Iris, 1944

WAGL-395; WLB-395

Call Sign: NODN

Builder: Zenith Dredge Corporation, Duluth, MN
Builder's Number: bn CG-176
Cost: $926,446
Length: 180' oa
Beam: 37' mb
Draft: 12' max (1945); 14' 7" (1966)
Displacement: 935 fl (1945); 1,026 fl (1966); 700 light (1966)
Keel Laid: 10 December 1943
Launched: 18 May 1944
Commissioned: 11 August 1944
Decommissioned: 20 June 1995
Status: Transferred to the Maritime Administration, 8 August 1997
Propulsion: 1 electric motor connected to 2 Westinghouse generators driven by 2 Cooper-Bessemer-type GND-8, 4-cycle diesels; single screw
Top speed: 13.0 kts sustained (1945); 11.9 kts sustained (1966)
Economic speed: 8.3 kts (1945); 8.5 kts (1966)
Complement: 6 Officers, 74 men (1945); 4 officers, 2 warrants, 47 men (1966)
Electronics:
  Radar: SL1 (1945)
  Sonar: QBE-3A (1945)
Armament: 1-3"/50 (single), 2-20mm/80 (single), 2 depth charge tracks, 2 Mousetraps, 4 Y-guns (1945); None (1966)

Class History:

When the US Coast Guard absorbed the Bureau of Lighthouses on 1 July 1939, *Juniper,* a 177-foot all welded steel buoy tender, was under construction and plans for a successor were on the drawing board. Plans initiated by the Bureau of Lighthouses called for the construction of several identical buoy tenders to replace existing coastal buoy tenders. The preliminary designs generated by the Bureau were for a vessel similar to *Juniper.* When the Aids to Navigation (ATON) system transferred to Coast Guard control, USCG planners reviewed the preliminary plans for the new class of buoy tenders and modified them to meet the service's multi-mission role. To be an effective part of the Coast Guard, the new buoy tenders needed to be multi-purpose platforms. They had to be capable of conducting Search and Rescue (SAR) and Law Enforcement (LE) missions, as well as their primary mission tending ATON. On 20 January 1941 the US Coast Guard contracted Marine Iron and Shipbuilding Company of Duluth , Minnesota to build the design based on *Juniper* and modified to meet the service's requirements. On 31 March 1941 Marine Iron and Shipbuilding laid the keel for the first vessel of the new buoy tender class. The new vessel measured 180 feet overall and had a beam of 37 feet at the extreme. She had a displacement of 935 tons and drew 12 feet. The new design was similar to *Juniper* in appearance but did exhibit some important differences. Gone was the turtle back forecastle. A notched forefoot, ice-belt at the waterline, and reinforced bow gave the vessel icebreaking capabilities. Extending the superstructure to the ship's sides increased interior volume above the main deck. A single propeller, turned by an electric motor powered by twin diesel generators, replaced the twin-screw arrangement. The 30,000-gallon fuel capacity gave the new design a range of 12,000 miles at a 12-knot cruising speed; at 8.3 knots the cruising range increased to 17,000 miles. Finer lines at the bow and stern increased the new tender's sea keeping ability in rough weather; an increase in draft also promoted seaworthiness.

Numerous minor alterations increased the vessel's utility as a SAR platform while deck-mounted guns and depth charge racks supported military duties. Marine Iron and Shipbuilding launched the prototype vessel on 25 November 1941, even as three more took shape. Preparations also went forward to begin a fifth vessel. By the time they commissioned the first 180, *Cactus*, on 1 September 1942 twelve vessels were under construction at the Marine Iron shipyard and at the Zenith Dredge Company shipyard, also in Duluth . The initial designation for the new buoy tenders was WAGL, which was a US Navy designation denoting an auxiliary vessel, lighthouse tender. The designation changed from WAGL to WLB in 1965. A few of the 180s have been designated as other types of vessels over the years; three became WMECs (medium endurance cutters), one of those, *Evergreen,* was a WAGO (oceanographic research vessel) before it became a WMEC. *Gentian* was a WMEC for a time and was then designated a WIX (Training Cutter) in 1999. Though designations have changed over time, each vessel's hull number has remained the same since commissioning.

DIFFERENCES WITHIN THE 180' CLASS

Six "B" or *Mesquite* class tenders followed the initial production run of thirteen vessels in the "A' or *Cactus*-class. The first *Mesquite*-class tender hit the water on 14 November 1942. Marine Iron and Shipbuilding built all except one of the *Mesquite*-class. The USCG built the lone exception, *Ironwood,* at the service's shipyard in Curtis Bay, Maryland. Twenty *Iris* or "C" class vessels followed the *Mesquite*-class tenders. The first launch of an *Iris* class vessel took place on 18 June 1943, and the final addition to the class slipped off the ways on 18 May 1944. Differences among the three classes were minimal. Their basic dimensions, length and beam were the same and draft varied based on loading. All were built of welded steel along the same framing pattern and with very similar internal and external layouts. All three classes could steam 8,000 miles at 13 knots, 12,000 miles at 12 knots, and 17,000 miles at 8.3 knots; though the "B" and "C" class vessels had engines with 20 percent more power than the "A" class. The "A" class vessels could carry the most fuel with a tank capacity of 30,000 gallons. The "C" class carried 29,335 gallons and the "B" class about 700 gallons less. The layout of the Commanding Officer's cabin and the radio room was slightly different in the "A" class vessels. The bridge wing door on the "B" and "C" vessels opened to the side while the doors on the "A" vessels opened forward. The cargo holds as originally laid out in the "C" were larger, by a nominal amount, than those in the other vessels. To hoist buoys and cargo, the "A" vessels carried an A-frame structure that straddled the superstructure and supported the cargo boom. The other two classes were fitted with power vangs that attached to the bridge wings and manipulated the cargo boom. The "A" vessels were originally fitted with manilla line as part of the cargo handling system while the second and third generation vessels used wire rope. From the outside, other than the A-frame used in the first production run, the three classes were almost indistinguishable. Over the years their internal differences and variation in equipment were minimized by successive overhauls and improvements. Moreover, it does not appear that any one of the three classes was superior to the other two in the eyes of the US Coast Guard administration or the men who manned the buoy tender fleet. Tenders from each of the three classes remained in use past the turn of the 21st century. It usually took from two to four months between the time shipyard workers laid a keel and the day the vessel slipped off the ways. Once launched, however, the tenders were far from ready for service. The practice was to build the superstructure, finish the interior, and complete the machinery installation while the vessel was floating. Hence, on launch day the tenders were little more than finished hulls. As the shipyard workers neared the end of the building process, the Coast Guard would begin assigning officers and men to the vessels. Once each vessel was complete and ready to enter active service, the US Coast Guard commissioned her as part of the fleet. Often the commissioning ceremonies took place after the tender had departed from Duluth and arrived at an initial duty station. For the 180s as a whole, it took an average period of 308 days to go from the beginning of construction to commissioning. Divided according to sub-class, the elapsed time from keel laying to commissioning averaged 360 days for the *Cactus*-class; 323 days for the *Mesquite*-class; and 269 days for the *Iris*-class. The building process averaged 192,018 man-hours of labor per vessel. In keeping with the Lighthouse Service practice of naming tenders after foliage, all of the 180s were named after trees, shrubs, or flowers.

THE 180s GO TO WAR

Though the design was completed before US entry into World War II, several of the vessels were already under construction when the Japanese attacked Pearl Harbor ; the tenders were very much a product of the war. The number of tenders built and the rapidity with which the shipyards turned them out is indicative of this nation's massive industrial output during the war years. Before the war, no group of thirty-nine steel ships had been produced in three years. Yet, during the period 1941-1944 the entire production run of the class went from blueprints to completed ships during a time when the United States was producing thousands of other ships at yards around the country. With the lone exception of the tender built at the Coast Guard Yard at Curtis Bay in Baltimore , Maryland , two commercial shipyards in Duluth , Minnesota built all the 180s. To achieve this level of production, even as much of the prewar workforce volunteered or was drafted for military service, the shipyards turned to a new source of labor. The Duluth shipyards, like industrial operations nationwide, began to recruit women. As Duluth 's men filed off to war as soldiers, sailors, airmen, and marines, Duluth 's women filed into the shipyards to become welders, machinists, and electricians. By the end of the war Duluth 's "welderettes" numbered 3,500 of the 14,000 persons laboring through the cold Minnesota winters to turn out ships for the war effort. The total number of civilian shipyard workers employed by Marine Iron and Zenith Dredge peaked at 1,200 and 1,500 respectively. Thus, the US Coast Guard 180s are historically significant not only as the first class of modern buoy tenders and as part of an unprecedented military build-up but also as milestones in labor history American women helped build the 180s during the period when women first began to enter the industrial workforce. Even after commissioning most vessels did not immediately enter regular service. Instead the tenders embarked on shakedown cruises to test the various mechanical, electrical, and hydraulic systems. The shakedown cruises also offered an opportunity for crew orientation and training. It was rare that the shakedown cruise did not reveal some defective system and most vessels returned to a shipyard to have any glitches repaired. Occasionally the return to the shipyard meant going back to Zenith Dredge or Marine Iron and Shipbuilding in Duluth . Before deployment to their duty stations, other vessels went to the USCG yard at Curtis Bay which provided an opportunity to outfit the vessels with any additional equipment or to carry out any modifications needed at the vessels' new duty stations.

The work done by the men and women of Duluth produced finished buoy tenders, but not warships. It would be up to military technicians to make the 180s combat-ready. Many of the buoy tenders were destined to operate far from home in a variety of war zones as part of a navy locked in a two-ocean war. To defend themselves against air attack, the tenders were fitted with 20mm guns, usually four of them, mounted high on the superstructure and on the aft portions of the main deck. Armorers outfitted the 180s with a single 3" cannon mounted aft of the stack to defend against aircraft and engage small surface or shore targets. They installed depth charge racks as well as K- and V-type launchers on the stern to deploy depth charges in case the vessels ever encountered enemy submarines. Some 180s were also fitted with a device known as a 'mousetrap'. This weapon system launched rocket-propelled explosive charges that would explode on contact with a submarine's hull. The mousetrap system was generally mounted on the bow so the launchers could fire ahead of the vessel. Besides the heavier weapons systems, the tenders carried assorted small arms. Technicians installed radar and sonar systems to help the 180s find targets or avoid enemy units. The US Coast Guard shipyard at Curtis Bay, Maryland carried out the bulk of the work that prepared the buoy tenders for duty overseas.

Buoy tenders from the 180 classes operating in the Atlantic Theater saw service from the frigid waters around Greenland to the tropical coast of Brazil . They tended buoys, broke ice, and provided assistance to vessels in need. They also served as the armed escorts for merchant convoys, hunted U-boats, and carried supplies to far-flung installations. The 180s were not limited to coastal duty. Several vessels in the class were dispatched thousands of miles out into the Atlantic to collect important meteorological data that allowed military planners to schedule and route aircraft flights to Europe . In the Pacific Theater the 180s covered thousands of miles of open ocean in pursuit of their varied duties. Several vessels worked to establish Long-Range Aids-to-Navigation (LORAN) station chains in the South Pacific while others conducted similar operations

in the Bering Sea . Navy commanders regularly dispatched 180s to carry supplies and personnel between installations throughout the theatre. The lift capacity and towing features of the tenders helped them carry out salvage work. The 180s fought shipboard fires and rescued Allied personnel from damaged vessels. Besides this range of duties, all the tenders fulfilled their design function on a regular basis. They serviced ATON along the West Coast, in the waters of the Bering Sea , and across the Pacific. They also set and serviced moorings and mooring buoys for naval and merchant vessels throughout the war zone. Their ATON work was especially important since many of the areas in which U.S. forces operated were very poorly charted or uncharted altogether. The work done by the 180s allowed thousands of Allied ships to operate along routes and in harbors far removed from pre-war shipping lanes. The buoy tenders never received the acclaim afforded larger warships, but their efforts did not go unnoticed. In the words of a contemporary observer:

> As the battleships and assault troop and cargo ships do the heavy work, the Coast Guard tenders scurry alongside, paving the broken way for the miracle of supply which follows. They'll lay cables in the ocean bed, fight fires and perform rescue and salvage chores. A tender may moor an anchor for battleships or tow a Navy seaplane caught on a reef-it's all in a day's work.

None of the 180s were lost to enemy action during the war. Those in the Atlantic Theater operated under the threat of German U-boats, but the few encounters saw the cutters dropping depth charges on the suspected positions of submerged U-boats and receiving no return fire. A German U-boat sank one U.S. Coast Guard buoy tender from another class, *Acacia* (WAGL-200), while she operated in the Caribbean Sea . *Acacia* was one of the ex-Army mine-planters acquired by the Lighthouse Bureau after WWI. The USCG named a "C" class 180 in honor of the sunken vessel. Though the 180s serving in the Pacific came under enemy air attack on many occasions, no severe damage resulted. The 180s contributed to the screen of anti-aircraft fire around the fleet during air raids and shot down several enemy aircraft while contributing to the destruction of others. One tender suffered significant damage from an explosion attributed to a floating Japanese mine. There were no encounters between the buoy tenders and Japanese submarines or surface units.
Weather was also a formidable adversary. Tenders operating in the northern reaches of both oceans frequently battled ice and snow as they went about their work. Tenders in the Atlantic Theatre were subjected to dangerously high winds and waves during storms, especially during winter storms on the North Atlantic . They also had to dodge hurricanes sweeping up from the tropics during the summer and fall months. The Pacific 180s, besides normal ocean storms, were subjected to the fury of powerful typhoons that regularly sank large ships. Heat was a problem in both theatres and, while never a grave threat to the vessels; it made life unpleasant for crews operating near the equator in the days before air conditioning. The 180s survived enemy action and the dangers of operating in the maritime environment in any weather. Every vessel survived the conflict and the class provided valuable service in the war effort. Their endeavors made possible the safe navigation of thousands of warships and merchantmen as the Allied powers dispatched convoys, battle groups, and invasion fleets to the far reaches of the Pacific and set up a floating conveyor belt carrying millions of tons of war materiel across the Atlantic.

PEACETIME MISSIONS

While a few vessels were left overseas to repair and improve ATON systems in the various Pacific island groups, most of the 180s returned to the United States where their wartime crews returned to civilian life. The drop in military manning levels, however, was so precipitous that the US Coast Guard had to decommission several 180s temporarily, simply because there were no crews available. Like their crews returning to civilian life, the buoy tenders themselves underwent a radical change in appearance. Black hulls and gleaming white topsides replaced the haze gray and oceanic camouflage schemes that helped to hide the tenders from enemy eyes during the war years. Shipyard workers stripped depth charge racks and mousetrap launchers from the vessels. Cutters re-assigned to the Great Lakes had their 3" and 20mm guns removed.. Those remaining overseas or assigned to coastal districts kept some of their armaments, but the guns spent most of their time concealed beneath canvas covers. With the war’s end service on the buoy tenders was more mundane. Instead of operating as part of vast naval fleets and anchoring in the company of

battleships, the 180s went about their prescribed missions alone. For the most part they spent their time tending buoys and other ATON. This was an especially important part of returning American maritime commerce to a peacetime footing as some ATON were neglected during the war while others were purposely disestablished to prevent their use by enemy forces. Similarly, many ATON established during the war required removal, as they were non-essential to normal maritime commerce. Most buoy tenders returning stateside quickly joined their domestic counterparts in an unending routine of hauling buoys, carrying out maintenance on various ATON, and delivering supplies to out of the way navigational installations.

TENDING BUOYS

The process of tending or servicing buoys has been the basic mission of the 180s throughout their careers. It is a process that has evolved through several important technological changes but one that remains fundamentally the same. Tending an ATON begins with traveling to its location and making contact. Once on scene, the conning officer maneuvers the vessel alongside the buoy so the deck force can snag it with reaching poles. Approaching a buoy is often a tricky and hazardous proposition since the marker's very purpose is often to mark shallow water or other hazards to navigation. The difficult nature of the task is reflected in the records of frequent groundings by the buoy tender fleet. The 180s original design, specifically single screw propulsion, meant they were not the most maneuverable platforms and required a skilled ship handler to bring them alongside an ATON. The addition of bow thrusters during later renovations made them more nimble during close quarters maneuvering. Once alongside a buoy, the deck crew snags it and then attaches the hook from the cargo boom to a lifting eye on the marker. Then the boom operator lifts the buoy out of the water and deposits it on the open well deck in front of the superstructure where it is secured. The process of recovering the buoy has not changed in any appreciable way over the years. Bringing the buoy on board is less than half the recovery process. A concrete block or 'sinker' weighing many thousands of pounds anchors each buoy. Heavy steel chain links the anchor block to the floating buoy. In order to conduct a thorough inspection of the whole system, the chain and sinker must be brought up. The mooring chain is led through a chain stopper on the edge of the well deck. The chain stopper is a mechanical device that prevents chain from slipping back overboard, essentially a one-way valve for chain. After the chain is secure in the chain stopper the boom operator reaches as far down the chain as possible and snags a length of chain, which is pulled up, laid in the chain stopper, and secured on deck with quick-releasing pelican clamps as a safety mechanism. Once the chain is secure, the boom snags another length and hauls it up. In this hand-over-hand fashion the boom operator hauls up the entire mooring. Often the sinker is left hanging overboard on the outside of the chain stopper. This part of the recovery process has changed since the 180s entered service. Initially, the vessels did not have a chain stopper mechanism, and chain was secured only by tie downs when the boom released one length to grab another. The crew of *Tupelo* is credited with inventing and demonstrating the value of a prototype chain stopper in 1948. With buoy, chain, and sinker resting on the buoy deck, or secured in the chain stopper, the deck force can begin working. This is the opportunity to inspect the whole system and do any needed painting, repair any structural damage, and check the batteries if it is a lighted ATON. The biggest change in this area over the years has been the shift from gas to electric lights, followed by the addition of solar panels to lighted buoys. The panels greatly extend battery life, thereby making battery replacement a less common chore. *Sweetgum* conducted the first at-sea “solarization” of a lighted buoy. At present all lighted buoys mount solar panels to extend battery life and improve the reliability of the light. Once serviced, the buoy must be returned to its charted position. Similarly, new or replacement buoys must be placed exactly on station. To accomplish this task, navigators feed information from the ship's satellite navigation system to the conning officer who guides the vessel to the correct place over the sea bottom. Once on station the bridge tells the deck force to release the sinker. A blow with a sledgehammer trips the chain stopper's release mechanism. This release sends the sinker to the bottom. The deck crew cuts or releases any tie downs securing the chain to the deck. The process of finding the exact position where the sinker belongs has changed dramatically over time. Prior to the introduction of Global Positioning Systems (GPS) the conning officer was directed to the correct spot by a team of at least

three crewmembers using survey sextants to measure horizontal angles to known landmarks visible from the vessel. This process, while accurate when done by experienced navigators, was time consuming and entailed more chance for error than today's use of computerized navigation systems. The shift from sextants to differential GPS has improved the efficiency of repositioning ATON. Not all buoy stations are within sight of land and sextant angles require fixed landmarks. In the days before GPS the Coast Guard used LORAN or radar ranges to position these offshore markers. GPS is more accurate than these older navigational tools and has increased the accuracy of placement for offshore buoys. Though the missions of the 180s became more mundane after World War II, they were not without the possibility of excitement and danger. The US Coast Guard had designed the 180s as functional SAR platforms and that capability, proven by rescues during the war, allowed them to respond to emergency calls throughout US waters. As the buoy tenders went about their ATON work, they were always on standby for dispatch to the aid of nearby mariners in distress. Dovetailing nicely with other SAR features was their ability to break ice on frozen waterways. This meant they could not only clear shipping lanes for routine commerce, but also go to the aid of other vessels trapped in the ice. Hence, they could carry out rescues that were impossible for most cutters and patrol boats. Beyond their seaworthiness and icebreaking capabilities, the buoy tender's SAR value was augmented by equipment for towing other vessels and the ability to fight fires on ships or along the shore.

NEW ROLE FOR THE 180S

By the late 1940s all the temporarily decommissioned buoy tenders had returned to service as manpower levels stabilized. All thirty-nine members of the type were engaged in ATON, SAR, and, depending on their location, icebreaking duties. Their combined operations covered the entire shoreline of the continental United States , the waters around Hawaii and Alaska , and large portions of the Pacific Ocean . During the postwar years the 180s were also increasingly involved in law enforcement activities. These efforts centered on two disparate pursuits. The buoy tenders helped enforce various federal fishing laws and regulations, with particular focus on fishing in the Bering Sea and Gulf of Alaska . The efforts emphasized keeping foreign fishing vessels out of U.S. waters and enforcement of international agreements on the high seas. Tenders stationed farther south along the California coast and those in the Southeastern United States were concerned with drug smuggling more than illegal fishing. As the flow of illicit drugs entering the U.S. increased, many cutters, 180s included, went out to sea to meet vessels headed for American ports, not to provide aid or check their fishing catch but to search them for cargoes of contraband. The efforts to interdict drug smugglers increased throughout the latter half of the century as the volume of smuggling increased. In the 1980s and 1990s preventing undocumented immigrants from entering the US by sea was added to the list of maritime law enforcement activities pursued by the 180s.

CONTINUING MILITARY SERVICE

The 180s saw limited duty in the Korean War and significant action in Vietnam . Five of the buoy tenders served in the waters around South Vietnam . None took up permanent station in the theater; instead, they rotated through short tours from homeports in the Philippines and elsewhere in the Pacific. The vessels spent most of their time placing and maintaining ATON marking coastal and inland waterways. Simultaneously, they conducted extensive training of Vietnamese nationals in preparation for the day when the ATON system passed into Vietnamese hands. This transfer was completed in 1972. Other missions carried out by the 180s serving in the war zone included cargo transport, survey work, and support of efforts to interdict enemy supply lines. Most of the 180s did not see wartime action after their service in World War II. This does not mean, however, that military training was not part of the buoy tender's overall mission. The potential military role of the Coast Guard, however, means USCG units participate in periodic military exercises and operations with the US Navy and allied maritime forces. As part of the US Coast Guard, the buoy tenders regularly drilled to improve their ability to find enemy forces, engage potential targets, survive battle damage, and work in concert with naval units. These maritime defense activities have been ongoing throughout the class' history and continue today.

THE FLEET SHRINKS

By the early 1970s the 180s had reached their thirtieth anniversaries as Coast Guard cutters. It was during this decade that the buoy tender inventory began to shrink. Appropriately enough, the first to go was *Cactus,* the first built. *Cactus* ran hard aground in 1971 and the damage was so extensive that the government decided to decommission the vessel rather than repair her. The USCG decommissioned the first of the 180s two days shy of the thirtieth anniversary of her launch. Two more 180s left active duty, albeit less traumatically and according to longstanding plans, the following year. A fourth vessel left service in 1973 and two more followed in 1975. These vessels, even *Cactus,* went on to second careers in the hands of foreign governments or private owners. Only one buoy tender was decommissioned by design in the 1980s; *Sagebrush* left active duty in April 1988, more than forty-four years after her commissioning. It was, however, a hard decade on the 180 fleet. On 28 January 1980, *Blackthorn* collided with a commercial tanker in Tampa Bay , Florida . The collision holed and capsized the buoy tender and it sank quickly, killing twenty-three members of the crew. In December 1989 *Mesquite* grounded on a rock pinnacle jutting from the bottom of Lake Superior . The crew safely abandoned ship in lifeboats, but the vessel suffered severe damage after pounding against the rocks during winter storms. USCG planners decided to decommission *Mesquite* soon after the accident and a commercial salvage company scuttled her in 1990. Three of the buoy tenders became Medium Endurance cutters (WMEC) during the 1980s. These conversions entailed the removal of the buoy handling gear and reassignment to predominately LE and SAR patrol duties.

The US Coast Guard decommissioned fourteen buoy tenders in the 1990s and seven more in the early years of the next decade. In early 2002, eight of the thirty-nine 180s remained in service as USCG buoy tenders. One other 180 remained in commission as a cutter, but operated in the role of a training and support vessel. Few of the decommissioned cutters have actually been destroyed or dismantled. Instead, they can be found throughout the world. A number were transferred overseas under the Foreign Military Sales Program and serve the navies of countries friendly to the United States . Two have embarked on careers as fishing vessels. One serves as a mobile base and supply ship for a missionary group working in the Pacific. Even *Cactus,* first of the 180s, first wrecked, and first decommissioned, still exists. The remains of the tender built in 1941 serve as a barge in the Pacific Northwest . The 180s that have passed out of use entirely were sunk as reefs or ended their lives as targets for naval munitions tests.

MAINTENANCE, REPAIR, AND OVERHAUL

The 180-footer design, drawn up before World War II and built in the early 1940s, has demonstrated remarkable longevity. The US Coast Guard decommissioned the bulk of the class only within the last decade and nine vessels continue to serve on active duty, sixty years after they were built and well past the projected life span of any military vessel. This is not to say that the 180s simply steamed out of the shipyard after their completion and were so well built that they lasted for five or six decades. To keep these buoy tenders on active duty the US Coast Guard has expended millions of dollars. The efforts that kept the 180s operating into the twenty-first century began in the early 1940s. Even as they went about their duties in the midst of war, maintenance remained a regular part of every tender's routine. Maintenance carried out by the tender crews as part of the everyday routine was interspersed with “availability” periods. During these periods, scheduled at the request of the tender's captain or by orders sent down the chain of command, the individual tenders temporarily left service while the regular crew, often augmented by ship repair specialists, addressed maintenance issues too complex to handle while the vessel pursued its regular mission. The availability periods took many forms. In the simplest incarnation, the tender would anchor out of the way or tie up alongside a dock after a long voyage or operation and the whole crew would devote a few days to putting everything in order. In instances where the vessels required extensive work, the tenders visited shipyards in the US or at naval bases overseas. A visit to a shipyard entailed any number of repairs including time in a drydock for work on the hull and exterior propulsion equipment. After the war the 180s were placed on a cyclical maintenance schedule. Exact timetables varied from ship to ship and according to the service's needs, but on average, each cutter visited a shipyard for a yard period or “availability” on a biannual basis. Time in the yard allowed for the undertaking of major repairs and improvements as well as routine

maintenance chores like painting the hull. Some of these yard periods took place at the US Coast Guard's yard in Curtis Bay , but most occurred at commercial shipyards near the individual tender's homeport. Buoy tenders were, of course, sent to the nearest yard equipped to handle the problem after groundings or other mishaps. In a few instances the Curtis Bay yard carried out special work to prepare vessels for unique projects. This was the case when *Spar* and *Bramble* were readied for a trip through the Northwest Passage and *Evergreen* underwent conversion to become an oceanographic research vessel. Cyclical yard periods and the efforts of personnel stationed on the buoy tenders kept them in proper shape for many years. Nevertheless, by the 1970s the vessels had reached the end of their projected thirty-year life spans and many were in need of substantial overhauls if their service careers were to continue. The first round of overhauls to affect the 180 fleet, known as “Austere Renovations”, began in 1974. Improvements carried out as part of the Austere Renovation program consisted of habitability improvements, engineering improvements, and equipment upgrades. The habitability improvements included modernization of the World War II-era crew quarters and sanitary facilities, installation of a crew lounge, remodeling of the dispensary area, and improved climate control systems. Work in the engineering spaces centered on the overhaul of the propulsion systems and a general modernization of the engineering plant. Equipment upgrades elsewhere included installation of modern electronics and replacement of aging deck machinery. Four buoy tenders went through the Austere Renovation program. At about the same time the Austere renovations commenced, the US Coast Guard began rotating other 180s through shipyards for more extensive improvements as part of the 'Major Renovation' (MAJREN) program. Under the MAJREN program, vessels received new diesel engines while the main electrical motor and its control systems underwent a thorough overhaul. New electrical wiring and switchboards were installed, as were entirely new water piping and sewage handling systems. Each vessel received a bow thruster to improve its maneuverability in close quarters. Future crews benefited from the replacement and modernization of all furnishings in the living areas. Decreasing the size of the forward hold allowed the expansion of the living area itself. Fourteen 180s went through the MAJREN program. These repairs and improvements extended each vessels service life by an estimated ten to fifteen years. The third renovation program to affect members of the 180 classes was the Service Life Extension Program (SLEP). This program began in 1983 and culminated a decade later. These renovations all took place at Curtis Bay and involved vessels that previously went through the MAJREN program. Whereas, Austere and MAJREN had entailed significant overhaul, the SLEP was the most extensive effort to extend the class' life span. During the yard periods new main engines and generators replaced the aging power plants. Upgrades and replacement components served to modernize the electrical systems. Shipyard technicians installed new navigational systems and computer controls for the engineering systems. SLEP work was far more than the replacement or upgrade of various systems or simply the addition of new equipment; it also entailed significant structural changes. Workers sandblasted each vessel throughout to remove all paint and expose the underlying steel for careful inspection. Shipyard workers tore away the existing deckhouse and replaced it with a new structure that included an expanded pilothouse, ship's office, and radio room. Internal changes included the installation of smaller forward tanks and the conversion of the forward cargo hold to make room for the installation of more berthing space, including bunks and heads for female sailors and a crew lounge. The reconfigured space also included boatswain, electrical, damage control, and electronics workshops. Work was done in the internal spaces to improve the watertight integrity of the vessel. Up on deck, a hydraulic system replaced the electric weight handling gear and the boom operator's booth was relocated. For *Cactus* class vessels SLEP included removal of the A-frame and reconfiguring the cargo handling system so the boom attached to the bridge wings. Hydraulic weight handling systems were also added to the boat davits on either side of the superstructure. The SLEP overhauls were extensive and they were also time consuming and costly. The average cost for a single tender to pass through the SLEP was $11 million. Time spent in the yard averaged eighteen months or, according to the analysis of two representative overhauls, 210,000-215,000 man-hours by shipyard workers. Like the earlier programs, the SLEP helped to extend the service life span of the aging buoy tenders. Coast Guard projections during the period

estimated the SLEP would extend vessel life spans by fifteen to twenty years. Three SLEP vessels remain in service as of 2002. All other 180s that went through the SLEP program left service beginning in 1999.

THE REPLACEMENTS

Renovating and improving the 180s bought time, but it did not ameliorate a basic problem facing the service. The US Coast Guard would eventually need to replace the 180s. While a steel vessel can be kept functioning almost in perpetuity, the cost of doing so eventually reaches a point where replacement is the preferred option. The savings can be measured in monetary terms as well as improved efficiency resulting from fewer breakdowns, less frequent yard periods, and the use of more advanced technologies. By the 1990s it was time to begin the lengthy process of creating a successor for the vessels one authority called, ". . . quite possibly the most versatile and useful cutter ever built for the Coast Guard," and, ". . . clearly the most multi-mission capable ship in the Black Fleet." An initial planning and consultation period ended in January 1993 when the USCG awarded a contract to Marinette Shipbuilding for the production of a new class of seagoing buoy tenders. Marinette Shipbuilding won a second contract in June 1993 for the construction of a new class of coastal buoy tender. The new seagoing tender class took the name of the prototype vessel: *Juniper.* The coastal tenders became the *Keeper* class, each named for a well-known lighthouse keeper from the past. The *Juniper* class vessels measure 225 feet in length, 46 feet in beam, and are propelled by two diesel engines driving a single reduction gear and a Controllable Pitch Propeller (CPP). Marinette builds them with both a bow and stern thruster, which combined with the CPP makes for a maneuverable platform. Like the 180s, they can handle limited icebreaking duties. The new seagoing tender incorporates many advances in maritime technology that allow the tenders, though larger than their predecessors, to operate effectively with a smaller crew.

Perhaps the most significant advance is the use of a dynamic positioning system (DPS) to help keep the tender on station. The DPS involves computerization of the systems that maneuver the vessel, namely propulsion and steering, combined with the latest in satellite navigation technology. This system allows the *Juniper* class vessels to maintain position within a 10-meter radius in 30-knot winds and 8' seas. *Juniper* passed from Marinette Shipbuilding to the USCG in 1996. Projections call for a total of sixteen *Juniper* class tenders. *Keeper* class tenders measure 175 feet in length and have a beam of 36 feet. They are the first USCG cutters propelled by a twin Z-Drive. This propulsion system is essentially a propeller installed within a nozzle that can rotate 360 degrees. This means thrust, in any amount manageable by the vessel's diesel engine, can be applied in any direction. The Z-Drive system, popular with many newer tugboats, combined with a bow thruster ensures the *Keeper* class tenders have excellent maneuverability and station-keeping qualities. Each vessel also carries dynamic positioning systems, honing the vessel's ability to hover on station even further. As of 2002 the USCG has fourteen *Keeper* class tenders in service. As the new seagoing and coastal tenders have entered service, the US Coast Guard has decommissioned the older 180s. At the beginning of 2002 there were nine of the old buoy tenders still in commission. They will phase out slowly and tentative plans call for *Acacia* to be the last in service with a decommissioning date sometime in 2006.

A GREAT DESIGN

The 180-foot buoy-tending cutters built for the US Coast Guard during the early 1940s are remarkable in terms of their longevity. Except the US Coast Guard's *Storis,* no other military vessels on active duty today served in World War II. The 180s longevity is not a case of superior construction, though they were undoubtedly built quite solidly. The service performed by the class for over sixty years is a function of their design. The 180s were extremely versatile and perfectly suited for their multifaceted role. They could break ice, replace a buoy, and save a sinking ship all in the course of a day's work. Moreover, they could complete these missions within sight of their homeport or steam across thousands of miles of ocean to complete an assigned task. They did not become outmoded until computers, satellites, and automation changed the way ships are built and equipped. The US Coast Guard spent time and money keeping the 180s in service long beyond their projected life span because that remained the best option. These ships that fought U-boats in

World War II have spent millions of hours since making the world's waterways a safer place for science, commerce, and recreation. This was possible due to the design’s versatility and reliability. Obsolescence crept up on the 180s very slowly, producing a tenure unmatched in twentieth-century American maritime history. The 180-foot buoy tenders proved to be extremely versatile vessels during their long careers. Though all spent some portion of their time afloat servicing buoys, they served in many other pursuits as well. Many of these alternate activities revolved around the vessel's intended secondary missions, search and rescue, law enforcement, and icebreaking. Often, however, the tenders carried out missions never envisioned by their designers, ranging from transporting rare tropical fish to landing scientific parties on drifting icebergs. This plethora of pursuits when combined with the wide geographic distribution of the 180s makes it difficult to describe a typical or generic career for a 180. The oceangoing buoy tenders built for the US Coast Guard in the early 1940s served around the world and fulfilled the service's requirement for a true multi-mission capable platform.

Cutter History:

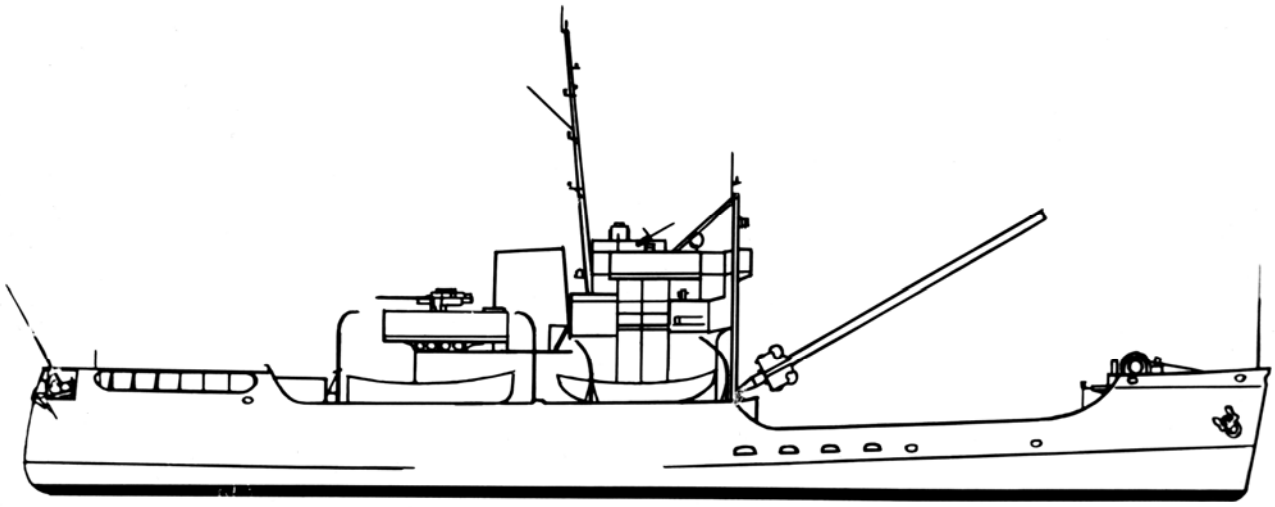
World War II

USCGC *Iris* was assigned to the 8th Coast Guard District. Homeported at Galveston, TX , the cutter was used for general ATON duties during 1944 and 1945.

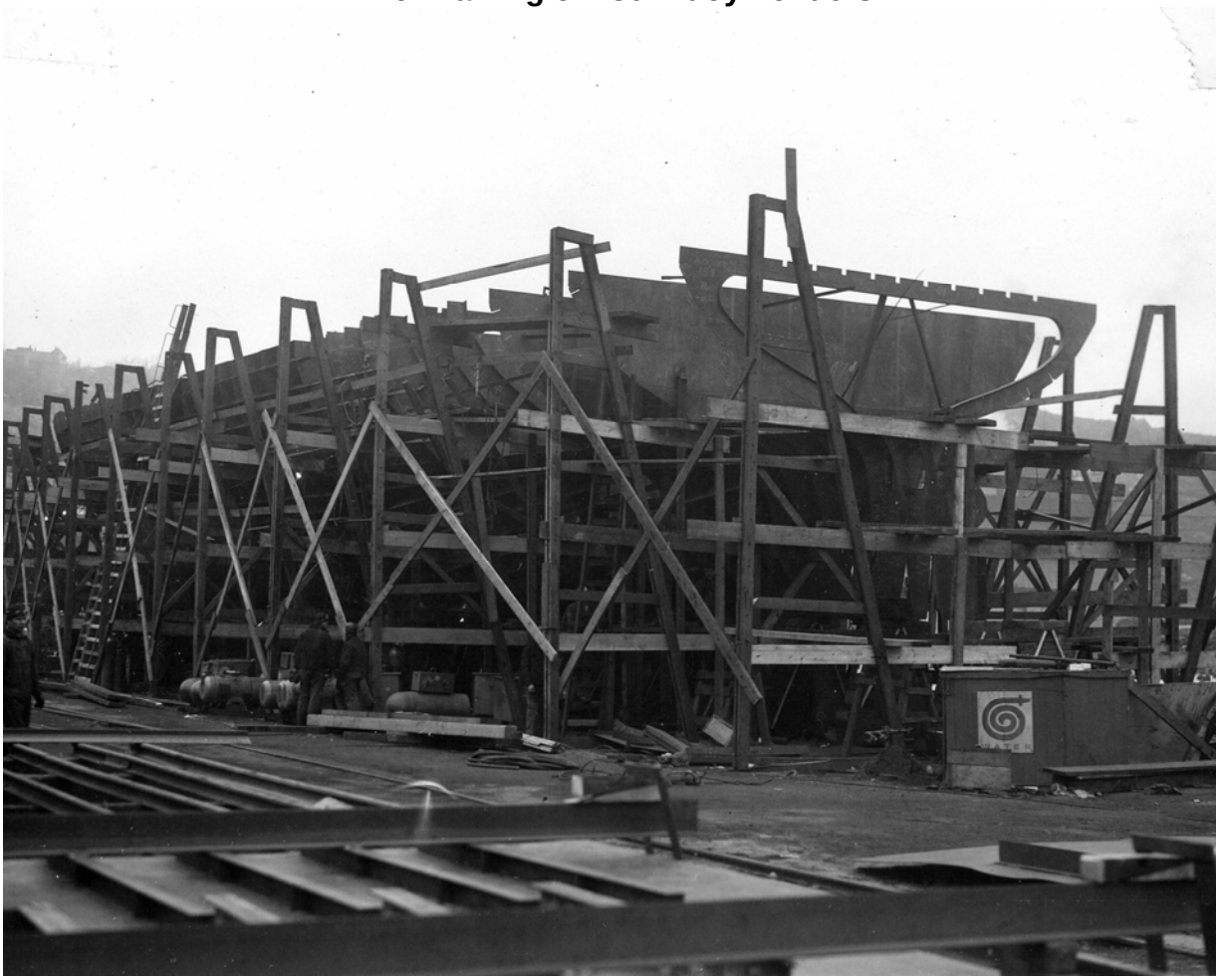
Postwar

After World War II until 15 March 1972, USCGC *Iris* was stationed at Galveston , TX and primarily used for ATON. During 1617 April 1947 *Iris* evacuated injured and dead from the devastating explosion at Texas City , TX . After the evacuations *Iris* returned to the site and helped fight the raging fires once she could get close enough to be effective. 11-14 February 1950 the tender unsuccessfully searched for a missing Navy PBM aircraft. From 2-5 January 1957 *Iris* was disabled and towed to New Orleans, LA by USCGC *Dione.* On 27 June 1957 *Iris* assisted FV *Parker* in distress during a hurricane. On 24 September 1957 *Iris* assisted USS *Navajo* at 29 35 N, 93 51 W. On 19 October 1957*Iris* intentionally beached at Aransas Pass after being holed during dragging operation for a sunken buoy. The cutter was refloated and was repaired at New Orleans, LA. On 15 February 1958 *Iris* assisted CG-*40459* off Galveston, TX. On 3 July 1958 the tender assisted FV *John and Mary* at 29 6 N, 94 35 W and, a few days later, on 6 July *Iris* fought a fire on MV *Anvers.* During August 1961 *Iris* escorted the Saturn missile barge *Compromise.* On 30 October 1966 *Iris* stood by heavily damaged MV *Gulfstag,* 50 miles south of Marsh Island. During May-June 1970 the tender provided assistance following an explosion and fire on an oil rig 10 miles off Galveston, TX. From 15 March 1972 through her decommissioning in 1995, *Iris* was stationed at Astoria, OR and used for ATON. On 24 April 1980 *Iris* was disabled by an engine room fire and was assisted by USCGC *Citrus* and USCGC *White Bush*, USCGC *Intrepid,* a 44-footer, 2 HHS2s from CG Air Station North Bend, OR and the commercial tug *Umpqua.* Despite being in the yard undergoing repairs in April 1989, *Iris* responded to the *Exxon Valdez* grounding and assisted with the clean-up operations in Prince William Sound.

Photographs:



Line Drawing of 180' Buoy Tenders



USCGC *Iris* under construction- 15 January 1944

Sponsor of USCGC *Iris* on 10 March 1944

Launching Party of USCGC *Iris* on 10 March 1944

Christening of USCGC *Iris* on 10 March 1944

Launching of USCGC *Iris* on 10 March 1944

USCGC *Iris* in 1963

USCGC *Iris* on 26 March 1974

USCGC *Iris* with Sea Otter submersible on the deck- 1974

USCGC *Iris* underway- no date

USCGC *Iris* underway in rough seas- no date

USCGC *Iris* in Prince William Sound assisting with the *Exxon Valdez* clean-up- Spring 1989

Sources:

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