mouth. Frying Pan Shoals light vessel, Cape Fear Lighthouse, and Bald Head Lighthouse are the principal guides for the approach.

The entrance of the river is obstructed by a bar which extends about two miles off-shore. The channel is under improvement to secure a depth of 26 feet from the sea to Wilmington, with a width of 400 feet across the bar, 300 feet in the river, and an increased width at the bends. In June, 1912, the full depth had been obtained, but not the full width in places. The channel is well marked by range lights and buoys, and with the aid of a chart it could not be difficult for a stranger of 16-feet draft to navigate it on a rising tide.

Cape Fear River Lights.

These aids consist of thirty-three lights marking the dredged channels of the Cape Fear River. They replace twenty-nine lights, mostly of the oil-burning post-lantern type, on old wooden structures, and not properly placed to mark the new channels. Ten of the new lighted beacons were established December 1, 1912, and the remainder November 15, 1913.

The aids extend along the Cape Fear River from the entrance to Wilmington, a distance of about twenty-nine miles. The sites are (except in three cases) submarine, the depth of water averaging six feet. The bottom is hard sand, underlaid in a few cases with rock.

The substructures built on marine sites (thirty in all) consist each of four reinforced concrete piles and connecting beams. These are surmounted by skeleton towers of galvanized iron pipe, carrying slatted wooden daymarks. Towers for rear range lights are thirty feet high and for front lights and others ten feet high.

A variety of illuminating apparatus has been installed, as follows:

No.	Apparatus	Illuminant	Characteristic	Candlepower
1	Reflector	Oil	Fixed	3,100
1	Range lens	Acetylene	Flashing every second	3,000
1	4th Order lens	Acetylene	Occulting every 2 seconds	830
7	300 mm. lens lanterns	Acetylene	Flashing every second	200
1	300 mm. lens lanterns	Acetylene	Flashing every 3 seconds	200
6	300 mm. lens lanterns	Acetylene	Occulting every 2 seconds	200
16	300 mm. lens lanterns	Oil	Fixed	170

In general, acetylene is used as the illuminant, where possible, for a distance of about twenty miles from the entrance, and oil from there to Wilmington. All acetylene lights are white, rear lights being occulting every two seconds and front lights flashing every second. All oil lights are fixed, rear lights white, and front lights red.

Eight of the white range lights which could be suitably located abreast of turns in the channel are provided with red sectors of 30 degrees covering these turns.

There have been no quarters provided, all lights being unwatched. The change of illuminant in Bald Head Light, which constitutes a unit of this system, makes quarters no longer necessary in connection therewith. The entire group of lights is cared for by two post light keepers, one resident near Southport, close to the entrance, having charge of three oil and sixteen gas lights, and one at Wilmington, at the other end of the group of lights, having charge of fourteen oil lights. All gas lights are so located that gas tanks can be landed from a launch directly upon the structure, except at Bald Head Light.

These improvements in the lighting of the Cape Fear River are being made under the Act of March 4, 1911, appropriating $21,000, and the Act of August 26, 1912, appropriating $30,000 additional. The total expenditures and obligations for the thirty-three lights to September 30, 1913, is $50,076.30, with a probable further expenditure of $500 for one additional light, and $300 for clearing timber which partially obstructs one range line.

Other aids supplementing the lighting aids mentioned above are, Frying Pan Shoals Whistling Buoy, westward of the outer end of the shoals; Cape Fear Entrance Whistling Buoy,[1] about two and one-half miles off the bar; Cape Fear Entrance Bell Buoy, at the entrance to dredged channels, and thirty-three iron buoys and five beacons marking turns and other critical points in the dredged channels in the river. Two other iron buoys mark the quarantine anchorage, and one marks a wreck on the middle ground at the mouth of the river.

[1]Notice to mariners:
"On November 2, 1915, Cape Fear River Entrance Gas-and-Whistle Buoy CF, painted in perpendicular stripes, was established in 6½ fathoms of water, in place of Cape Fear River Entrance Whistle Buoy CF, which was discontinued. The gas-and-whistle buoy is cylindrical, with skeleton superstructure, and shows a flashing white light of 390 candlepower every three seconds, thus, 0.3 seconds; eclipse 2.7 seconds, 16 feet above the water."