

PANAMA AND THE U-BOATS

Despite all the fears in the immediate pre-war, and the scares that followed the Pearl Harbor attack in December 1941, it turned out that the only direct threat to the Panama Canal and its traffic during World War 2 came from German U-boats. Even then, Panama and the Canal Zone did not suffer any direct attacks – unlike neighbouring Costa Rica, which had the indignity of a U-boat actually entering Puerto Limón to torpedo a merchantman¹, or Aruba, which saw its refinery shelled by a U-boat (in accordance, as we shall see, in accordance with Admiral Raeder's oft ignored directives). Neither did have to cope with another feared threat, U-boats putting spies or saboteurs ashore².

Nevertheless, Panama and the Canal Zone had to endure the shortages of food and materials³ caused by the disruption engendered by the presence of the U-boats in the Caribbean, and the efforts of the Navy and the US Army Air Force (US Army Air Corps until 1941) were increasingly focussed on the U-boat threat.

Fortunately, despite fears of a Japanese attack, by surface vessel or submarine, on the Pacific approaches, the threat came wholly on the Caribbean side – although defences, including long air patrols over the ocean and advance bases as far away as Peru and the Galapagos Islands, nevertheless had to be employed as a precaution. Unlike the Germans, and latterly the US, the Japanese never employed their substantial submarine force against its enemies' shipping in the same way, instead largely using it in support of the

¹ It was not until 1940 that funds were made available to improve such defences at important US harbours, with 10 earmarked to receive nets – including Balboa – and with the Chief of the Ordnance Bureau estimating that it would take two to three years to obtain the necessary materials and install the defences. In December 1940, the Chief of Naval Operations ordered the laying and tending of a net and boom defence at Cristobal, to prevent the enemy from entering the Atlantic side of the Canal by submarine or small surface craft. By July 1941, nets were in place at either end of the Canal:

<https://www.navycthistory.com/NSGStationsHistory.txt>

² The Germans did land such agents on the coast of the Continental US, with little or no effect.

³ Ironically, even as daily nutritional intakes declined, many people in the area were left in the dark about the cause, thanks to a US military blackout of news regarding the deadly submarine war. (*The Caribbean Front in World War II: The Untold Story of U-Boats, Spies, and Economic Warfare*, by José L Bolívar Fresneda, Princeton NJ: Markus Wiener Publishers, 2021).

fleet, as Japanese strategic policy at the time limited submarines primarily to attacks on enemy naval forces, with merchant shipping being a purely secondary target⁴.

Even if the Japanese strategy had been different, in December 1941, Japan had only 20 submarines capable of traveling from Japan as far as the US West Coast (and Panama was even further away). During December 1941, nine of these did patrol off the West Coast, attacking 10 commercial vessels and sinking one merchant ship and three tankers. Then, between February and October 1942, four other Japanese submarines patrolled off the West Coast up to a month at a time. These sank seven ships, including a submarine, and on at least three occasions attacked installations ashore⁵, but inflicting little damage. No Japanese submarines then operated off the West Coast again until late 1944, when one was to sink two more ships. As far as I can find, none managed to reach the Pacific approaches to the Canal.

For the Germans, the U-boats in use at the time were already operating at the effective limit of their range and endurance to reach even the Caribbean, so that German U-boats did not have the range to make their way to the Pacific approaches - the journey to the Caribbean, made using only one engine to conserve fuel, was some 7-8,000 miles (13,334 to 14,816 km), taking many days sailing, just to get to the targets off Aruba and Trinidad in the Eastern Caribbean.

Surface raiders could be discounted, at least after 1940-41. By then the *Graf Spee* had been scuttled in Montevideo and no other major German warship ventured further than the North Atlantic, and while there would be converted merchant ships operating as commerce raiders in the Indian Ocean, none of these would make the long passage across the Pacific to the Americas.

⁴ There was, of course, the small-scale attacks using submarine-launched floatplanes on the West Coast of the US; and later in the war there was a plan to attack the Canal, also using (better) submarine-borne aircraft and much larger submarines, but in the latter case the war was all but over by the time the boats were ready.

⁵ As used as a plot device in the Spielberg movie "1941".

Even though the effects of the U-boat campaign were considerable with, during its worst period, between February and August 1942, no fewer than 330 vessels being sunk by U-boats and Italian submarines in the Caribbean, its approaches and the Gulf of Mexico, the time of greatest intensity was relatively short, and the difficulties facing the U-boats and their crews were considerable, and became greater as the war progressed. Eventually losses tailed off altogether and the boats withdrew. Even so, for a time they came close to cutting off vital supplies of oil from Venezuela (for both the US and Britain) and bauxite ore (the raw material used to make aluminium) from the Guianas⁶.

Panama was then, as now, a country with a sizeable shipping register, although nowhere near the scale it was to reach postwar. Many of the ships on its register were US-owned, taking advantage of tax and other cost savings. During the war, 78 ships on its register (totalling 416,682 tons) were sunk and four others damaged (totalling 38,456 tons).⁷ Even while neutral, at least seven Panama-flag vessels had been sunk before Pearl Harbor⁸, all of them in the North or South Atlantic.

Losses to the defence of the Canal included that of the patrol gunboat USS *Erie* in 1942, and the submarine USS *Dorado*, the latter which may have been a “friendly fire” loss, or a victim of a mine laid by a U-boat in 1943.

In early 1942, the U-boats were enjoying the so-called “Happy Time” off the East Coast of the US⁹, where there was no effective blackout (at least initially), no convoying and few effective defences. The situation began to change from April 1942 as a coastal blackout was imposed and with improved defences and convoy tactics. Eventually the Germans

⁶ *Panama Canal defenders: Camouflage and Markings of US Sixth Air Force and Antilles Air Command 1941-1945 – Volume 1: Single-engined Fighters* by Dan Hagedorn (Model Centrum PROGRES, 2021).

⁷ <https://uboat.net/allies/merchants/search.php>

⁸ <http://www.usmm.org/casualty.html>

⁹ Operation *Drumbeat* (“*Paukensclag*”) saw 397 Allied ships sunk in just six months, January-June 1942.

would abandon operations there (except for some minelaying) from September 1942 until the following Spring.

It was not until June 1942 that a U-Boat entered the outer reaches of the Panama Sea Frontier in the Caribbean. Then, in June, the SS *Merimack*, carrying supplies to Panama, was torpedoed about 60 miles (96.5 km) off Couzime Island - a mostly undeveloped Mexican island off the Yucatan Peninsula. This was followed by the loss of two more merchant vessels near Swan Island off Honduras, and three more near the Colombian islands of Old Providence and St Andrews. A further vessel was sunk some 85 miles (136.7 km) from Colón, which is the city at the Atlantic end of the Canal.

The Panama Sea Frontier patrol and threat area covered both Pacific and Caribbean regions. It stretched from the Mexico/Guatemala border out to the Galapagos Islands and down to a point at 5° of latitude on the coast of South America. On the other side, it stretched from the Mexico/British Honduras border to Punta de Gallinas in Colombia on the north coast of South America, and around 90 miles (144.8 km) west of Aruba. In doing so, the Panama Sea Frontier encompassed the coastlines of British Honduras, Guatemala, Honduras, Nicaragua, Costa Rica, Panama and Colombia.

The commander of the U-boat arm, Admiral Dönitz, initially assigned five U-boats of the Second U-boat Flotilla for what was called Operation *Neuland*. Their orders were set out as –

“Surprise, concentric attack on the traffic in the waters adjacent to the West Indies Islands. The core of the attack thus consists in the surprising and synchronised appearance at the main stations of Aruba a[nd] Curaçao”¹⁰.

They were to attack with torpedoes first, and thereafter their 10.5 cm (4-inch) deck guns, if suitable land targets were available. The Kriegsmarine commander, Admiral Raeder,

¹⁰ Note that there was no specific mention of the Panama Canal.

was insistent on the latter point, although Dönitz was far less keen, seeing it as a diversion from the U-boats' main function.¹¹ The Operational Order identified the primary targets as oil tankers and bauxite freighters as well as the various oil refineries on the islands - most notably the plant at San Nicolas, Aruba, then the largest in the world; the refinery at Pointe-a-Pierre, the largest in the British Empire; and the Royal Dutch Shell Shottogat plant at Curacao¹². Dönitz instructed that all attacks were to be launched precisely "five hours before daybreak" to assure surprise.¹³

Operation *Neuland* formally began in the new moon period beginning on 16 February 1942. The Type IXC¹⁴ U-boats used for the operation made the long journey to the Caribbean using only a single engine to save fuel, and could only spend two to three weeks on station there before having to return home¹⁵. The five boats that comprised the first phase of Operation *Neuland* were - U-67, to take up station off Curacao; U-156 and U-502 off Aruba; U-161 off Port of Spain, Trinidad, and U-129 off the coast of British and Dutch Guiana¹⁶.

¹¹ It was transformed into a formal order as Operations Order No 51 'West Indien' on 17 January 1942. Despite undertaking to the Kriegsmarine commander Raeder that he would instruct the U-boats to shell land-based oil facilities such as tank farms, Dönitz ignored the instruction.

¹² The U-Boat captains had also met two Hamburg-America Line captains, who were familiar with the region, and had briefed Dönitz on the precise nature of the oil traffic:

https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

¹³ https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

¹⁴ The Type IXC was the most numerous German U-boat in the early war years, having entered service in 1937. It was larger and had a longer range (14,035 nautical miles or 25,990 km) than the previous Type VII (which had a range of only 8,500 nautical miles or 15,742 km). It had a crew of 48 and could carry 22 torpedoes (or up to 66 mines). They had diesel engines, used on the surface and to recharge the batteries used for submerged operations. They mounted a 10.5 cm (4-inch) deck gun as a secondary weapon. It lacked air conditioning or other effective ventilation systems which would have proved a godsend in the battle. 194 Type IX were built, of which 88% were lost during the war. See:

<http://www.uboataces.com/uboaat-type-ix.shtml>

¹⁵ This being before the introduction of *milchkühe* supply submarines.

¹⁶ https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

At the time of the June 1942 attacks, a gunboat¹⁷ was the only active escort vessel available in the Panama Sea Frontier area. There were four ageing destroyers engaged in offshore patrol but these lacked radar and did not detect any U-Boats.

Although the Canal Zone was itself heavily fortified, the original and still-present fixed defences were chiefly designed to counter an attack by surface vessels¹⁸, with large calibre coastal artillery and mortars¹⁹. As far back as 1923, the US War Department had determined that either a larger naval fleet or a much larger number of aircraft would provide better protection, but it was felt that the cheapest option was continued reliance on guns and submarine mines²⁰. The major threat in the immediate pre-war period (aside from sabotage) had been thought to be from an air attack, and hence the majority of the aircraft stationed there were, and would remain to be, fighters²¹. These could be used, and were used, to mount anti-submarine patrols (alongside USAAC/USAAF land-based bombers and other, less suitable, types, as well as US Navy patrol flying-boats), but were of little use against a U-boat, except (as with any air asset, to force the U-boat to dive or stay submerged)²². The Panama Air Task Force was created under the supervision of the Caribbean Defense Command on 22 December 1941, being intended for anti-submarine patrol work, but suffered from the shortages in the number of suitable aircraft. Latterly, the bombers and flying-boats, in greater numbers and equipped with radar, would become much more effective, assisted by US Navy blimps which could escort a slow-

¹⁷ The aforementioned USS *Erie*.

¹⁸ Although the first air unit to arrive in the Canal Zone during World War 1, the 7th Aero Squadron in 1917, was used on U-boat patrol from Cristobal with Curtiss seaplanes.

¹⁹ One of the measures taken to specifically address a submarine threat as that the US Army placed a 3-inch (7.62 mm) gun battery in the 16th Century fort on the Caribbean coast at San Lorenzo to discourage U-boats from using the Chagres River to attack the dams necessary for the Canal operations.

²⁰ Bear in mind that harbour defences in the Canal Zone, as in the US and other overseas possessions, were the responsibility of the US Army, not the Navy.

²¹ <http://www.ibiblio.org/hyperwar/ETO/Atlantic/UBoat-Caribbean.html>

²² It is said that one of the reasons for despatching the Bell P-39 Airacobra fighter to Panama during the war was the belief that its heavy 37mm cannon armament could be of some use against a U-boat.

moving convoy more effectively²³. However, in the early months, and during the height of the U-boat campaign in 1942, the Germans appeared to have the upper hand.

THE CAMPAIGN BEGINS

The first U-Boat began operating in the Eastern Caribbean in February 1942 then, after running down operations off the US East Coast, the U-Boats intensified their operations in the Caribbean, in Operational *Neuland*²⁴, which the Americans would call the Battle of the Caribbean. The main concentration was on oil traffic from Venezuela and Aruba, and the South American trade (including all the US supplies of bauxite) which had to pass by Trinidad. By the end of 1942, 336 vessels or 1.5 million tons of shipping had been sunk in the Caribbean zone.

The larger Italian submarines also took part in operations near the Lesser Antilles, on the far east of the area in 1942, but did not venture as far into the Caribbean as the Germans and never into the Panama Sea Frontier region.

By the end of February 1942, enemy submarine activity in the Caribbean had grown to the point that 10% of shallow draft tankers operating out of Maracaibo, Venezuela to Aruba had been sunk²⁵. Between March and June 1942, 173 ships (of a total 965,000 tons) were lost in the Caribbean with the rate increasing until August – of these, 57% were tankers. U-boat activity was greatest in the Trinidad sector, and the area between Guiana and Trinidad became nicknamed “Torpedo Junction”.²⁶ Apart from housing the oil refinery

²³ I have written elsewhere about the role of blimps, and during the war, Panama saw detachments from blimp squadrons ZP-15, ZP-21 and ZP-22, including those operating from an advance base in Colombia.

²⁴ *The U-Boat War in the Caribbean* by Gaylord TM Kelshall (US Naval Institute Press, 1994).

²⁵ <https://digitalcommons.fiu.edu/cgi/viewcontent.cgi?article=3672&context=etd>

²⁶ *Long Night of the Tankers: Hitler's War Against Caribbean Oil* by David J Bercuson and Holger H Herwig (University of Calgary Press, Canada, 2014).

and tank farms, Trinidad was also the trans-shipment site for bauxite, as well as the departure point for seaborne traffic bound for Cape Town.²⁷

One of the early results of the attacks was that, in Curacao, Chinese tanker crews went on strike - 15 being shot by the local Dutch militia, while 37 others "disappeared".²⁸

As we have seen, it was June 1942 before the attacks occurred closer to the Canal, with two merchant vessels sunk near the Canal in June, by which time there were four U-Boats active in the immediate area. As a result, the US Navy ordered the port of Cristobal (at the Atlantic end of the Canal) closed to outbound traffic and organised a "hunter-killer" group consisting of two destroyers, three motor torpedo boats²⁹ and PBY Catalina patrol flying-boats. This group went in search of a U-Boat spotted by an USAAF bomber off Colón, but found nothing. At the same time, additional PBY and USAAF bombers were made available for use on the Caribbean side of the Canal, while an escorted convoy of transports *en route* for the Pacific safely passed through the Canal shortly after.

However, a British tanker bringing fuel to Cristobal was then sunk by two U-Boats within 75 miles (120 km) of the port, followed by two more vessels sunk off Santa Marta, Colombia and a schooner sailing ship off the Colombian coast. Shortly after this, a U-Boat entered Puerto Limón, along the coast north of Panama in Costa Rica and sank a merchant ship, the SS *San Pablo*, in the harbour³⁰.

Although this part of the battle never involved more than five U-Boats it saw on average a ship a day sunk over a two-week period. It also resulted in additional defence measures being put in place on the Caribbean coast. These included anti-submarine nets at Puerto

²⁷ https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

²⁸ Ibid.

²⁹ "PT Boats" in US Navy parlance.

³⁰ The U-Boat involved, U-161, was lost with all hands off Bahia, Brazil 3 months later, after an attack by a US Navy patrol bomber.

Limón, increased air patrols (including now with radar-equipped PBY Catalinas), and convoys being organised for shipping between the Canal and Guantanamo Bay, Cuba.

The first U-Boat “kill” in the Panama Sea Frontier sector then followed. An abortive attack on a US net tender resulted in a patrol boat and PBY being despatched to carry out a search, with USAAF aircraft (fighters and a B-18 Bolo medium bomber) and a further PBY joining the following day. On the third day, the patrol boat spotted an oil slick and it and the searching aircraft used all their depth charges at the site. A destroyer, USS *Lansdowne* was detached from a convoy to assist, and detecting the U-Boat, attacked and sank it on 13 July.³¹

In August 1942, aircraft from the USAAF, US Navy and the RAF combined to make 18 attacks on U-Boats in the Caribbean and, on 22 August, a B-18 bomber sank another U-Boat off Colón³².

However, it has to be said that the latter incident was the only occasion when a bomber from the VI Bomber Command based in Panama achieved a U-boat sinking, and even this was not confirmed at the time. The B-18 of the 45th Bombardment Squadron had caught the U-654 about 150 miles (241 km) north of Colón at conning tower depth and had attacked. The bomber was then been joined by five other B-18 from the same squadron, and altogether they dropped a total of 48 depth charges. However, the loss of the U-boat (with all of its 44 crew) was not confirmed until postwar. The Command’s squadrons did claim the destruction of three other U-boats by aircraft based elsewhere in the region.³³

Fortunately, a less successful attack had been carried out the previous day, 21 August, by a B-18 of the same 45th Bombardment Squadron. This “friendly fire” incident occurred at Balboa, at the Caribbean end of the Canal, when the S-17, an old, World War I-vintage US

³¹ U-153, there were no survivors.

³² U-654, once again there were no survivors.

³³ <http://warfare.gg/PlanesAndPilotsOfWW2/panama/submarine.htm>

submarine surfaced in the outer harbour but failed to display the necessary recognition colours. The commanding officer of the 45th Bombardment Squadron dropped four bombs, straddling the boat and causing damage that took seven days to repair. A subsequent investigation cited the submarine for carelessness, and the USAAF personnel for being “over-eager” in attacking the submarine without allowing it time to recognise their mistake and fly the correct colours³⁴.

Despite the success the few U-boats had achieved, after August 1942 the strategic picture began to change. Defences throughout the Caribbean, including the increasing number of USAAF bases in Panama, had been substantially improved. Shipping was better protected and employed better methods. US anti-submarine tactics benefited from British experience, and the advent of AI-10 ASV radar and Leigh Lights³⁵ being fitted to B-18B and B-18C bombers of the USAAF³⁶ had helped these otherwise obsolescent aircraft become effective anti-submarine platforms. Deprived of a further “happy time” in the Caribbean, the U-boats were redeployed against the Atlantic shipping lanes, and the convoys to Russia.³⁷

Reasons for the success in the Battle of the Caribbean included the creation of a ring of defences designed to protect the Canal, with bases on islands and in mainland North and South America. In time, a ring of airfields and US Navy seaplane bases encircled the Caribbean basin – from Cozumel, Mexico, to Waller Field, Trinidad, and from San Nicolas, Aruba to San Juan, Puerto Rico³⁸. Eventually, two-thirds of all US anti-submarine aircraft in the Caribbean Defense Zone were based on British holdings that had been included in the 1940 bases-for-destroyers deal.

³⁴ <https://digitalcommons.fiu.edu/cgi/viewcontent.cgi?article=3672&context=etd>

³⁵ The Leigh Light was a 22-million candlepower, 24-inch (61 cm) searchlight used to illuminate U-boats on the surface at night.

³⁶ The first patrol aircraft equipped with ASV airborne radar were LB-30 Liberators which began to arrive in March 1942.

³⁷ American Aviation Historical Society Journal, Winter 2012.

³⁸ *Long Night of the Tankers: Hitler's War Against Caribbean Oil* by David J Bercuson and Holger H Herwig (University of Calgary Press, Canada, 2014).

The relatively limited range of the U-boats could be extended by use of the resupply U-boats, known as “milk cows” (*Milchkühe*)³⁹. However, in July 1942 the Allies successfully destroyed five of the type off the Azores and Spain, leaving just two such boats to service the *Neuland* campaign.⁴⁰

A united anti-submarine command was also created. This extended in time from just involving the US, British, and Dutch, to include the Caribbean and Latin American countries that formed the outer ring of defences (Cuba, Columbia, Venezuela and, outside the Caribbean Basin, Brazil) – as well as helping to resolve the disagreements between the US Army and Navy⁴¹. On 20 May 1943, the US Navy established the 10th Fleet, a command with jurisdiction over all anti-submarine activities in the Caribbean region⁴². Ultimately, of the 90 or so U-boats deployed in the Caribbean, US Navy patrol craft destroyed 30, USAAF bombers four, and the RAF three.⁴³

³⁹ The Type XIV was a modified Type IXD. The first was commissioned in November 1941. Only 10 were built, and the improved Allied anti-submarine operations in the Atlantic effectively ended their use during 1943 and 14 more were cancelled: <https://uboat.net/types/milkcows.htm>

⁴⁰ https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

⁴¹ Long before World War 2, in 1920, the US Congress had mandated that the US Navy was not permitted to operate land-based combat aircraft. During the war, however, this rule was gradually modified, as the Navy sought greater control over all aspects of naval warfare, and the Army needed all its units for operations in Europe and the Pacific. Finally, in August 1943, the two services came to an agreement, with the Army agreeing to turn over all anti-submarine operations to the Navy: *The Army-Navy Contest for Control of Land-Based Antisubmarine Aviation and the Military Unification Debate, 1942–1948* by George H Monahan (OUP, October 2019).

In 1935, a Joint Action of the Army and Navy clarified the relationship. Along with aviation connected to the Fleet operations, the Navy was given responsibility for all inshore and offshore patrol to protect shipping and defence of the coastal frontier. Army aircraft might temporarily carry out “Navy” functions in support of, or in lieu of, naval forces; and that Navy aircraft might be called on to support land operations. It was clear that the Navy had the role of protecting coastwise shipping and conducting offshore patrols:

<https://www.afhra.af.mil/Portals/16/documents/Studies/101-150/AFD-090522-043.pdf>

⁴² This was a “paper” fleet, wholly without ships or aircraft, but one that represented King’s determination to finally defeat the U-boats. The 10th Fleet had as its mission the directing and coordinating all Navy anti-submarine activities worldwide: <https://warfarehistorynetwork.com/article/sub-hunters-over-the-bay-of-biscay/>

⁴³ https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

The Allied defences were also made more effective due to ULTRA decryption of German Enigma radio signals and the use of High-Frequency Direction-Finding (or “Huff-Duff”) which enabled the Allies were able to triangulate the U-boats’ replies to U-Boat Command to within a mile of their source.⁴⁴

On the other hand, Germany never fully developed systems to counter the anti-submarine weaponry and technology deployed by the Allies.

U-boat operations in the Gulf of Mexico had caused the cancellation of numerous sailings from New Orleans to the Canal Zone, causing a build-up of cargo at intended for the Zone. Nevertheless, monthly deliveries of Army cargo to Cristobal and Balboa in the Canal Zone still reached a peak of 85,286 tons in September 1942.

However, for a time, the Allied oil supply was at genuine risk⁴⁵. The 59 million gallons per day destined for the US East Coast, and which came from the Caribbean and the Gulf of Mexico by tanker, shrank by 25% by at the end of 1942. Caribbean oil shipments to Britain declined from 67% of total imports in 1941 to just 23% by 1943⁴⁶. The supply of bauxite also fell dramatically, by May 1942 the handful of U-boats had destroyed 22% of the Allied bauxite fleet⁴⁷. Whereas, in 1939, Britain had imported all of its raw supply of the ore - some 302,000 tons from the region, by 1942 that figure had fallen to just 48,000 tons⁴⁸.

⁴⁴ *Long Night of the Tankers: Hitler's War Against Caribbean Oil* by David J Bercuson and Holger H Herwig (University of Calgary Press, Canada, 2014).

⁴⁵ The decline became critical for Operation *Torch*, the Allied landings in North Africa in November 1942, and *Neuland* was the catalyst behind the construction of both the Big Inch and the Little Big Inch pipelines that were to stretch from the east Texas oil fields to near Philadelphia and New York City:

https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

⁴⁶ British oil reserves fell to only six months' supply. Royal Navy stocks fell to danger level, and some RAF bomber squadrons faced being grounded for lack of fuel: https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

⁴⁷ https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

⁴⁸ Aircraft production in Britain was only maintained by drastically increasing finished aluminium imports, almost exclusively from the US, increasing it from 58,000 to 132,000 tons between 1939 and 1942:

https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

The supply of one million tons of bauxite a year shipped to ALCOA in the US and ALCAN in Canada was also badly affected⁴⁹.

It seemed that Dönitz had found one of the few true strategic chokepoints in the Allied war effort but, fortunately for the Allies, he did not fully realise it at the time, and the effectiveness of the attacks would quite quickly fade.⁵⁰

October 1942 saw no losses to U-Boats in the Gulf of Mexico and Panama Sea Frontier areas – this being the first time in six months⁵¹. In fact, after January 1943, U-Boats were never again a major threat in the Caribbean. While attacks and losses continued, the Kriegsmarine had come to regard the Caribbean as a difficult or dangerous place to operate, particularly with often clear and shallow waters. The Submarine Command war diary noting the presence of strong to very strong air patrol, convoys and independent vessels protected by air and surface escorts, and day and night radar. These deterrents combined with the stress caused by the heat, the humid atmosphere and the boats having to operate submerged for long periods to avoid detection. The U-boats lacked sophisticated detection devices, having only primitive listening gear. They had to acquire their targets by sight via lookouts on the surface, or through a periscope when submerged⁵². This is one reason why the majority of attacks took place at the entrances to major oil ports⁵³, island passages and nearing the Canal, where traffic was more concentrated and thus easier to locate⁵⁴.

⁴⁹ The US Navy calculated that the sinking of an average-sized ship was equivalent to the damage inflicted by 1,000 successful Luftwaffe bombing sorties.

⁵⁰ https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

⁵¹ However, in November, losses to U-Boats rose in the Trinidad area

⁵² <http://www.ibiblio.org/hyperwar/ETO/Atlantic/UBoat-Caribbean.html>

⁵³ A G7e torpedo, a 21-inch (53.3 cm) weapon with a 300 kg (661 lb) warhead, fired by U-156 ended up on a beach in Aruba on 16 February 1942. It later killed four Dutch Marines who tried to disassemble it for study. It had missed the Texaco tanker *Arkansas*, berthed at Eagle Pier (although a second hit the ship).

⁵⁴ <http://www.ibiblio.org/hyperwar/ETO/Atlantic/UBoat-Caribbean.html>

On 12 November 1942, the patrol gunboat, USS *Erie*, which had the Canal Zone as its home base, was torpedoed by U-161 just out of Curacao while on escort duties. Damaged and beached as a near-total loss, she was later towed to Willemstad in the Dutch West Indies (now Curacao), but capsized three weeks later and settled in the harbour.⁵⁵

In 1942, U-Boats in the Caribbean sank 336 ships of over 1 million tons. However, in 1943, losses fell to only 35 ships and 178,000 tons, and in 1944, only three ships of 15,000 tons were lost to U-Boats. By June 1943, it is said that it seemed clear to those stationed in the Canal Zone that the submarine threat had diminished, at least for the time being⁵⁶.

Despite the problems of operating in the Caribbean the Germans returned once more in October 1943, with a U-Boat laying mines within four miles (6.4 km) of the Colón breakwater. These caused no damage, and most were swept within a month⁵⁷.

While several Panama-flagged ships were included in the list of US merchant ships lost to, or damaged by, mines during World War 2⁵⁸, only one was recorded as damaged in the vicinity of Panama itself. In January 1943, the USS *Charles Carroll* (AP 58), a *Crescent City* Class transport (later reclassified in 1943 as an attack transport as APA 28), serving with the US Navy, struck a mine off the Canal Zone and had to put into Balboa for repairs. After seeing involvement in Operation *Torch*, the Allied invasion of North Africa, it had been heading for the Pacific when she was damaged by the mine⁵⁹.

With the minelaying effort having proved to have had little effect, in November 1943, Admiral Doenitz (the U-boat commander was by now the head of the Kriegsmarine)

⁵⁵ <http://www.usserie.org>

⁵⁶ American Aviation Historical Society Journal, Winter 2012.

⁵⁷ The U-Boat involved went on to lay mines off the Gulf of Paria, Venezuela, again with little or no effect.

⁵⁸ <http://www.usmm.org/mineships.html>

⁵⁹ The only other mine casualty in Panama waters that appears to have been recorded, was the loss of a locally-based Canal tug, which struck a mine that had come loose from the protective minefields. It is not clear if the *Charles Carroll* was damaged by a mine laid by a U-boat (the most likely explanation) or a rogue one from the Canal Zone defences (like the Panamanian tug).

instead ordered an attack to be carried out by three U-Boats on shipping in the Caribbean. Unfortunately, when the first U-Boat arrived in the Panama Sea Frontier area the sea defence forces there were actually on the other side of the isthmus, engaged in a tactical exercise with two escort carriers in the Pacific.

There was a sighting of this U-boat near Curacao, and ships and aircraft were used in an attempt to locate it. However, it managed to reach the Canal area by hugging the north coast of South America and sank a small Panamanian freighter (with a US Navy armed guard aboard⁶⁰) 60 miles (96.5 km) off Cartagena, Colombia. It went on to sink a small Colombian schooner off Cristobal, and an unescorted US tanker nearby, followed by another unescorted Liberty ship 75 miles (120.7 km) from the entrance to the Canal. The U-Boat then escaped searching aircraft, while all unescorted shipping was stopped, as well as some convoys - with some convoys rerouted north along the Mosquito Coast of Costa Rica, Nicaragua and Honduras.

After claiming another victim, off the Gulf of San Blas in Panama, low on fuel, the U-boat left the area. Even then, on its return journey, it sank another unescorted US tanker 30 miles (48.2 km) off Aruba, with it then evading or surviving attacks by search aircraft, to eventually returned home safely⁶¹.

Despite the US Navy having just taken over air patrols on the Pacific approaches, during the period of renewed U-boat threat from 23 November 1943 to 8 April 1944, the USAAF in the Canal Zone took on more of the anti-submarine work in the Caribbean once more. During this period there were 219 sorties by four-engine bombers and 266 by twin-engine bombers undertaken by VI Bomber Command, carrying out anti-submarine sweeps on behalf of the Navy.

⁶⁰ The US Navy provided detachments to man guns fitted to merchantmen and Army transports. Eventually, the Armed Guard Service had a greater manpower than the peacetime Navy of 1937: <https://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/n/naval-armed-guard-service-in-world-war-ii.html>

⁶¹ The U-516, it was eventually lost in the North Sea in 1945.

The effectiveness of the U-Boats would be constantly undermined by disagreements between Dönitz and his immediate superior, Grand Admiral Raeder, over aims and tactics, combined with a lack of overall tactical objectives. This only ended when Raeder was dismissed and Dönitz replaced him. There was also meddling by Hitler, who would order U-boats removed for use elsewhere⁶².

Behind the scenes, Grand Admiral Raeder, then the Commander-in-Chief of the Kriegsmarine, had demanded that shore installations such as refineries and tank farms be given priority. After all, the Aruba refineries alone produced 500,000 barrels of gasoline and diesel fuel per day, including some 5,000 barrels of critical 100-octane aviation fuel. However, Dönitz had insisted that it was the number of sinkings that was the important point. He hoped that Germany could sink ships faster than Britain and the US could build new ones, but this simple was to fail in the face of US industrial strength and ingenuity.⁶³

In another difference of opinion, Dönitz's had wanted the available U-boats to be sent out in waves to maintain the element of surprise and to exert the maximum pressure on Allied tankers, transports, and their escorts. On the other hand, Raeder wanted what he termed "continuous occupation" of the Caribbean basin by U-boats – something that would prove impossible. Apart from operational difficulties in the combat area, only a handful of boats were ever available at any one time, and it would take them up to three weeks to reach their operational area from their bases in France.⁶⁴

The interference from Hitler took the form of him ordering redeployment to other areas he saw threatened, while reminding Dönitz that the Battle of the Atlantic remained the “zone of destiny”. Even as *Neuland* began in February 1942, Hitler ordered 20 boats to

⁶² *Long Night of the Tankers: Hitler's War Against Caribbean Oil* by David J Bercuson and Holger H Herwig (University of Calgary Press, Canada, 2014).

⁶³ https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

⁶⁴ Ibid.

Norwegian waters, fearing an invasion. In June 1942, he ordered a redeployment to the Cape Verde and the Madeira islands, fearing an Allied landing in North Africa and, when those landings did take place later in November, he ordered the eight available boats to attack the invasion fleet.⁶⁵

One has to feel for the U-boat crews. Not only did they have to cope with the stress and danger of the, increasingly likely, discovery and attack by Allied aircraft and warships, but condition aboard the boats could be foul. Temperatures of 40 degrees centigrade (104 degrees Fahrenheit) were reported when submerged, with a humidity of near 100%. As the water aboard heated it could not effectively cool the engines, and even charging the boats' batteries could be difficult or impossible in such high temperatures. Crewmen complained of skin sores, boils, digestive disorders, and exhaustion, in addition to the mental stress they endured.⁶⁶

POSTSCRIPT - ANTI-SUBMARINE INDICATOR LOOPS

US Navy Loop Stations apparently operated along the Panama coast, with about 850 nautical miles (1,574 km) of 8-inch (20.3 cm) cable running down the full length of both coasts of Panama, and the main cable having several 2-inch (5.08 cm) feeder cables running back to the mainland⁶⁷.

Indicator loops were long lengths of cable laid on the seafloor of harbours to detect enemy submarines. The system was developed by the Royal Navy before World War 1, tested during that war, and used at British ports during World War 2, as well at harbours in the colonies and Dominions, as well as elsewhere. By 1942, the technology had been adopted and adapted by the US Navy⁶⁸.

⁶⁵ Ibid.

⁶⁶ https://www.usni.org/magazines/naval-history-magazine/2010/february/slaughter-paradise?mc_cid=6338d3e9ec&mc_eid=366bc8b40d

⁶⁷ <http://indicatorloops.com/panama.htm>

⁶⁸ <http://indicatorloops.com/loops.htm>

It relied on magnetic properties of submarines. The cable on the ocean floor in shipping channels detected when a submarine passed overhead by means of an induced current being produced, this being indicated on galvanometers at a shore station. Even if wiped or degaussed⁶⁹, submarines still had sufficient magnetism to produce a small current in a loop.⁷⁰

In the US, the control stations were known as 'loop receiving stations' and were a part of the Harbor Entrance Control Post (HECP), with the first loop installation being at Cape Henry, Virginia in Summer 1941. The system was subsequently installed in practically every major and medium importance Continental US harbour in the few months after August 1942, and by the end of 1942 was being employed in the South Pacific. Systems were also installed in the 15th Naval District based in the Canal Zone, as well in Australia and South America.⁷¹

In the Canal Zone, control stations were at Fort Sherman, Cristobal on the Atlantic side and at Fort Amador on the Pacific side.⁷²

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8 November 2022

⁶⁹ A process to reduce the threat from magnetic mines, which also used the metallic nature of a ship as a trigger.

⁷⁰ <http://indicatorloops.com/usnlrs.htm>

⁷¹ Ibid.

⁷² Ibid.