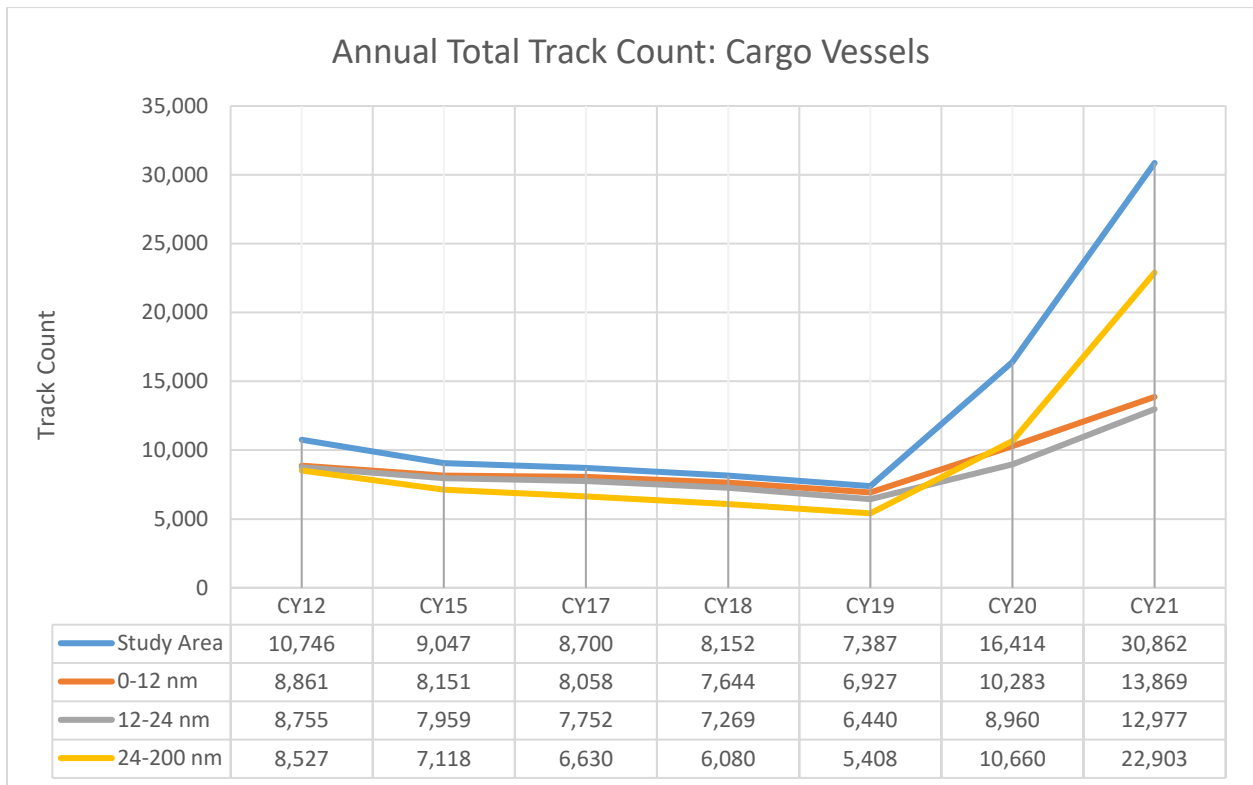


Figure 27. The annual total track count of 'Cargo Vessels'.

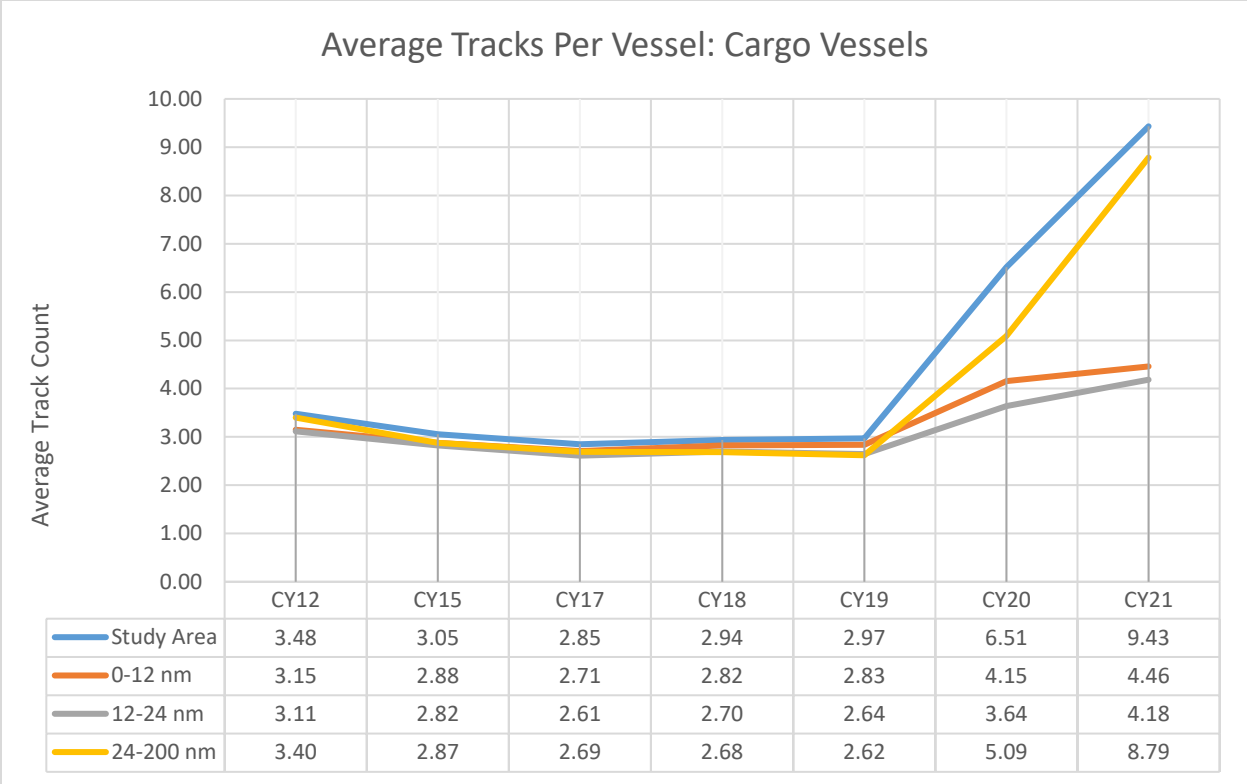


Figure 28. The average tracks per vessel based on 'Cargo Vessels'.

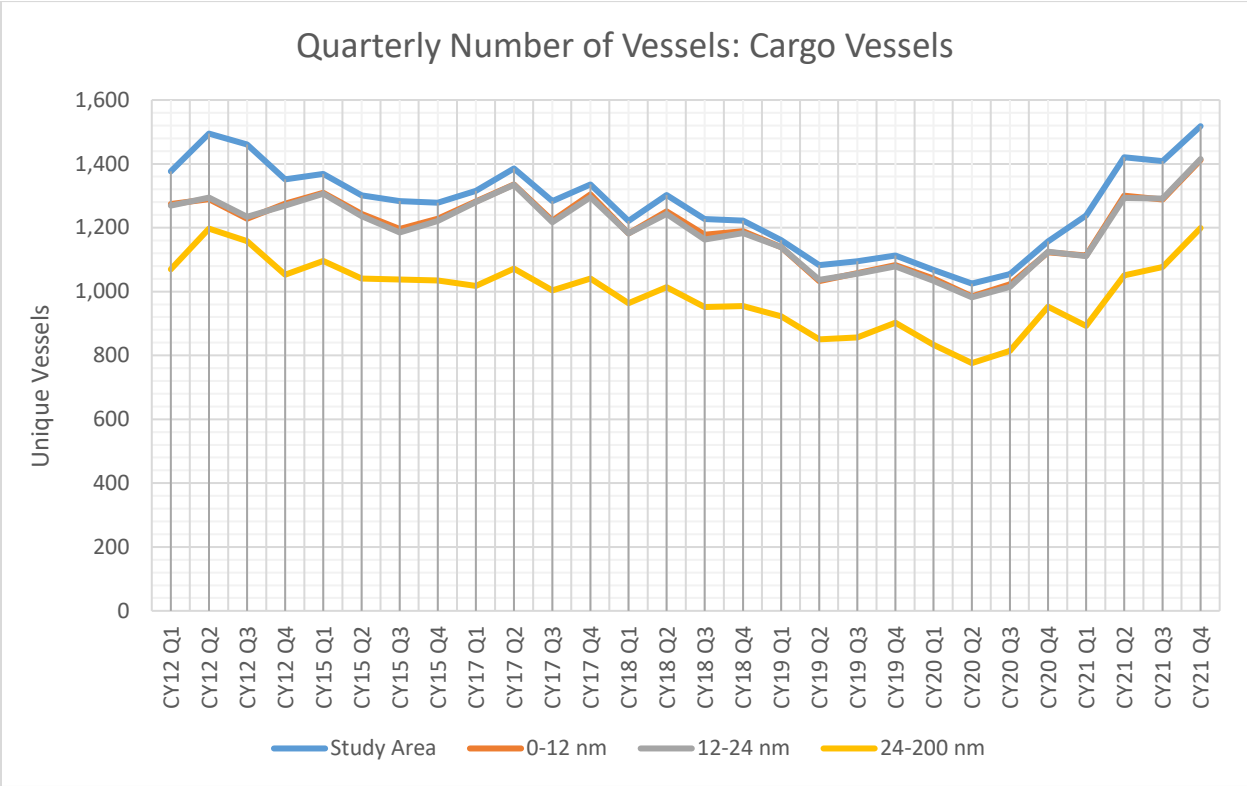


Figure 29. The quarterly number of 'Cargo Vessels'.

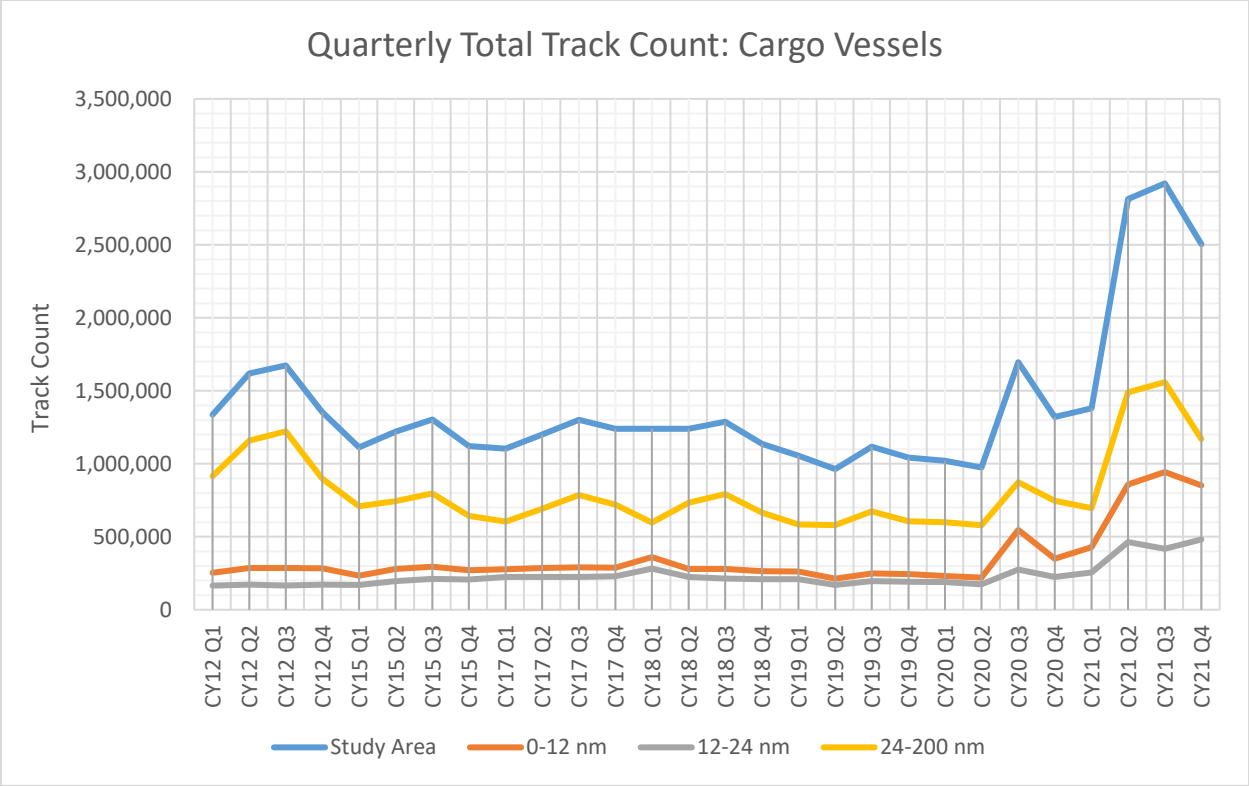


Figure 30. The quarterly total track count of 'Cargo Vessels'.

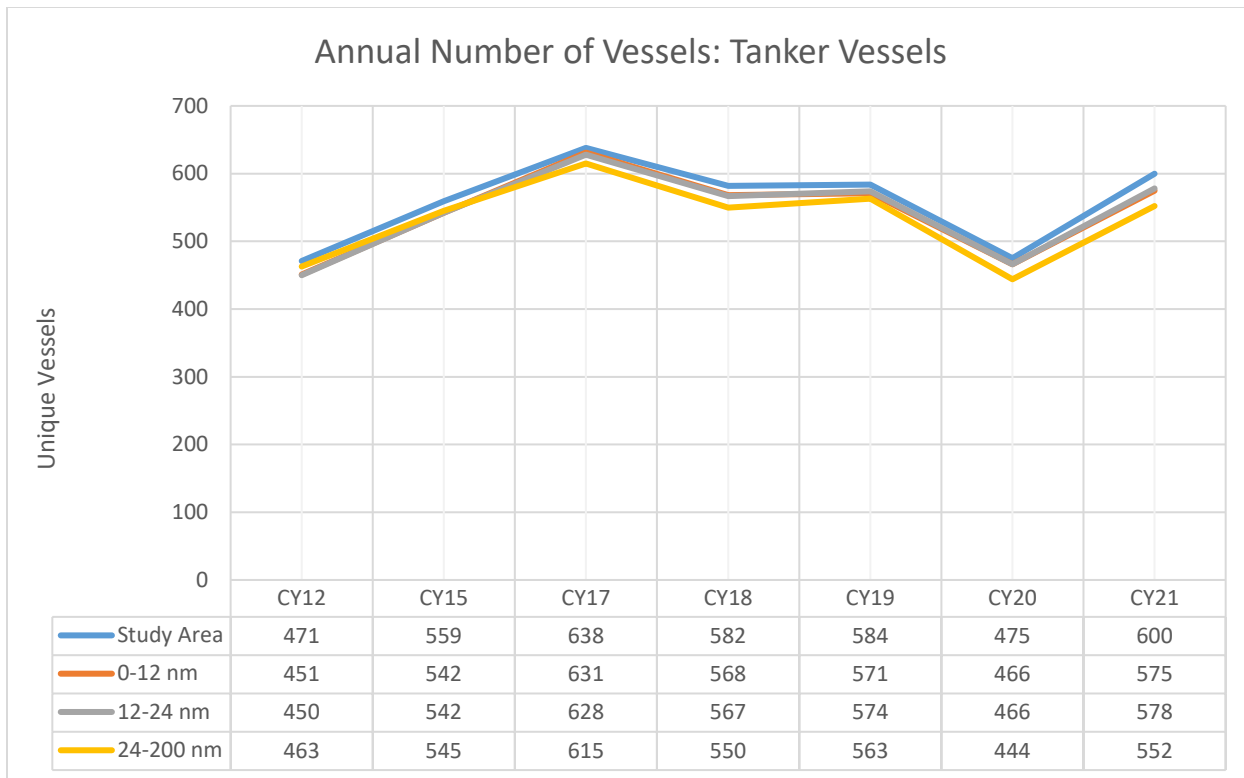


Figure 31. The annual number of 'Tanker Vessels'.

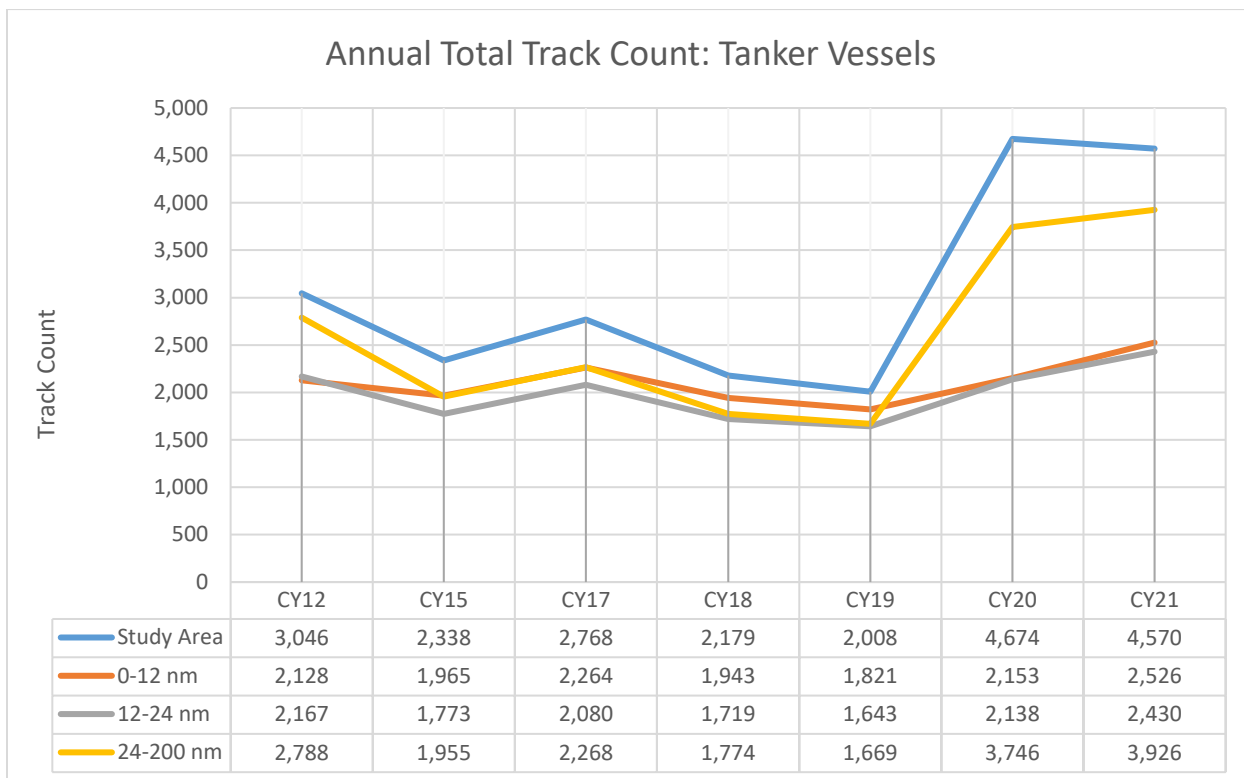


Figure 32. The annual total track count of 'Tanker Vessels'.

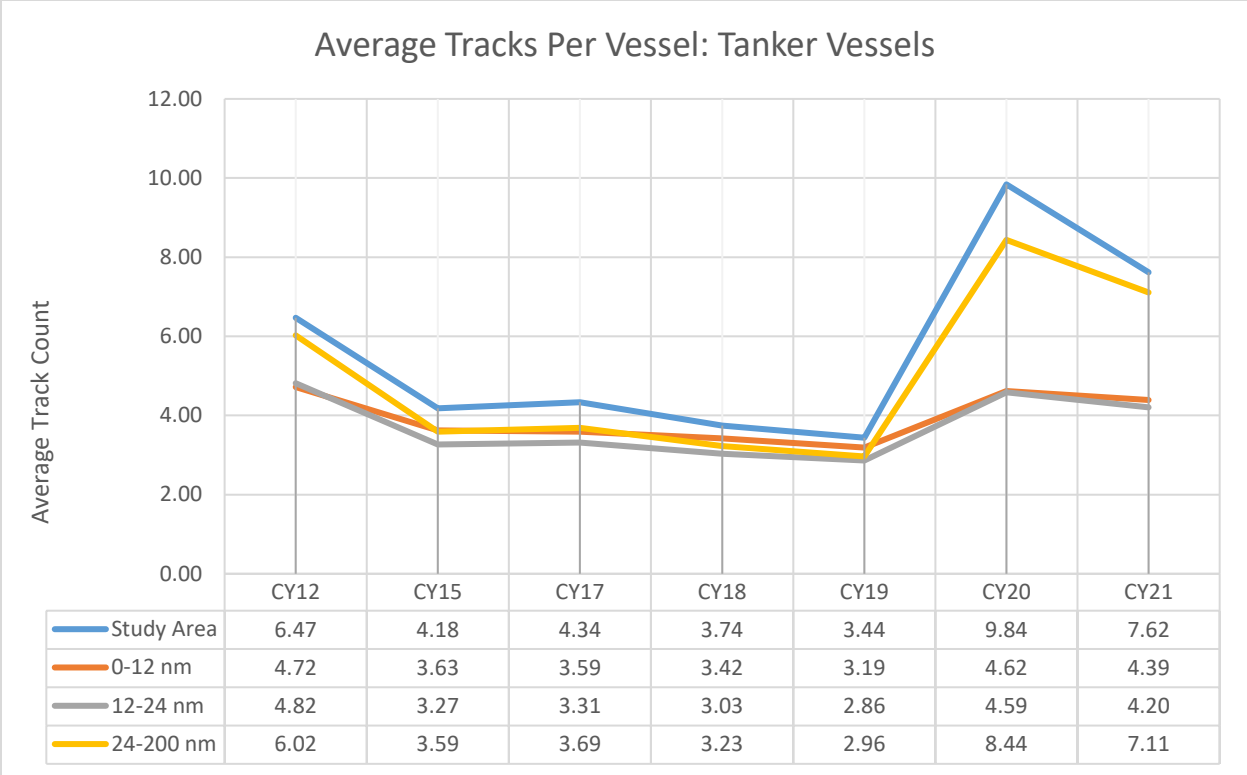


Figure 33. The average tracks per vessel based on 'Tanker Vessels'.

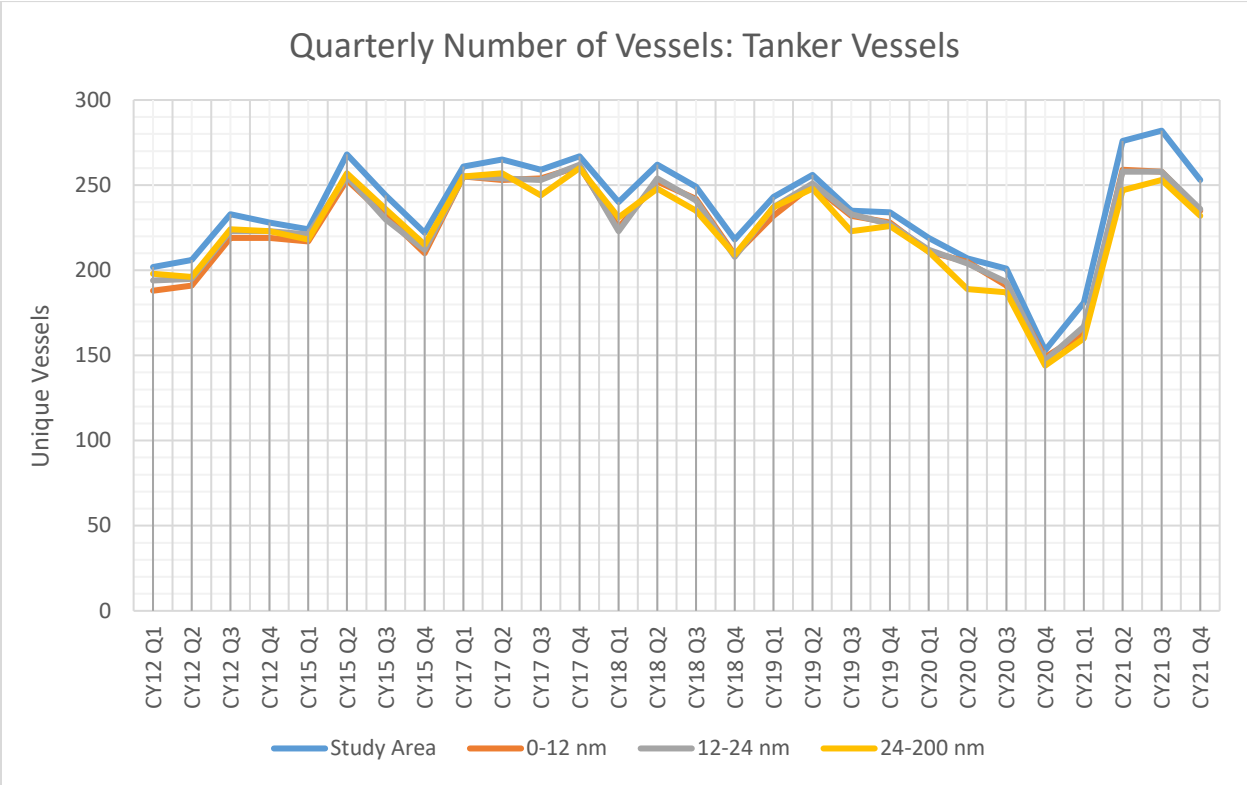


Figure 34. The quarterly number of 'Tanker Vessels'.

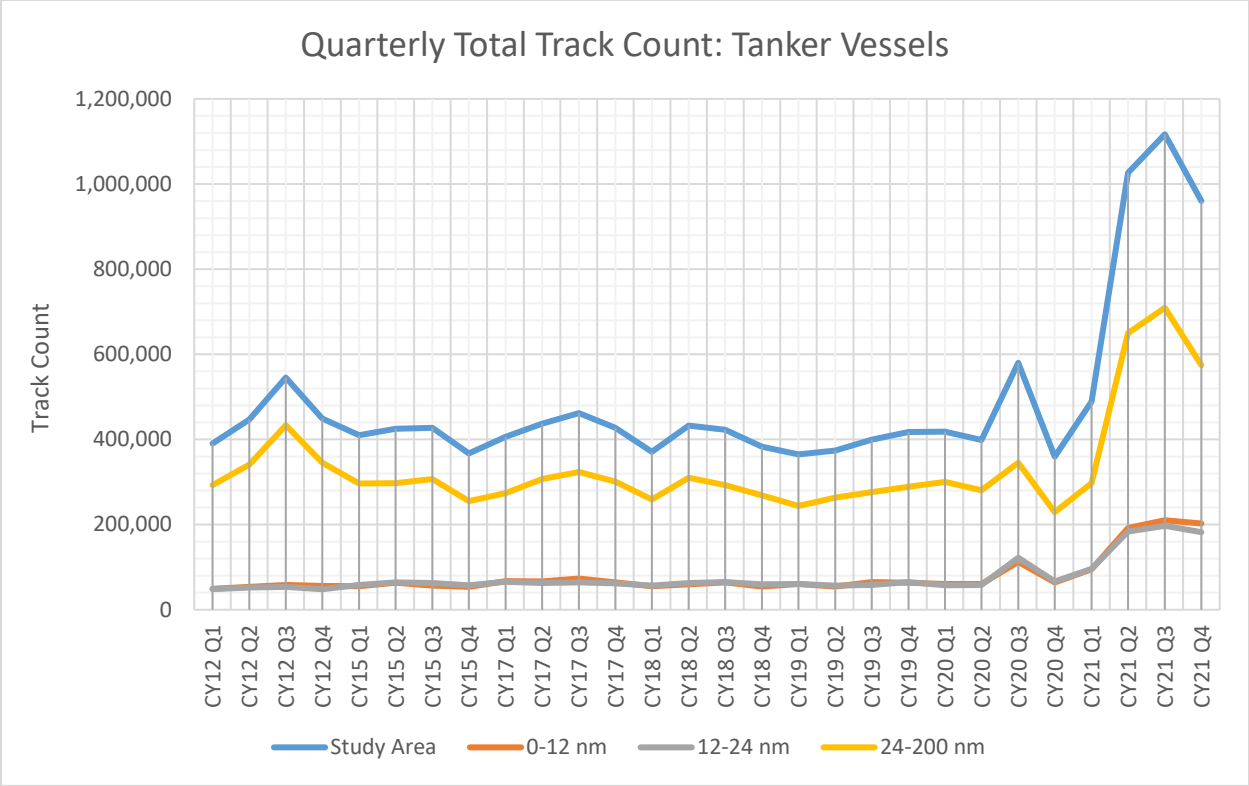


Figure 35. The quarterly total track count of 'Tanker Vessels'.

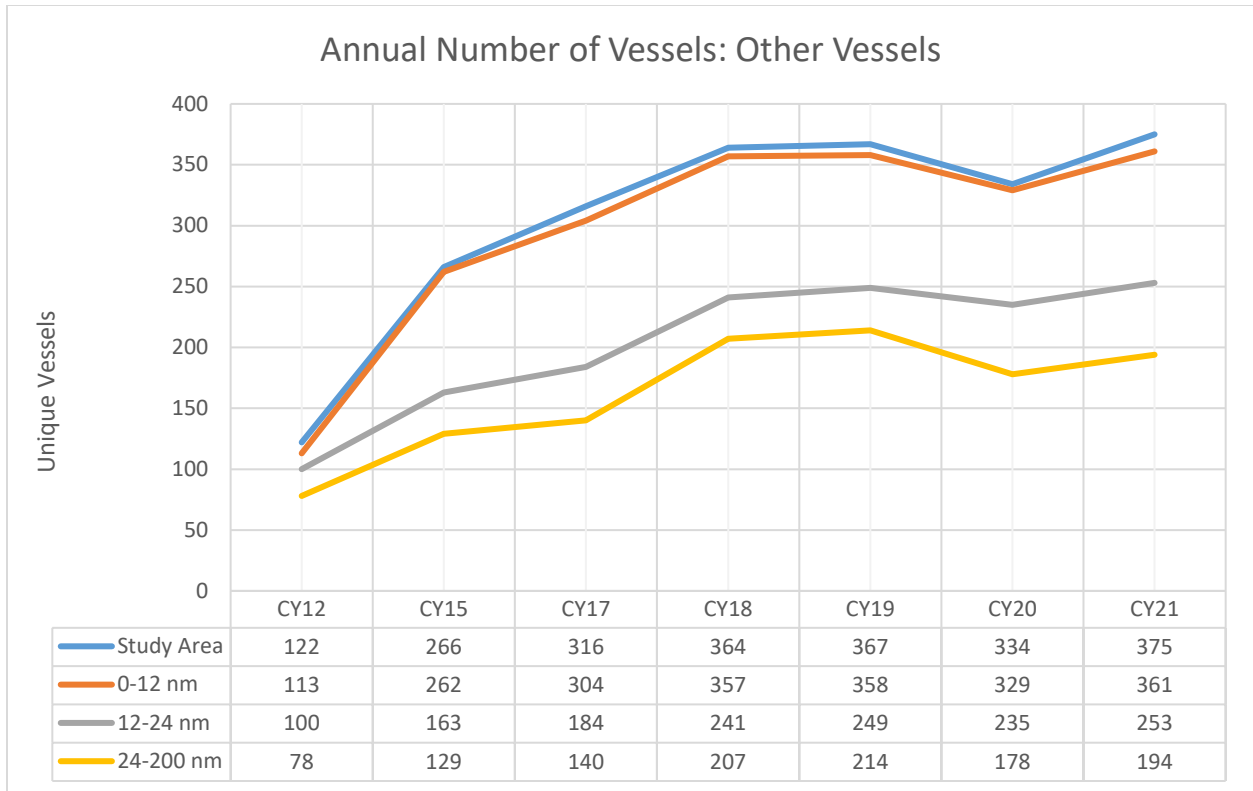


Figure 36. The annual number of 'Other Vessels'.

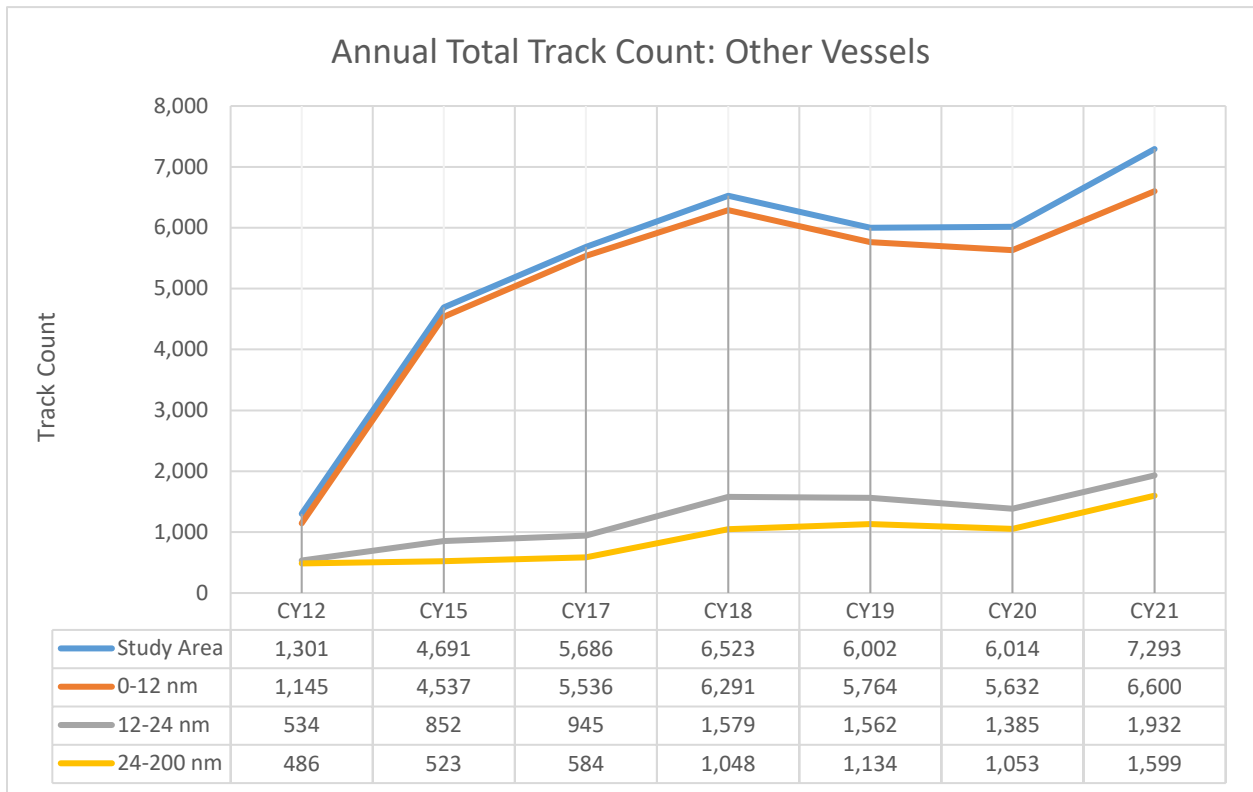


Figure 37. The annual total track count of 'Other Vessels'.

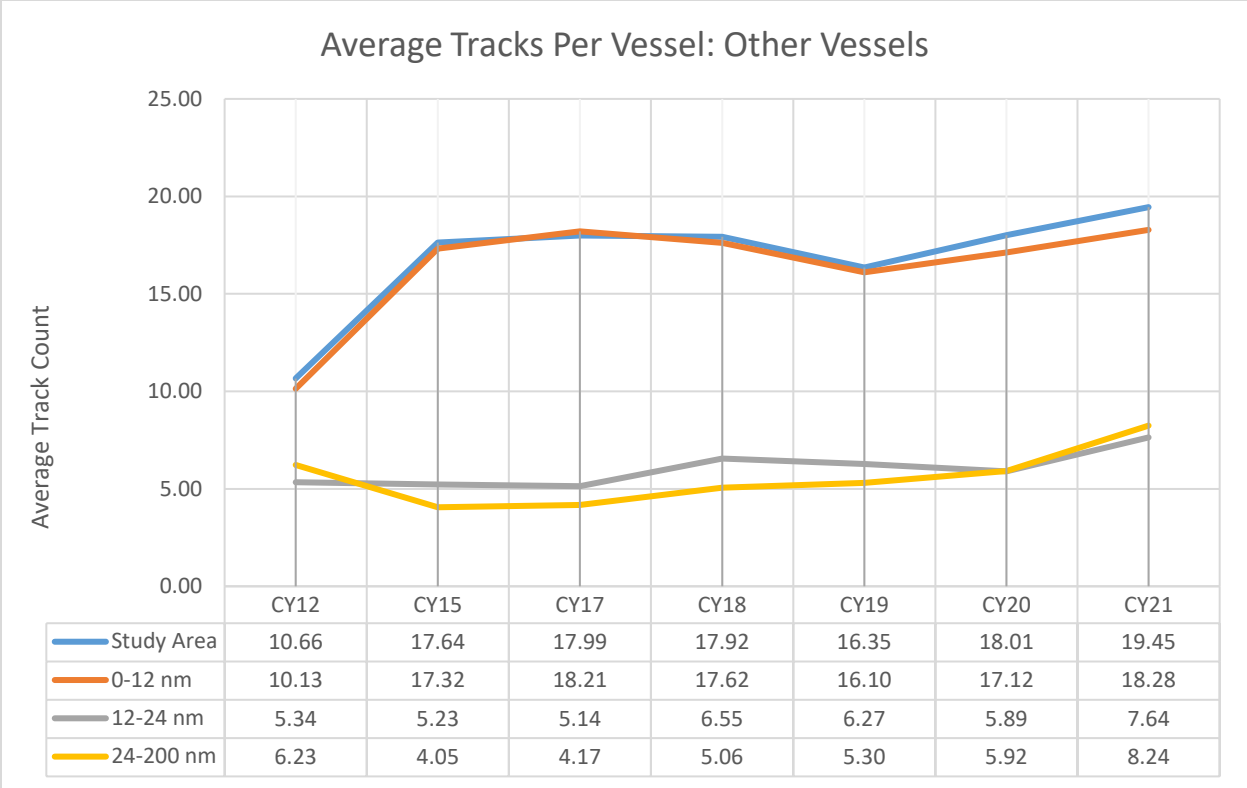


Figure 38. The average tracks per vessel based on ‘Other Vessels’.

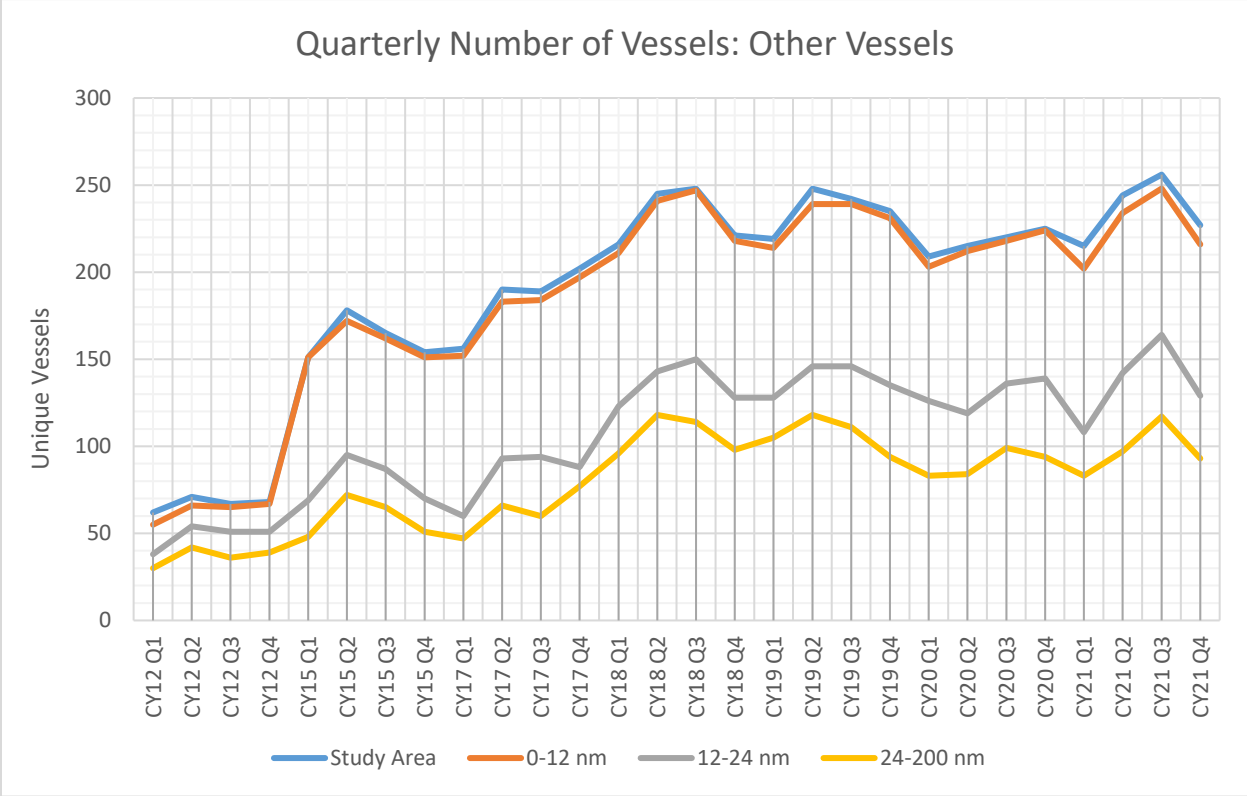


Figure 39. The quarterly number of ‘Other Vessels’.

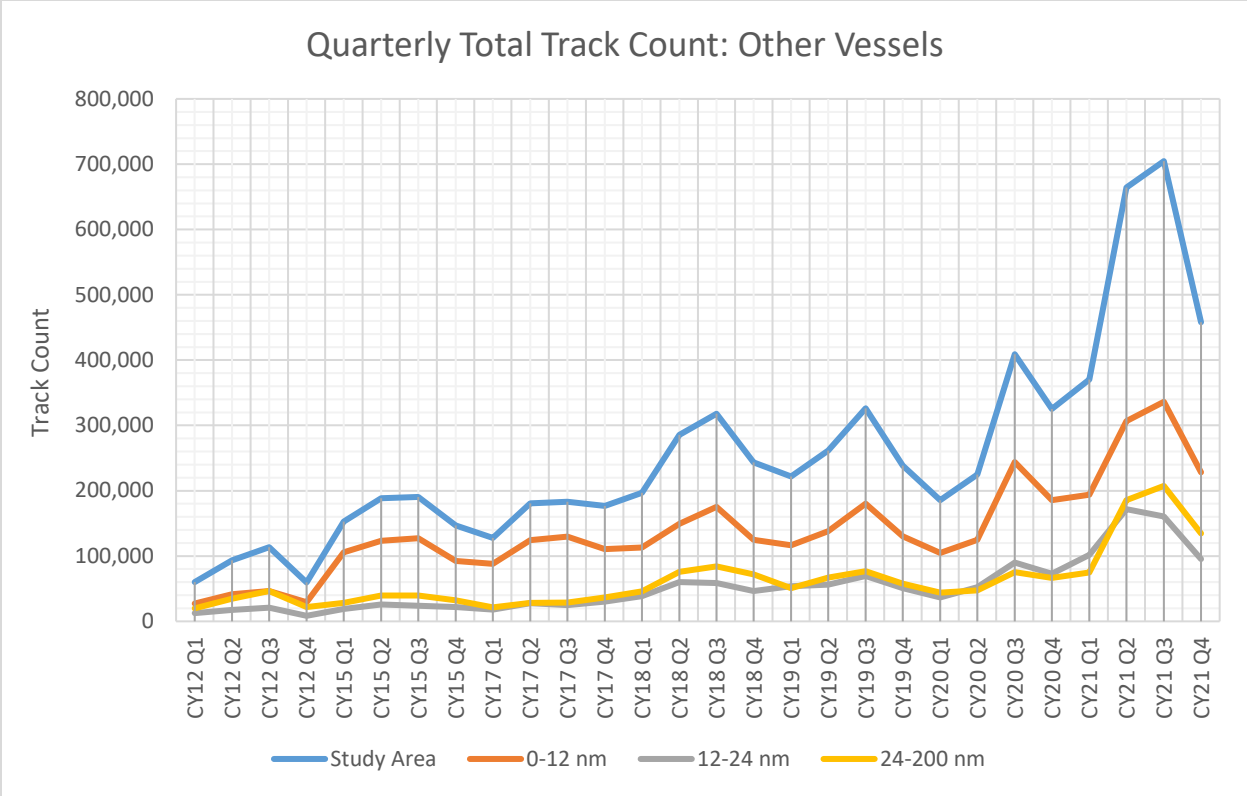


Figure 40. The quarterly total track count of 'Other Vessels'.

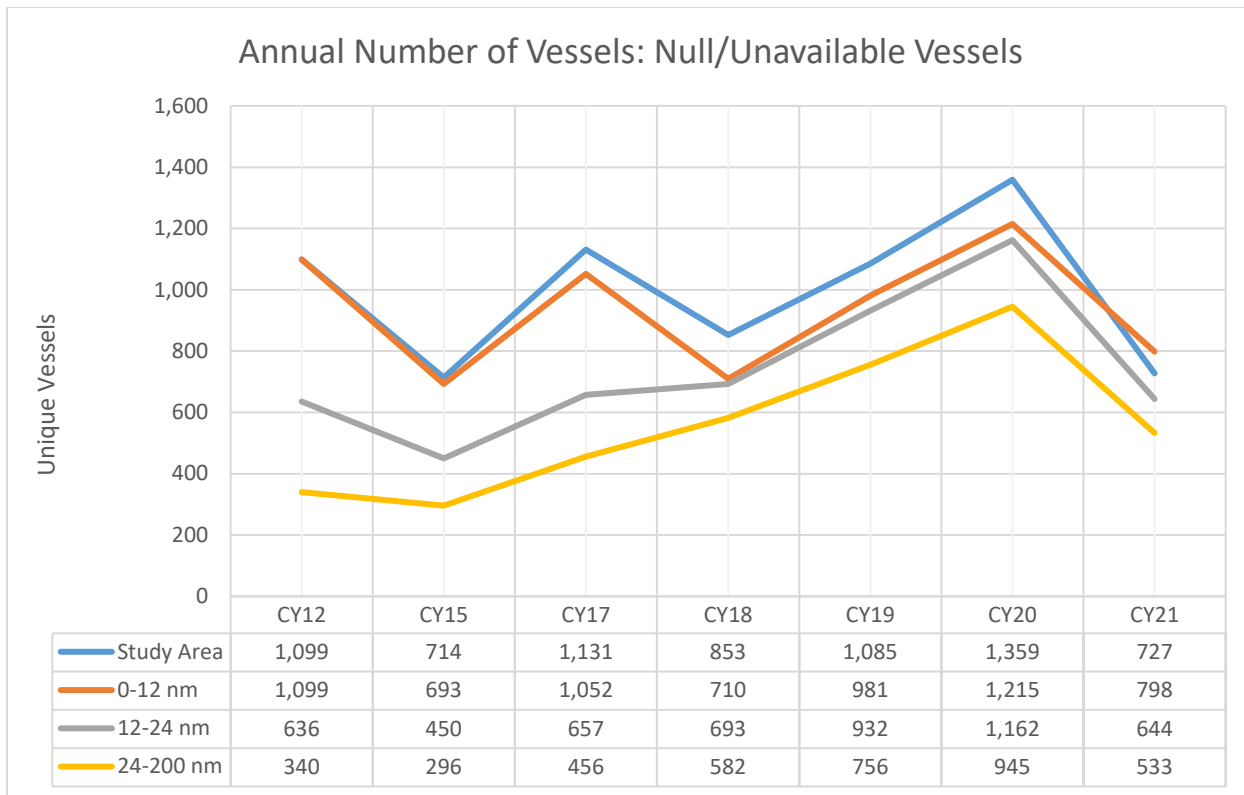


Figure 41. The annual number of 'Null/Unavailable Vessels'.

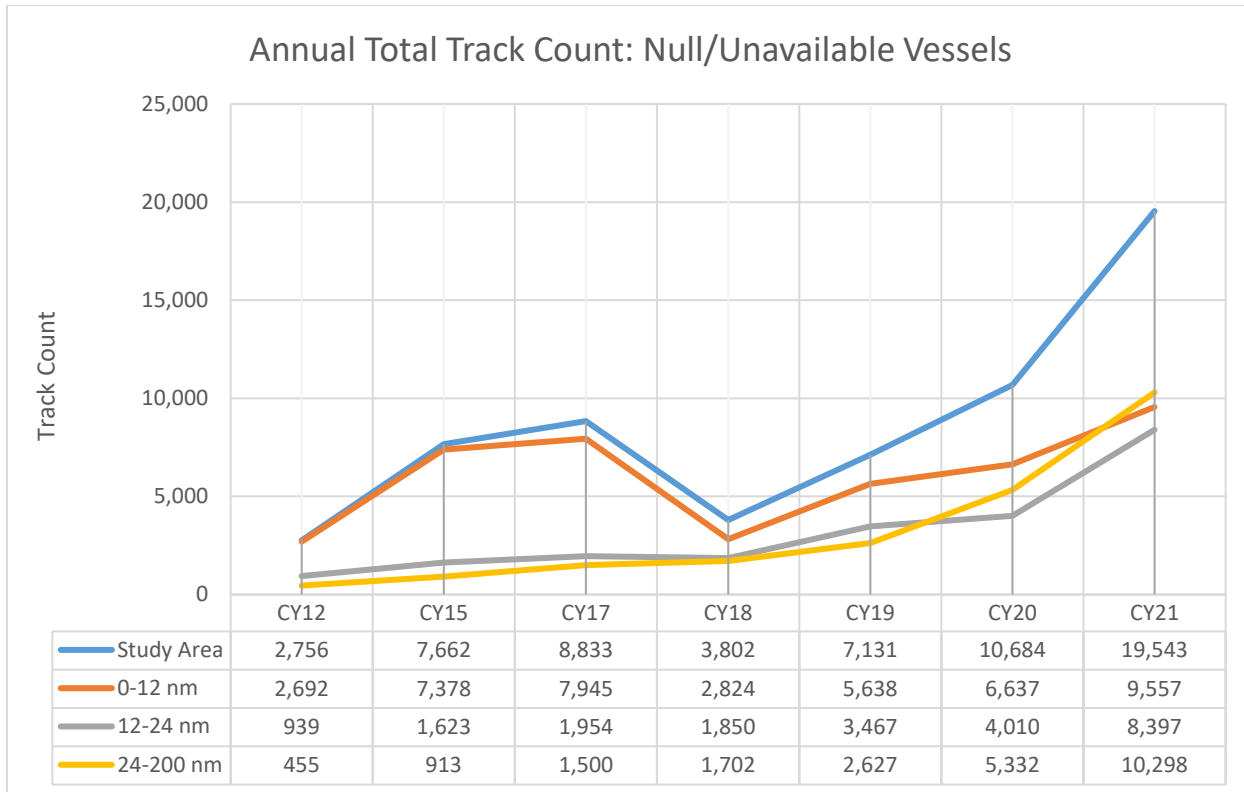


Figure 42. The annual total track count of 'Null/Unavailable Vessels'.

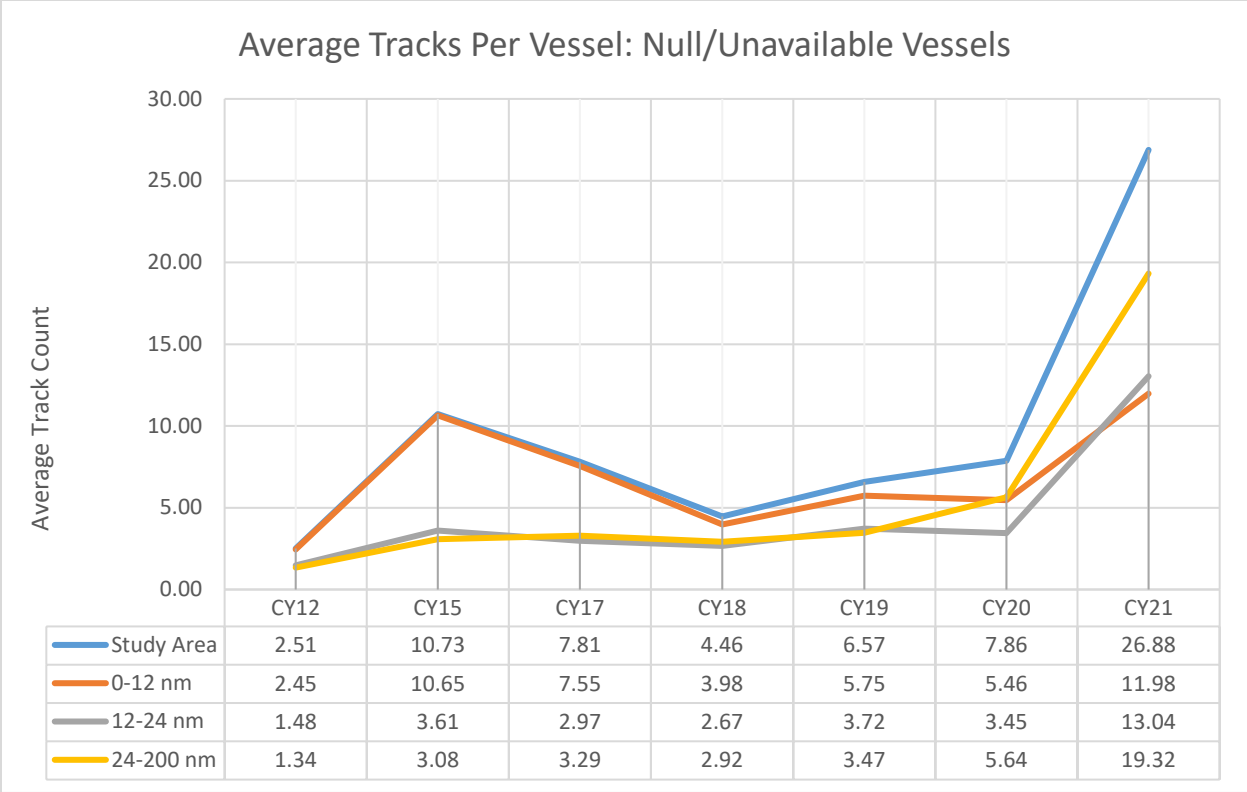


Figure 43. The average tracks per vessel based on 'Null/Unavailable Vessels'.

Attachment 3 – Vessel Density Results

Table of Figures

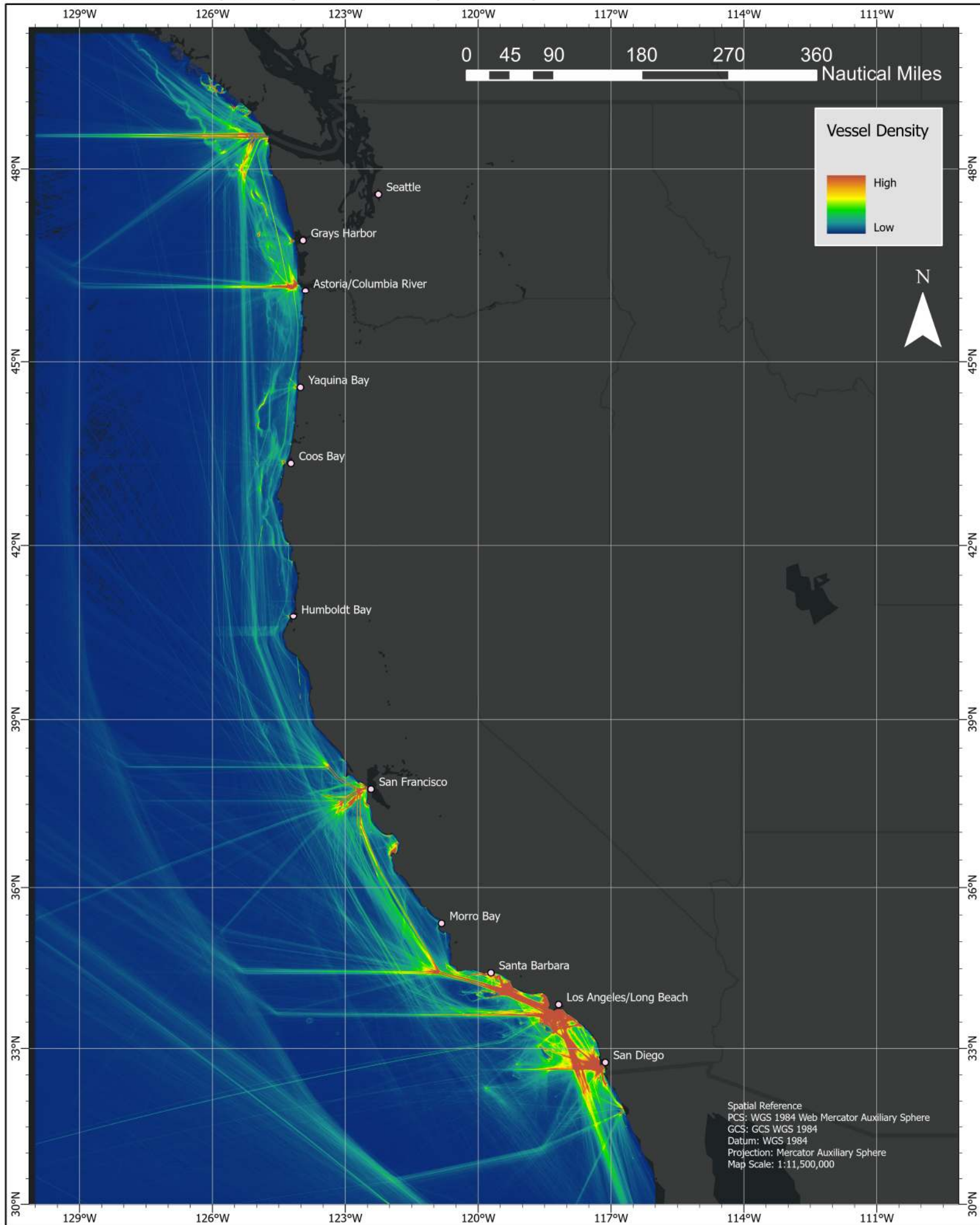
All Vessels	Map	Page
	5-year Average	3-2
	CY Q1 5-year Average	3-3
	CY Q3 5-Year Average	3-4
	2021	3-5
	2018	3-6
	2015	3-7
	2012	3-8
Fishing		
	5-year Average	3-9
	CY Q1 5-year Average	3-10
	CY Q3 5-Year Average	3-11
	2021	3-12
	2018	3-13
	2015	3-14
	2012	3-15
Tug and Tow		
	5-year Average	3-16
	CY Q1 5-year Average	3-17
	CY Q3 5-Year Average	3-18
	2021	3-19
	2018	3-20
	2015	3-21
	2012	3-22

Passenger	Map	Page
	5-year Average	3-30
	CY Q1 5-year Average	3-31
	CY Q3 5-Year Average	3-32
	2021	3-33
	2018	3-34
	2015	3-35
	2012	3-36
Cargo		
	5-year Average	3-37
	CY Q1 5-year Average	3-38
	CY Q3 5-Year Average	3-39
	2021	3-40
	2018	3-41
	2015	3-42
	2012	3-43
Recreational		
	5-year Average	3-23
	CY Q1 5-year Average	3-24
	CY Q3 5-Year Average	3-25
	2021	3-26
	2018	3-27
	2015	3-28
	2012	3-29

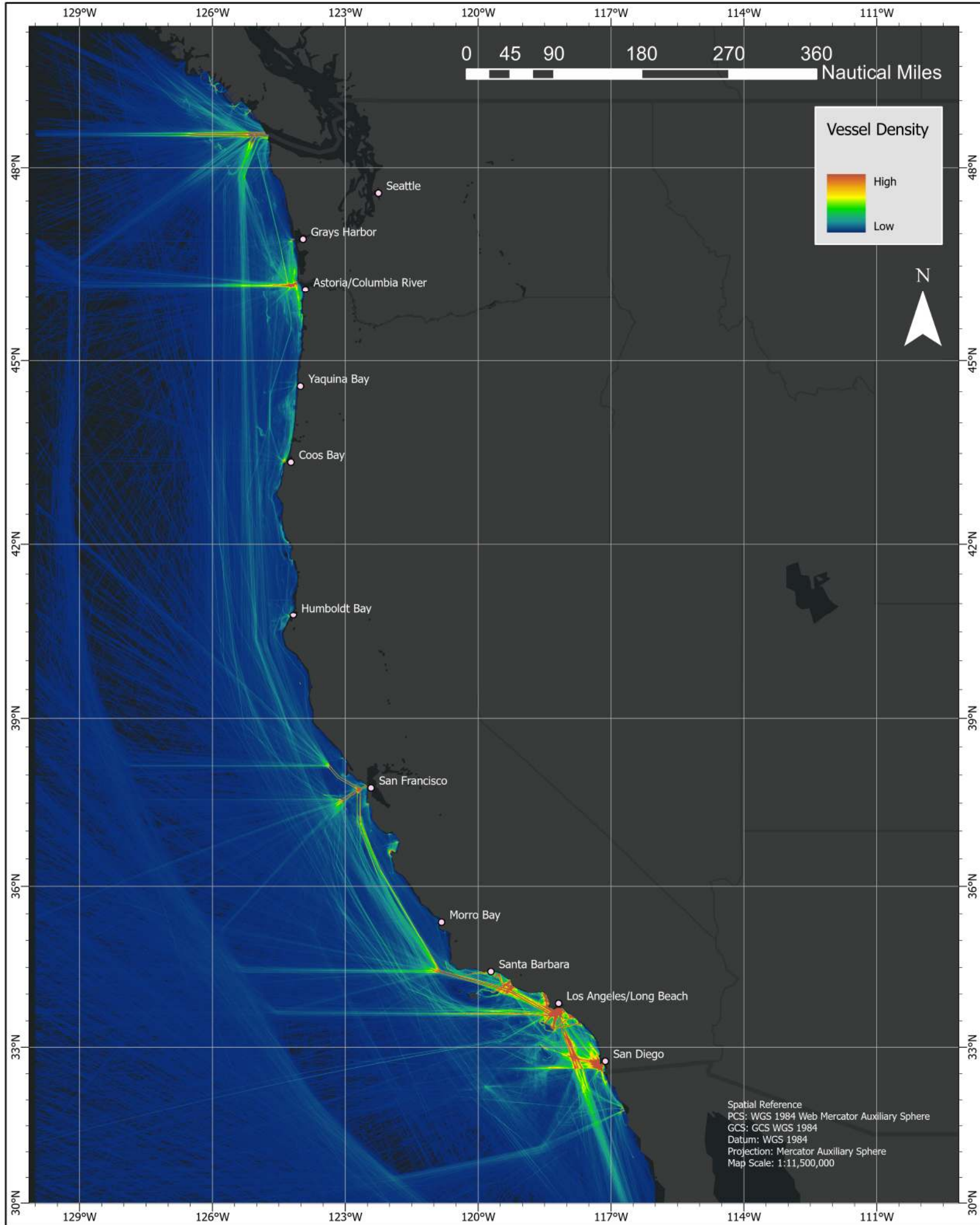
Tanker	Map	Page
	5-year Average	3-44
	CY Q1 5-year Average	3-45
	CY Q3 5-Year Average	3-46
	2021	3-47
	2018	3-48
	2015	3-49
	2012	3-50
Other		
	5-year Average	3-51
	CY Q1 5-year Average	3-52
	CY Q3 5-Year Average	3-53
	2021	3-54
	2018	3-55
	2015	3-56
	2012	3-57
Null/Unavailable		
	5-year Average	3-58

* Maps with the same color highlighting can be compared if they are the same ship-type category.

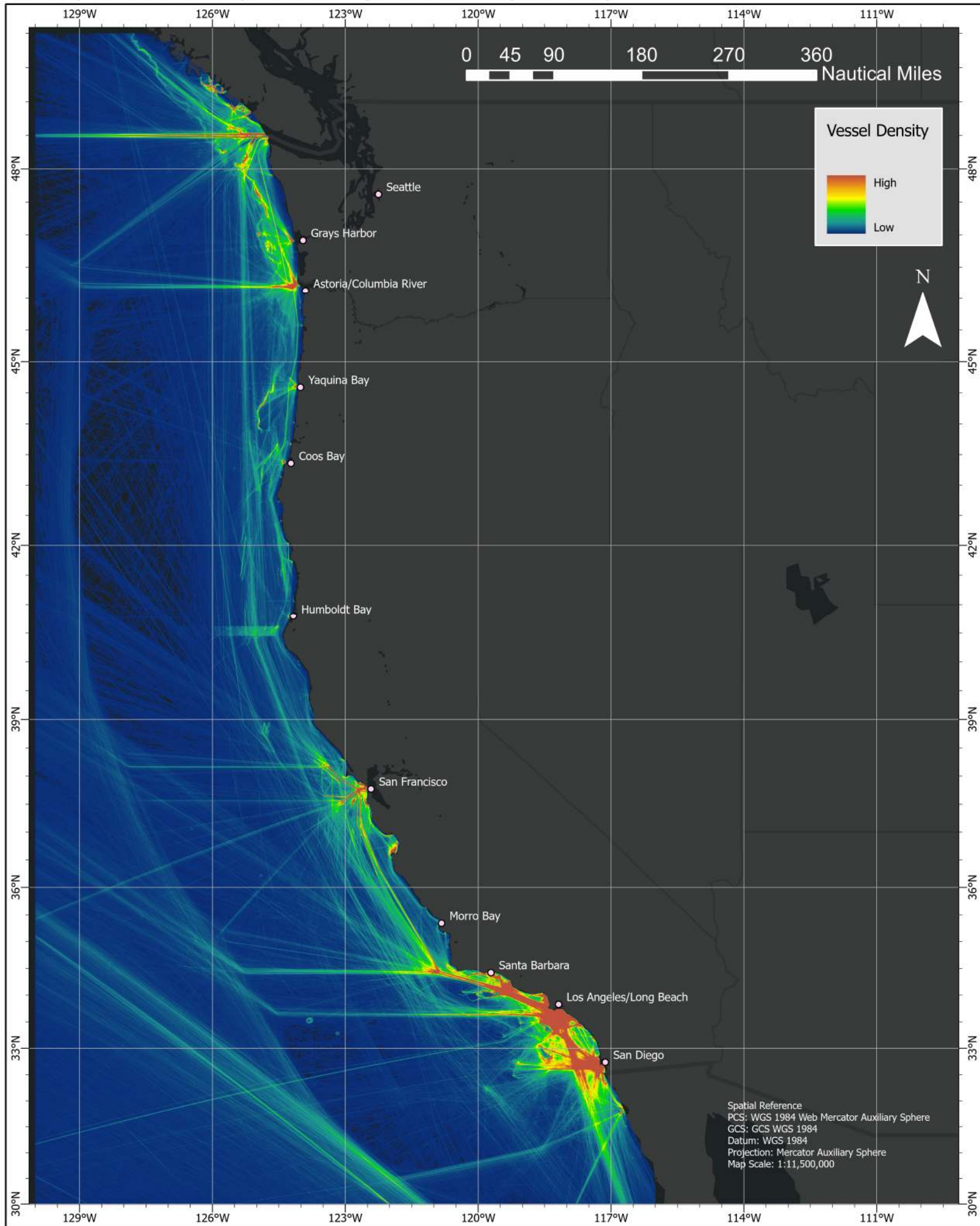
Annual AIS Vessel Density: Average of All Vessels (2017-2021)



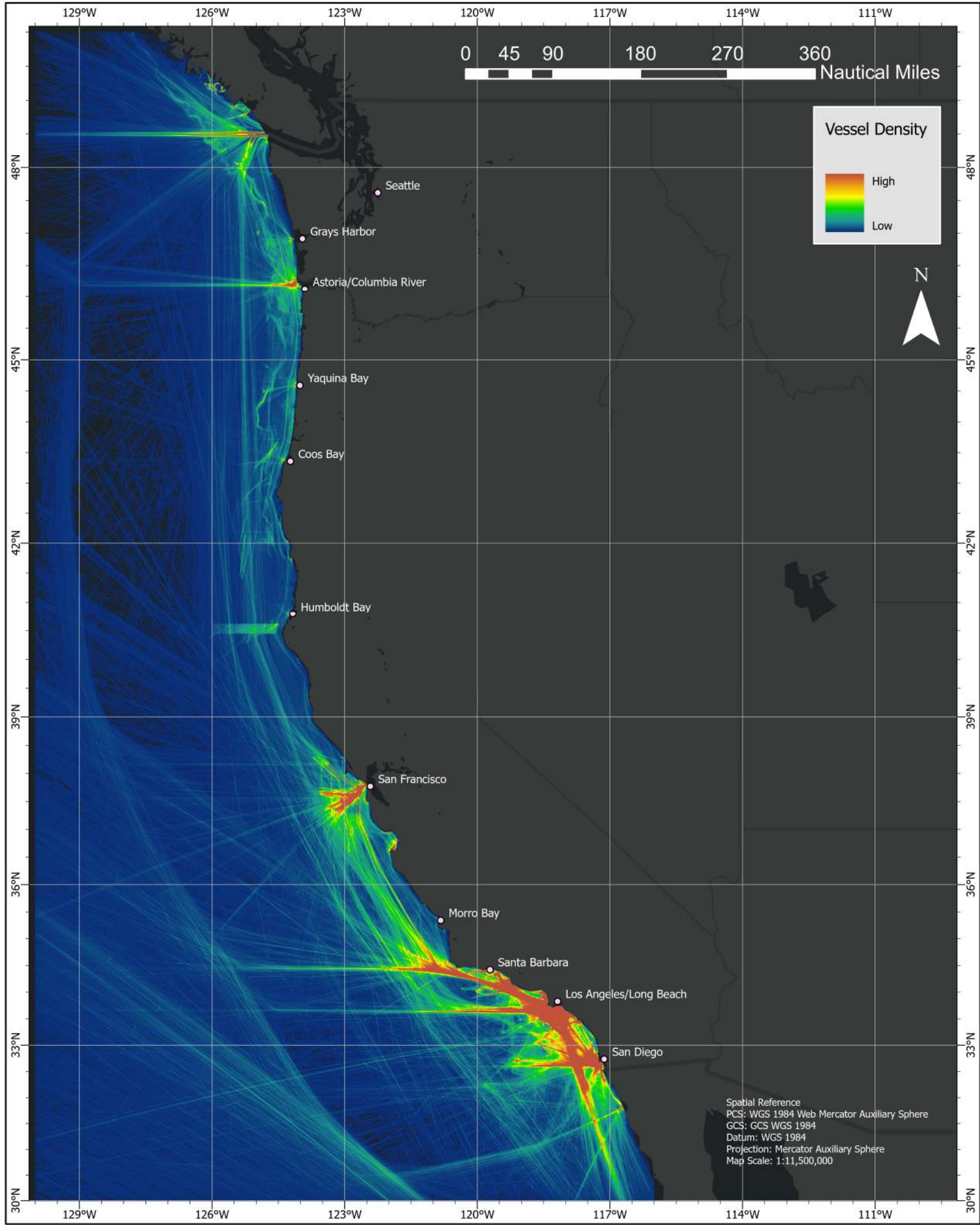
Quarterly AIS Vessel Density: CYQ1 Average of All Vessels (2017-2021)



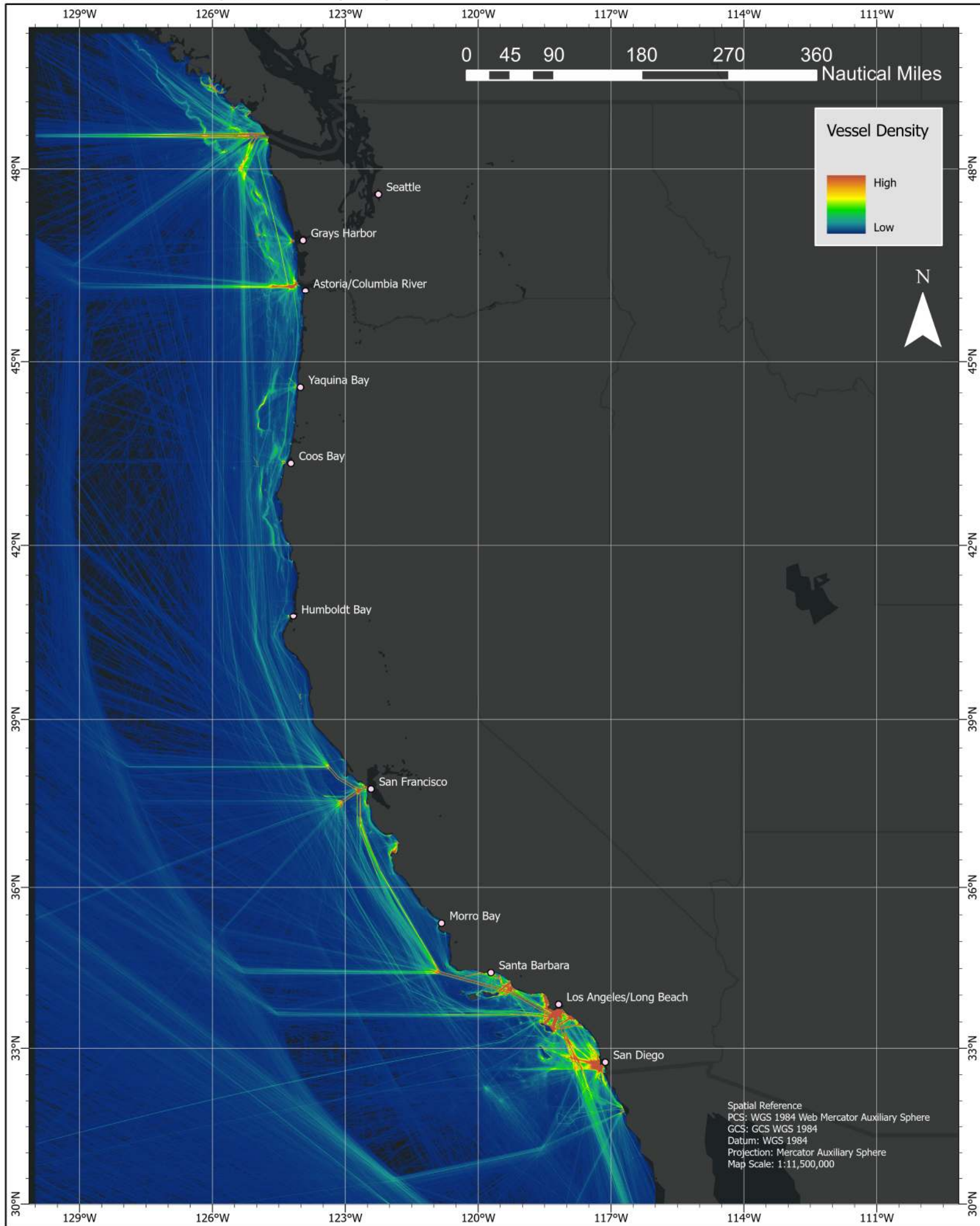
Quarterly AIS Vessel Density: CYQ3 Average of All Vessels (2017-2021)



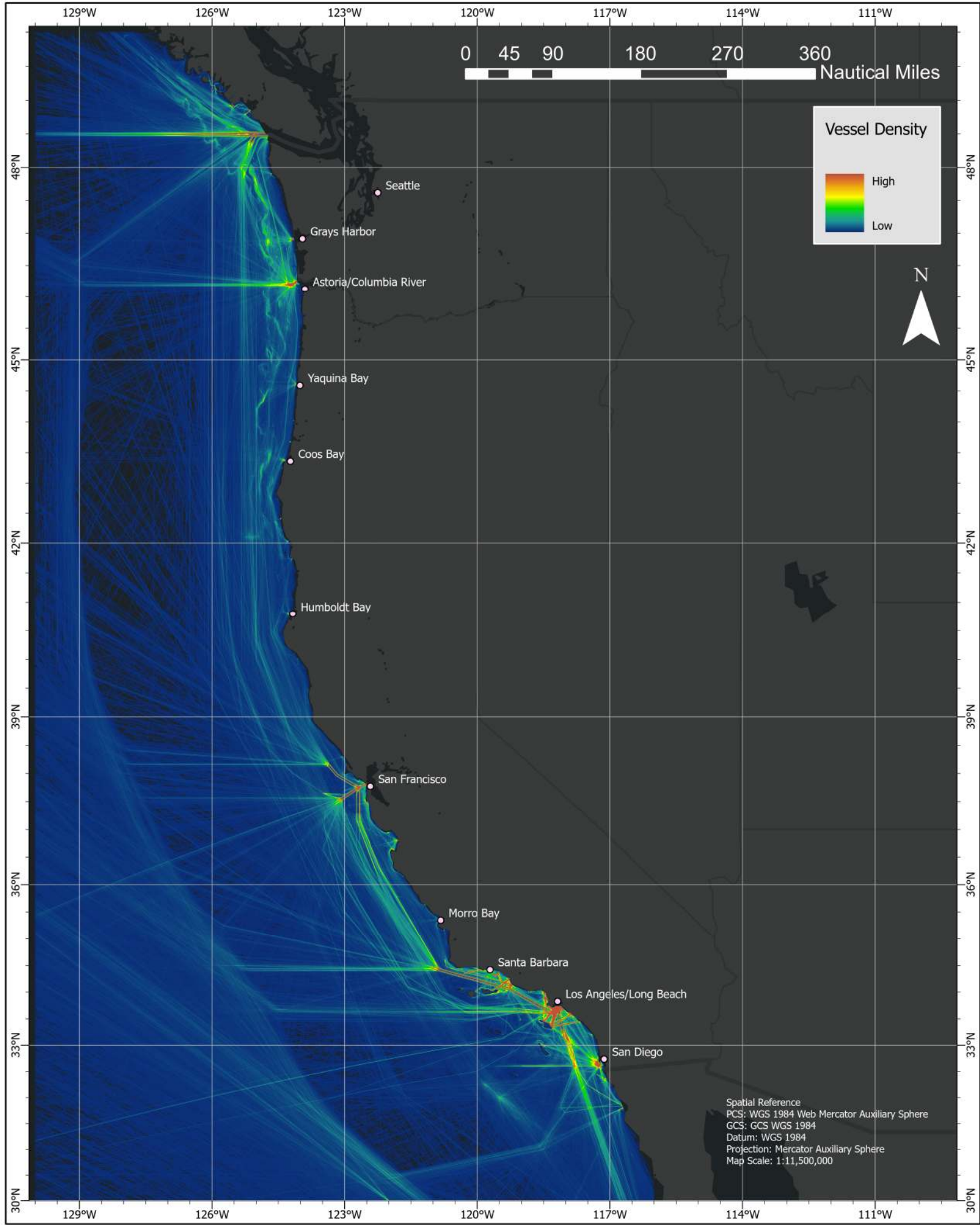
Annual AIS Vessel Density: All Vessels (2021)



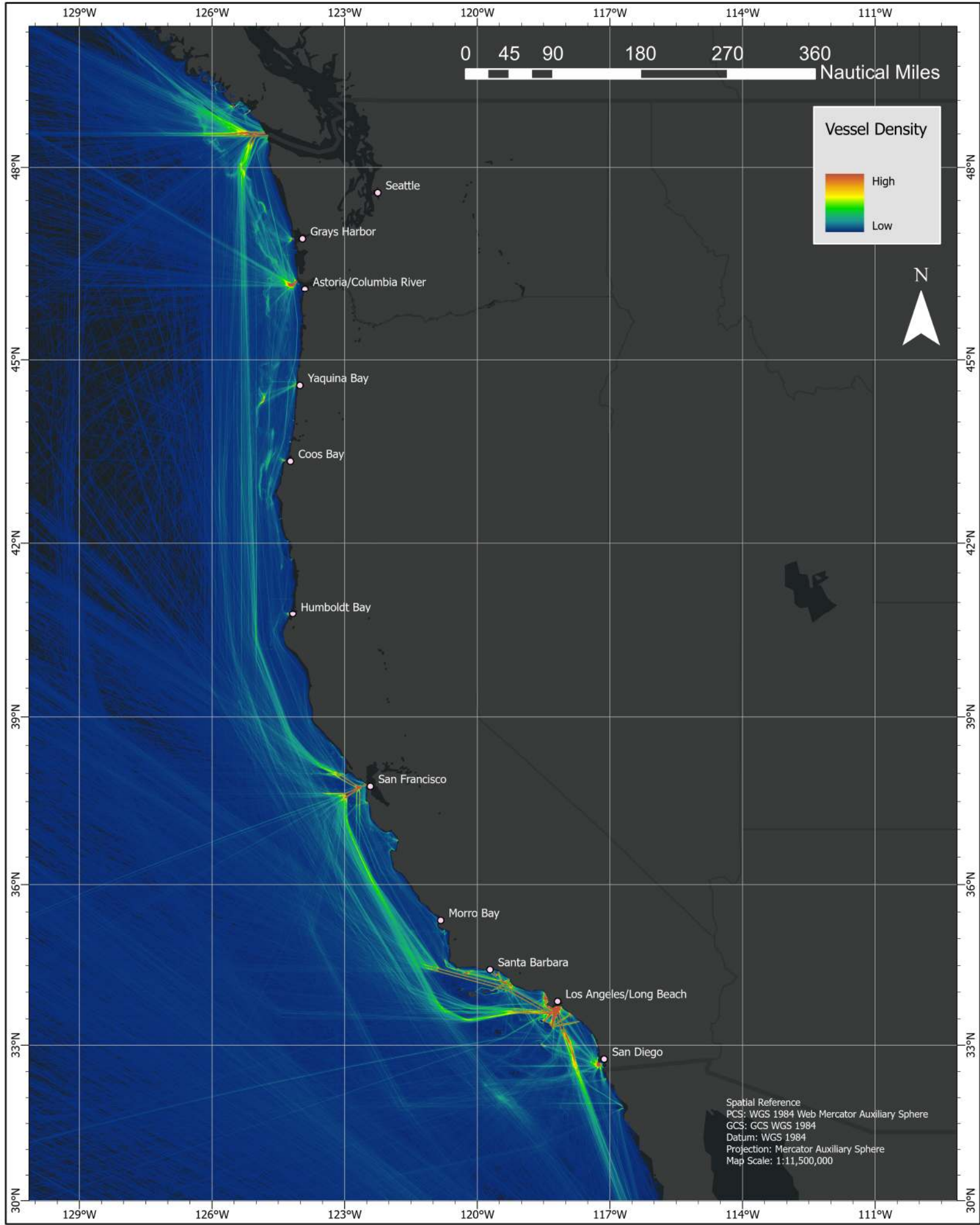
Annual AIS Vessel Density: All Vessels (2018)



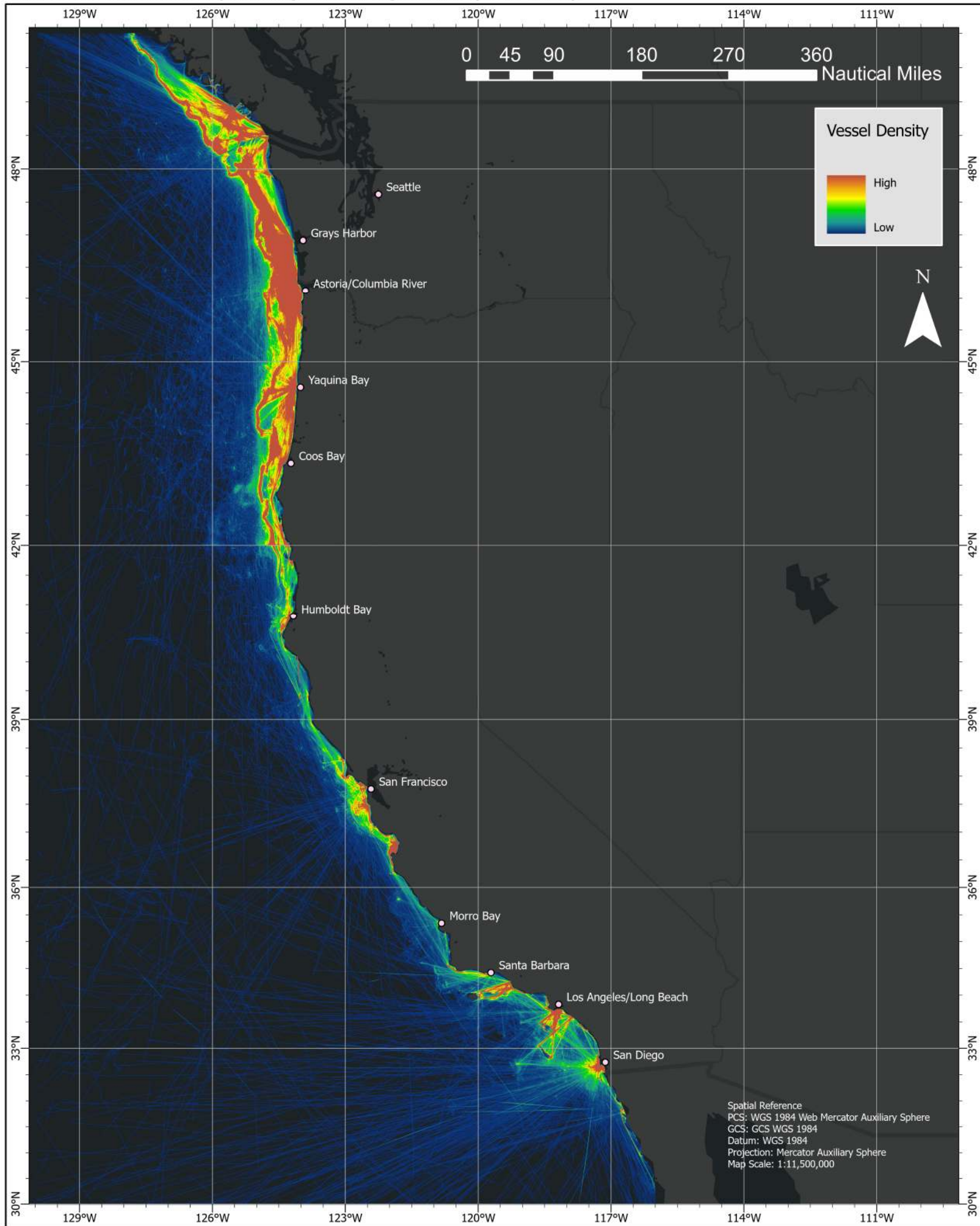
Annual AIS Vessel Density: All Vessels (2015)



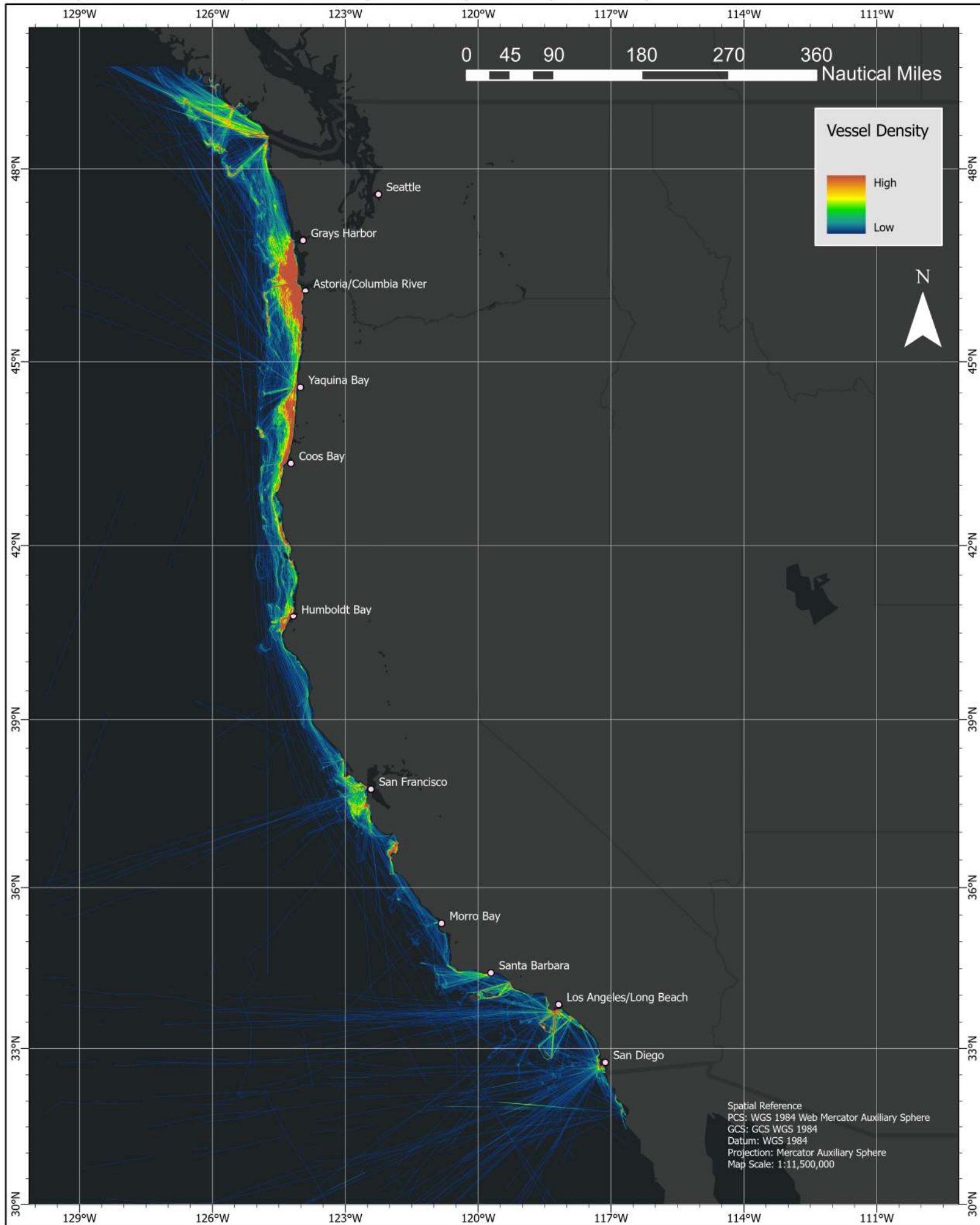
Annual AIS Vessel Density: All Vessels (2012)



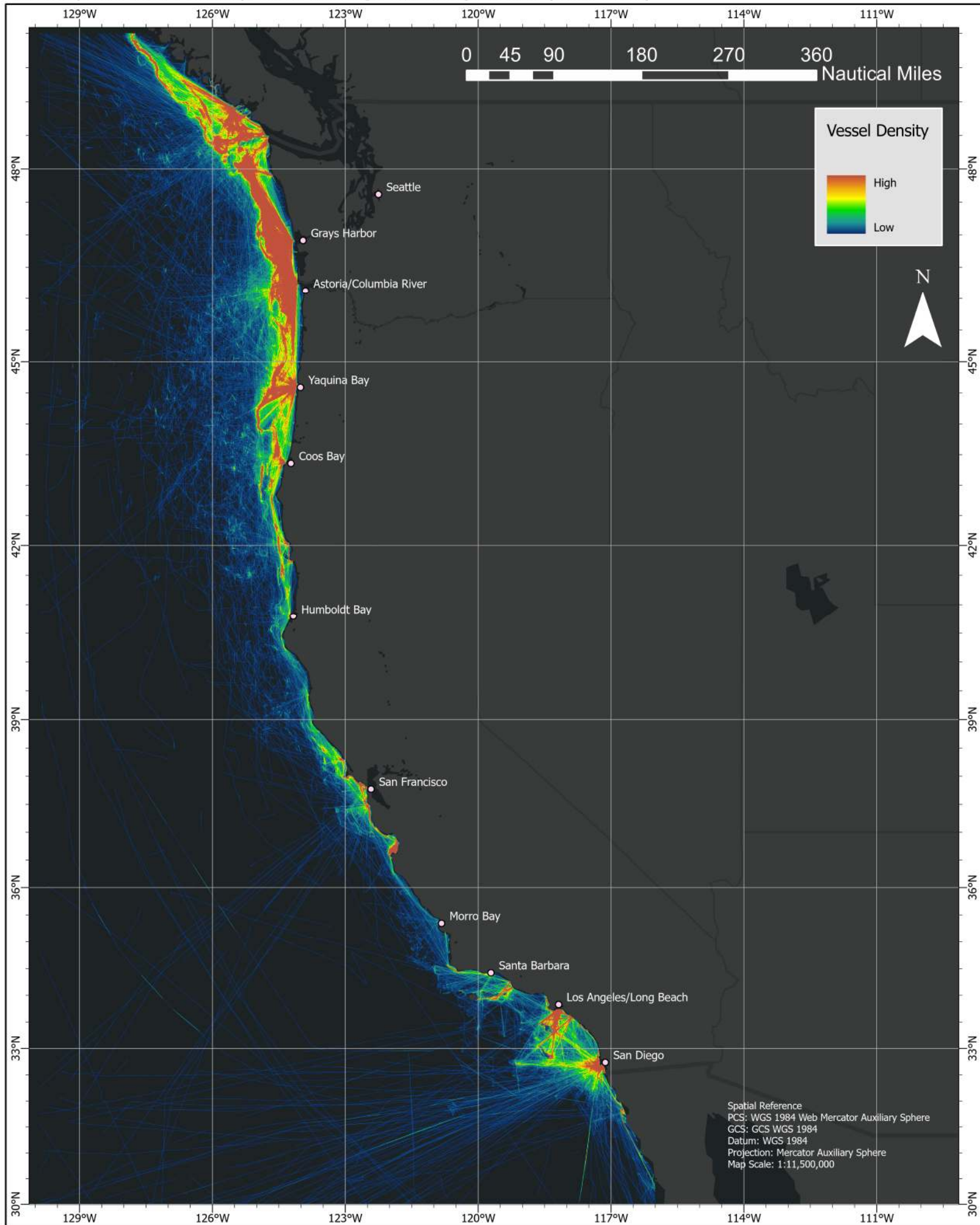
Annual AIS Vessel Density: Average of Fishing Vessels (2017-2021)



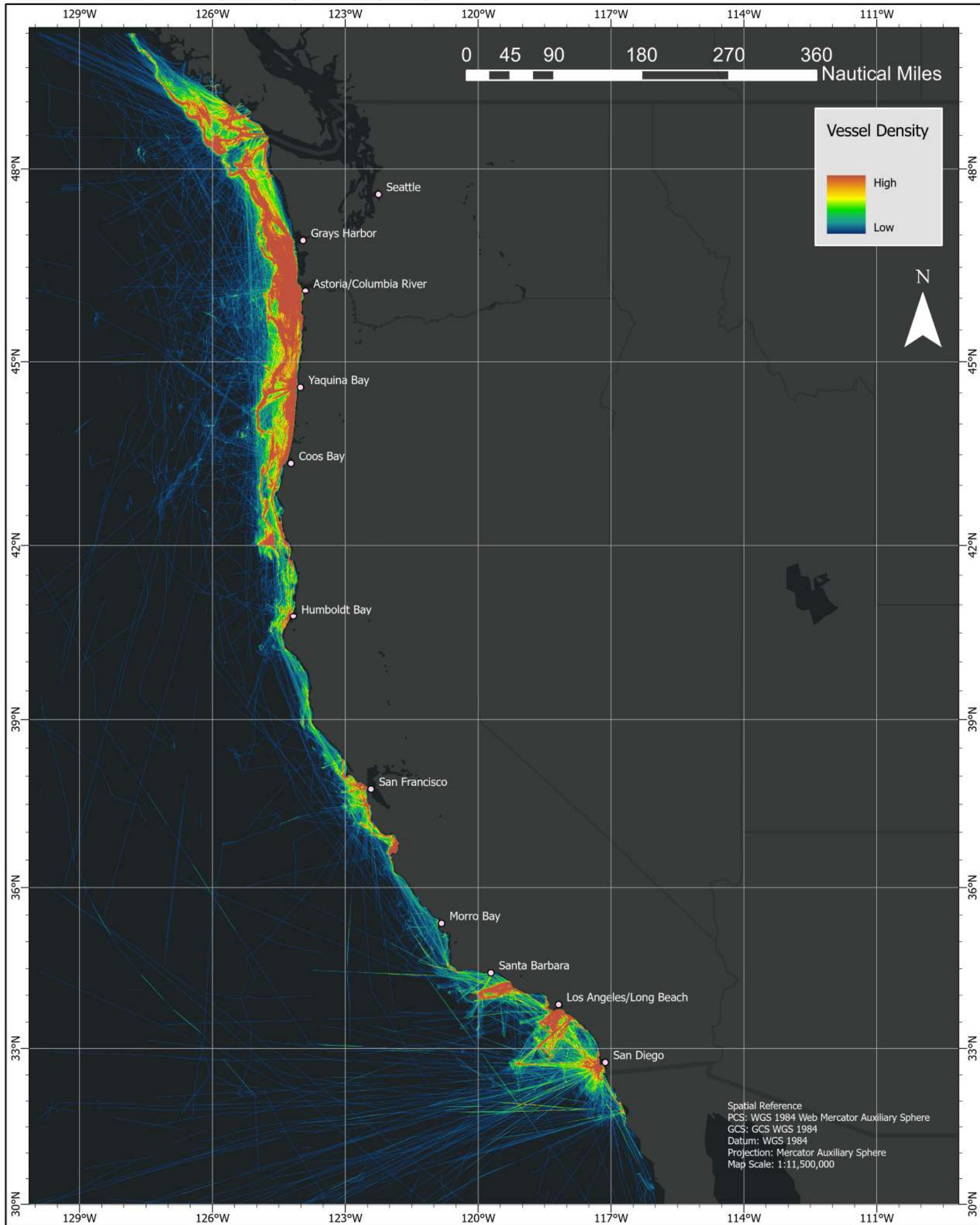
Quarterly AIS Vessel Density: CYQ1 Average of Fishing Vessels (2017-2021)



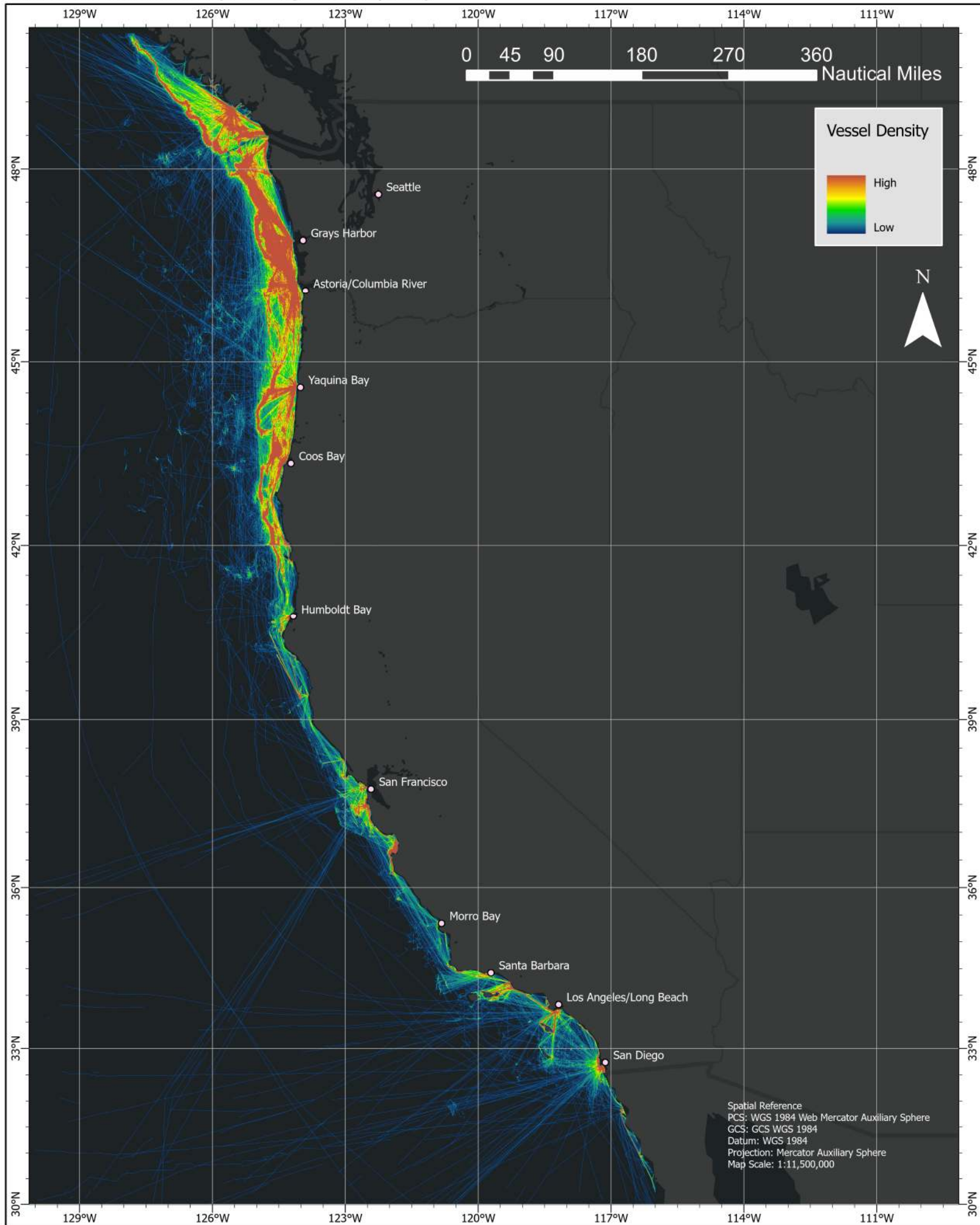
Quarterly AIS Vessel Density: CYQ3 Average of Fishing Vessels (2017-2021)



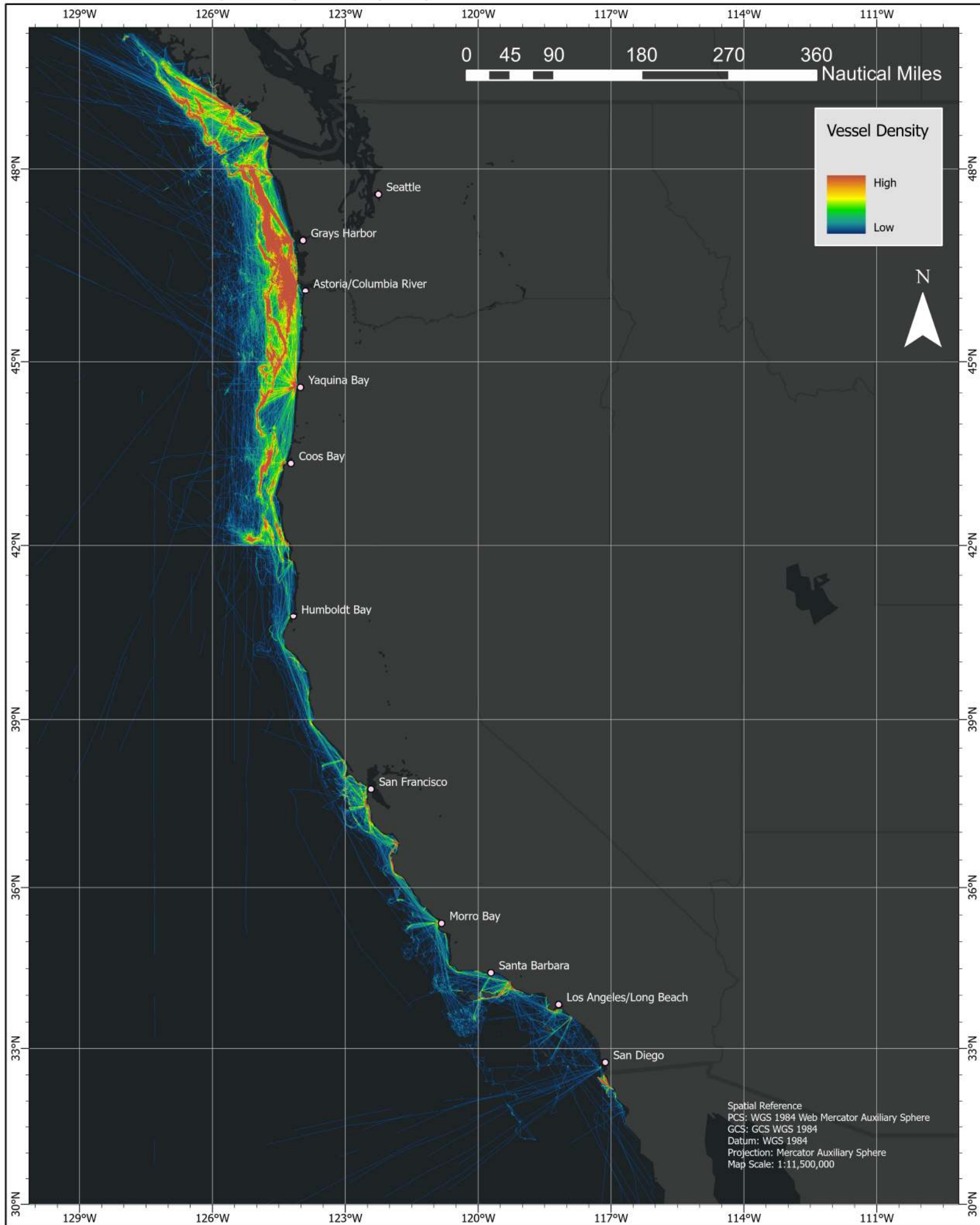
Annual AIS Vessel Density: Fishing Vessels (2021)



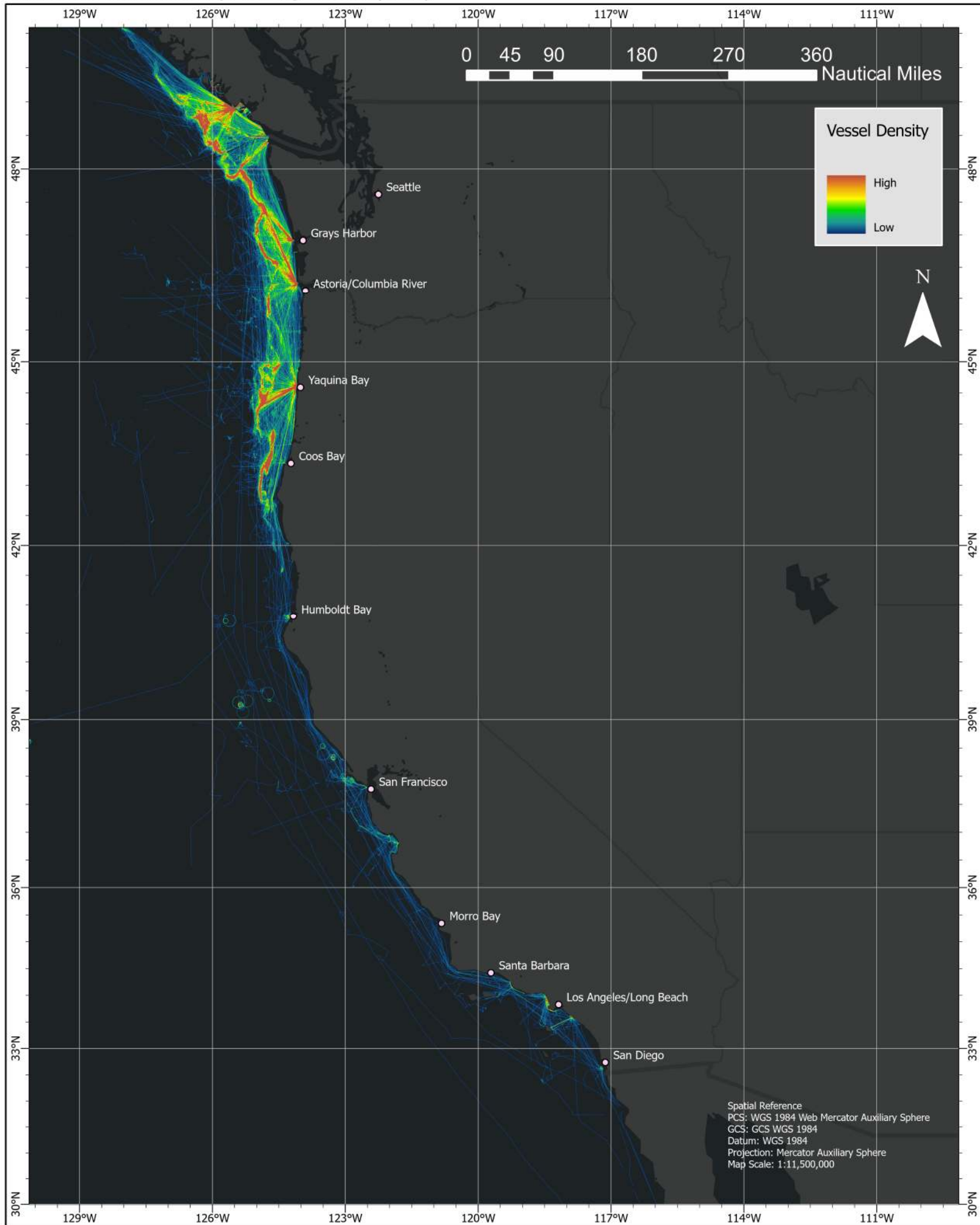
Annual AIS Vessel Density: Fishing Vessels (2018)



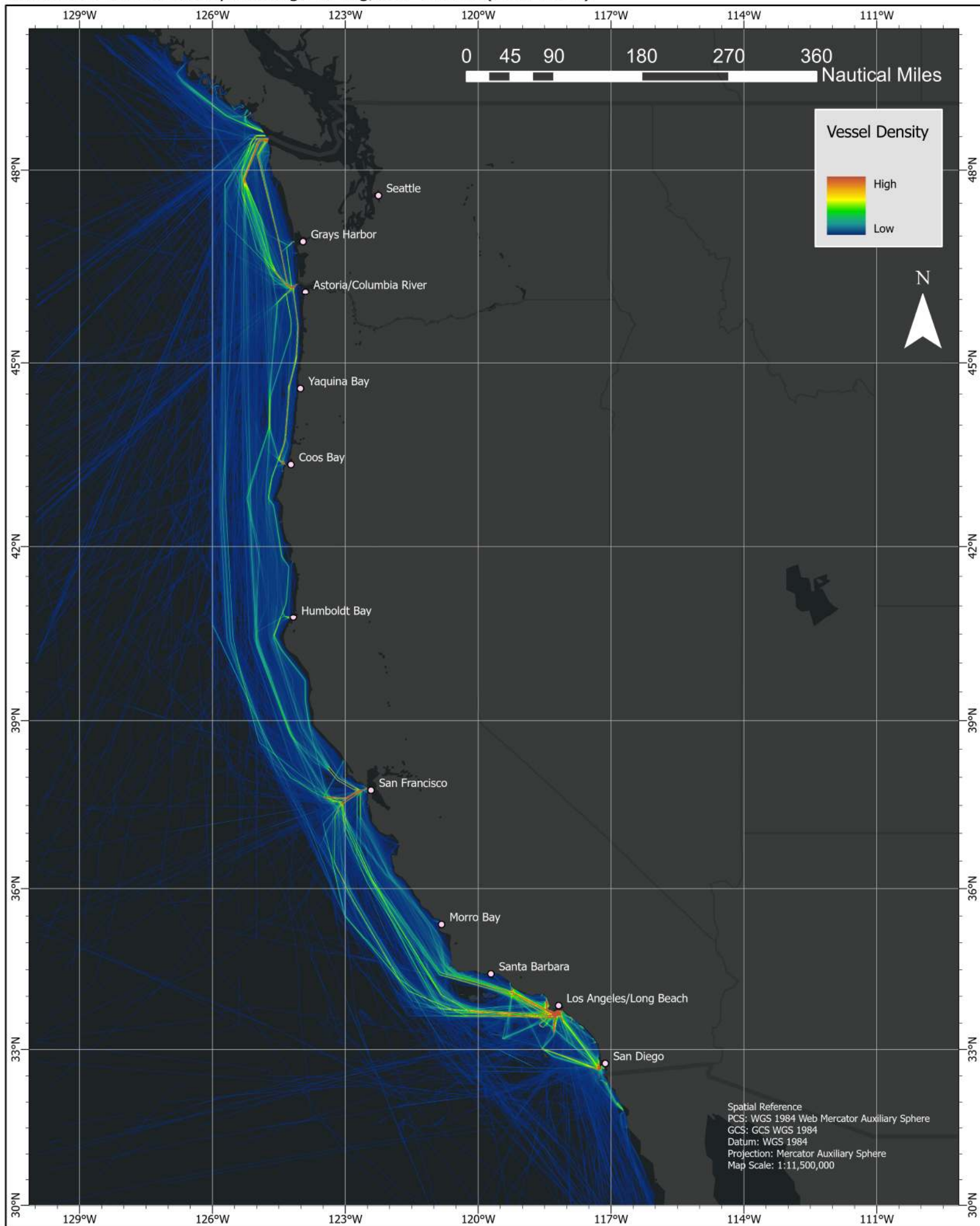
Annual AIS Vessel Density: Fishing Vessels (2015)



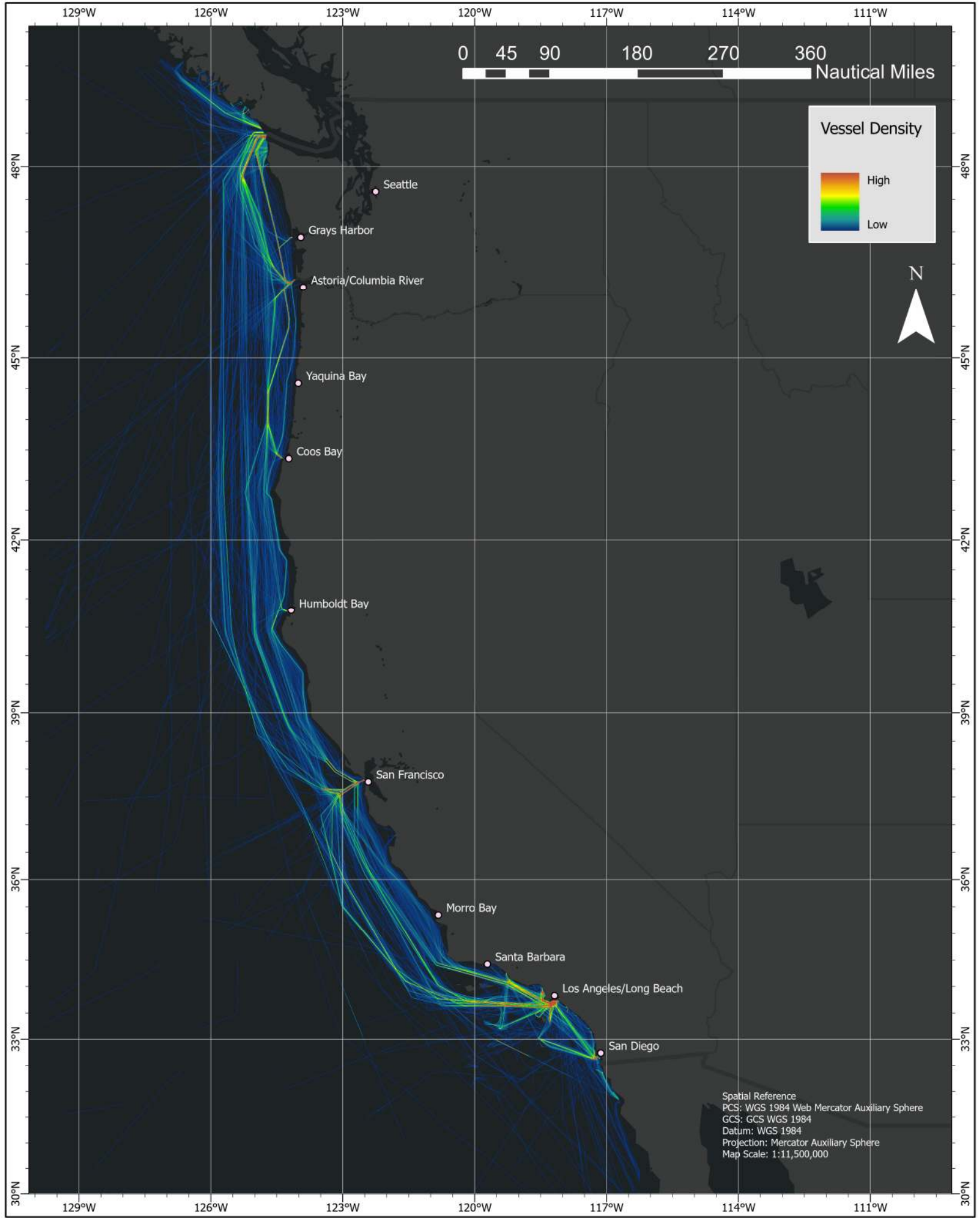
Annual AIS Vessel Density: Fishing Vessels (2012)



Annual AIS Vessel Density: Average of Tug/Tow Vessels (2017-2021)

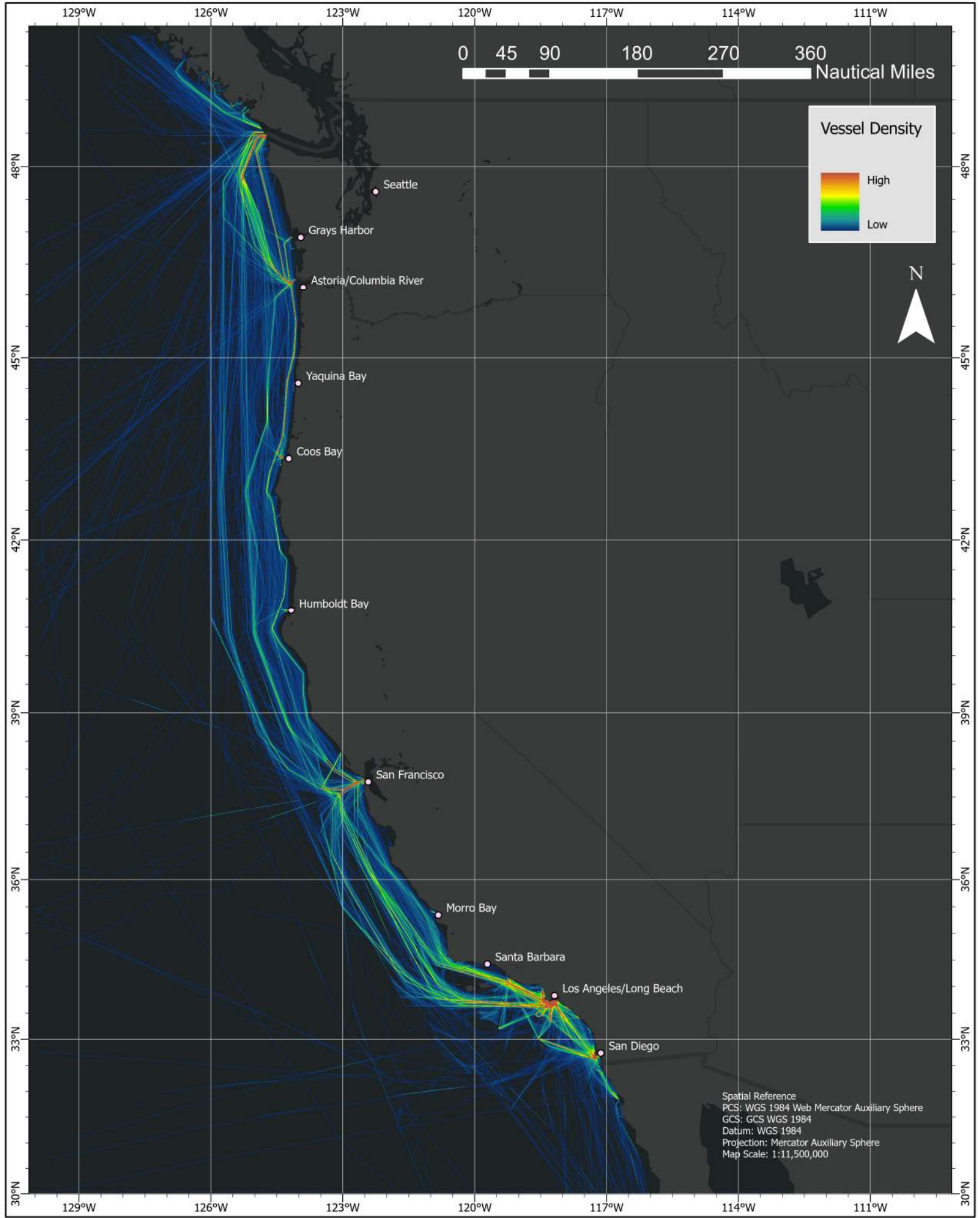


Quarterly AIS Vessel Density: CYQ1 Average of Tug/Tow Vessels (2017-2021)



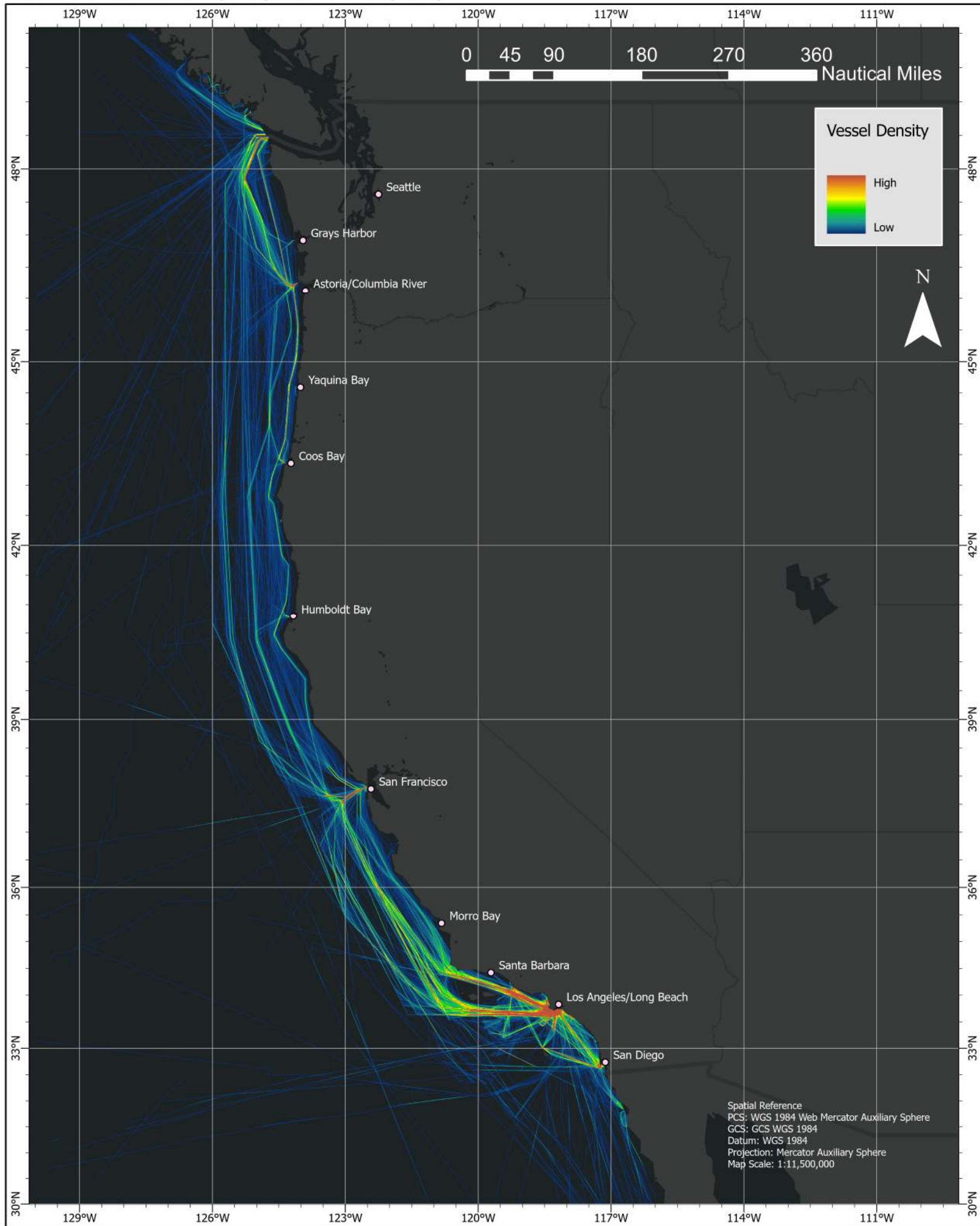
Basemap: Esri, HERE, Garmin, FAO, NOAA, USGS, EPA. Overlays: USCG. Additional overlay information documented in the Pacific Coast Port Access Route Study (PAC-PARS).

Quarterly AIS Vessel Density: CYQ3 Average of Tug/Tow Vessels (2017-2021)

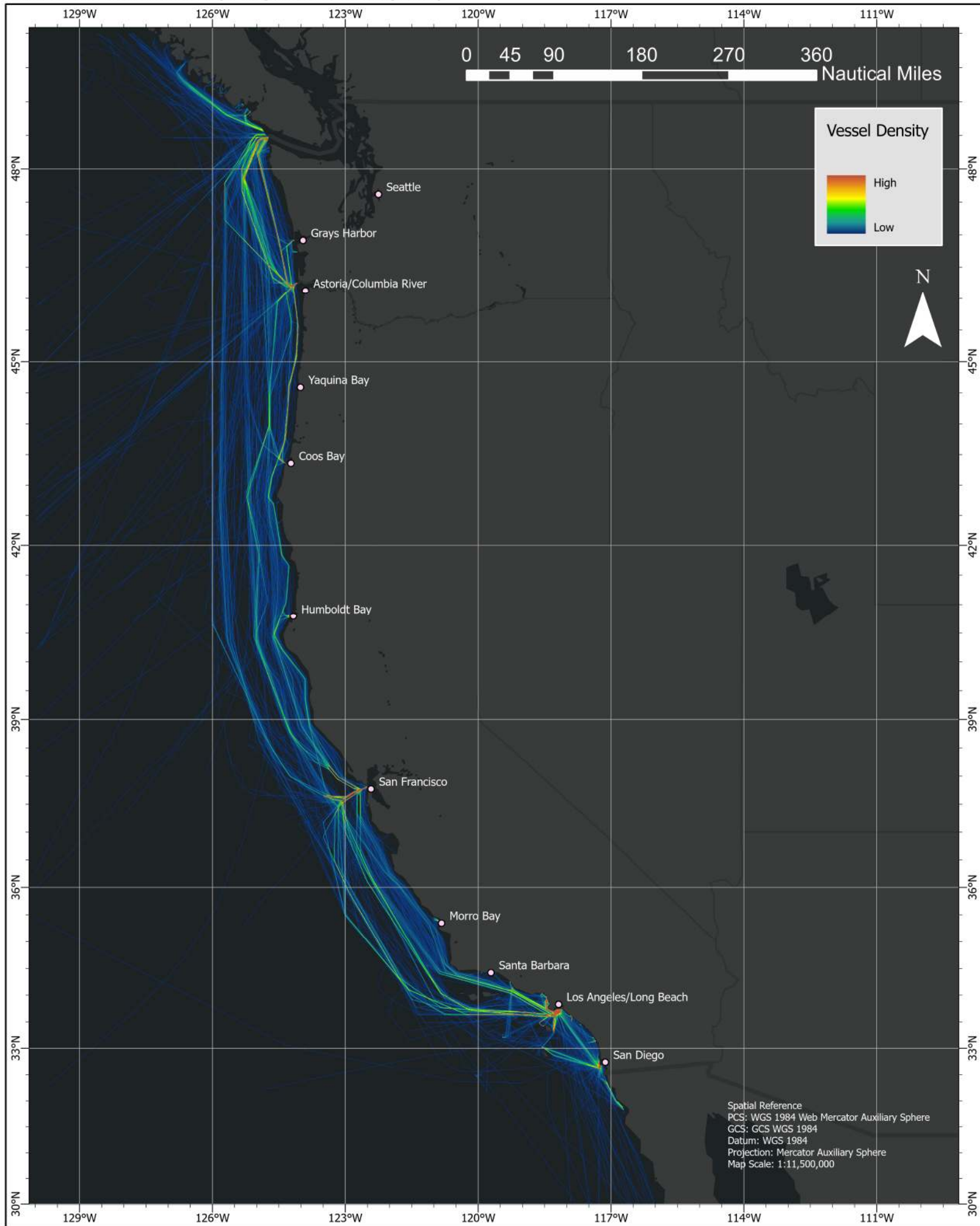


Basemap: Esri, HERE, Garmin, FAO, NOAA, USGS, EPA. Overlays: USCG. Additional overlay information documented in the Pacific Coast Port Access Route Study (PAC-PARS).

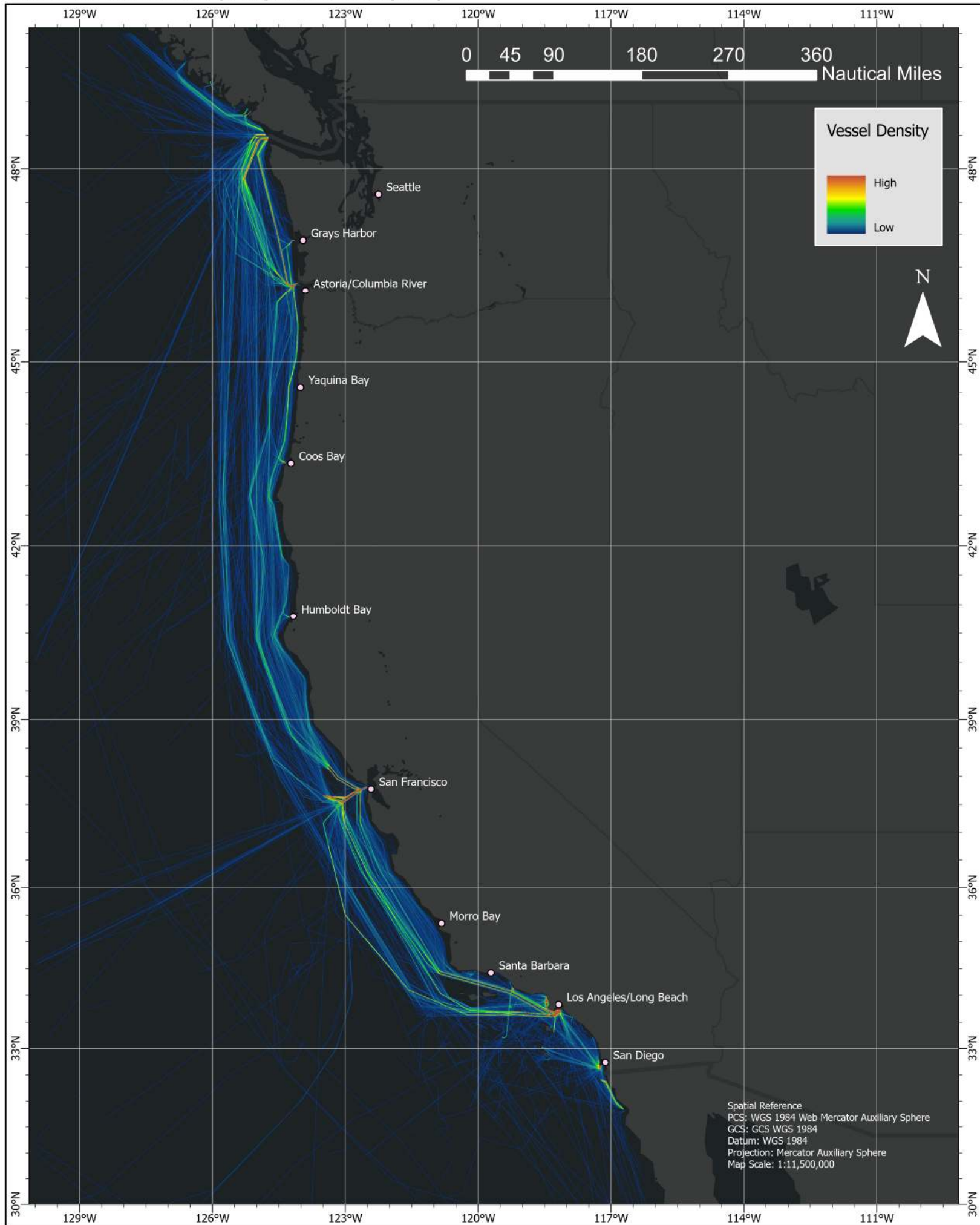
Annual AIS Vessel Density: Tug/Tow Vessels (2021)



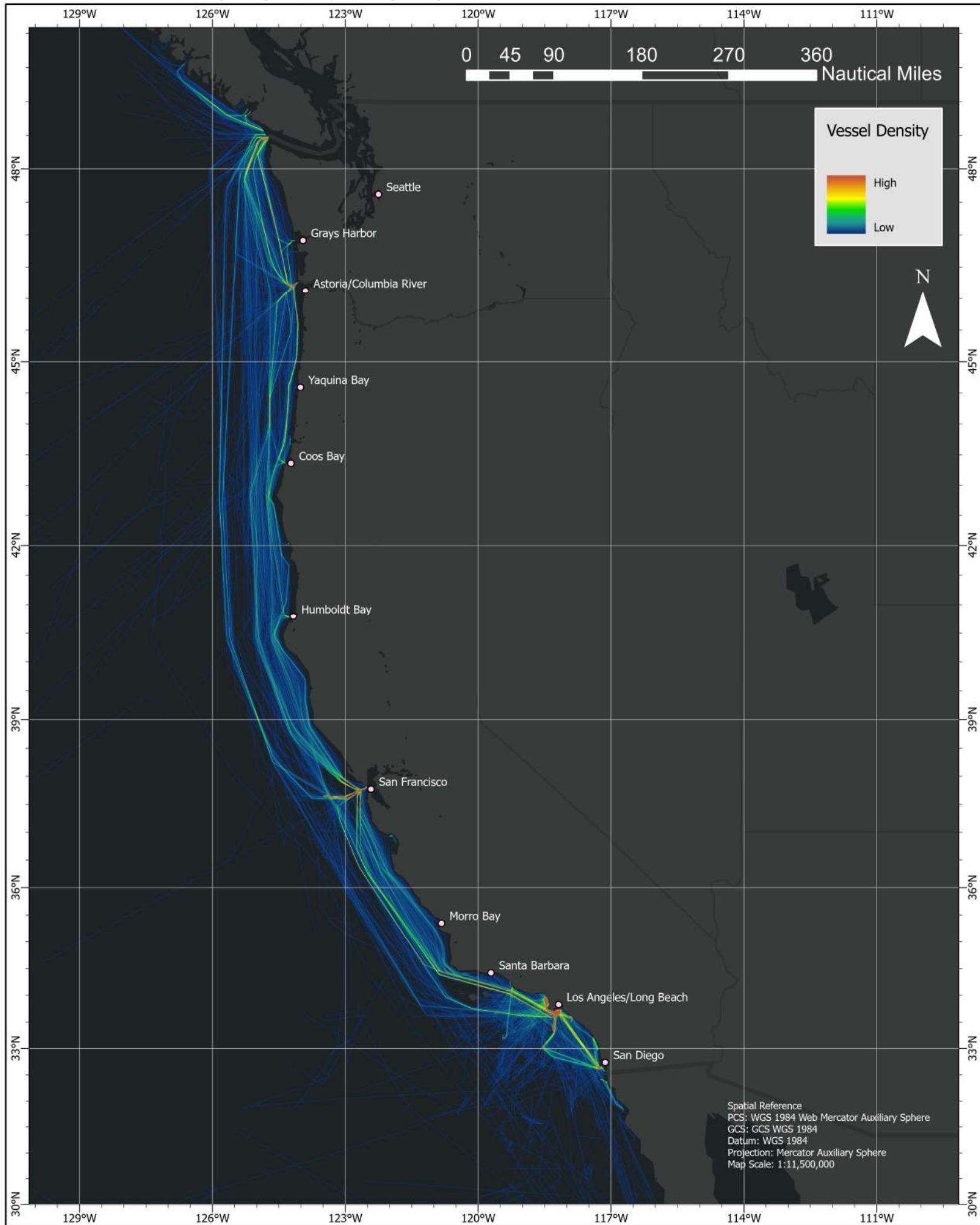
Annual AIS Vessel Density: Tug/Tow Vessels (2018)



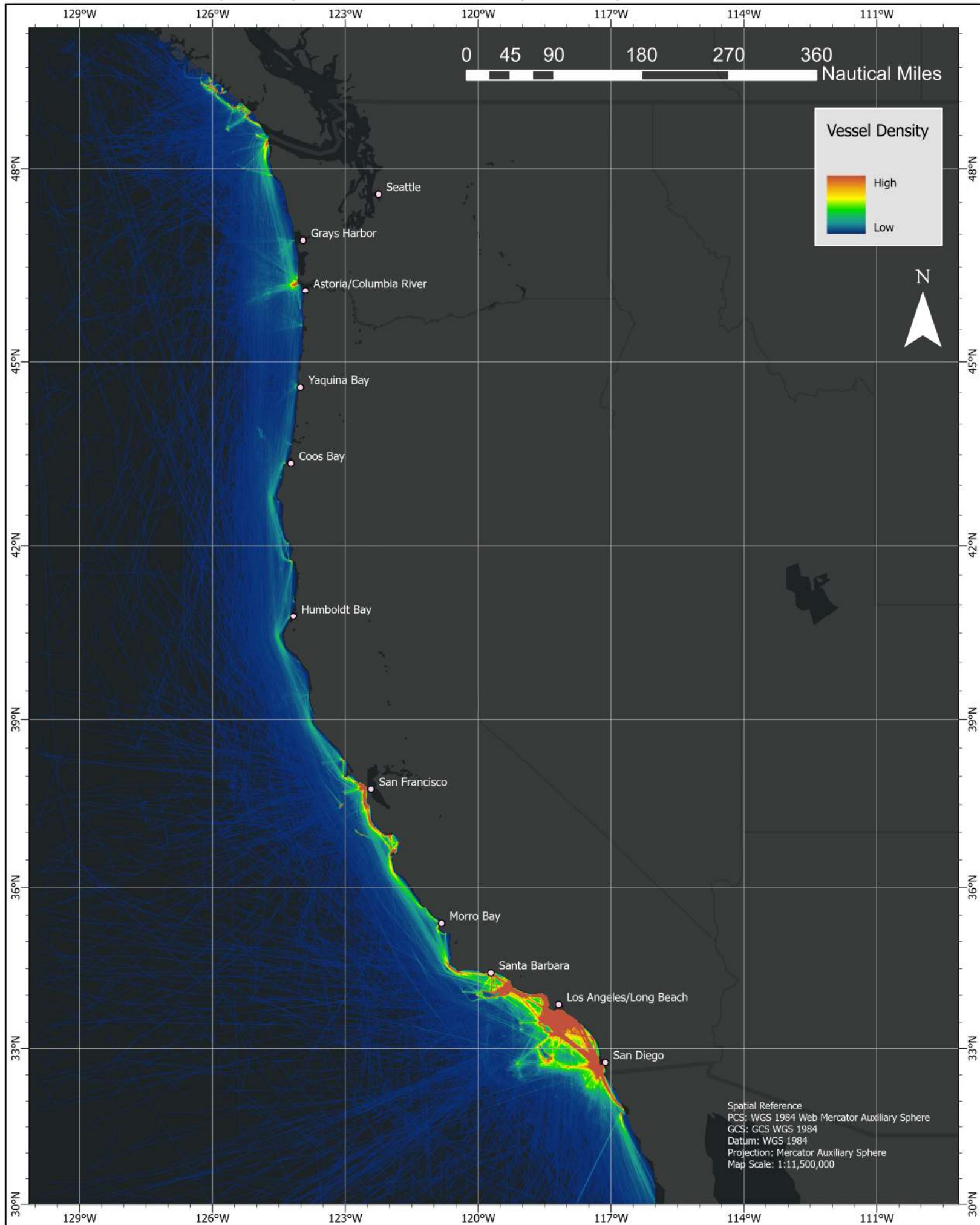
Annual AIS Vessel Density: Tug/Tow Vessels (2015)



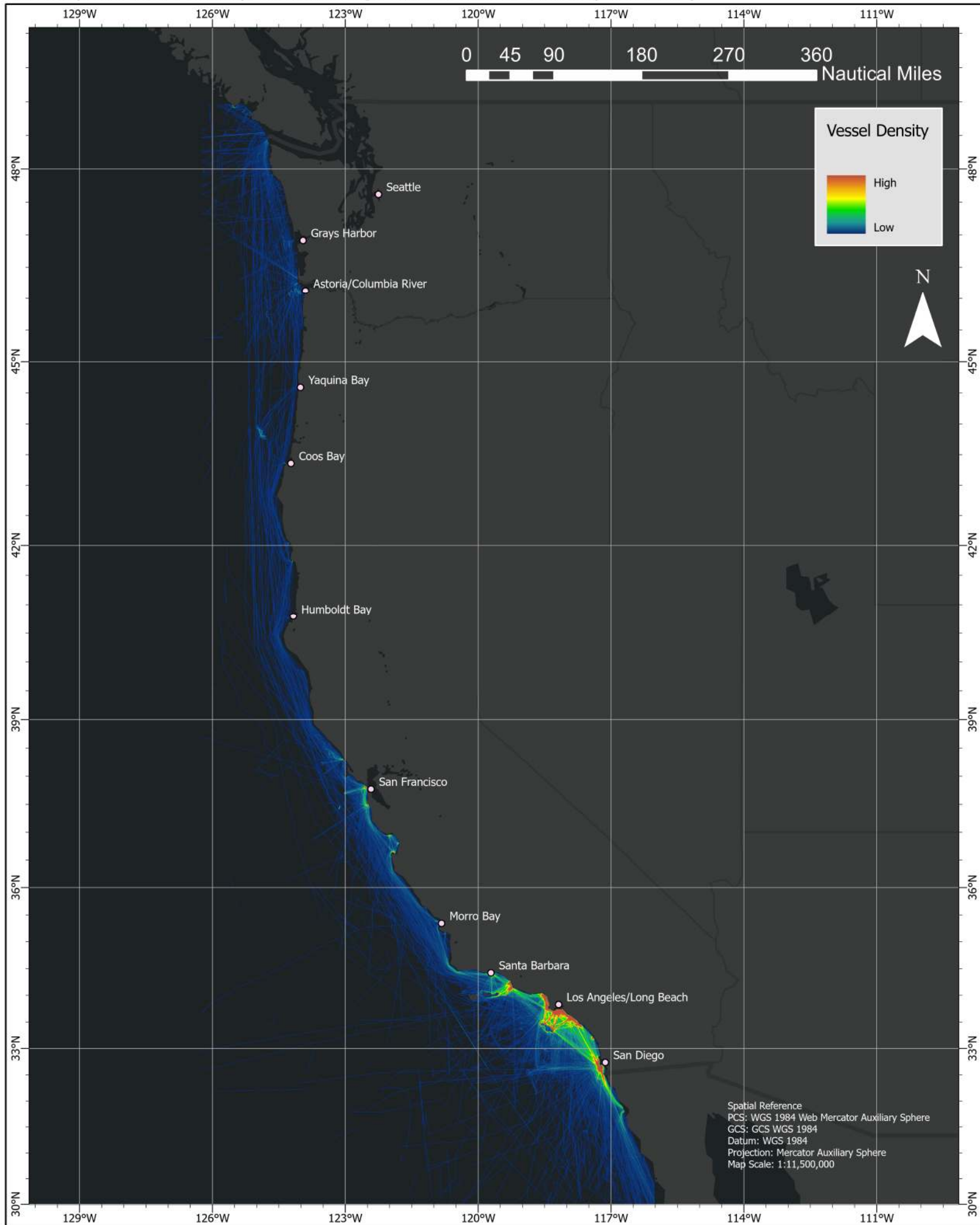
Annual AIS Vessel Density: Tug/Tow Vessels (2012)



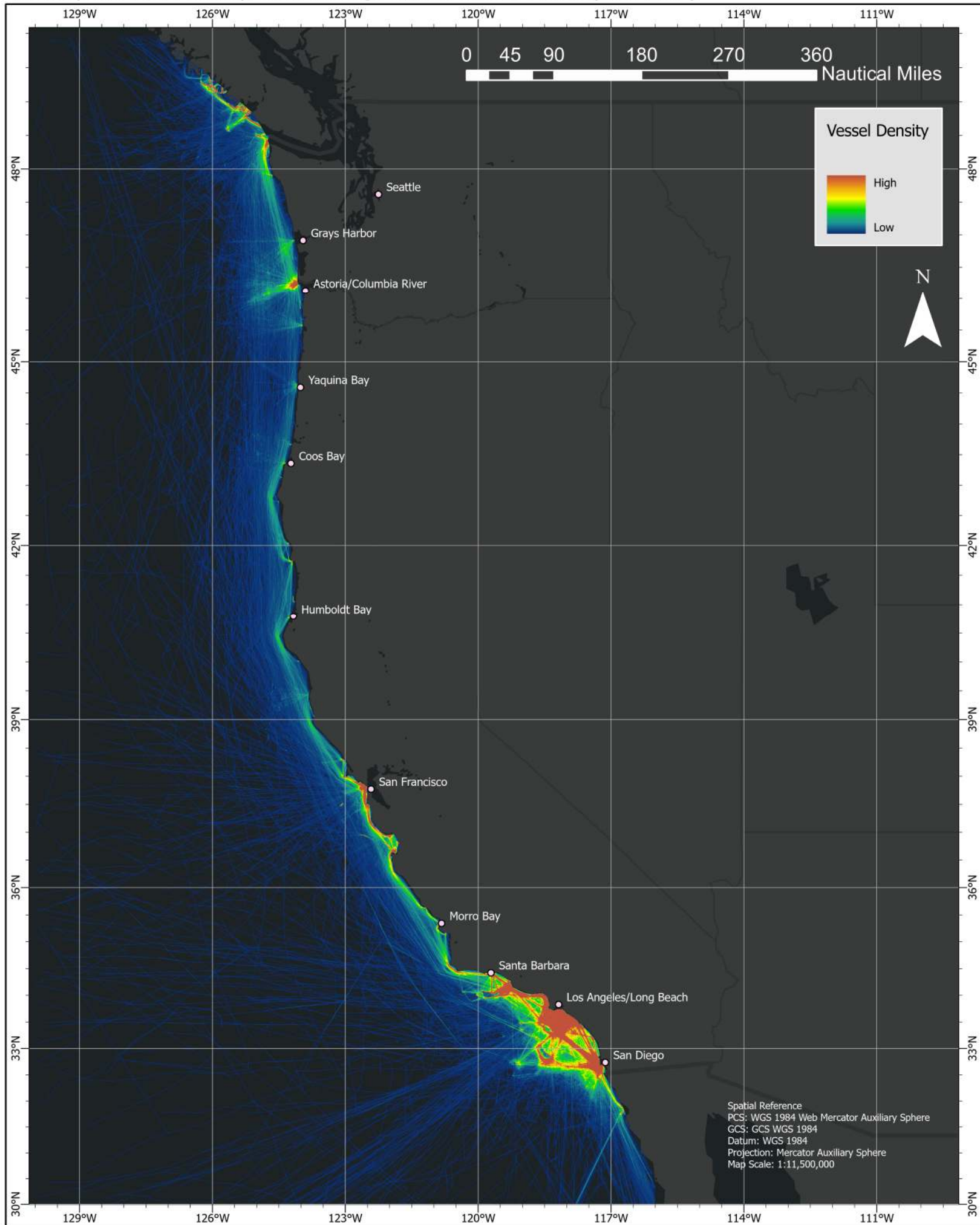
Annual AIS Vessel Density: Average of Recreational Vessels (2017-2021)



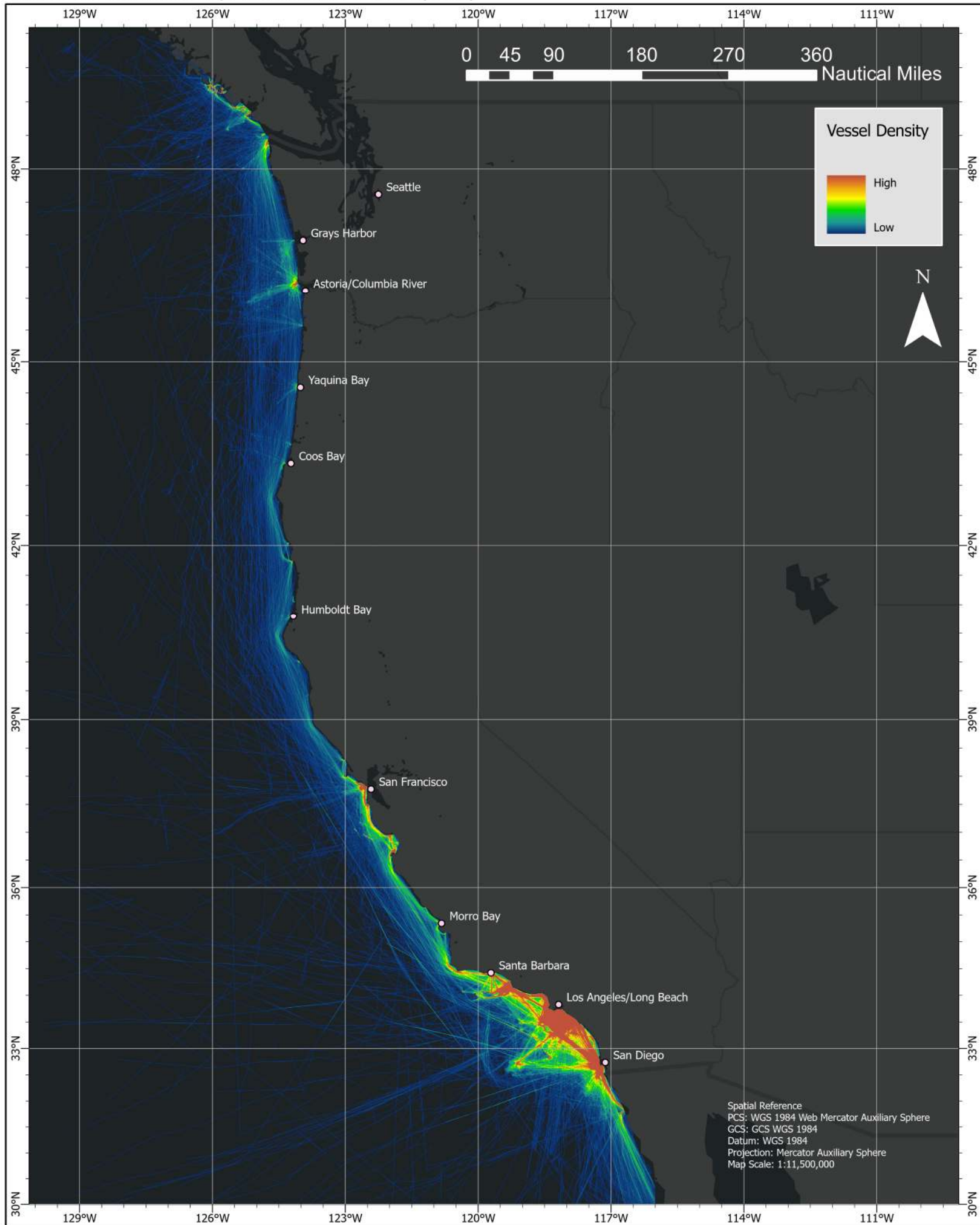
Quarterly AIS Vessel Density: CYQ1 Average of Recreational Vessels (2017-2021)



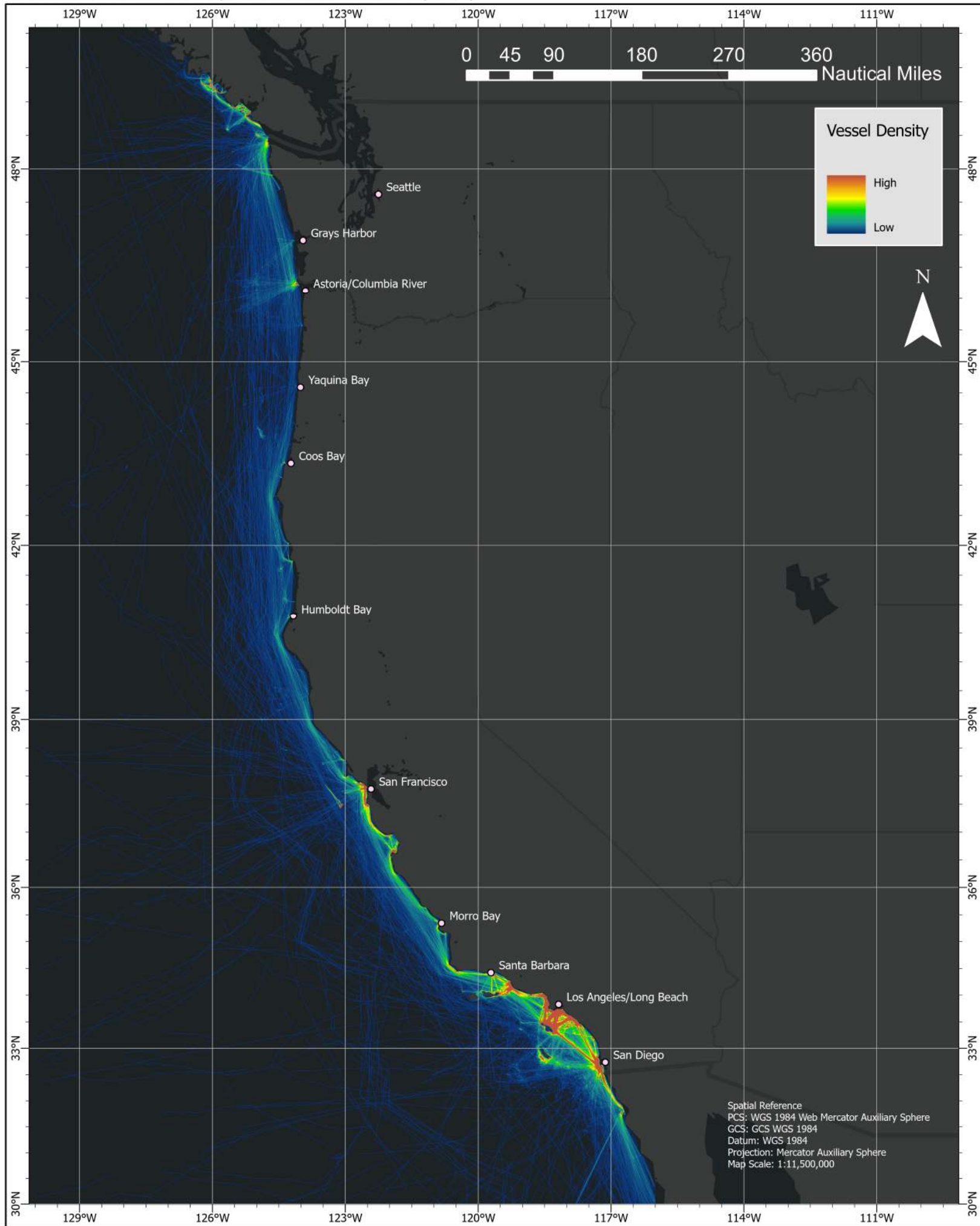
Quarterly AIS Vessel Density: CYQ3 Average of Recreational Vessels (2017-2021)



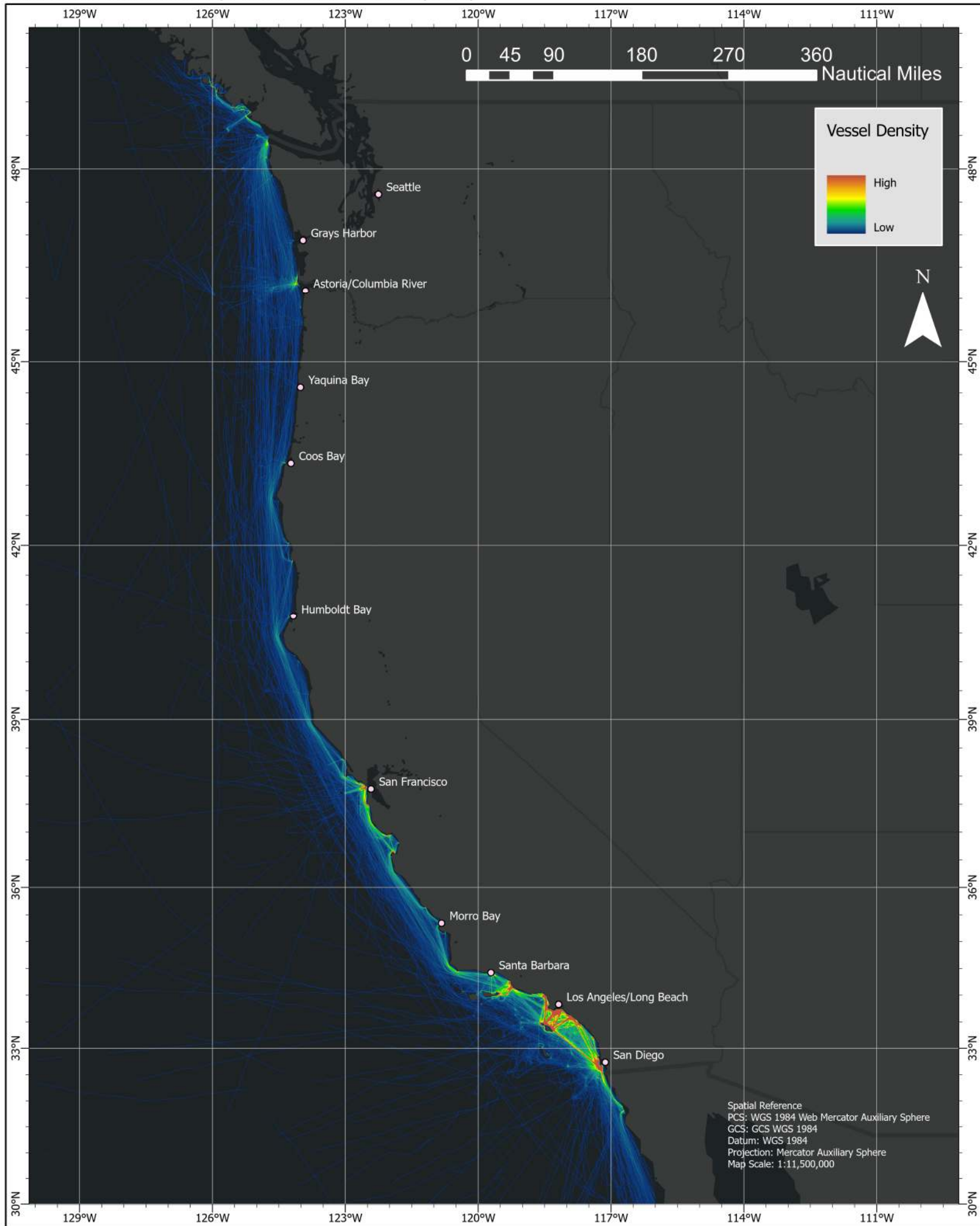
Annual AIS Vessel Density: Recreational Vessels (2021)



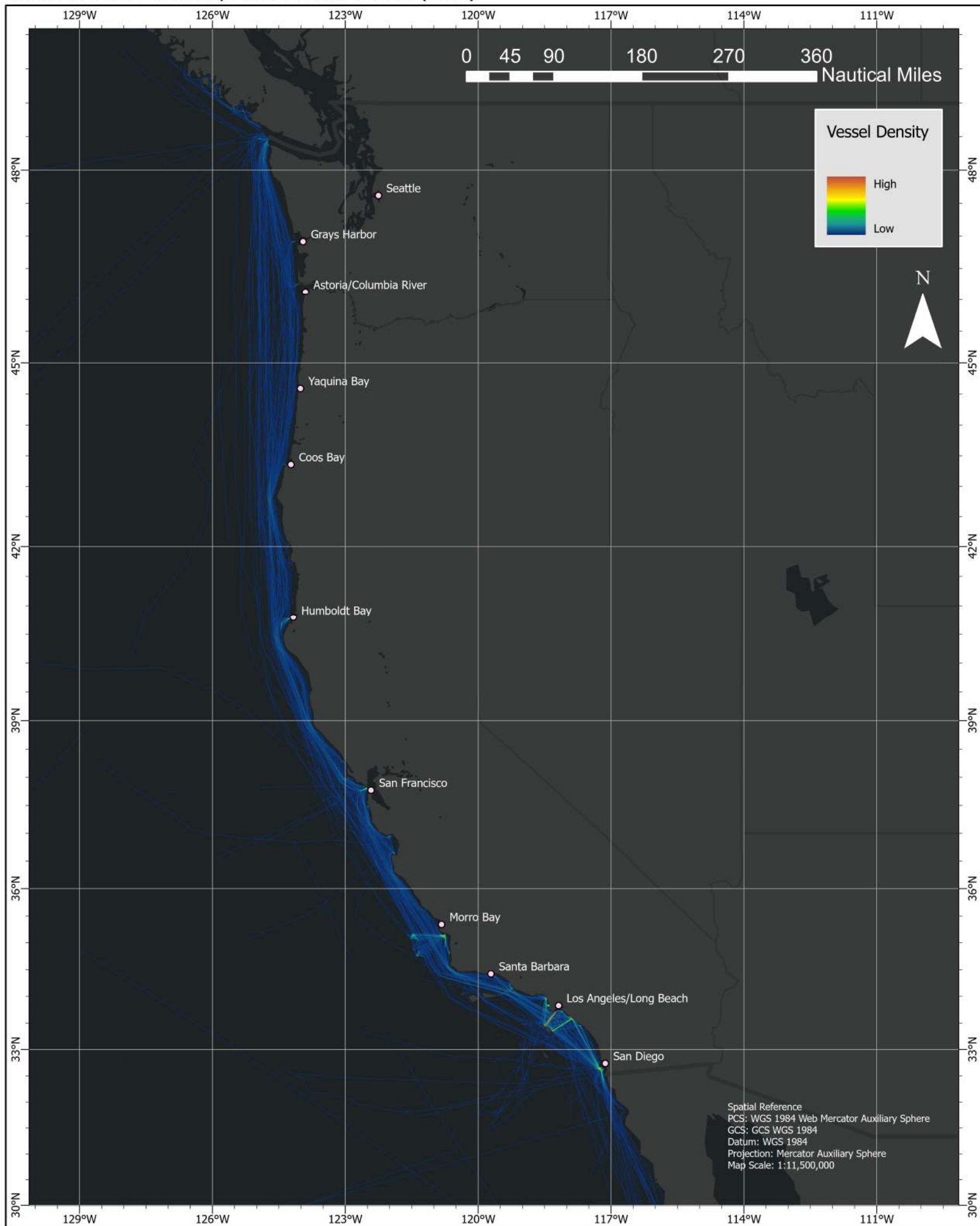
Annual AIS Vessel Density: Recreational Vessels (2018)



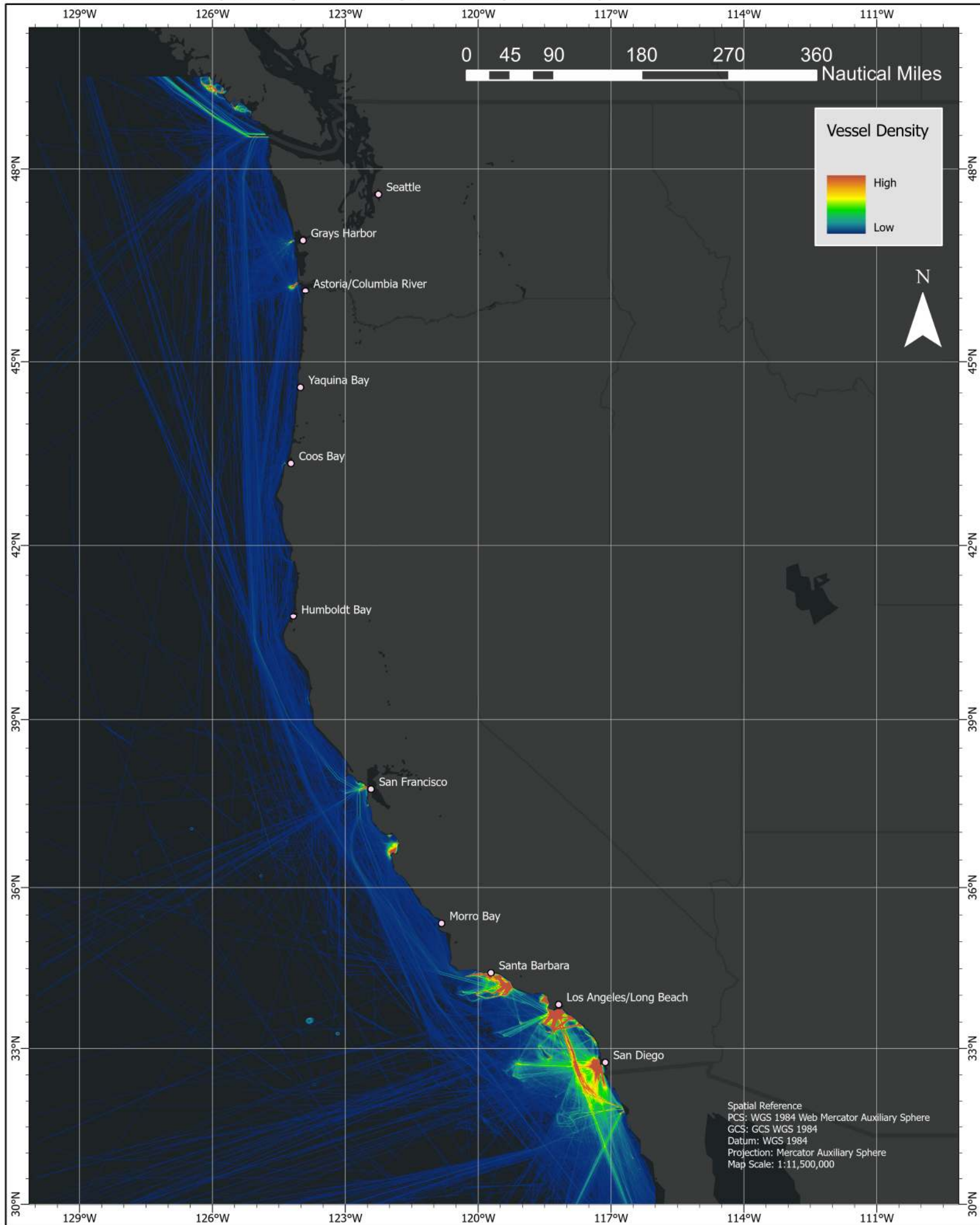
Annual AIS Vessel Density: Recreational Vessels (2015)



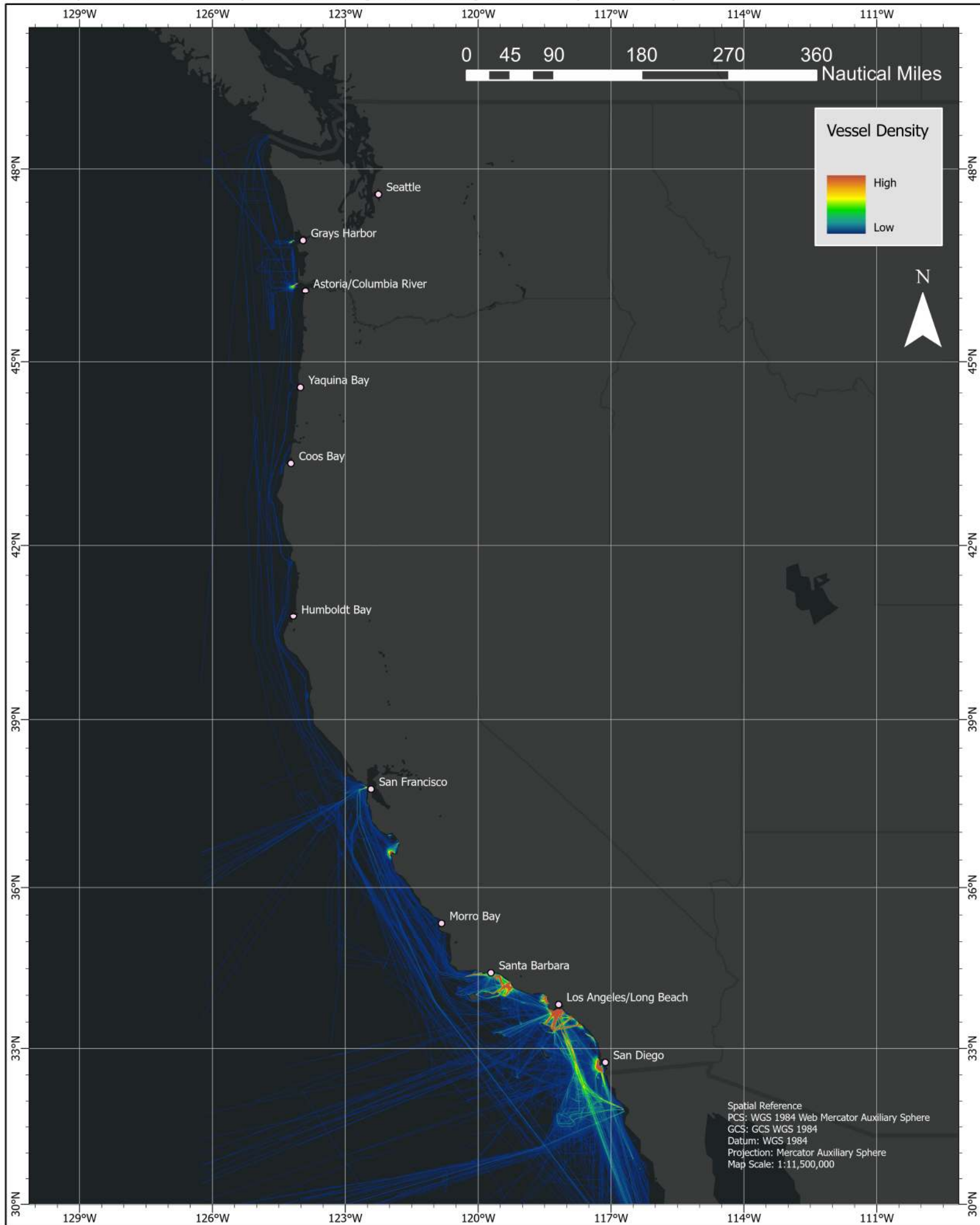
Annual AIS Vessel Density: Recreational Vessels (2012)



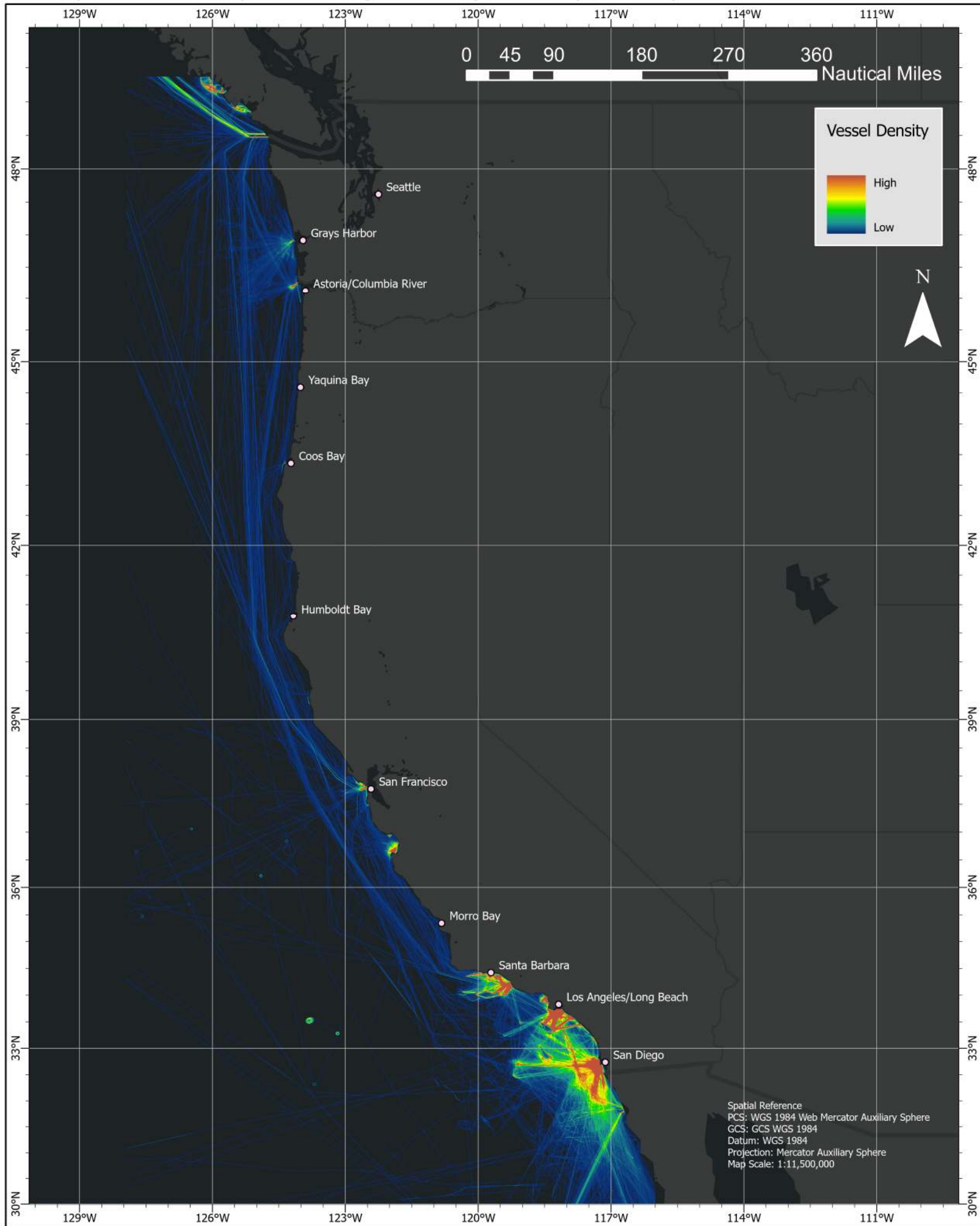
Annual AIS Vessel Density: Average of Passenger Vessels (2017-2021)



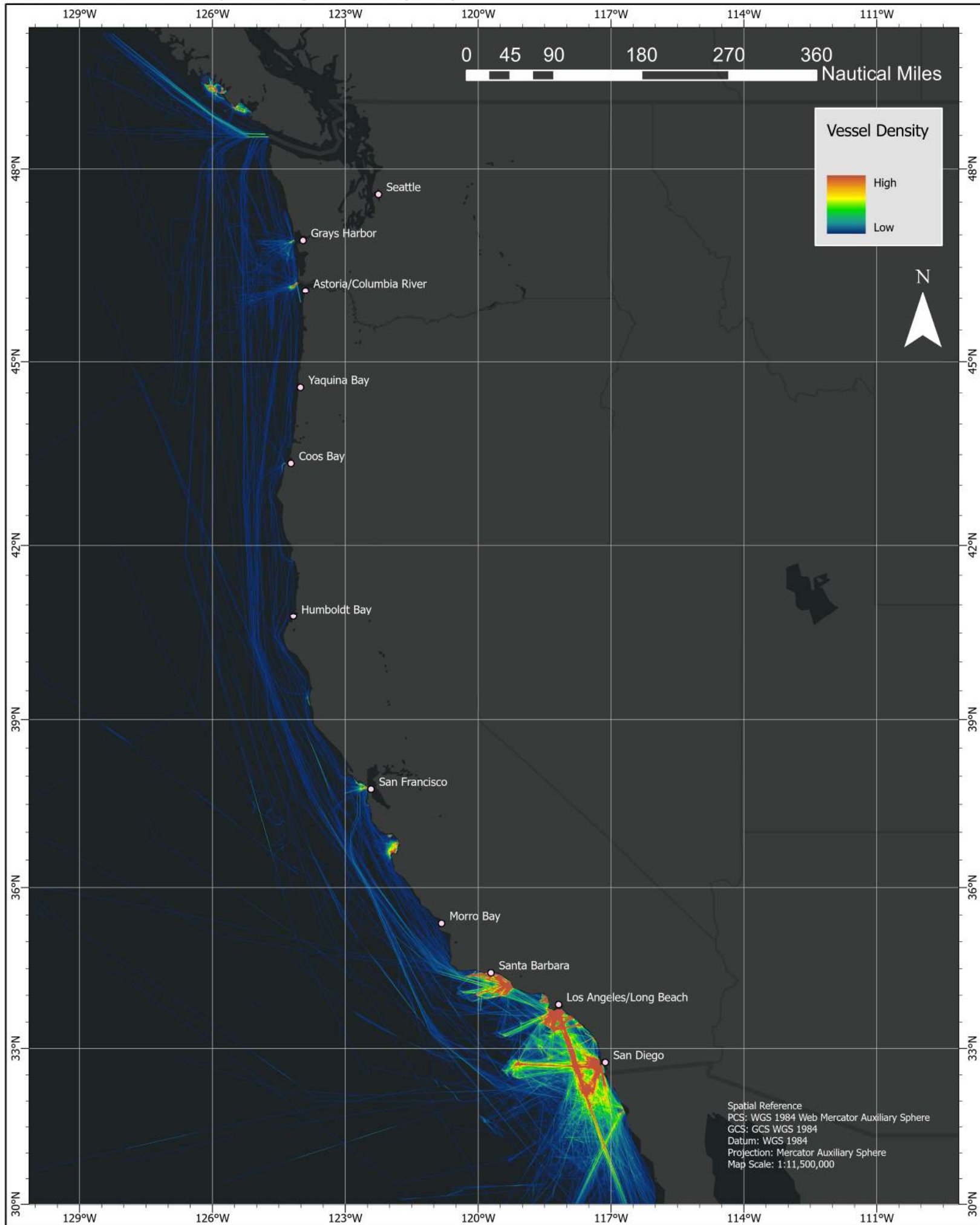
Quarterly AIS Vessel Density: CYQ1 Average of Passenger Vessels (2017-2021)



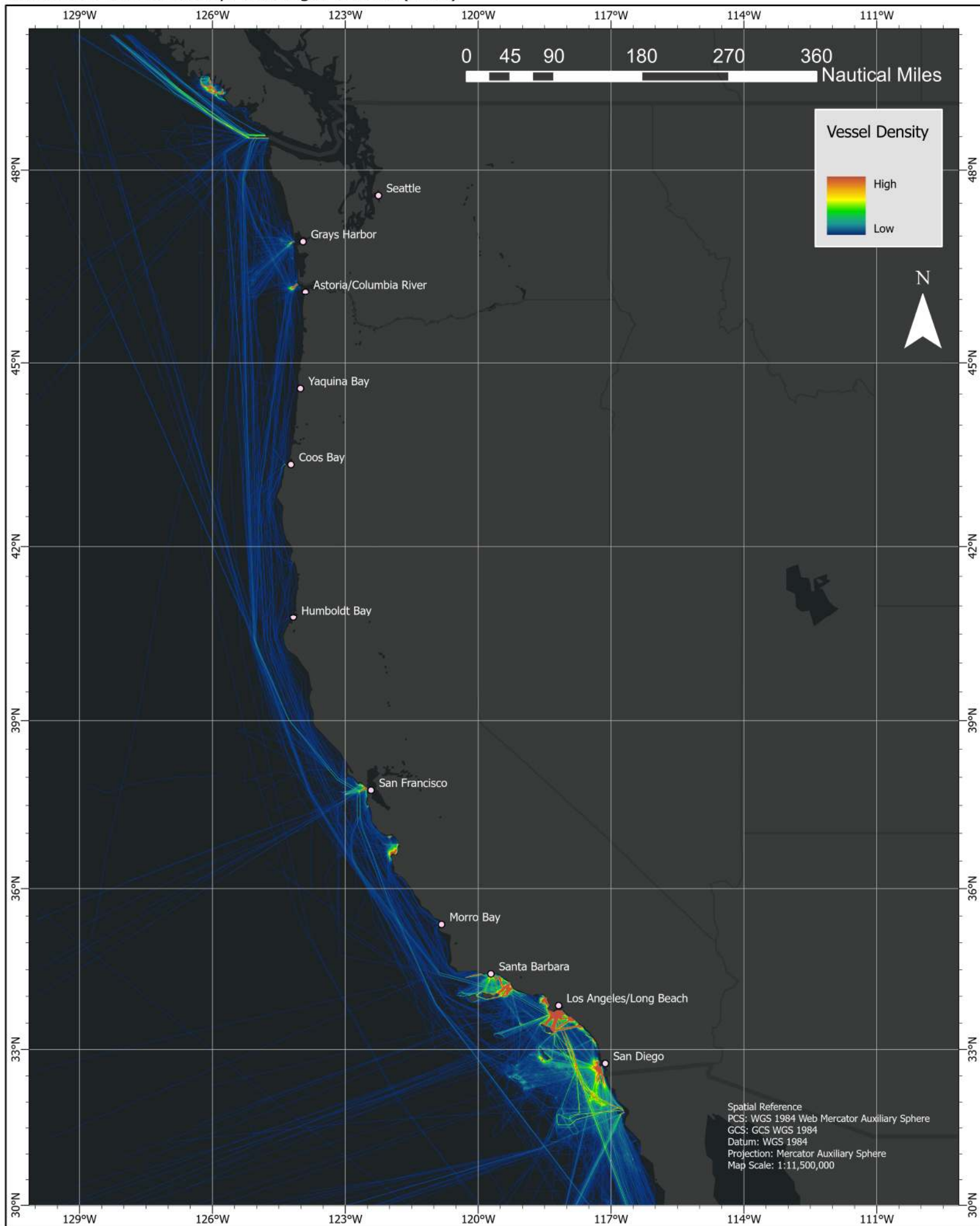
Quarterly AIS Vessel Density: CYQ3 Average of Passenger Vessels (2017-2021)



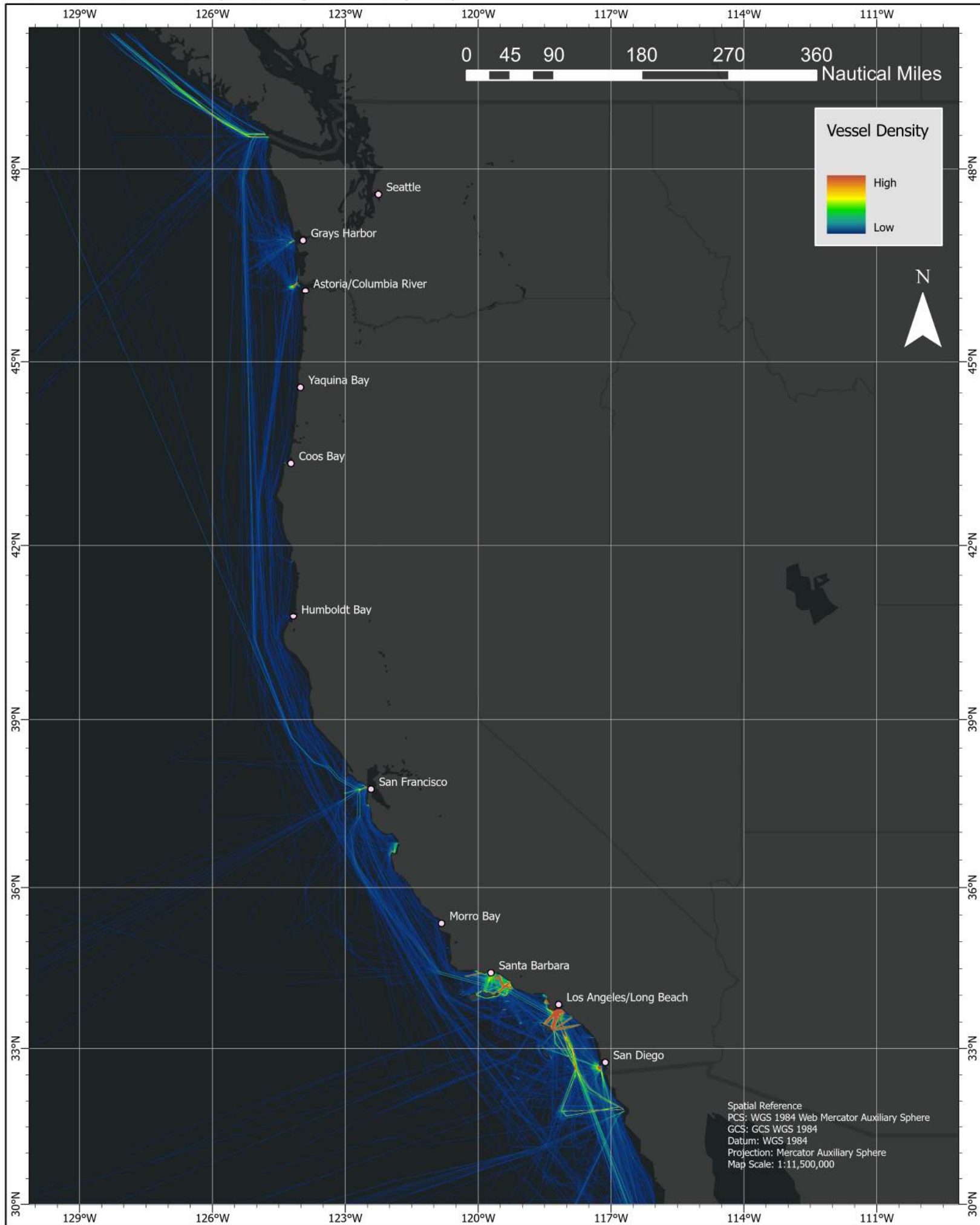
Annual AIS Vessel Density: Passenger Vessels (2021)



Annual AIS Vessel Density: Passenger Vessels (2018)



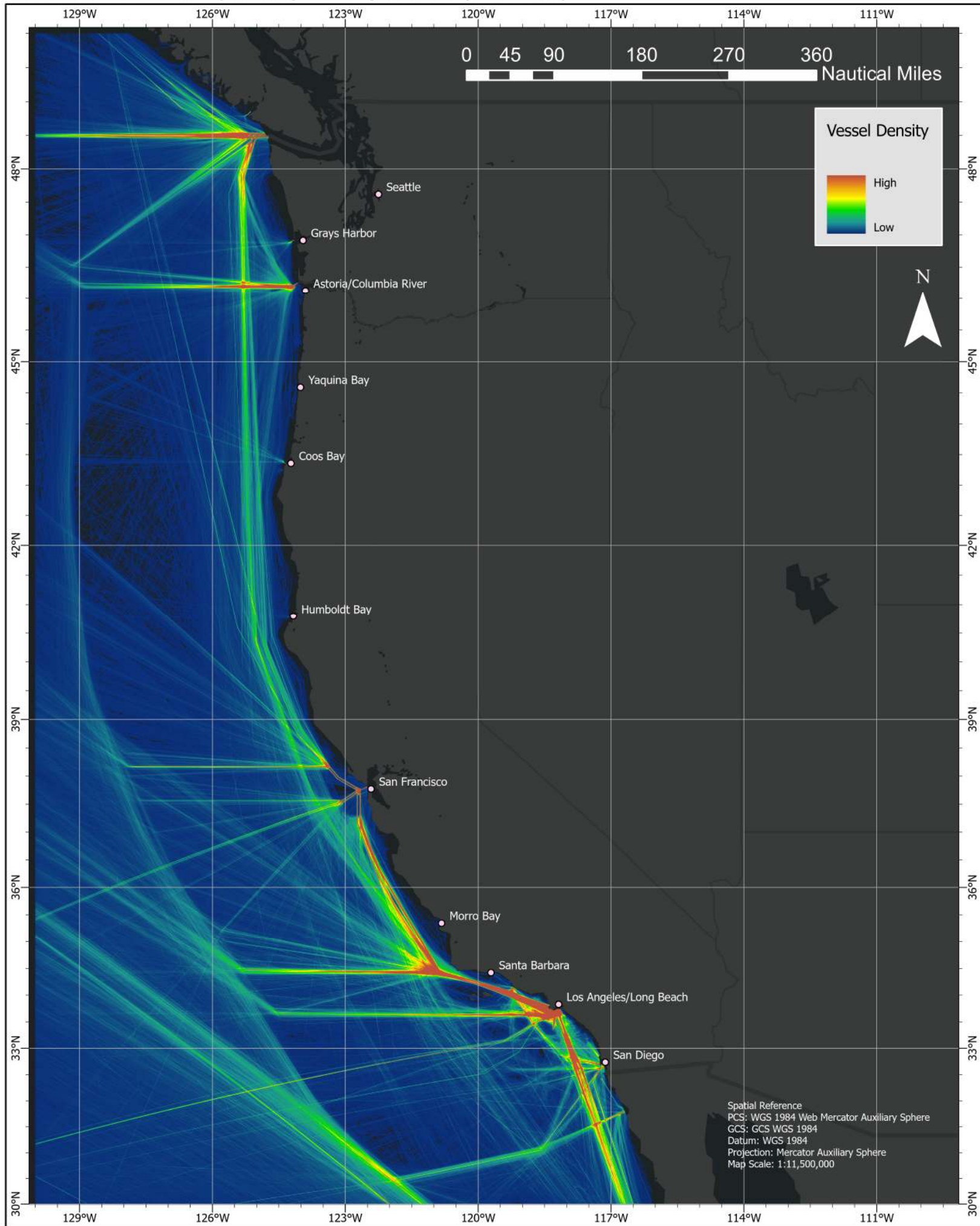
Annual AIS Vessel Density: Passenger Vessels (2015)



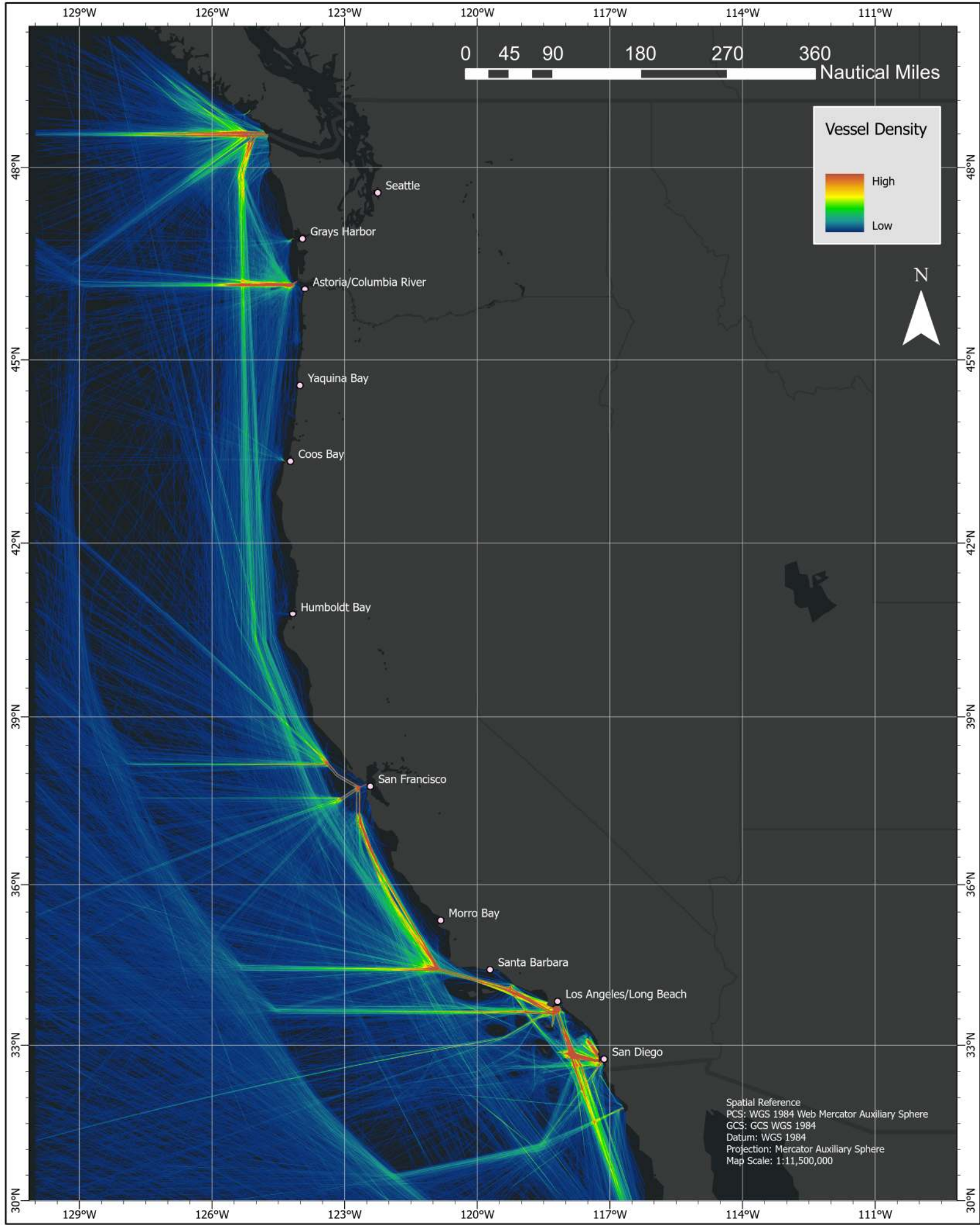
Annual AIS Vessel Density: Passenger Vessels (2012)



Annual AIS Vessel Density: Average of Cargo Vessels (2017-2021)

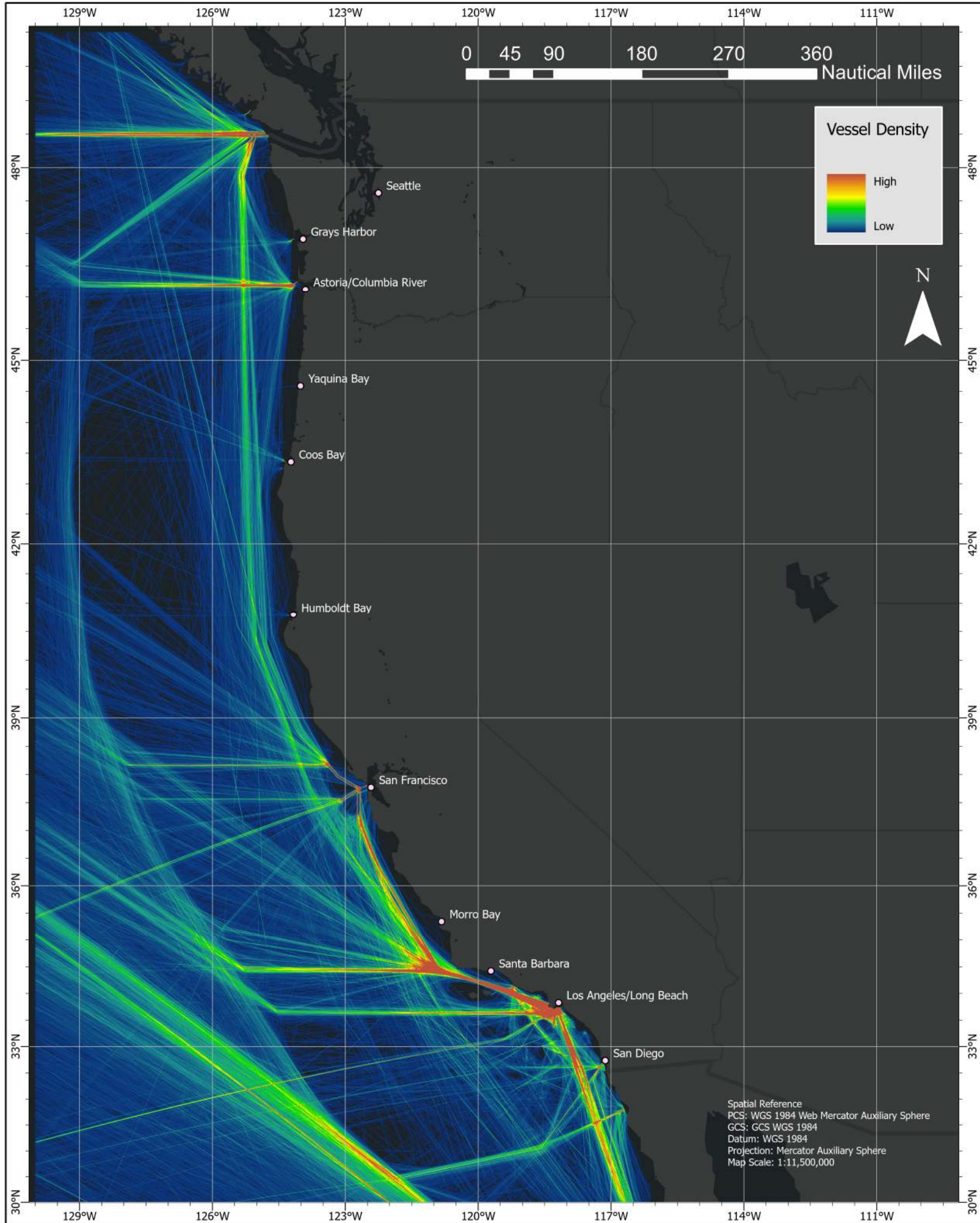


Quarterly AIS Vessel Density: CYQ1 Average of Cargo Vessels (2017-2021)

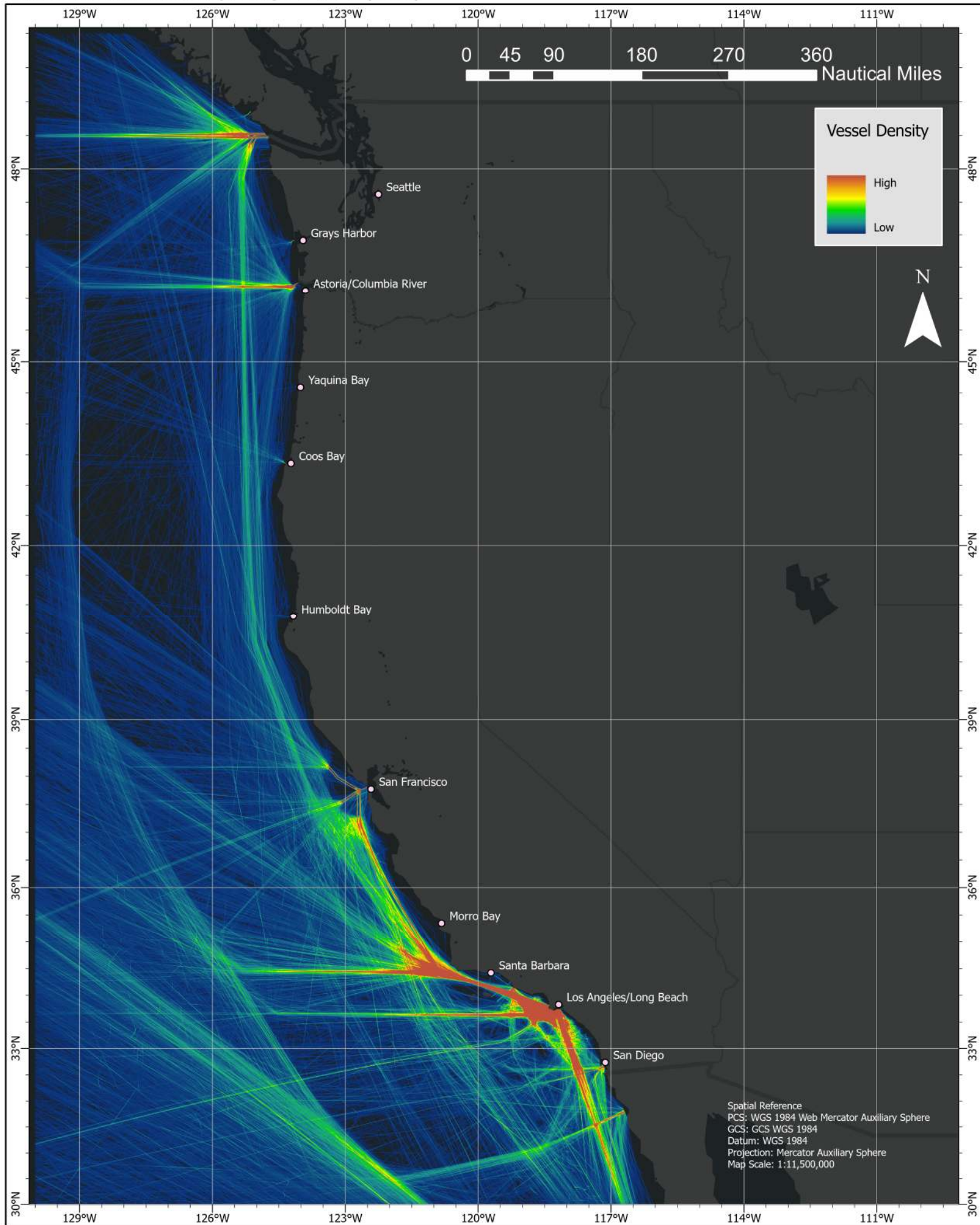


Basemap: Esri, HERE, Garmin, FAO, NOAA, USGS, EPA. Overlays: USCG. Additional overlay information documented in the Pacific Coast Port Access Route Study (PAC-PARS).

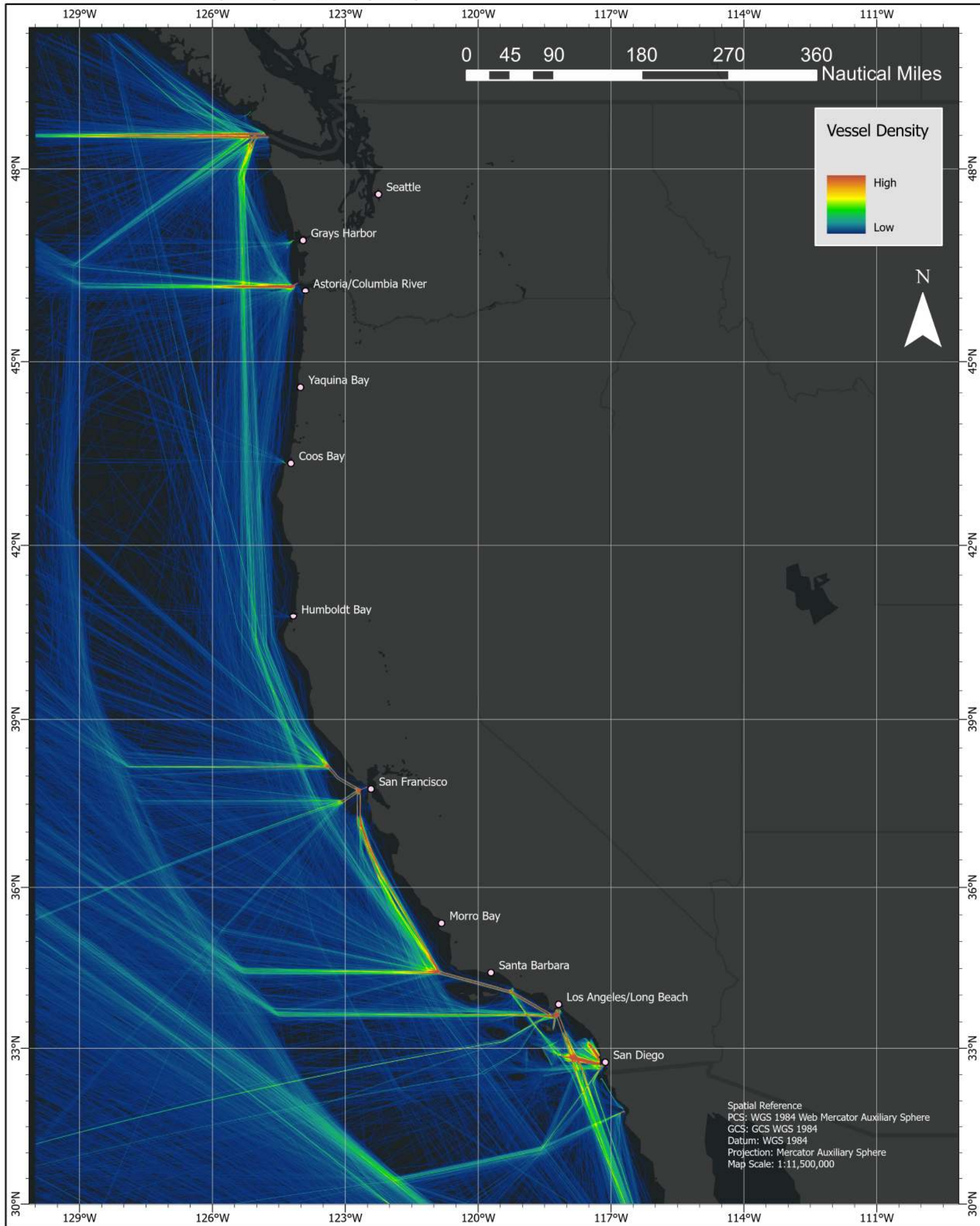
Quarterly AIS Vessel Density: CYQ3 Average of Cargo Vessels (2017-2021)



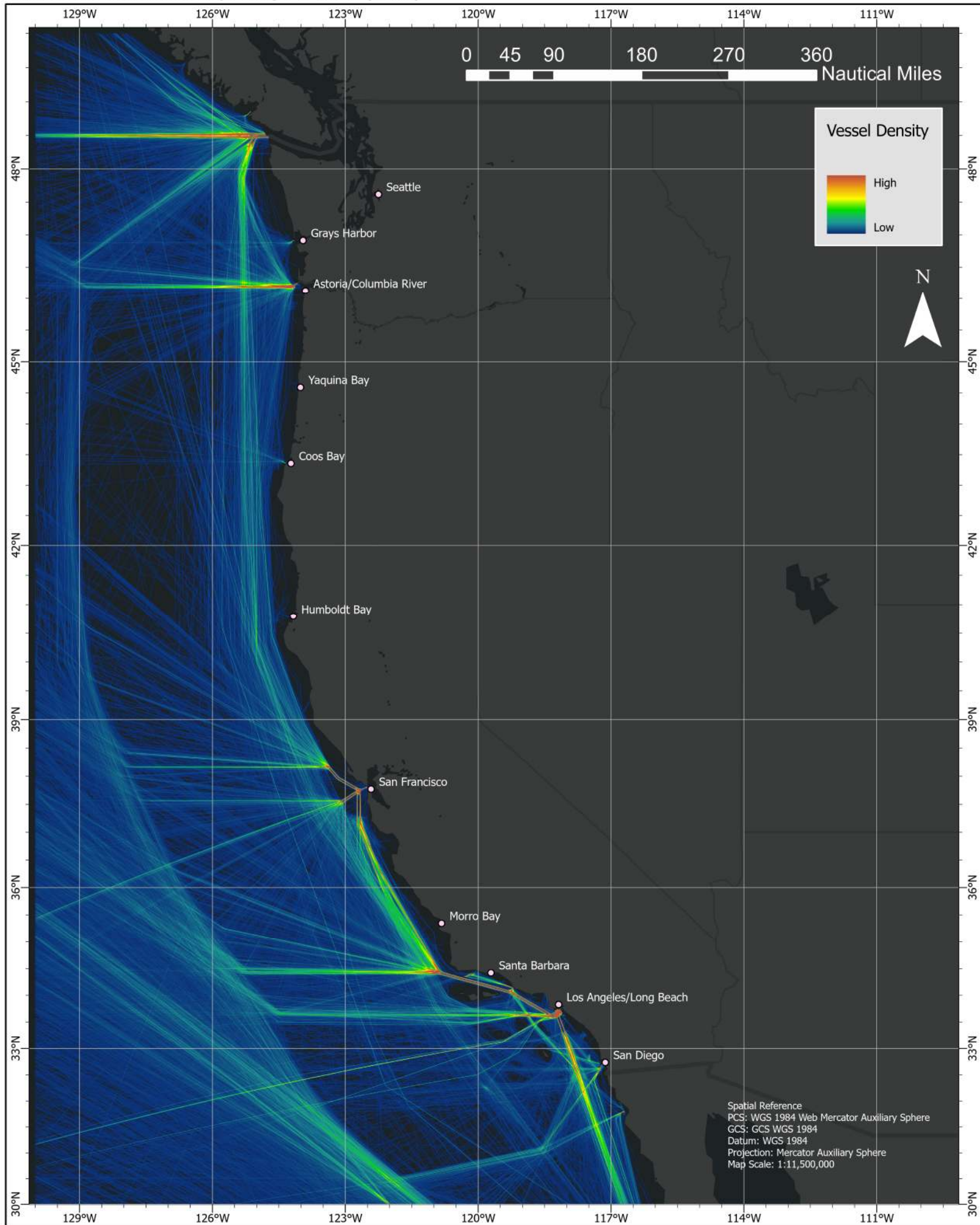
Annual AIS Vessel Density: Cargo Vessels (2021)



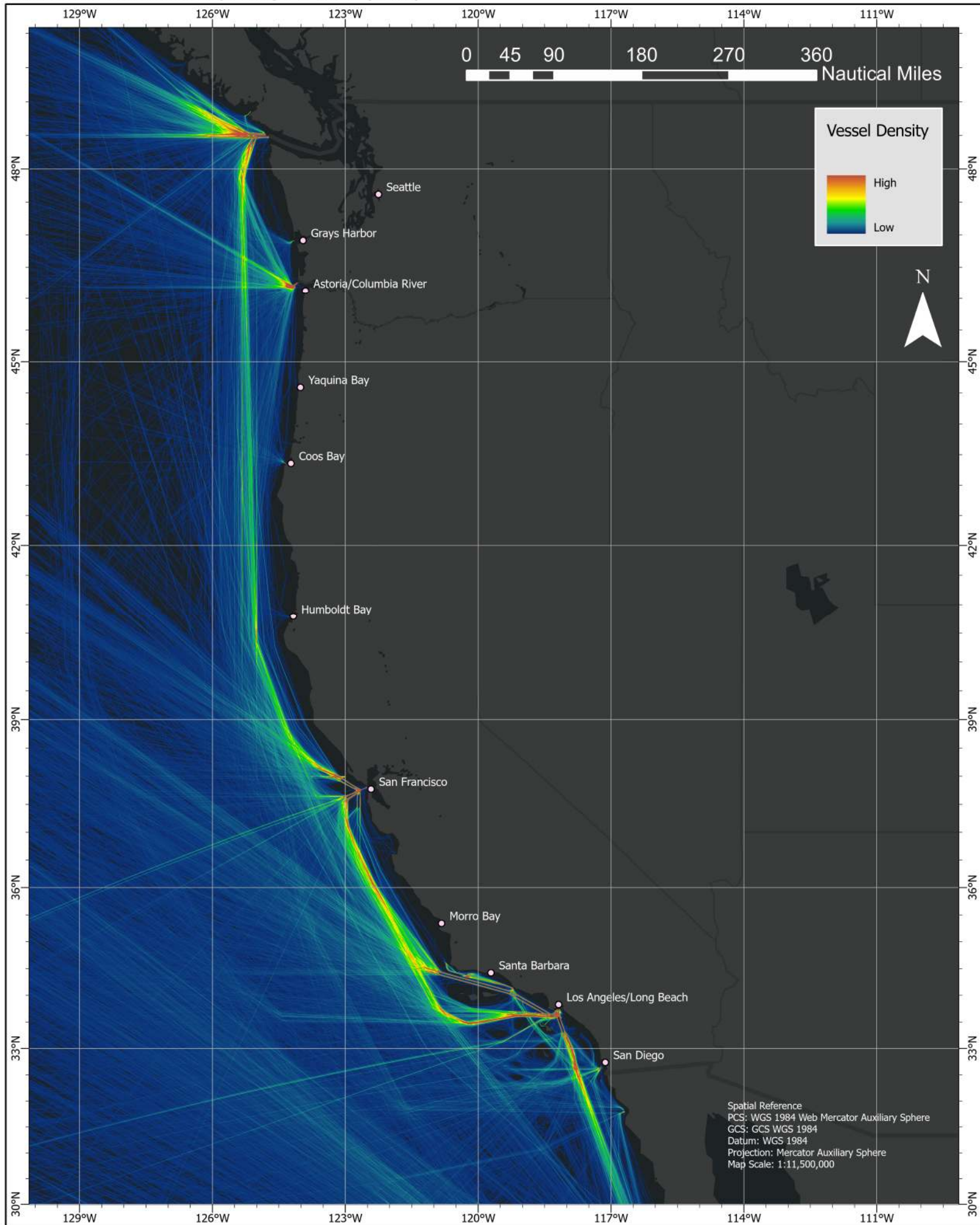
Annual AIS Vessel Density: Cargo Vessels (2018)



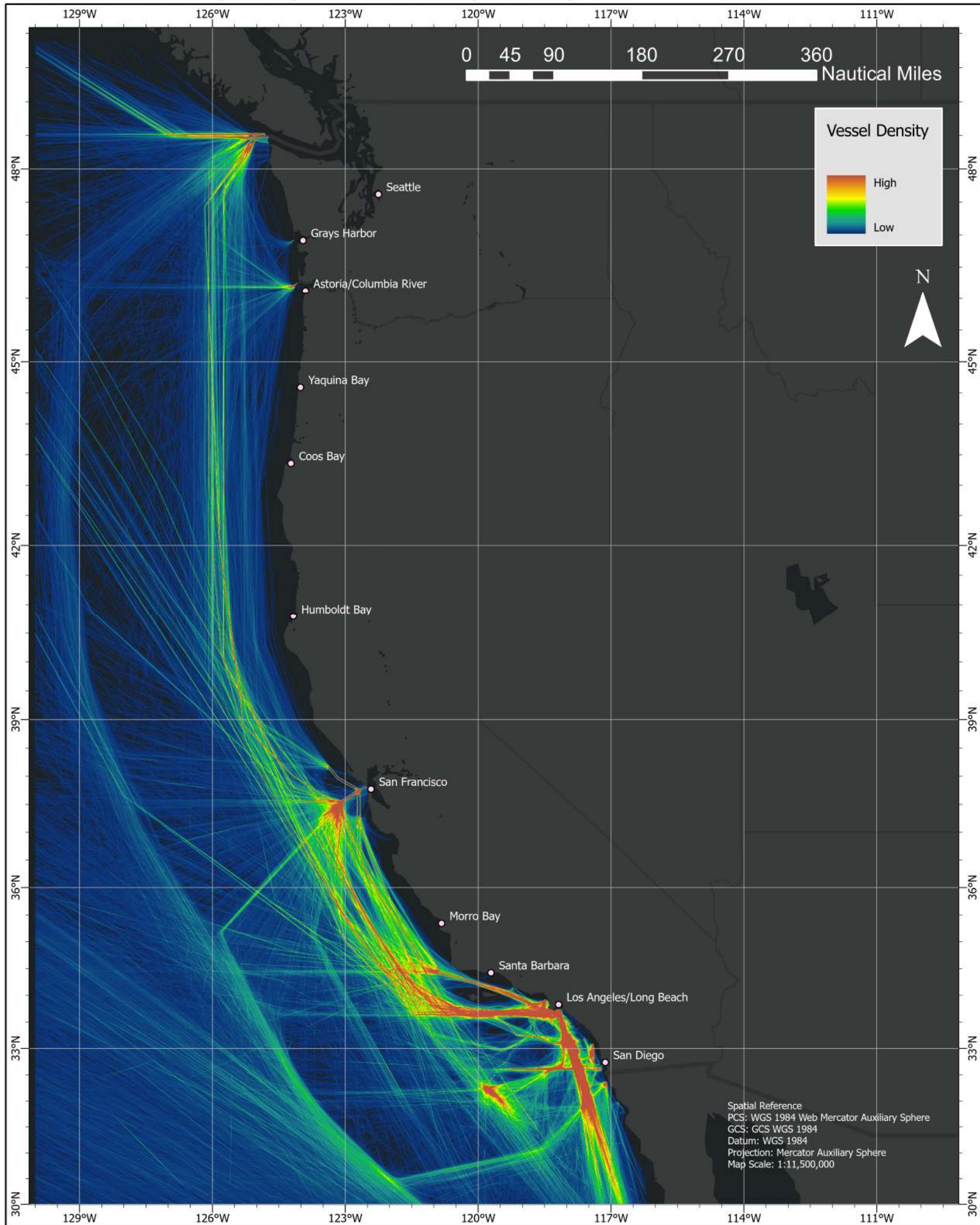
Annual AIS Vessel Density: Cargo Vessels (2015)



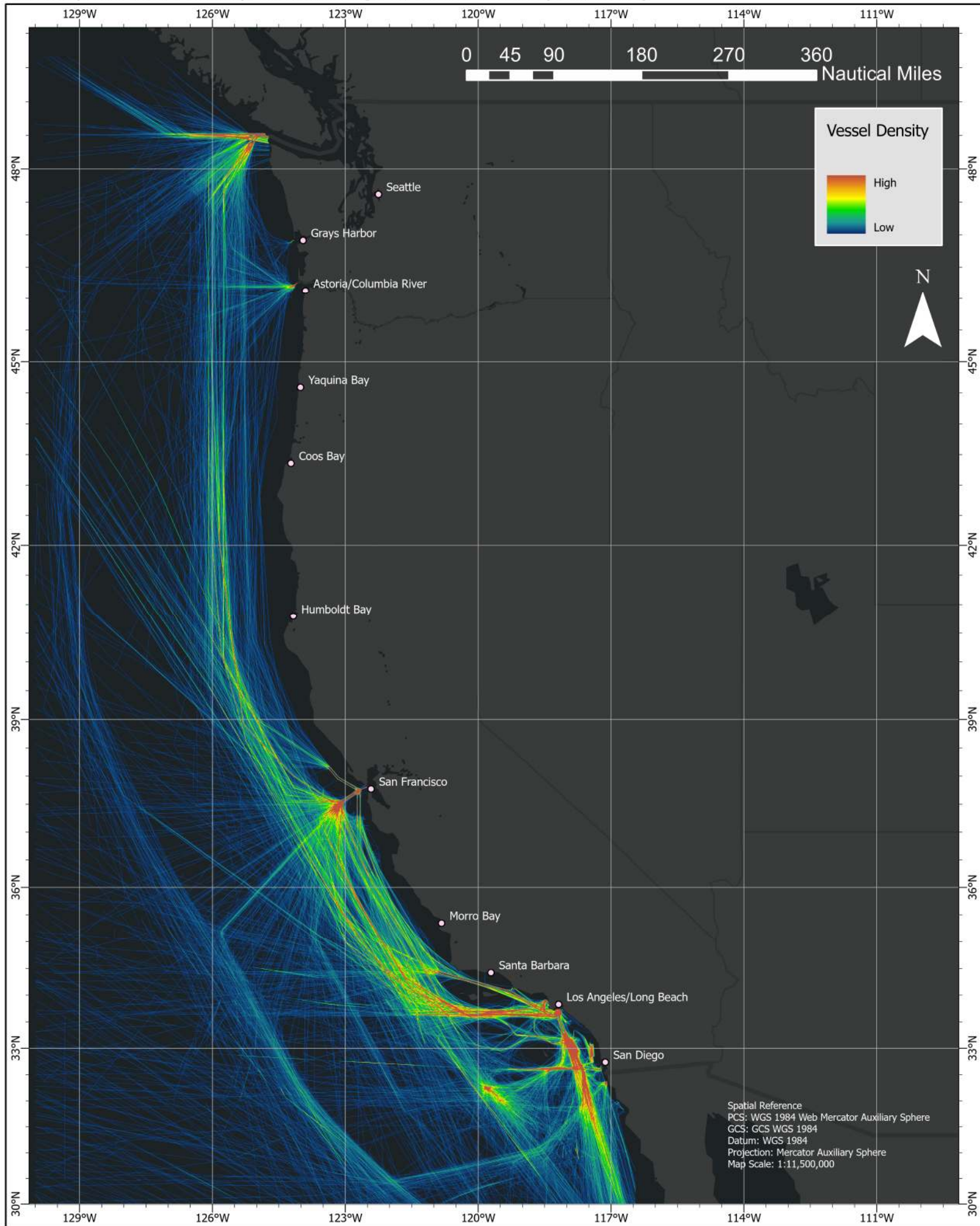
Annual AIS Vessel Density: Cargo Vessels (2012)



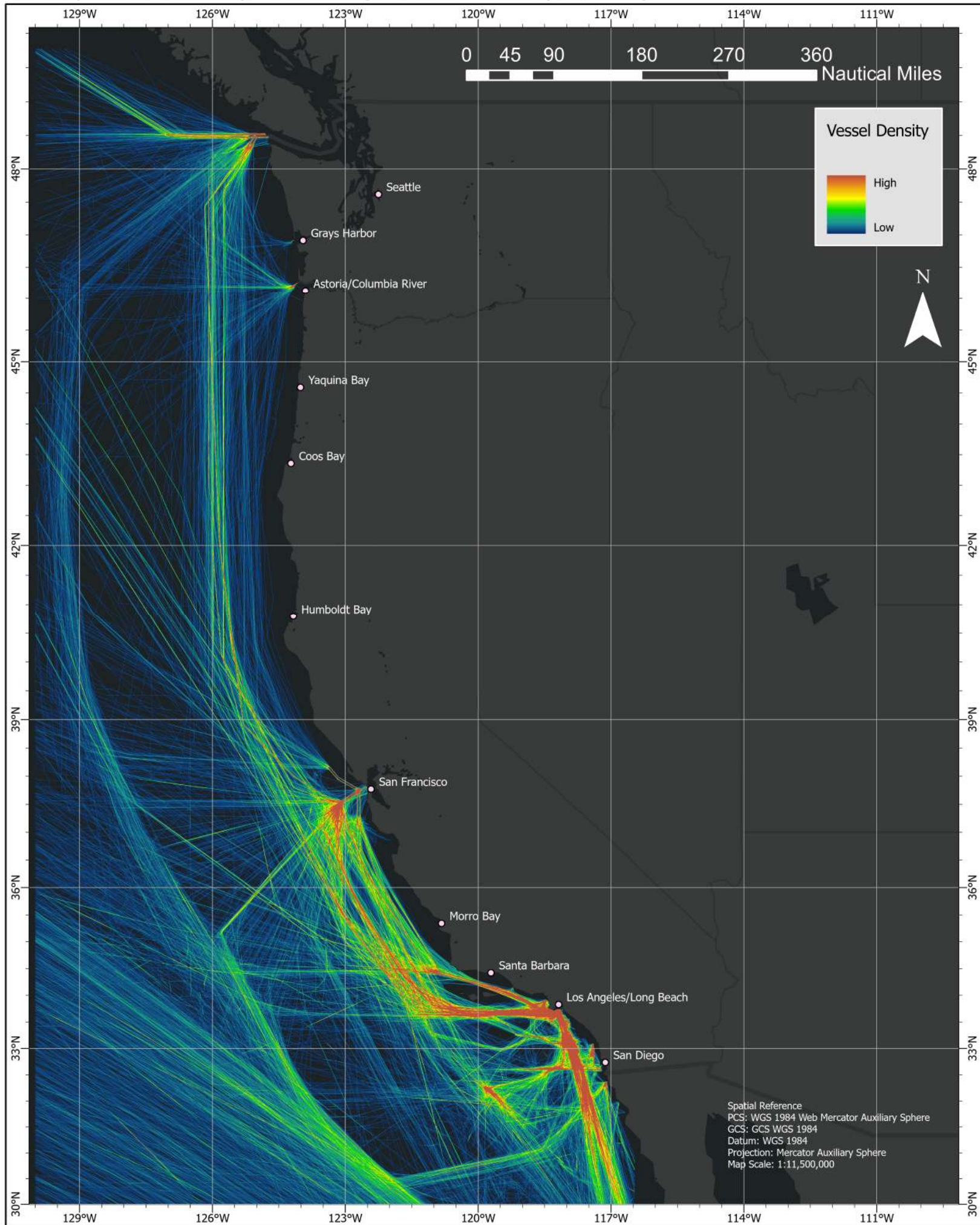
Annual AIS Vessel Density: Average of Tanker Vessels (2017-2021)



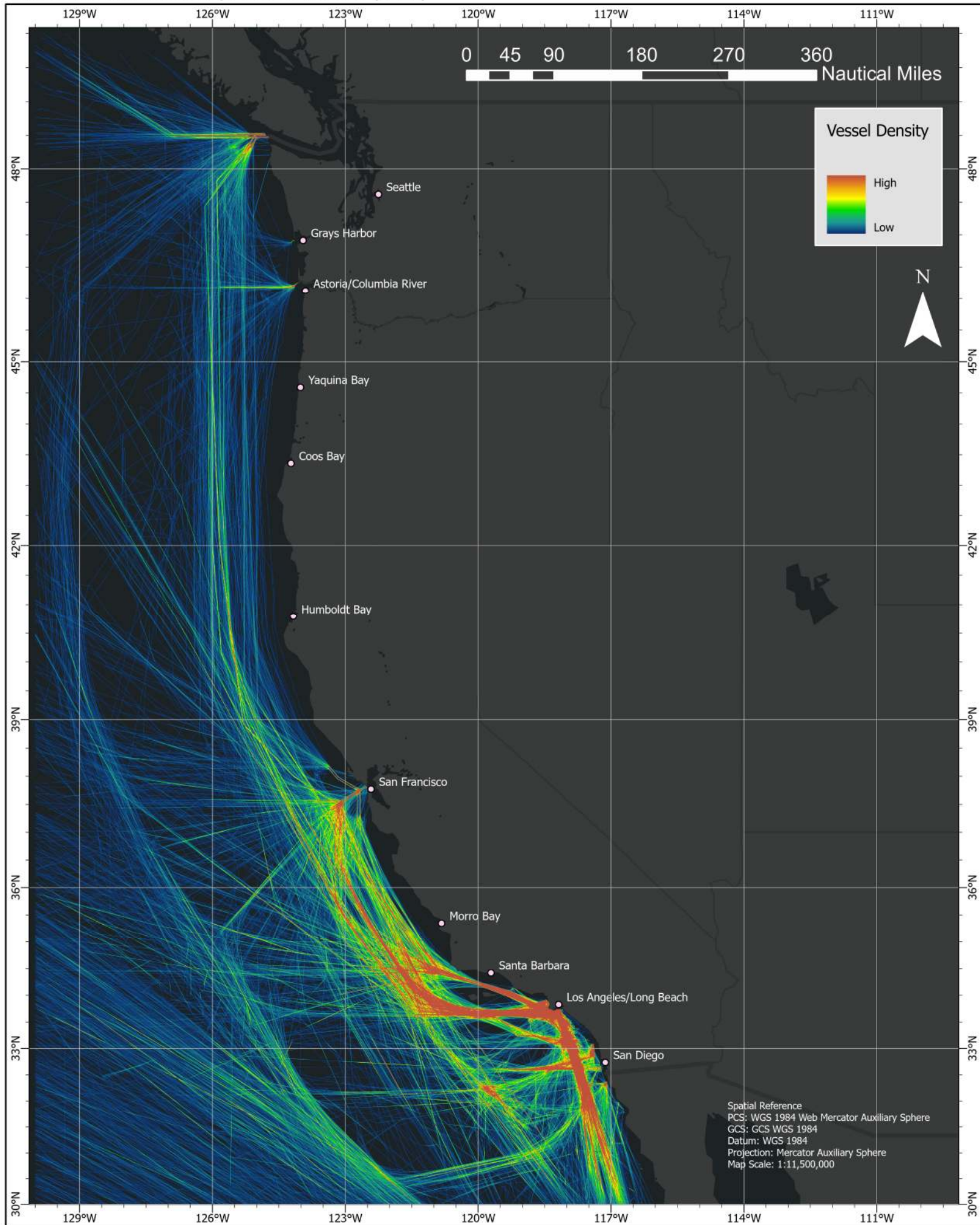
Quarterly AIS Vessel Density: CYQ1 Average of Tanker Vessels (2017-2021)



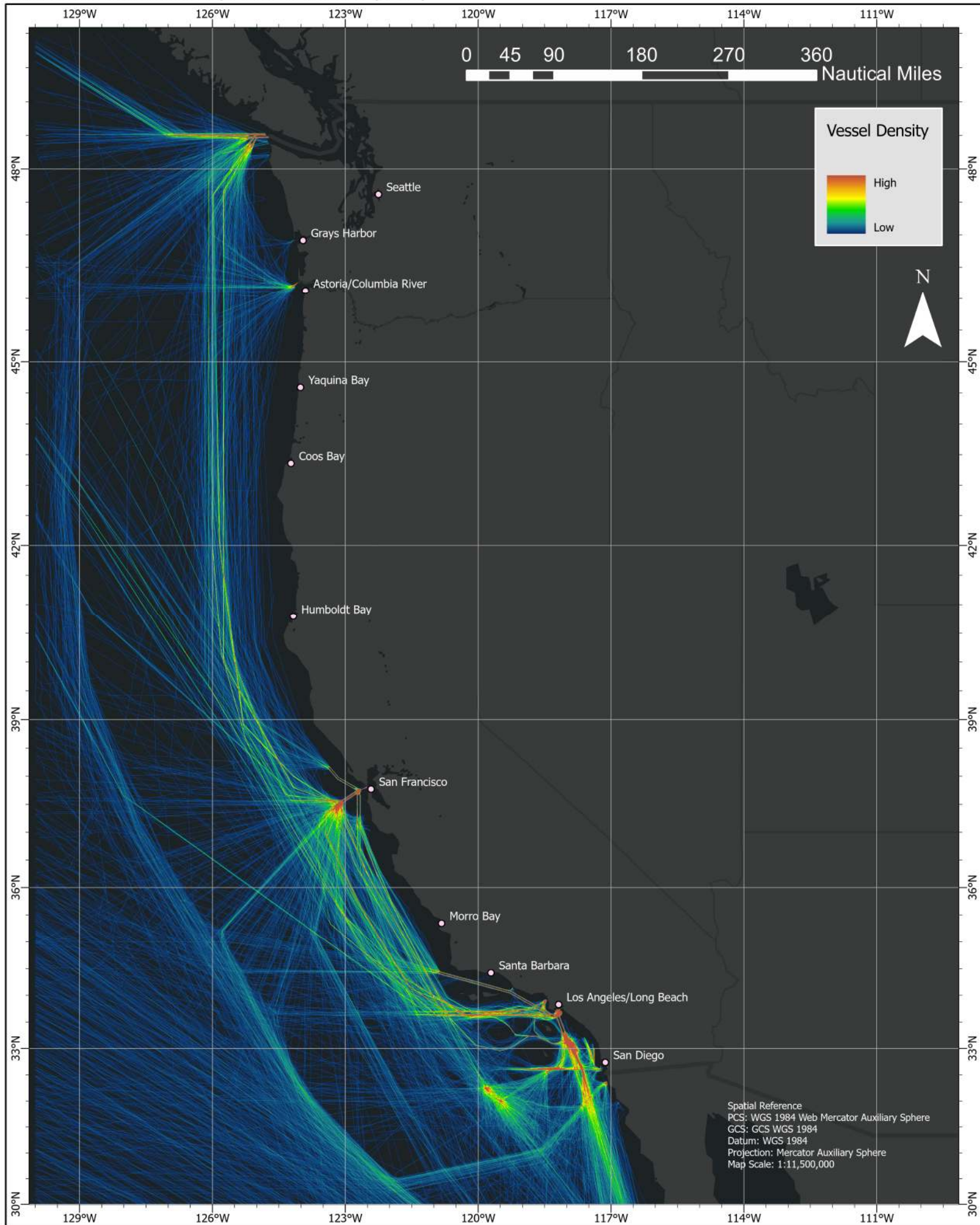
Quarterly AIS Vessel Density: CYQ3 Average of Tanker Vessels (2017-2021)



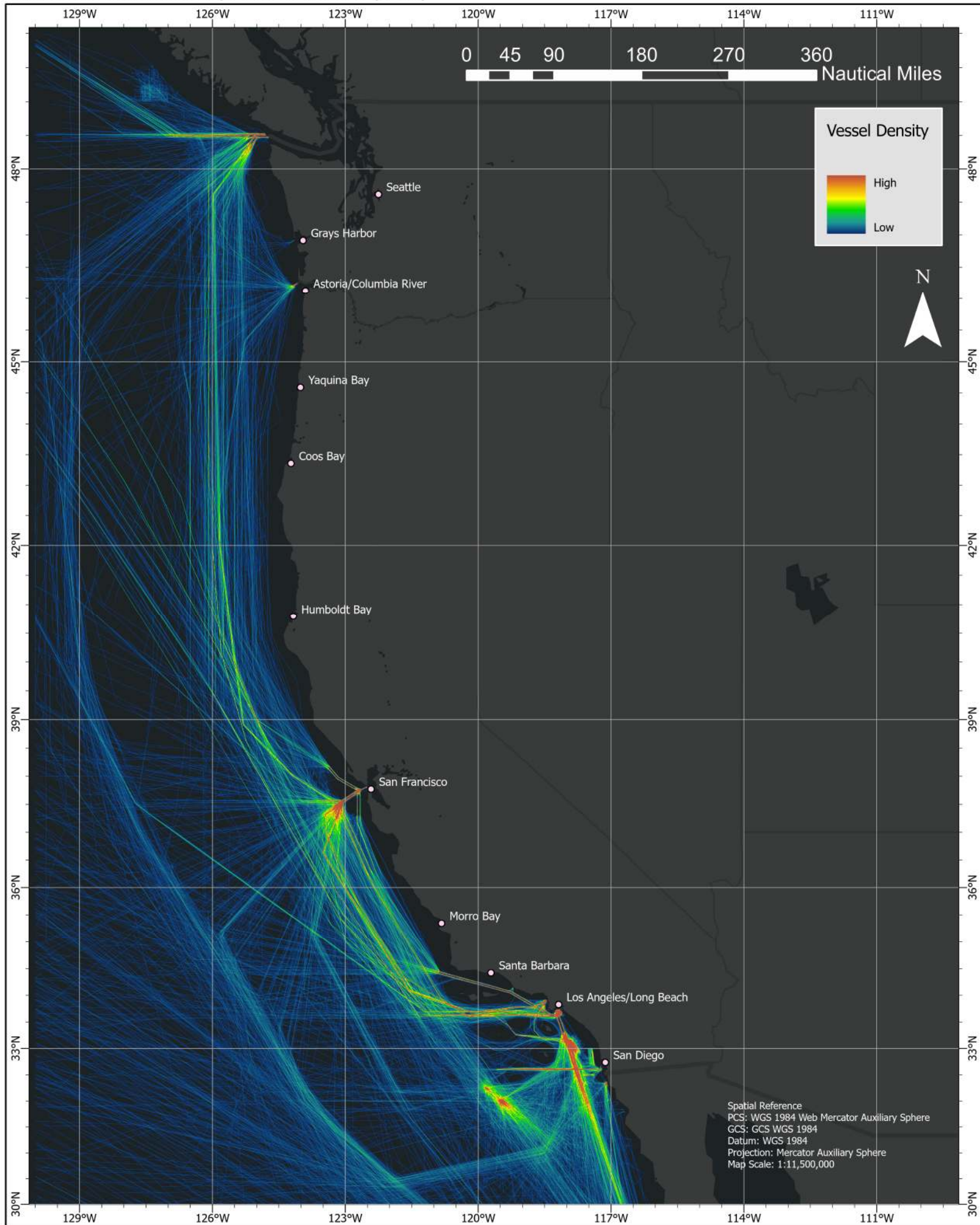
Annual AIS Vessel Density: Tanker Vessels (2021)



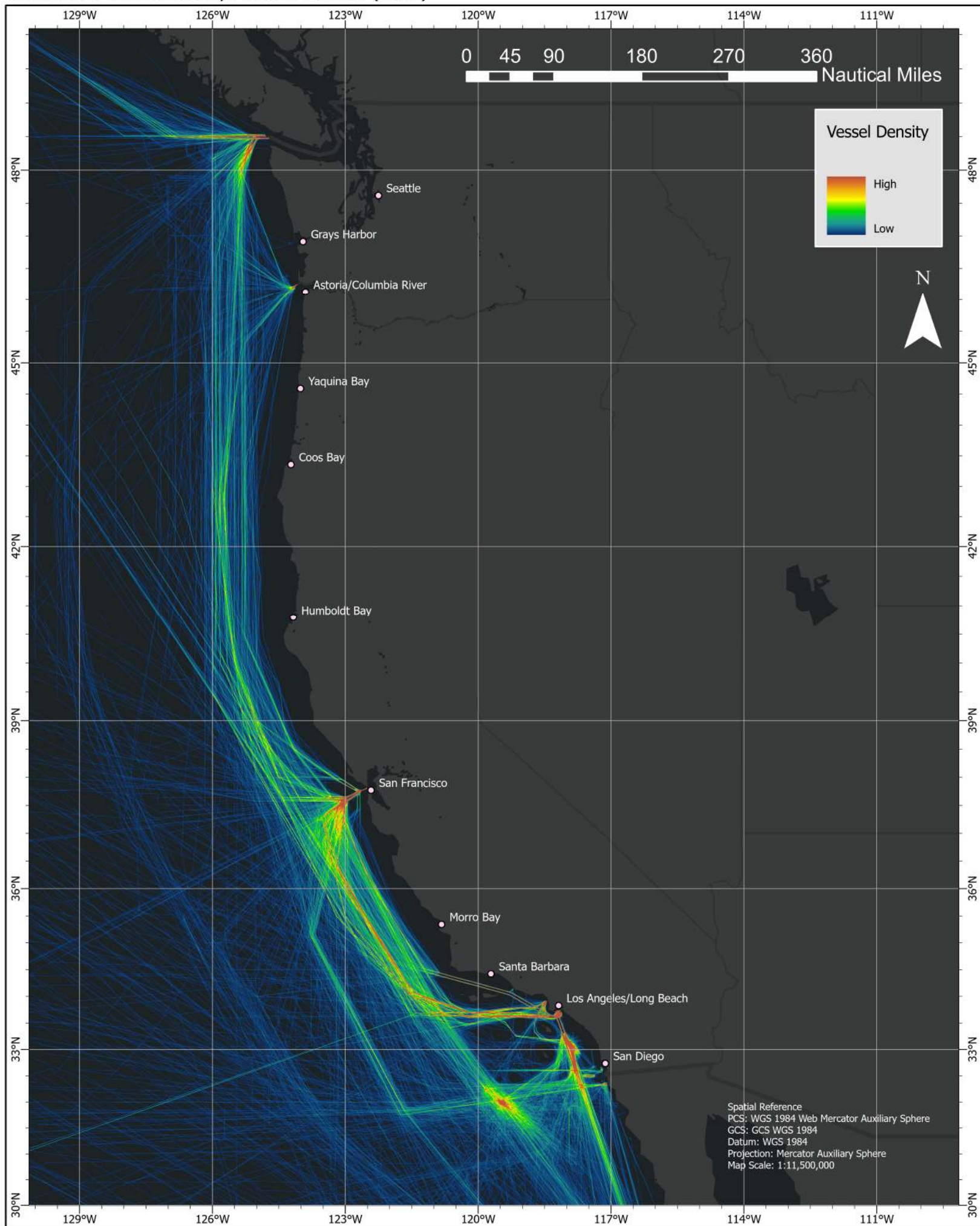
Annual AIS Vessel Density: Tanker Vessels (2018)



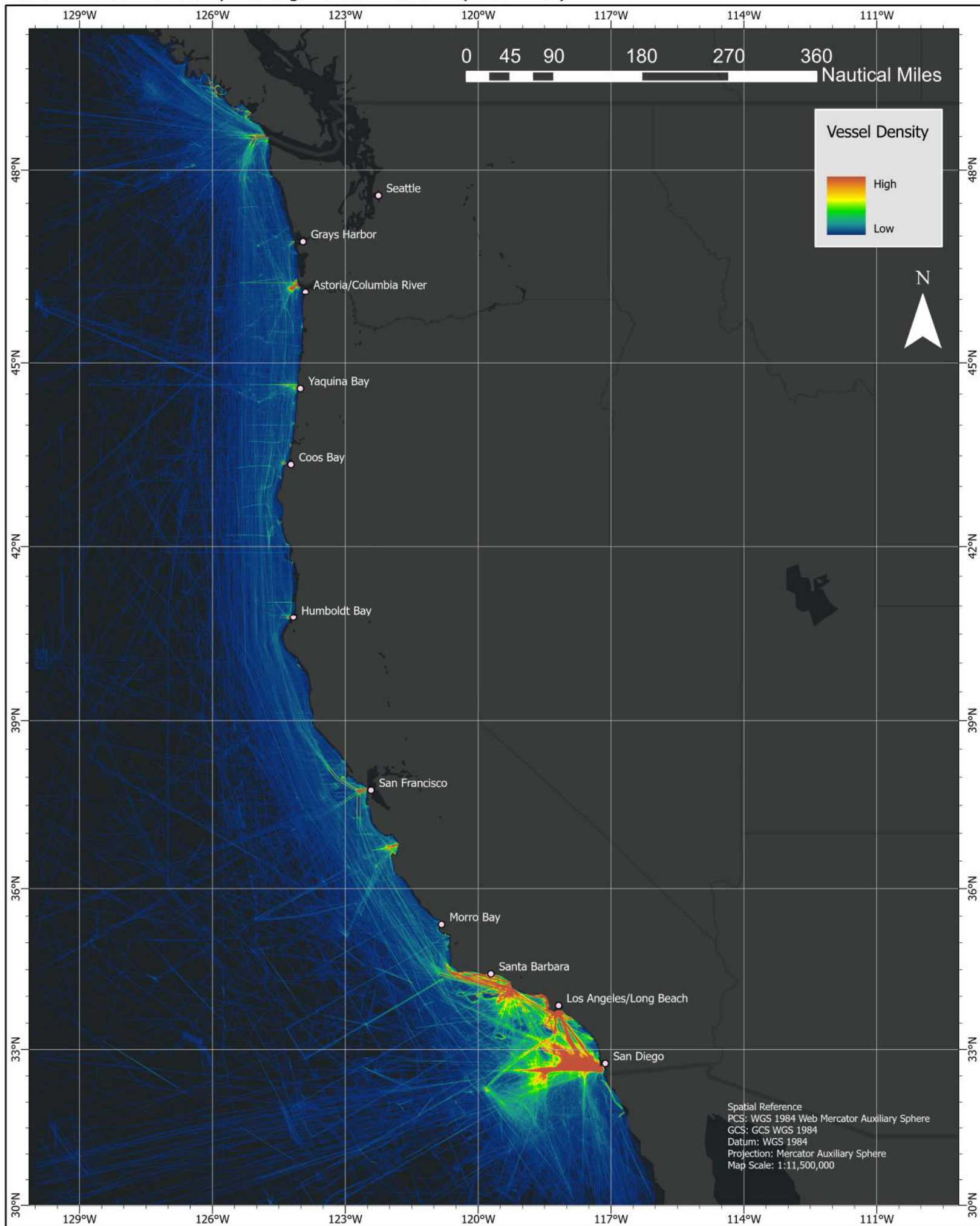
Annual AIS Vessel Density: Tanker Vessels (2015)



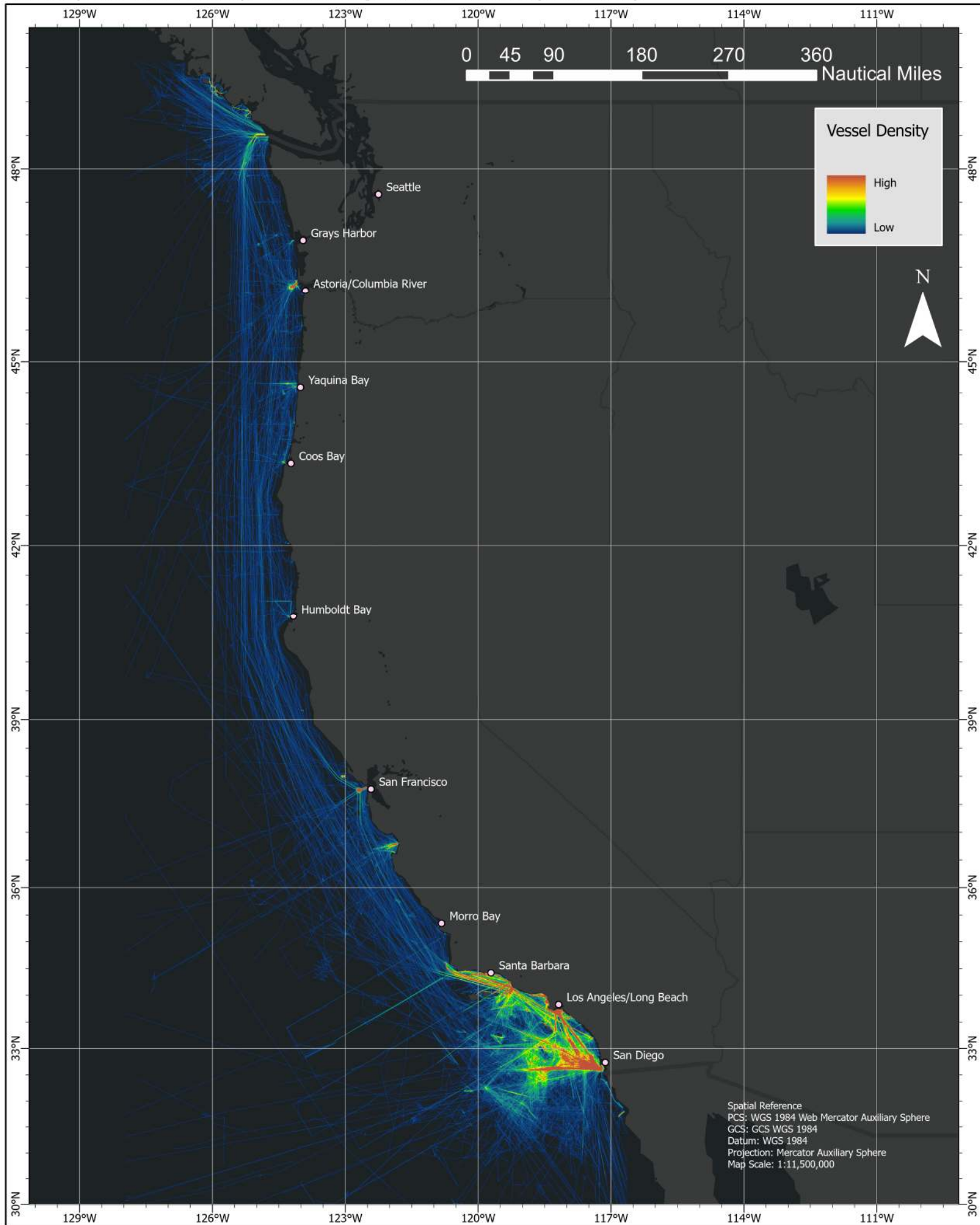
Annual AIS Vessel Density: Tanker Vessels (2012)



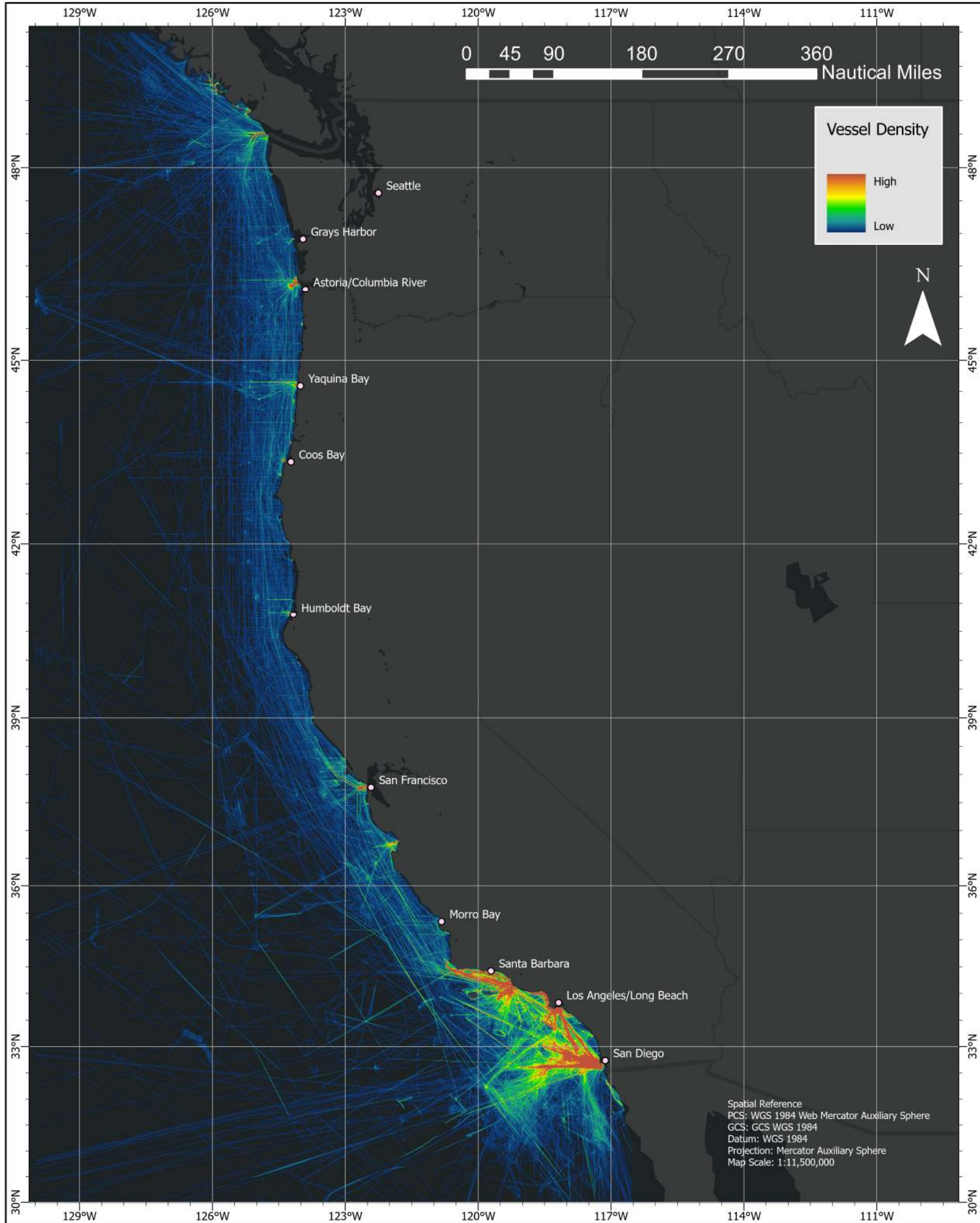
Annual AIS Vessel Density: Average of Other Vessels (2017-2021)



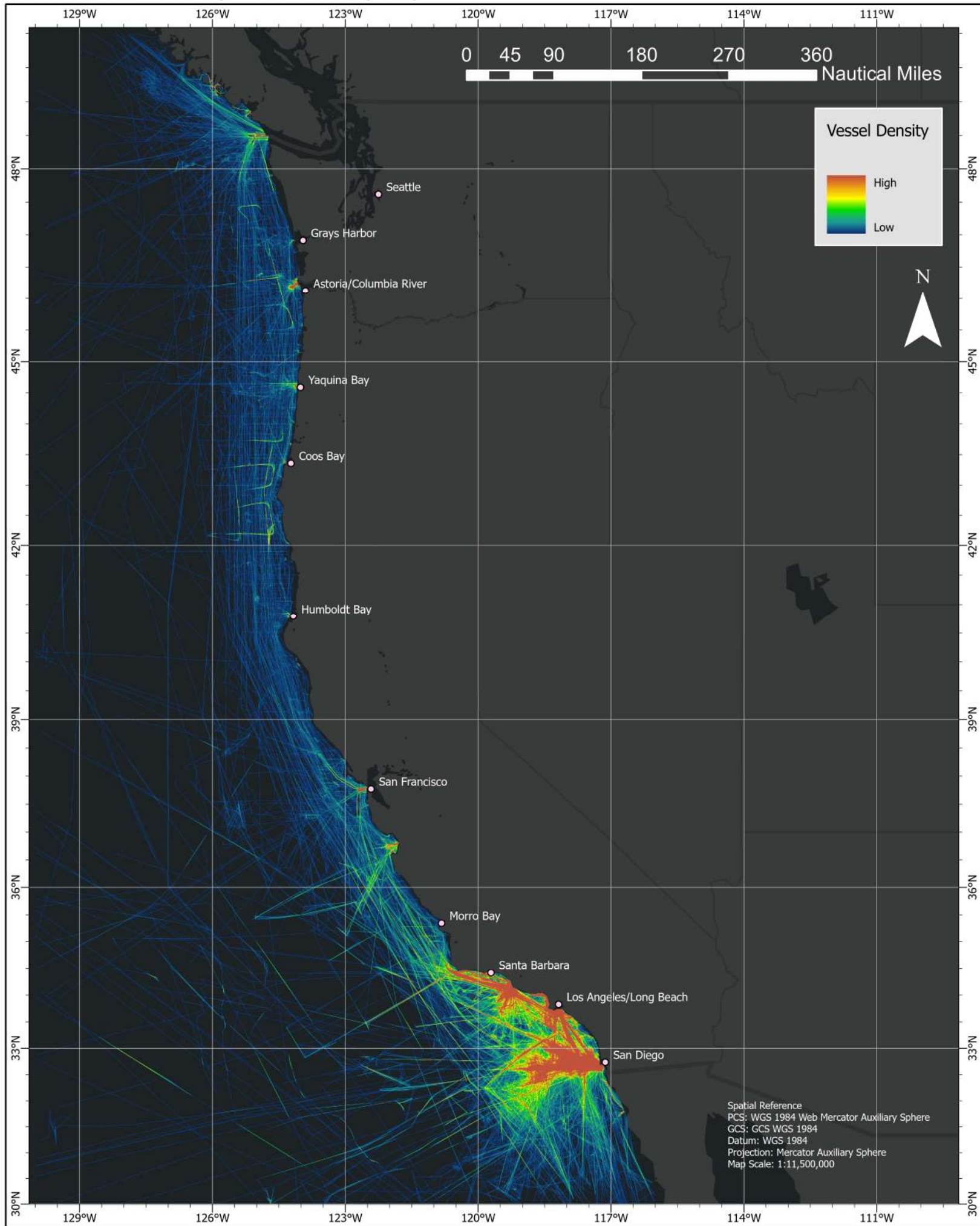
Quarterly AIS Vessel Density: CYQ1 Average of Other Vessels (2017-2021)



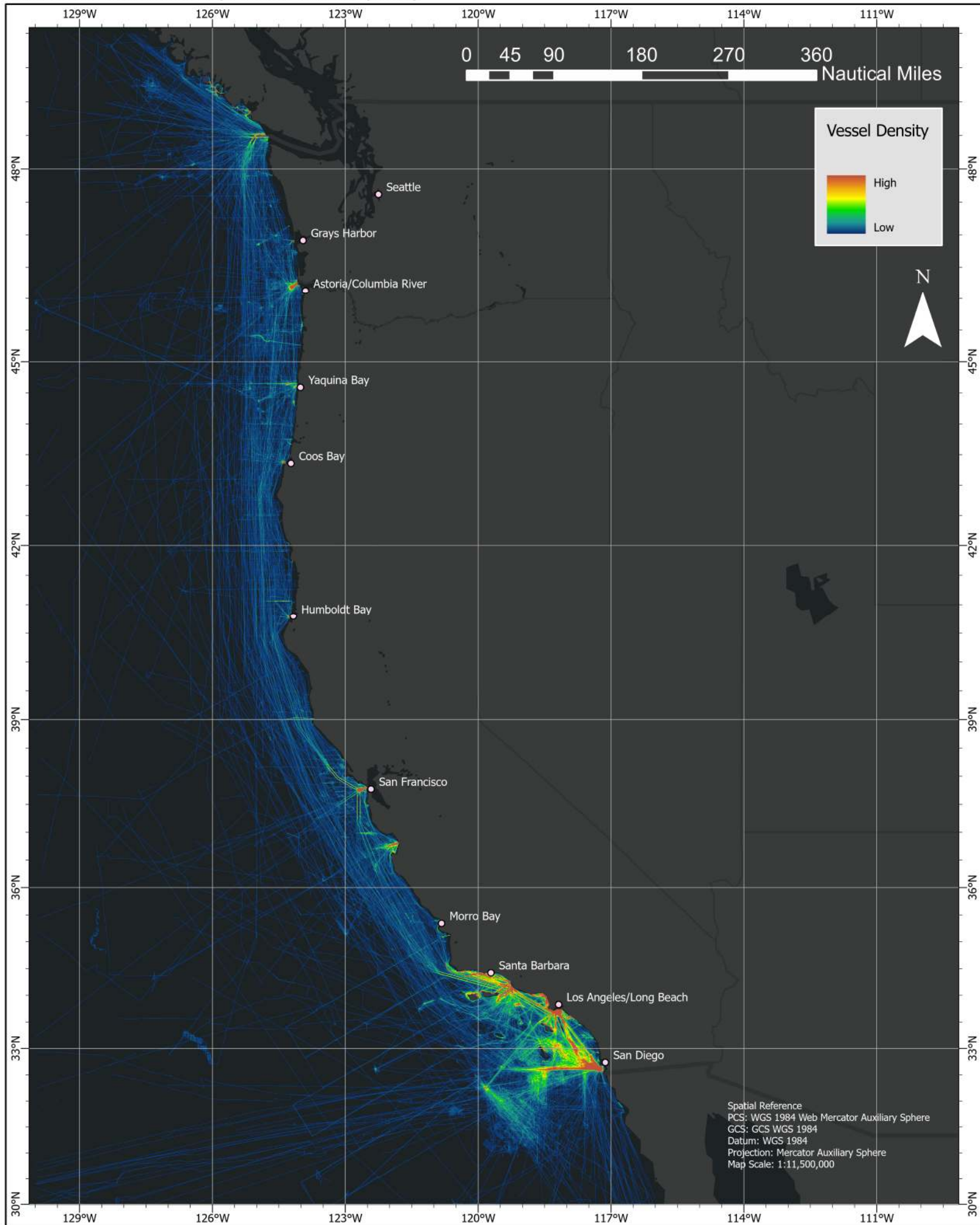
Quarterly AIS Vessel Density: CYQ3 Average of Other Vessels (2017-2021)



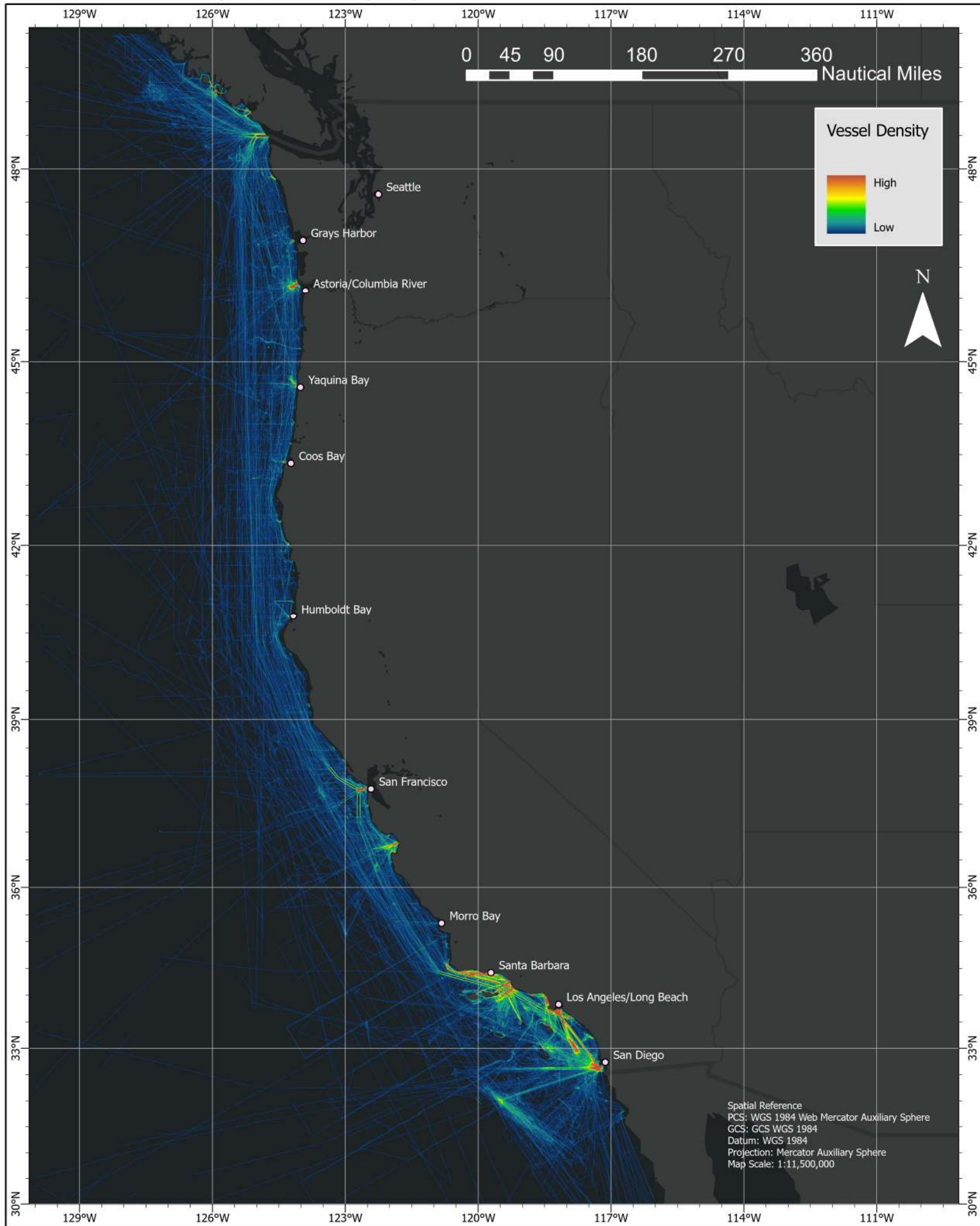
Annual AIS Vessel Density: Other Vessels (2021)



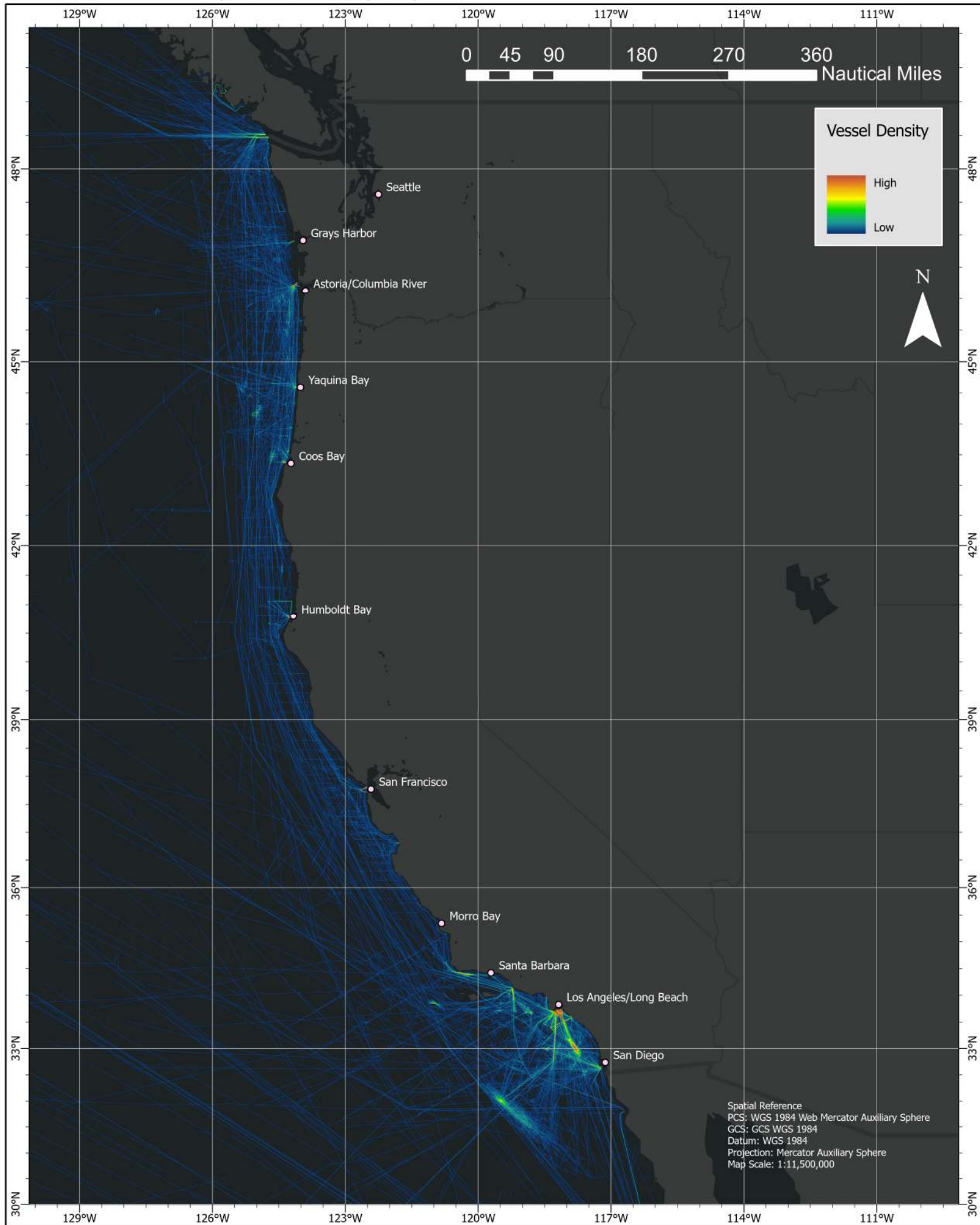
Annual AIS Vessel Density: Other Vessels (2018)



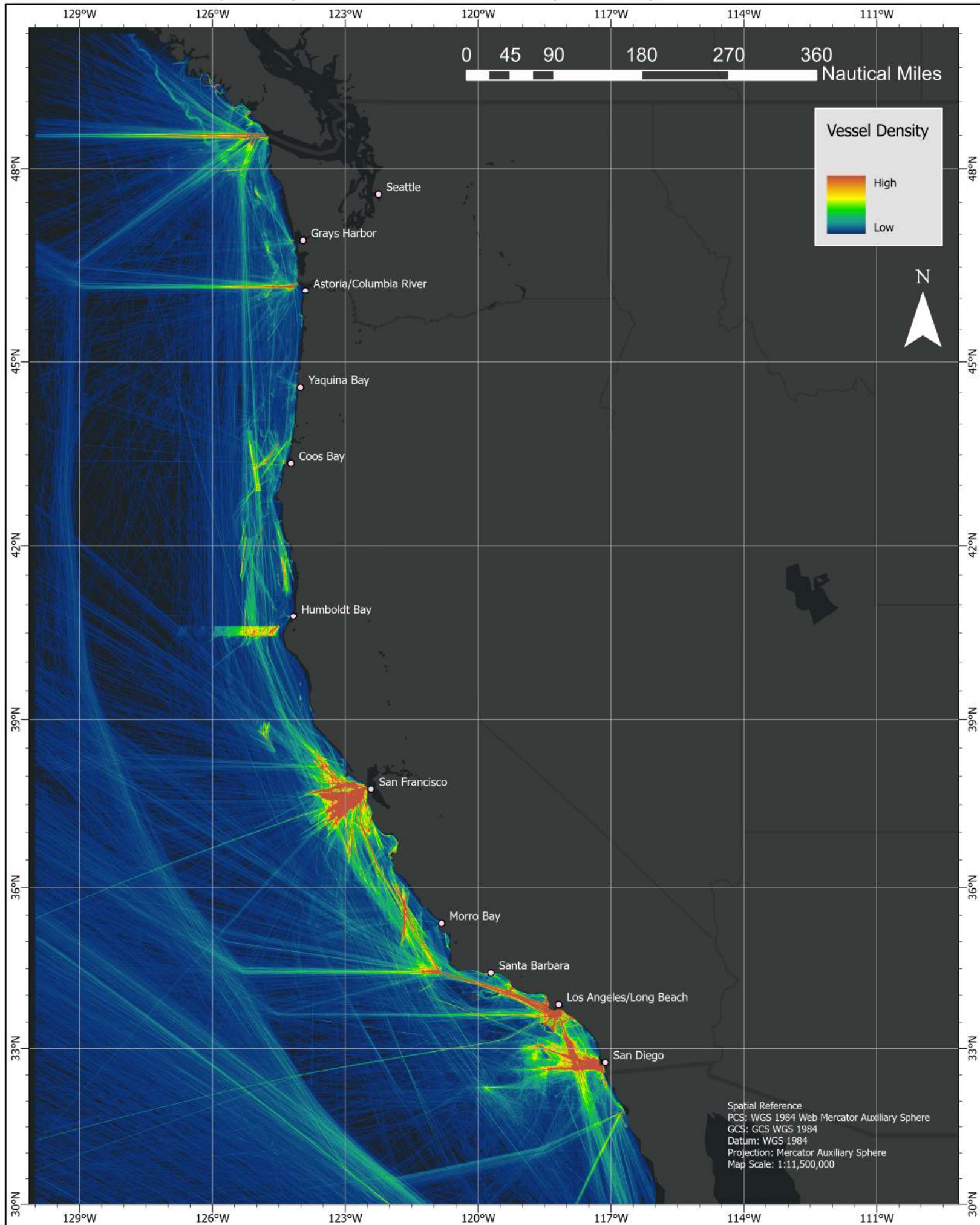
Annual AIS Vessel Density: Other Vessels (2015)



Annual AIS Vessel Density: Other Vessels (2012)



Annual AIS Vessel Density: Average of Null/Unavailable Vessels (2017-2021)

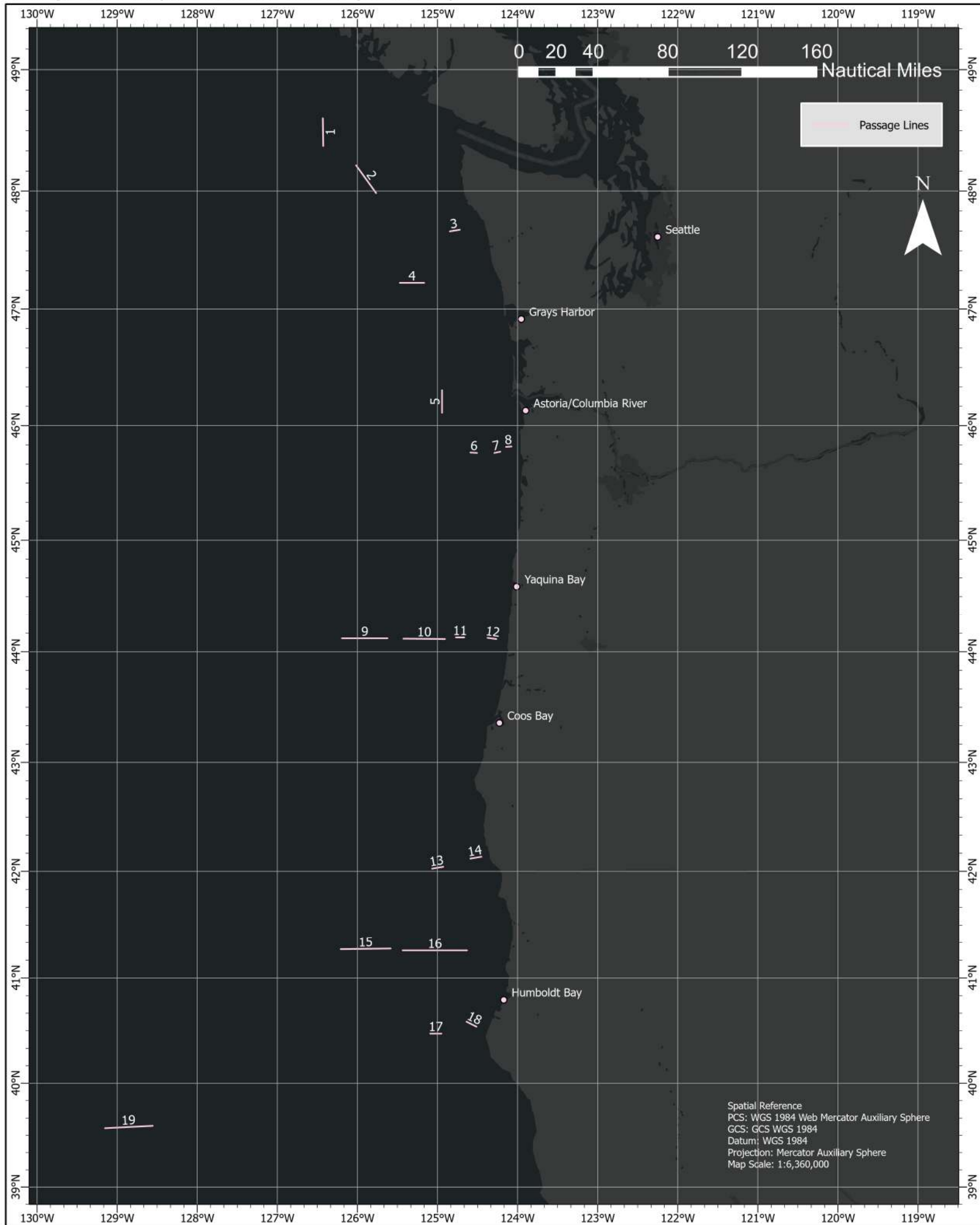


Attachment 4 – Passage Line Results

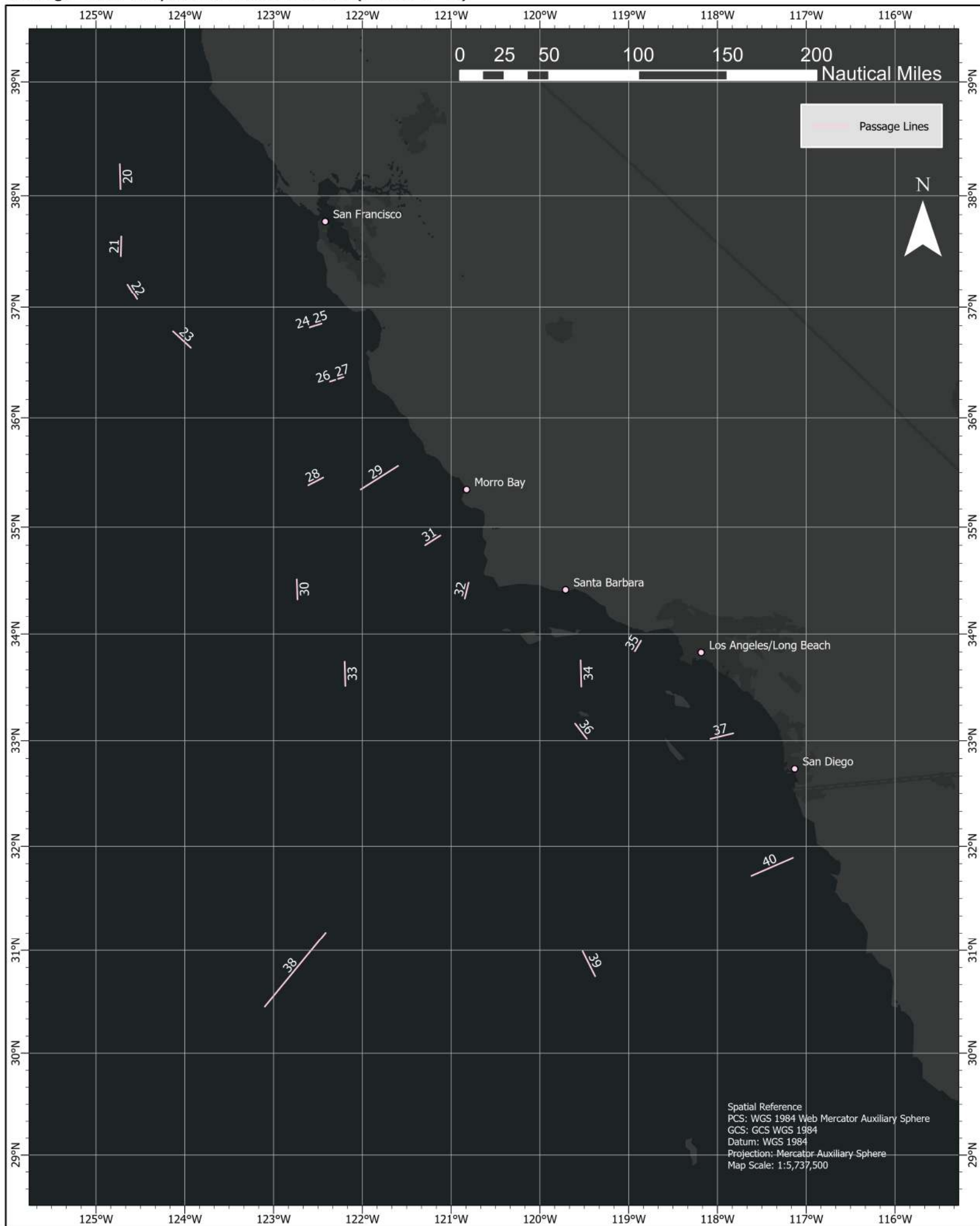
LIST OF TABLES

TABLE SET 1. THE NUMBER OF VESSELS AND TRACKS INTERSECTING WITH PASSAGE LINES 1 THROUGH 4.....	4-4
TABLE SET 2. THE NUMBER OF VESSELS AND TRACKS INTERSECTING WITH PASSAGE LINES 5 THROUGH 8.....	4-5
TABLE SET 3. THE NUMBER OF VESSELS AND TRACKS INTERSECTING WITH PASSAGE LINES 9 THROUGH 12.....	4-6
TABLE SET 4. THE NUMBER OF VESSELS AND TRACKS INTERSECTING WITH PASSAGE LINES 13 THROUGH 16.....	4-7
TABLE SET 5. THE NUMBER OF VESSELS AND TRACKS INTERSECTING WITH PASSAGE LINES 17 THROUGH 20.....	4-8
TABLE SET 6. THE NUMBER OF VESSELS AND TRACKS INTERSECTING WITH PASSAGE LINES 21 THROUGH 24.....	4-9
TABLE SET 7. THE NUMBER OF VESSELS AND TRACKS INTERSECTING WITH PASSAGE LINES 25 THROUGH 28.....	4-10
TABLE SET 8. THE NUMBER OF VESSELS AND TRACKS INTERSECTING WITH PASSAGE LINES 29 THROUGH 32.....	4-11
TABLE SET 9. THE NUMBER OF VESSELS AND TRACKS INTERSECTING WITH PASSAGE LINES 33 THROUGH 36.....	4-12
TABLE SET 10. THE NUMBER OF VESSELS AND TRACKS INTERSECTING WITH PASSAGE LINES 37 THROUGH 40.....	4-13

Passage Line Analysis: Northern Section (Lines 0-19)



Passage Line Analysis: Southern Section (Lines 20-40)



Passage Line 1									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	1974	5-yr Avg
All Vessels	926	2122	2304	2400	2251	1974	1974	1974	2181
Fishing	3	5	13	15	15	17	21	21	16
Tug/Tow	3	7	3	5	3	1	2	2	3
Recreational	0	4	1	7	5	14	19	19	9
Passenger	0	3	0	6	3	0	5	5	3
Cargo	673	1772	1962	1851	1647	1316	1603	1603	1676
Tanker	205	249	244	267	247	219	200	200	235
Other	16	10	11	9	9	13	21	21	13
Number of Unique Vessels									
All Vessels	612	1231	1368	1370	1263	1299	1331	1331	1326
Fishing	3	5	10	13	14	16	15	15	14
Tug/Tow	3	6	1	5	3	1	1	1	2
Recreational	0	4	1	7	5	11	17	17	8
Passenger	0	3	0	6	3	0	3	3	2
Cargo	522	1075	1197	1060	919	869	1070	1070	1023
Tanker	60	80	93	105	84	92	86	86	92
Other	7	8	7	7	9	8	17	17	10

Passage Line 2									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	1021	5-yr Avg
All Vessels	501	1115	1146	1185	1316	1044	1021	1021	1142
Fishing	8	20	26	34	39	35	31	31	33
Tug/Tow	12	31	43	27	31	27	42	42	34
Recreational	1	5	10	19	18	28	27	27	20
Passenger	8	16	15	18	19	2	11	11	13
Cargo	281	796	779	729	762	545	665	665	696
Tanker	162	195	196	205	203	193	156	156	191
Other	8	14	24	32	27	16	25	25	25
Number of Unique Vessels									
All Vessels	289	796	845	879	977	794	784	784	856
Fishing	7	15	22	25	27	29	24	24	25
Tug/Tow	3	11	10	9	7	9	11	11	9
Recreational	1	4	10	19	15	25	22	22	18
Passenger	6	12	10	12	10	2	5	5	8
Cargo	179	605	609	571	602	445	528	528	551
Tanker	66	107	118	124	121	105	95	95	113
Other	7	10	19	20	19	10	19	19	17

Passage Line 3								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	212	369	357	401	353	272	305	338
Fishing	23	76	77	130	101	81	103	98
Tug/Tow	98	164	141	128	109	100	77	111
Recreational	25	70	87	106	102	55	99	90
Passenger	6	12	5	8	7	2	5	5
Cargo	2	2	4	1	2	1	3	2
Tanker	0	0	0	0	1	0	0	0
Other	5	15	9	10	9	13	9	10
Number of Unique Vessels								
All Vessels	125	195	196	226	216	166	202	201
Fishing	21	47	45	66	58	56	51	55
Tug/Tow	33	43	38	41	37	34	39	38
Recreational	19	59	72	94	88	51	90	79
Passenger	4	8	5	5	6	2	4	4
Cargo	2	2	4	1	2	1	3	2
Tanker	0	0	0	0	1	0	0	0
Other	4	13	8	8	7	9	7	8

Passage Line 4								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	1229	935	912	935	957	939	928	934
Fishing	12	48	37	37	45	31	37	37
Tug/Tow	73	83	53	52	77	84	84	70
Recreational	1	15	18	24	23	13	21	20
Passenger	43	48	53	47	37	1	16	31
Cargo	931	599	648	620	599	610	610	617
Tanker	128	71	57	50	26	53	73	52
Other	16	43	21	41	40	29	41	34
Number of Unique Vessels								
All Vessels	675	511	485	509	487	550	601	526
Fishing	12	31	22	25	33	19	24	25
Tug/Tow	28	28	22	20	27	27	28	25
Recreational	1	12	17	24	18	13	20	18
Passenger	22	24	30	29	24	1	10	19
Cargo	510	312	310	293	272	345	388	322
Tanker	70	58	48	44	25	34	46	39
Other	13	31	17	31	24	22	25	24

Table Set 1. The number of vessels and tracks intersecting with passage lines 1 through 4.

Passage Line 5									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	520	1054	1263	1297	1138	1136	1162	1199	
Fishing	20	42	60	55	29	42	48	47	
Tug/Tow	3	4	7	3	3	0	2	3	
Recreational	0	17	19	36	29	48	27	32	
Passenger	0	2	9	14	0	2	5	6	
Cargo	442	907	1054	982	829	789	939	919	
Tanker	20	23	31	50	48	51	65	49	
Other	11	10	7	8	30	15	9	14	
Number of Unique Vessels									
All Vessels	392	732	884	923	833	820	876	867	
Fishing	9	29	38	41	25	31	35	34	
Tug/Tow	3	4	5	3	3	0	2	3	
Recreational	0	9	17	19	18	17	19	18	
Passenger	0	2	6	6	0	1	4	3	
Cargo	335	633	743	701	599	588	701	666	
Tanker	17	19	25	39	37	31	30	32	
Other	9	6	6	6	10	12	8	8	

Passage Line 6									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	142	180	160	143	194	189	204	178	
Fishing	19	43	45	43	64	60	66	56	
Tug/Tow	53	68	46	38	60	46	37	45	
Recreational	2	7	9	9	19	16	19	14	
Passenger	0	3	1	2	2	0	0	1	
Cargo	32	32	36	29	19	36	42	32	
Tanker	7	6	2	4	6	2	7	4	
Other	7	14	10	15	12	9	7	11	
Number of Unique Vessels									
All Vessels	101	118	119	111	124	136	143	127	
Fishing	18	29	34	34	46	44	44	40	
Tug/Tow	20	26	22	20	17	23	15	19	
Recreational	2	6	9	9	18	12	19	13	
Passenger	0	3	1	2	2	0	0	1	
Cargo	32	32	35	28	18	35	41	31	
Tanker	6	6	2	3	6	2	6	4	
Other	6	9	8	12	10	7	7	9	

Passage Line 7								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	167	234	192	230	311	288	253	255
Fishing	26	112	69	112	187	189	142	140
Tug/Tow	20	31	45	48	41	37	35	41
Recreational	12	11	24	21	36	22	30	27
Passenger	2	12	13	19	12	2	4	10
Cargo	54	33	17	19	14	22	26	20
Tanker	4	1	0	0	0	0	0	0
Other	13	9	16	5	9	8	11	10
Number of Unique Vessels								
All Vessels	119	141	125	142	166	150	145	146
Fishing	18	48	40	58	72	77	62	62
Tug/Tow	12	21	18	22	18	17	16	18
Recreational	9	11	22	19	33	21	24	24
Passenger	2	10	10	15	10	2	4	8
Cargo	47	27	17	18	14	19	25	19
Tanker	2	1	0	0	0	0	0	0
Other	6	8	13	4	8	8	9	8

Passage Line 8								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	103	197	188	208	227	237	261	224
Fishing	14	83	77	110	132	117	134	114
Tug/Tow	56	76	69	57	46	59	72	61
Recreational	4	16	23	31	22	38	31	29
Passenger	2	2	3	1	2	0	3	2
Cargo	1	0	0	1	12	3	2	4
Tanker	0	0	0	0	0	0	0	0
Other	4	8	5	6	6	4	12	7
Number of Unique Vessels								
All Vessels	50	93	107	115	116	134	134	121
Fishing	8	36	46	53	56	67	65	57
Tug/Tow	16	25	23	24	26	23	21	23
Recreational	4	15	23	29	20	28	29	26
Passenger	2	2	3	1	2	0	2	2
Cargo	1	0	0	1	1	1	2	1
Tanker	0	0	0	0	0	0	0	0
Other	2	7	5	5	4	3	6	5

Table Set 2. The number of vessels and tracks intersecting with passage lines 5 through 8.

Passage Line 9									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	431	282	301	373	413	450	485	404	
Fishing	3	5	7	15	5	6	14	9	
Tug/Tow	47	33	37	34	70	58	60	52	
Recreational	2	3	4	2	10	3	9	6	
Passenger	1	2	0	3	1	0	3	1	
Cargo	145	90	85	136	108	134	169	126	
Tanker	217	140	156	159	182	191	202	178	
Other	3	7	7	10	6	4	9	7	
Number of Unique Vessels									
All Vessels	216	146	152	215	206	224	269	213	
Fishing	2	4	7	13	5	5	14	9	
Tug/Tow	7	7	10	9	13	10	10	10	
Recreational	2	3	4	2	10	3	9	6	
Passenger	1	1	0	3	1	0	3	1	
Cargo	102	59	59	91	74	88	126	88	
Tanker	90	63	61	77	69	68	74	70	
Other	3	7	6	8	6	4	9	7	

Passage Line 10									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	1256	927	1012	999	1054	1005	1099	1034	
Fishing	63	129	178	166	161	126	137	154	
Tug/Tow	65	67	48	42	54	63	60	53	
Recreational	12	17	36	35	25	14	42	30	
Passenger	43	38	40	48	53	2	17	32	
Cargo	893	562	607	581	600	623	656	613	
Tanker	101	45	45	26	22	33	60	37	
Other	31	47	30	51	46	30	53	42	
Number of Unique Vessels									
All Vessels	707	495	491	497	488	538	645	532	
Fishing	29	46	52	62	65	55	58	58	
Tug/Tow	34	37	27	28	20	24	19	24	
Recreational	10	16	32	30	21	12	39	27	
Passenger	20	17	20	25	27	2	11	17	
Cargo	501	295	281	260	251	309	384	297	
Tanker	55	39	39	25	20	28	37	30	
Other	20	32	20	34	32	22	32	28	

Passage Line 11								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	223	192	249	249	265	220	239	244
Fishing	20	20	62	55	54	22	26	44
Tug/Tow	101	70	75	67	95	82	81	80
Recreational	12	13	9	9	14	6	14	10
Passenger	8	13	18	13	12	0	5	10
Cargo	65	56	63	67	62	73	80	69
Tanker	4	4	1	2	5	6	2	3
Other	3	9	13	22	9	12	14	14
Number of Unique Vessels								
All Vessels	124	128	148	149	144	134	150	145
Fishing	16	19	26	25	30	19	19	24
Tug/Tow	27	27	25	22	24	32	27	26
Recreational	12	13	9	9	12	5	13	10
Passenger	6	9	14	10	10	0	5	8
Cargo	49	42	56	55	47	54	63	55
Tanker	2	4	1	2	3	4	1	2
Other	3	7	11	14	8	8	11	10

Passage Line 12								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	185	206	338	329	251	281	354	311
Fishing	26	60	184	177	96	140	197	159
Tug/Tow	83	85	80	74	62	77	76	74
Recreational	13	28	24	40	53	31	51	40
Passenger	3	1	3	6	7	4	3	5
Cargo	3	0	3	4	2	2	3	3
Tanker	0	0	0	0	0	0	0	0
Other	13	20	19	14	19	11	16	16
Number of Unique Vessels								
All Vessels	99	119	127	137	168	142	169	149
Fishing	13	33	49	51	54	62	66	56
Tug/Tow	30	36	27	30	36	34	28	31
Recreational	10	26	23	30	50	25	50	36
Passenger	3	1	3	5	6	3	3	4
Cargo	2	0	3	4	2	2	3	3
Tanker	0	0	0	0	0	0	0	0
Other	8	13	10	7	10	6	11	9

Table Set 3. The number of vessels and tracks intersecting with passage lines 9 through 12.

Passage Line 13									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	380	309	332	320	264	237	317	294	
Fishing	1	19	10	15	8	6	19	12	
Tug/Tow	75	60	56	46	44	38	22	41	
Recreational	1	10	18	23	20	5	19	17	
Passenger	14	21	22	20	19	1	10	14	
Cargo	250	158	189	180	113	135	205	164	
Tanker	15	10	7	6	10	11	14	10	
Other	10	21	15	22	13	8	15	15	
Number of Unique Vessels									
All Vessels	219	198	211	207	166	166	247	199	
Fishing	1	15	9	15	8	6	16	11	
Tug/Tow	33	27	21	16	13	16	12	16	
Recreational	1	10	17	22	20	5	17	16	
Passenger	10	13	17	15	13	1	7	11	
Cargo	141	102	113	108	79	92	156	110	
Tanker	11	10	7	6	8	10	9	8	
Other	9	15	13	19	10	7	12	12	

Passage Line 14									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	200	274	322	310	265	229	278	281	
Fishing	14	78	130	123	84	65	86	98	
Tug/Tow	61	69	42	48	47	51	58	49	
Recreational	27	65	83	95	92	70	108	90	
Passenger	2	4	5	8	9	3	5	6	
Cargo	2	2	5	4	2	5	4	4	
Tanker	0	0	0	0	0	0	0	0	
Other	9	20	13	15	13	10	11	12	
Number of Unique Vessels									
All Vessels	129	169	203	221	206	179	206	203	
Fishing	12	37	55	72	51	51	53	56	
Tug/Tow	27	32	25	30	28	31	25	28	
Recreational	23	58	74	82	89	64	104	83	
Passenger	2	4	5	7	8	3	5	6	
Cargo	1	2	4	4	2	3	3	3	
Tanker	0	0	0	0	0	0	0	0	
Other	6	13	11	13	12	7	9	10	

Passage Line 15								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	556	492	507	516	527	562	623	547
Fishing	1	3	3	5	0	2	5	3
Tug/Tow	51	54	60	44	89	72	88	71
Recreational	0	2	10	12	5	3	9	8
Passenger	6	10	2	1	1	0	7	2
Cargo	212	182	171	199	157	166	215	182
Tanker	271	217	242	212	229	242	258	237
Other	2	19	10	16	11	5	13	11
Number of Unique Vessels								
All Vessels	248	240	255	291	249	265	312	274
Fishing	1	3	3	4	0	2	5	3
Tug/Tow	8	13	16	11	15	10	11	13
Recreational	0	2	9	11	5	3	9	7
Passenger	1	2	2	1	1	0	4	2
Cargo	137	106	128	133	103	110	156	126
Tanker	93	93	80	94	85	78	86	85
Other	2	17	8	14	9	4	10	9

Passage Line 16								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	1595	1324	1329	1421	1423	1319	1444	1387
Fishing	4	9	26	21	18	17	16	20
Tug/Tow	167	170	126	98	103	132	113	114
Recreational	23	74	78	117	87	34	78	79
Passenger	57	67	73	75	78	2	29	51
Cargo	1136	799	857	883	823	870	961	879
Tanker	109	66	50	43	36	48	87	53
Other	37	83	61	93	82	51	85	74
Number of Unique Vessels								
All Vessels	805	671	665	741	662	679	857	721
Fishing	4	9	24	18	16	15	13	17
Tug/Tow	56	51	46	40	33	45	37	40
Recreational	19	62	62	106	81	29	67	69
Passenger	27	30	35	35	34	2	16	24
Cargo	566	375	372	386	342	406	539	409
Tanker	58	55	43	41	30	37	51	40
Other	26	49	37	52	44	35	49	43

Table Set 4. The number of vessels and tracks intersecting with passage lines 13 through 16.

Passage Line 17									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	777	522	499	526	579	475	827	581	
Fishing	1	1	4	2	3	2	0	2	
Tug/Tow	77	93	78	68	67	79	70	72	
Recreational	0	4	10	20	10	8	9	11	
Passenger	43	37	18	46	56	1	14	27	
Cargo	614	323	330	326	326	295	305	316	
Tanker	29	24	23	16	9	13	38	20	
Other	8	26	15	21	16	10	22	17	
Number of Unique Vessels									
All Vessels	367	251	256	254	253	269	295	265	
Fishing	1	1	4	2	3	2	0	2	
Tug/Tow	26	26	24	20	17	22	15	20	
Recreational	0	4	10	20	10	8	9	11	
Passenger	21	15	14	19	23	1	9	13	
Cargo	288	157	156	142	150	166	200	163	
Tanker	20	21	21	16	8	10	22	15	
Other	6	20	12	17	14	9	16	14	

Passage Line 18									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	241	314	272	310	299	260	721	372	
Fishing	9	28	35	26	42	42	56	40	
Tug/Tow	102	83	45	67	55	61	77	61	
Recreational	47	104	94	121	103	79	108	101	
Passenger	7	14	16	13	15	4	8	11	
Cargo	7	19	33	29	28	19	32	28	
Tanker	0	0	0	0	0	0	1	0	
Other	12	36	30	24	24	27	23	26	
Number of Unique Vessels									
All Vessels	151	214	200	211	208	182	223	205	
Fishing	9	22	28	20	25	27	33	27	
Tug/Tow	41	42	27	27	23	31	34	28	
Recreational	38	83	80	100	95	71	95	88	
Passenger	5	12	11	10	12	3	7	9	
Cargo	6	11	18	15	14	9	24	16	
Tanker	0	0	0	0	0	0	1	0	
Other	10	20	18	15	15	17	17	16	

Passage Line 19								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	92	420	307	405	341	290	295	328
Fishing	0	0	1	0	0	0	1	0
Tug/Tow	0	2	1	0	1	0	0	0
Recreational	0	0	0	0	0	1	0	0
Passenger	0	0	0	0	1	0	0	0
Cargo	70	328	235	278	200	176	216	221
Tanker	22	74	57	71	70	43	61	60
Other	0	1	1	3	1	0	4	2
Number of Unique Vessels								
All Vessels	83	364	273	348	306	264	260	290
Fishing	0	0	1	0	0	0	1	0
Tug/Tow	0	2	1	0	1	0	0	0
Recreational	0	0	0	0	0	1	0	0
Passenger	0	0	0	0	1	0	0	0
Cargo	64	295	214	241	185	165	183	198
Tanker	19	52	45	55	56	39	48	49
Other	0	1	1	3	1	0	4	2

Passage Line 20								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	334	453	651	625	549	355	303	497
Fishing	1	0	1	0	0	3	1	1
Tug/Tow	1	1	2	2	2	1	0	1
Recreational	0	3	2	5	4	2	2	3
Passenger	0	2	0	1	0	0	0	0
Cargo	228	382	565	516	379	230	163	371
Tanker	86	46	64	63	85	73	119	81
Other	4	5	2	3	5	3	5	4
Number of Unique Vessels								
All Vessels	204	262	338	296	324	231	206	279
Fishing	1	0	1	0	0	3	1	1
Tug/Tow	1	1	2	2	2	1	0	1
Recreational	0	3	2	5	4	2	2	3
Passenger	0	2	0	1	0	0	0	0
Cargo	150	210	280	240	218	157	132	205
Tanker	43	31	42	23	47	30	45	37
Other	1	5	2	3	4	3	5	3

Table Set 5. The number of vessels and tracks intersecting with passage lines 17 through 20.

Passage Line 21									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	134	262	237	237	231	176	179	212	
Fishing	1	0	0	0	1	0	1	0	
Tug/Tow	0	0	0	0	0	0	0	0	
Recreational	0	0	1	5	6	1	7	4	
Passenger	0	0	0	0	0	0	1	0	
Cargo	97	210	193	179	150	101	110	147	
Tanker	29	43	37	39	52	41	48	43	
Other	1	4	2	0	1	1	2	1	
Number of Unique Vessels									
All Vessels	108	175	171	181	179	148	155	167	
Fishing	1	0	0	0	1	0	1	0	
Tug/Tow	0	0	0	0	0	0	0	0	
Recreational	0	0	1	5	4	1	7	4	
Passenger	0	0	0	0	0	0	1	0	
Cargo	79	140	136	134	122	91	91	115	
Tanker	21	28	28	28	33	28	37	31	
Other	1	4	2	0	1	1	2	1	

Passage Line 22									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	159	185	178	185	179	222	188	190	
Fishing	1	0	0	7	0	2	2	2	
Tug/Tow	0	7	0	0	1	1	2	1	
Recreational	0	0	2	5	3	4	0	3	
Passenger	2	1	1	2	0	1	2	1	
Cargo	146	158	149	137	125	133	146	138	
Tanker	6	15	20	22	13	28	19	20	
Other	1	4	3	6	3	2	2	3	
Number of Unique Vessels									
All Vessels	63	68	66	76	68	89	94	79	
Fishing	1	0	0	5	0	1	2	2	
Tug/Tow	0	3	0	0	1	1	2	1	
Recreational	0	0	2	5	1	4	0	2	
Passenger	2	1	1	2	0	1	2	1	
Cargo	51	45	39	34	41	43	56	43	
Tanker	6	15	18	20	13	21	19	18	
Other	1	4	3	4	3	2	1	3	

Passage Line 23								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	114	187	221	226	220	168	162	199
Fishing	0	0	5	0	0	2	0	1
Tug/Tow	1	1	0	0	0	0	0	0
Recreational	1	1	2	11	5	0	2	4
Passenger	0	1	2	0	1	1	2	1
Cargo	51	98	93	101	74	57	75	80
Tanker	53	80	114	98	106	65	68	90
Other	3	4	2	3	1	2	6	3
Number of Unique Vessels								
All Vessels	79	117	135	156	152	106	122	134
Fishing	0	0	2	0	0	2	0	1
Tug/Tow	1	1	0	0	0	0	0	0
Recreational	1	1	2	11	5	0	2	4
Passenger	0	1	2	0	1	1	2	1
Cargo	38	58	47	63	49	38	51	50
Tanker	34	50	77	67	71	39	48	60
Other	2	4	2	3	1	2	5	3

Passage Line 24								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	132	567	631	634	585	552	536	588
Fishing	0	0	2	0	5	7	5	4
Tug/Tow	37	25	21	20	10	14	20	17
Recreational	7	12	13	15	14	14	16	14
Passenger	7	9	11	14	11	5	4	9
Cargo	59	446	509	478	394	384	362	425
Tanker	2	43	56	49	47	26	45	45
Other	2	21	12	21	15	7	13	14
Number of Unique Vessels								
All Vessels	80	335	302	305	303	281	315	301
Fishing	0	0	2	0	5	4	2	3
Tug/Tow	17	17	13	13	7	10	11	11
Recreational	7	10	13	14	14	14	16	14
Passenger	5	8	8	6	7	5	3	6
Cargo	30	239	212	191	179	180	199	192
Tanker	2	36	41	37	35	20	32	33
Other	2	17	9	15	13	6	12	11

Table Set 6. The number of vessels and tracks intersecting with passage lines 21 through 24.

Passage Line 25									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	119	673	825	983	973	871	748	880	
Fishing	0	0	1	5	1	11	4	4	
Tug/Tow	34	34	8	14	13	15	18	14	
Recreational	6	14	9	19	19	22	29	20	
Passenger	3	11	13	30	20	5	5	15	
Cargo	48	549	742	812	740	614	513	684	
Tanker	5	17	22	30	37	34	62	37	
Other	2	19	16	17	16	10	13	14	
Number of Unique Vessels									
All Vessels	78	343	353	411	431	433	429	411	
Fishing	0	0	1	5	1	3	2	2	
Tug/Tow	21	16	8	13	12	11	13	11	
Recreational	6	14	9	19	16	21	27	18	
Passenger	3	9	10	13	10	4	3	8	
Cargo	26	258	279	289	292	276	268	281	
Tanker	4	17	20	19	31	29	47	29	
Other	2	15	13	16	11	8	11	12	

Passage Line 26									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	109	451	498	506	477	490	463	487	
Fishing	0	0	2	1	1	5	4	3	
Tug/Tow	21	17	11	12	4	6	6	8	
Recreational	2	14	5	13	13	8	21	12	
Passenger	4	8	14	15	7	3	1	8	
Cargo	57	343	399	388	340	352	301	356	
Tanker	3	35	51	41	41	28	51	42	
Other	2	27	13	18	14	8	19	14	
Number of Unique Vessels									
All Vessels	70	280	247	237	242	252	283	252	
Fishing	0	0	2	1	1	5	3	2	
Tug/Tow	16	11	11	12	4	6	6	8	
Recreational	2	13	5	13	13	7	19	11	
Passenger	4	7	9	6	4	3	1	5	
Cargo	25	191	170	149	154	166	175	163	
Tanker	3	30	37	29	30	23	36	31	
Other	1	21	10	12	12	6	13	11	

Passage Line 27								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	142	703	880	975	910	820	669	851
Fishing	1	3	0	5	2	0	2	2
Tug/Tow	45	37	7	13	11	16	25	14
Recreational	13	13	19	20	13	27	21	20
Passenger	5	14	16	28	11	4	6	13
Cargo	53	551	781	802	697	593	449	664
Tanker	5	24	26	24	31	21	42	29
Other	4	27	13	21	17	10	16	15
Number of Unique Vessels								
All Vessels	91	350	356	392	393	403	381	385
Fishing	1	3	0	5	2	0	2	2
Tug/Tow	27	17	7	10	7	10	13	9
Recreational	13	13	18	19	13	24	20	19
Passenger	5	11	12	12	6	3	5	8
Cargo	25	246	275	272	269	263	245	265
Tanker	4	23	20	18	30	18	31	23
Other	1	21	11	17	11	9	11	12

Passage Line 28								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	550	266	202	217	199	349	467	287
Fishing	0	0	2	0	0	1	1	1
Tug/Tow	21	25	23	24	27	35	34	29
Recreational	1	4	2	4	8	4	6	5
Passenger	0	0	0	0	1	0	0	0
Cargo	311	94	75	87	72	118	216	114
Tanker	201	123	89	85	74	133	165	109
Other	5	8	6	4	6	8	12	7
Number of Unique Vessels								
All Vessels	309	164	118	125	124	157	201	145
Fishing	0	0	2	0	0	1	1	1
Tug/Tow	8	11	7	7	10	8	8	8
Recreational	1	4	2	4	8	3	6	5
Passenger	0	0	0	0	1	0	0	0
Cargo	207	79	56	59	50	76	115	71
Tanker	81	57	44	39	38	28	31	36
Other	4	7	4	4	6	5	8	5

Table Set 7. The number of vessels and tracks intersecting with passage lines 25 through 28.

Passage Line 29									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	2360	2349	2525	2518	2458	2258	2261	2404	
Fishing	5	3	14	6	7	6	9	8	
Tug/Tow	158	134	72	82	69	105	140	94	
Recreational	20	58	69	86	60	65	104	77	
Passenger	62	82	76	79	74	19	28	55	
Cargo	1824	1718	1943	1828	1559	1494	1474	1660	
Tanker	187	199	230	189	190	153	259	204	
Other	13	82	68	84	87	38	71	70	
Number of Unique Vessels									
All Vessels	855	974	1013	1026	1021	1001	1115	1035	
Fishing	5	3	12	5	7	6	8	8	
Tug/Tow	55	40	28	35	30	33	33	32	
Recreational	17	51	59	75	56	50	98	68	
Passenger	29	35	35	34	41	15	12	27	
Cargo	566	640	655	607	573	594	654	617	
Tanker	103	117	157	129	133	94	134	129	
Other	11	47	31	48	50	27	42	40	

Passage Line 30									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	233	606	696	676	633	581	730	663	
Fishing	0	0	0	0	1	0	1	0	
Tug/Tow	0	0	0	0	0	0	0	0	
Recreational	0	0	2	6	1	1	0	2	
Passenger	3	3	1	0	1	0	1	1	
Cargo	211	560	611	557	477	391	623	532	
Tanker	14	26	58	32	47	43	65	49	
Other	4	1	0	0	2	1	3	1	
Number of Unique Vessels									
All Vessels	170	365	429	383	390	409	478	418	
Fishing	0	0	0	0	1	0	1	0	
Tug/Tow	0	0	0	0	0	0	0	0	
Recreational	0	0	2	6	1	1	0	2	
Passenger	1	2	1	0	1	0	1	1	
Cargo	153	327	356	307	279	284	377	321	
Tanker	13	25	52	29	39	33	41	39	
Other	2	1	0	0	2	1	1	1	

Passage Line 31								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	668	1405	1710	1691	1569	1536	1500	1601
Fishing	3	2	5	7	4	0	4	4
Tug/Tow	125	85	44	47	55	59	61	53
Recreational	23	45	55	67	50	43	73	58
Passenger	18	43	47	34	27	10	19	27
Cargo	422	1064	1398	1324	1130	1079	943	1175
Tanker	22	66	82	60	69	46	100	71
Other	5	48	39	34	36	21	36	33
Number of Unique Vessels								
All Vessels	289	631	676	662	682	639	737	679
Fishing	3	2	5	6	4	0	4	4
Tug/Tow	46	30	25	29	30	22	25	26
Recreational	20	40	46	58	48	39	69	52
Passenger	13	22	22	24	24	10	12	18
Cargo	144	418	462	404	402	396	436	420
Tanker	15	53	67	51	61	37	70	57
Other	4	34	22	28	27	16	23	23

Passage Line 32								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	2177	2791	2909	2905	2821	3441	3887	3193
Fishing	2	8	15	13	25	52	15	24
Tug/Tow	147	96	47	51	51	60	63	54
Recreational	19	41	60	75	61	42	82	64
Passenger	25	53	39	50	45	13	35	36
Cargo	1753	2246	2332	2195	1932	2319	2988	2353
Tanker	144	203	275	188	225	206	359	251
Other	14	64	65	67	68	40	68	62
Number of Unique Vessels								
All Vessels	922	1206	1289	1266	1293	1380	1640	1374
Fishing	2	6	11	6	5	7	9	8
Tug/Tow	42	35	27	29	26	24	33	28
Recreational	14	36	51	66	58	36	76	57
Passenger	15	24	22	30	30	11	17	22
Cargo	682	864	886	817	771	856	1069	880
Tanker	105	159	212	144	176	143	204	176
Other	10	39	30	39	40	25	36	34

Table Set 8. The number of vessels and tracks intersecting with passage lines 29 through 32.

Passage Line 33									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	238	458	544	489	429	215	366	409	
Fishing	0	0	4	2	0	5	1	2	
Tug/Tow	0	0	0	0	0	1	0	0	
Recreational	0	2	1	0	2	1	6	2	
Passenger	0	0	0	0	0	0	1	0	
Cargo	202	405	489	416	347	132	290	335	
Tanker	22	39	39	39	30	23	40	34	
Other	7	5	7	9	9	7	6	8	
Number of Unique Vessels									
All Vessels	163	236	237	192	192	154	197	194	
Fishing	0	0	3	2	0	5	1	2	
Tug/Tow	0	0	0	0	0	1	0	0	
Recreational	0	2	1	0	2	1	6	2	
Passenger	0	0	0	0	0	0	1	0	
Cargo	133	193	190	132	135	88	130	135	
Tanker	21	32	33	36	25	22	32	30	
Other	4	3	6	7	7	3	4	5	

Passage Line 34									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	1919	1149	1158	1100	1030	953	1228	1094	
Fishing	0	1	13	17	15	20	11	15	
Tug/Tow	73	80	63	66	60	93	136	84	
Recreational	5	29	17	32	60	73	46	46	
Passenger	16	19	20	24	20	6	9	16	
Cargo	1402	673	684	592	466	267	453	492	
Tanker	314	267	273	246	248	359	412	308	
Other	14	46	58	53	70	32	72	57	
Number of Unique Vessels									
All Vessels	569	484	432	426	424	356	425	413	
Fishing	0	1	5	7	3	7	7	6	
Tug/Tow	24	20	19	17	21	17	19	19	
Recreational	5	27	16	28	48	40	41	35	
Passenger	11	15	10	15	14	5	7	10	
Cargo	409	286	245	188	167	141	188	186	
Tanker	73	99	99	92	94	74	87	89	
Other	7	14	20	31	27	15	24	23	

Passage Line 35								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	2422	3114	3384	3415	3351	4004	4454	3722
Fishing	9	17	36	35	34	33	47	37
Tug/Tow	238	169	138	133	114	162	195	148
Recreational	46	167	232	294	354	378	464	344
Passenger	28	69	62	81	81	51	76	70
Cargo	1779	2244	2392	2194	1946	2287	2870	2338
Tanker	140	212	279	195	232	209	349	253
Other	27	94	111	196	154	116	148	145
Number of Unique Vessels								
All Vessels	1029	1363	1497	1492	1584	1681	1681	1587
Fishing	5	14	20	20	19	20	30	22
Tug/Tow	66	53	51	59	47	57	63	55
Recreational	35	130	171	223	272	240	315	244
Passenger	18	37	39	43	55	29	36	40
Cargo	681	838	866	787	753	833	1031	854
Tanker	101	164	213	151	177	148	0	138
Other	18	45	49	64	57	43	0	43

Passage Line 36								
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg
All Vessels	230	233	236	234	247	269	317	261
Fishing	0	0	1	3	4	3	1	2
Tug/Tow	4	9	6	4	4	4	8	5
Recreational	0	6	5	4	23	10	19	12
Passenger	4	3	3	10	7	4	2	5
Cargo	190	189	204	182	141	155	222	181
Tanker	11	15	8	8	7	6	15	9
Other	4	5	5	11	17	6	20	12
Number of Unique Vessels								
All Vessels	84	79	76	66	89	80	113	85
Fishing	0	0	1	3	3	3	1	2
Tug/Tow	3	5	6	4	3	4	6	5
Recreational	0	6	5	4	20	10	19	12
Passenger	3	1	3	4	6	4	2	4
Cargo	58	44	44	26	23	31	36	32
Tanker	9	12	8	7	7	4	12	8
Other	2	5	5	9	14	6	16	10

Table Set 9. The number of vessels and tracks intersecting with passage lines 33 through 36.

Passage Line 37									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	2573	2782	3013	2906	3230	3361	3823	3267	
Fishing	8	5	27	26	47	43	67	42	
Tug/Tow	44	41	23	32	30	49	51	37	
Recreational	46	337	470	603	727	920	971	738	
Passenger	272	393	349	318	401	173	445	337	
Cargo	1357	1131	1196	1026	977	1135	1237	1114	
Tanker	589	629	699	571	556	456	631	583	
Other	62	92	115	145	180	147	188	155	
Number of Unique Vessels									
All Vessels	1048	1279	1442	1472	1581	1658	1681	1567	
Fishing	6	3	16	18	14	28	37	23	
Tug/Tow	22	24	19	24	19	26	28	23	
Recreational	33	218	299	401	430	466	589	437	
Passenger	26	45	59	50	61	66	78	63	
Cargo	570	530	549	493	483	540	706	554	
Tanker	247	324	354	301	313	227	86	256	
Other	16	37	50	71	83	59	0	53	

Passage Line 38									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	1011	2504	2259	2430	2337	2298	2451	2355	
Fishing	0	1	4	3	8	7	8	6	
Tug/Tow	0	2	0	0	3	0	0	1	
Recreational	0	1	3	1	11	3	4	4	
Passenger	11	2	2	3	4	4	1	3	
Cargo	905	2154	1819	1816	1595	1478	1965	1735	
Tanker	83	260	344	333	304	246	374	320	
Other	9	2	5	2	0	3	11	4	
Number of Unique Vessels									
All Vessels	690	1421	1432	1487	1498	1451	1583	1490	
Fishing	0	1	2	2	6	6	7	5	
Tug/Tow	0	2	0	0	3	0	0	1	
Recreational	0	1	3	1	11	1	4	4	
Passenger	6	1	2	3	3	4	1	3	
Cargo	601	1189	1111	1043	960	876	1168	1032	
Tanker	74	181	252	245	230	190	280	239	
Other	6	2	4	2	0	2	9	3	

Passage Line 39									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	94	400	468	532	504	386	447	467	
Fishing	0	0	8	8	3	0	0	4	
Tug/Tow	0	0	0	0	0	1	1	0	
Recreational	0	2	1	2	0	2	3	2	
Passenger	12	20	28	26	24	10	2	18	
Cargo	59	292	299	372	338	269	358	327	
Tanker	22	71	83	78	64	50	51	65	
Other	1	0	4	1	0	0	12	3	
Number of Unique Vessels									
All Vessels	65	243	287	321	291	248	300	289	
Fishing	0	0	4	5	2	0	0	2	
Tug/Tow	0	0	0	0	0	1	1	0	
Recreational	0	2	1	2	0	2	1	1	
Passenger	7	7	12	9	11	6	1	8	
Cargo	38	168	176	204	173	151	212	183	
Tanker	19	56	69	67	59	40	42	55	
Other	1	0	3	1	0	0	9	3	

Passage Line 40									
Number of Transits	2012	2015	2017	2018	2019	2020	2021	5-yr Avg	
All Vessels	1698	1881	2229	2189	2335	2149	2549	2290	
Fishing	1	5	7	9	10	14	31	14	
Tug/Tow	9	9	14	17	10	6	20	13	
Recreational	8	37	40	85	148	126	150	110	
Passenger	184	339	417	413	471	270	468	408	
Cargo	1137	1025	1135	1037	997	1081	1166	1083	
Tanker	290	402	540	437	433	336	517	453	
Other	24	27	33	43	47	31	82	47	
Number of Unique Vessels									
All Vessels	716	814	927	972	1095	1004	1165	1033	
Fishing	1	3	7	7	9	7	19	10	
Tug/Tow	6	8	13	14	7	6	15	11	
Recreational	7	34	32	75	112	69	110	80	
Passenger	29	38	66	68	82	61	58	67	
Cargo	466	450	470	444	438	466	562	476	
Tanker	154	233	289	244	268	192	248	248	
Other	14	18	25	30	36	24	44	32	

Table Set 10. The number of vessels and tracks intersecting with passage lines 37 through 40.

Attachment 5 – Vessel Length, Draft, and Tonnage Results

LIST OF FIGURES

FIGURE 1. VESSEL LENGTH DISTRIBUTIONS FOR 2012, 2015, 2017-2021.....	5-2
FIGURE 2. VESSEL DRAFT DISTRIBUTIONS FOR 2015, 2017-2021.....	5-2
FIGURE 3. VESSEL TONNAGE DISTRIBUTIONS FOR 2015, 2017-2021.....	5-2

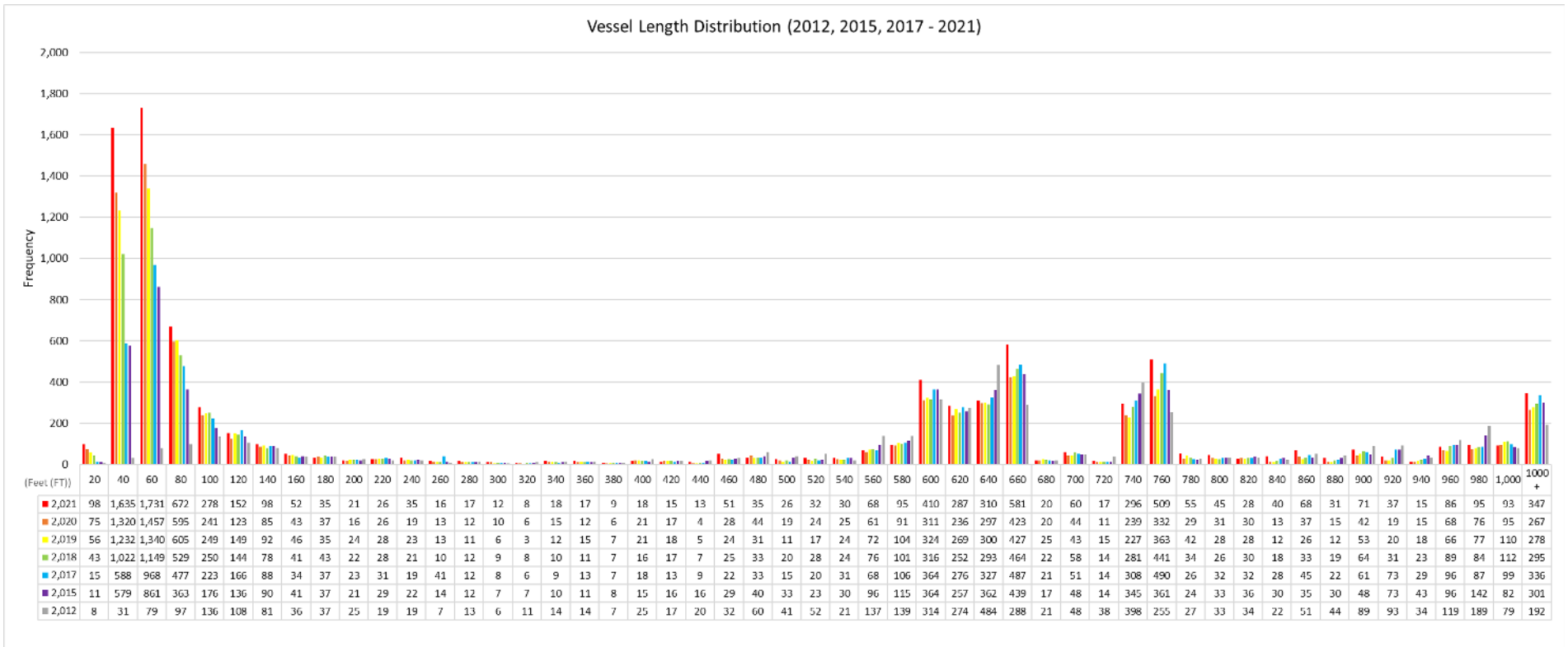


Figure 1. Vessel length distributions for 2012, 2015, 2017-2021.

Vessel Draft Distribution (2015, 2017 - 2021)

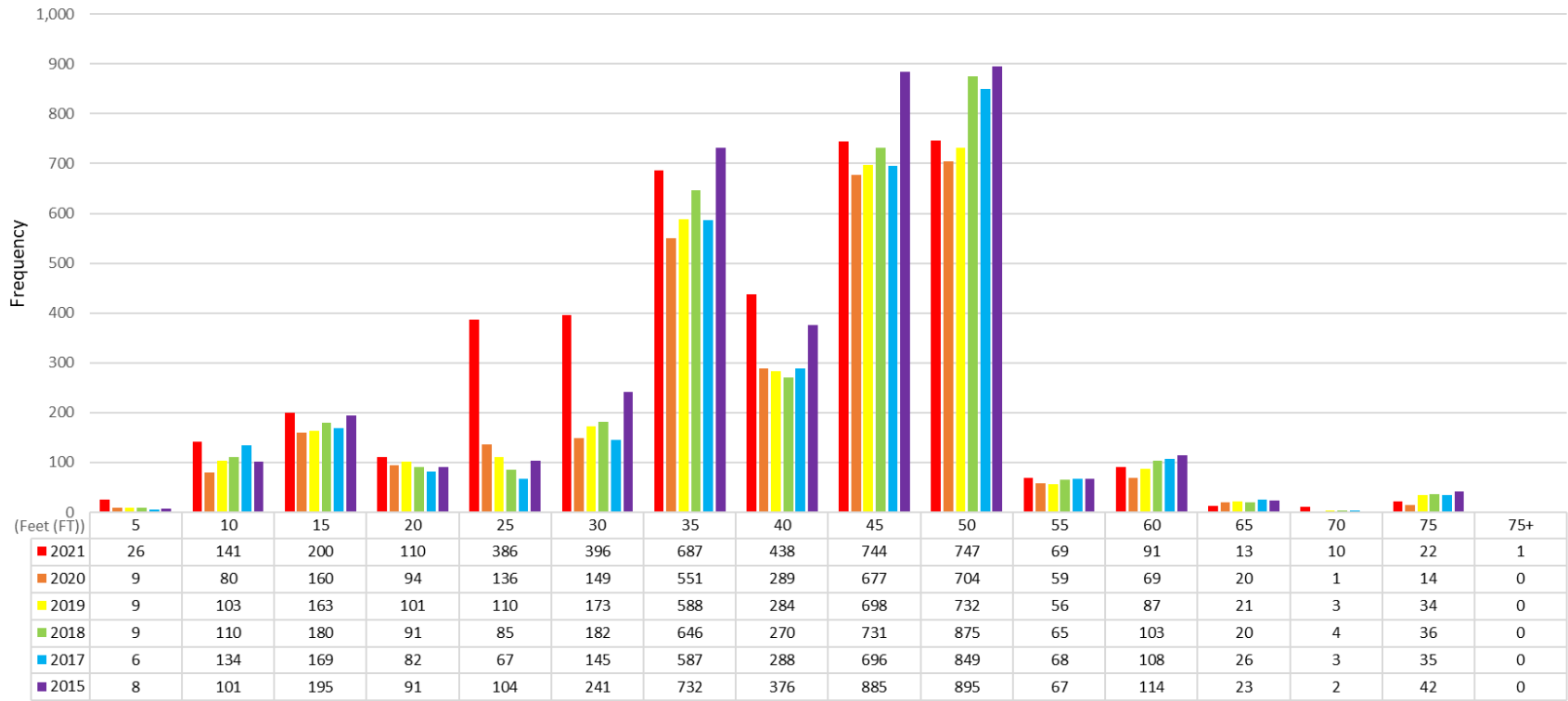


Figure 2. Vessel draft distributions for 2015, 2017-2021.

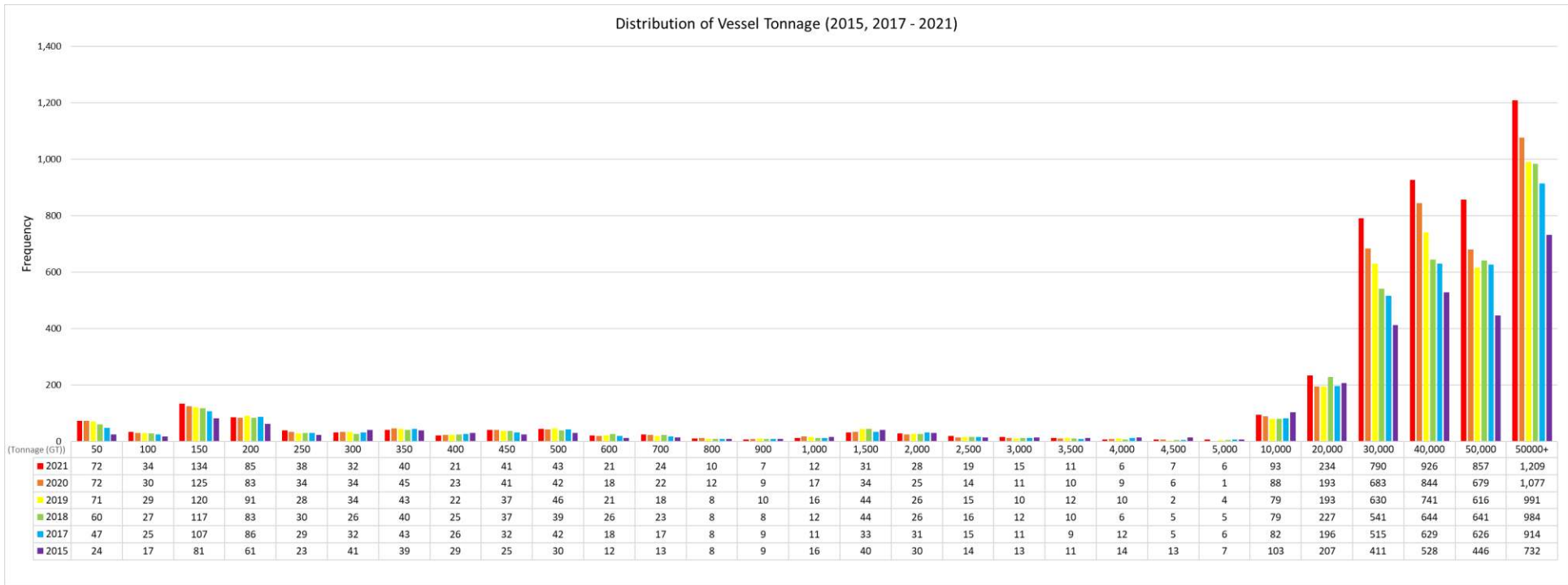


Figure 3. Vessel tonnage distributions for 2015, 2017-2021.