U.S. SUBMARINE MINING SUCCESSES DURING WORLD WAR II

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Little historical attention has been given to the mining operations conducted by U.S. submarines during the Pacific war. In comparison with our submarines' outstanding torpedo successes, their mine-planting forays appear as a minor sideshow. Indeed, the official Joint Army-Navy Assessment Committee (JANAC) tally of Japanese ships sunk during the war attributes only five ships totaling 18,553 tons to mines laid by U.S. submarines, but it does not identify the boats credited with those sinkings. Consequently, the count of ships and tonnage sunk by individual submarines has never included the victims of the mines planted by those same boats.

Unfortunately, it is extremely difficult to pinpoint a ship's sinking to a specific minefield, let alone to the submarine or other agent that may have laid the mines. Casualties usually occurred hours, days, or even months after a minefield was laid, when the enemy could have had ample time to sweep the mines or cordon off the dangerous grounds. In several locations both submarines and aircraft planted mines in close vicinity, while the positions reported for Japanese losses as well as those recorded for the Allied minefields themselves are often of questionable precision. The figures almost never correlate exactly with each other, and are usually several miles apart.

In addition to the possibility of being detected and swept, mines had their own internal weaknesses such as exploding prematurely, breaking their tethers and drifting out of position, or failing with age. In spite of such problems, mines were known to be very effective offensive weapons against enemy shipping when planted clandestinely in strategic locations such as harbors or channels. They were also widely used defensively to protect against enemy approaches to beaches or harbors. Accordingly, mines were extensively used by all combatants throughout the Pacific theater, often in the same general areas, where they were likely to become a threat to friend and foe alike.

The problems of identifying a mine victim are illustrated by the only instance when a U.S. submarine actually observed a victim exploding a freshly laid mine. LCDR Roy Benson in TRIGGER (SS 237) was in the process of planting a field of 19 magnetic mines on 20 December 1942 off the cape Inubo Saki when a freighter conveniently ran into one, blew up, jack knifed and sank. Two days later in the same area he torpedoed another victim which he last saw going down by the bow, and on 26 December he sighted yet another ship heading into the mined area, followed later by a distant explosion.

JANAC was never able to identify the ship seen to sink in the minefield, but Benson was credited with an Unknown Maru. His torpedo attack was later assessed as sinking the TEIFUKU MARU. Postwar Japanese records are somewhat confusing and contradictory, but the most likely conclusion seems to be that the ship seen to sink in the minefield (the Unknown Maru) was the MITSUKI MARU; the torpedo victim, which was damaged but not sunk, was the YOSHU MARU; no ship was sunk or damaged by the mine explosion heard on the 26th; and the TEIFUKU MARU actually hit a mine on 29 December, was run aground, and became a total loss. The records for most of the other ships credited to mines suffer from similar confusion.

Minelaying was seldom regarded as a primary mission for U.S. submarines. Although many other navies included submarines specially fitted for laying mines, only the single USS ARGONAUT (SM 1) was designed primarily as a minelayer. By 1941 ARGONAUT, then the Navy's largest submarine, was old, slow, unwiedly, under-armed, and overdue for a thorough modernization. Operating as an ordinary submarine, she was on station off Midway Island when the Japanese attacked Pearl Harbor. On her return, she was ordered to Mare Island for her much-needed updating. The original minelaying installation, featuring internal stowage and transfer facilities for 60 Mk XI mines laid from two 40-inch diameter stern tubes, was retained. Although the authorities in Washington had deemed it worth refurbishing, forces afloat had other ideas. On her return to Pearl Harbor the mine gear was immediately stripped out to provide space for carrying Marines to the Makin Island raid. Being then reclassified as a submarine transport, ARGONAUT was

ordered to Brisbane to conduct special missions such as evacuating refugees from the Philippines. While en route she was directed to attack a convoy, only to be sunk by Japanese destroyers with the loss of 105 lives.

Abandoning the concept of dedicated submarine minelayers, the Navy shifted to developing mines that could be ejected through the torpedo tubes of all fleet submarines starting with SARGO (SS188). The main drawback was that only a small load of mines could be carried. In the early months of the war, when Allied surface and air forces had been driven back from the Far East, distances to enemy targets were so great that submarines were the only effective means of laying mines surreptitiously in Japanese waters. Aircraft mining in the South and Southwest Pacific theaters did not start until March 1943. Herb Mandel, who was then on FINBACK (SS 230) during her shakedown early in 1942, recalls going out on GRUNION (SS 216) to observe a practice mine plant. This training must have been discontinued shortly thereafter, as his own boat never did such an exercise, nor did GRUNION ever lay a live minefield. However, as skipper of PERMIT (SS 178) at the end of the war, Mandel laid a dummy mine plant for the Bureau of Ordnance in Provincetown Harbor, so obviously even the oldest fleet boats had been refitted to handle mines.

The first submarine minefield was laid out of Fremantle by W. J. Millican in THRESHER (SS 200) in the approaches to Bangkok on 16 October 1942. It was followed four days later by another in the same area planted by Donald McGregor in GAR (SS 206). Both submarines carried maximum loads of 32 Mk 12 mines, which took the space of 16 torpedoes. Although their designed maximum load was 40 mines, in practice U.S. subs carried at least eight torpedoes for use in an emergency before the mine plant or to attack targets thereafter. All minelaying missions but one were carried out by boats of the Tambor or later classes, probably because the earlier types had fewer torpedo tubes. The only exception was the one by STINGRAY (SS 186)—a Salmon-class boat with only four tubes forward—in April 1943.

Most of the early mine loads were probably carried in the forward torpedo room. Later in the war typical loads were gradually reduced to only eleven mines, then increased again to 23 in 1945. According

to E. C. Hawk's report of the plant laid by POMPON (SS 267) in December 1943, his 11 mines were fired alternately from tubes 9 and 10 in the after torpedo room. When HARDHEAD (SS 365) laid a field of 23 mines, her commander, F. A. Greenup, fired 10 from tubes 3 and 4 forward and 13 from tubes 9 and 10 aft.

The Mk 12 was a non-tethered ground mine housed in a streamlined case and actuated by a Mk 3 magnetic exploder, a complex device that had to be set according to the polarity and strength of the earth's magnetic field in the location where it was to operate. It could also be adjusted to be sensitive to a particular size of target passing overhead and to detonate only after a selected number of targets had been counted. These features were intended to make the mines harder to find and sweep, and probably had to be pre-set in the shop before going on patrol. The ship count was set for the first target to be detected in all but six fields where the mines were set at various combinations between one and nine counts.

Although the Mk 12 mine's explosive charge would remain active indefinitely, the exploder was powered by a battery, possibly activated by sea water, with an expected life of 90 days. In order to function as designed, it had to be planted in depths ranging from seven to twenty fathoms with the submarine running either fully surfaced, with decks awash, or at periscope depth, depending on the circumstances. In the Pacific war U.S. submarines initially placed these mines spaced between 280 and 1500 yards apart, while in later fields the spacing was between 500 yards and one mile. Two of the reports I have seen note that the mines had to be laid in a carefully plotted sinusoidal curve, apparently to make sweeping more difficult. A delay mechanism could give the boat 45 minutes to clear the area, but in most cases no delay at all was set. The first five patrols using Mk 12 mines experienced 11 failures, including premature explosions in each case. In August 1944 these mines were refitted with the improved Mk 3 Mod 2 exploder, making them twice as sensitive.

Other characteristics of the Mk 12 mines and their exploders are apparently still classified, which leads to some questions about their performance. According to Captain Franklin G. West, Jr., Training and Readiness Officer of the Mine Warfare Command in 1990, the Mk 12 mine was inoperative after the 90-day battery had expired.

However the life of a battery is not that exactly predictable, so allowance has to be made that mines might be viable somewhat longer. Also, it apparently did not have a sterilization mechanism. As will be seen later in a detailed analysis of claimed casualties due to mines, losses were credited to submarine mines much later than three months after the fields were planted, either due to lack of knowledge of the exploder's real characteristics or to some other unspecified mechanism by which it might have been set off.

In October 1942 the WHALE (SS 239) under J. B. Azer sailed from Pearl Harbor on her first war patrol with a load of 24 Mk 10-1 mines to be laid in Empire waters in Kii Suido. The objective was to plant them close inshore in order to force enemy traffic into deeper water where it would be more vulnerable to torpedo attacks. These were tethered mines touched off by contact with chemical horns and planted in fairly deep water with the mines themselves held at a selected depth below the surface. The WHALE's were laid in 15 to 42 fathoms of water with the explosive casings held two fathoms below the surface, but later plantings were made in water as deep as 63 fathoms. These mines consisted of two major sections—the floating sphere and its anchor—and their connecting cable, without any outer casing. Like their Mk 12 counterparts, they too were susceptible to failures: in the WHALE's case, one proved to be a floater. Only three later missions, all from Pearl Harbor, used these mines. B. F. McMahon in DRUM (SS 228) took 24 of them to Bungo Suido in December 1942, and in April 1943 W. N. Wylie in SCORPION (SS 278) carried the only load in which both Mk 12 and Mk 10-1 mines were laid together. In the final mission Creed Burlingame in the SILVERSIDES (SS 236) planted 24 of them in Steffan Strait as part of a coordinated operation with aircraft, the strait being the only entrance to Kavieng, New Ireland, that aircraft mines could not block. Following that exercise, the boat continued on to Fremantle, Australia.

As might be expected with weapons such as these, submariners did not like handling mines. In addition to their inherent hazards, they required taking one's boat into dangerously shallow waters near enemy ports, displaced more versatile and familiar torpedoes, and almost never produced visible or creditable results. Several missions were to replenish older minefields, in which cases accurate naviga-

tion was crucial. Examples of the risks are numerous. When J. B. Azer took WHALE inside Japanese minefields in order to lay his mines in a shipping lane, he detected a Japanese mine in the process. After planting his load in three sub-fields, he was forced down by destroyers, but had the satisfaction of seeing some ships previously damaged in a torpedo attack head straight toward the mines and later heard four heavy explosions. Unfortunately, these may have been premature, as no victims have been identified in post-war Japanese records.

Roy Benson in TRIGGER (SS 237) recorded having to pass up favorable torpedo targets to avoid alerting the Japanese, start his mine plant while surfaced in bright moonlight, and break off temporarily when ships appeared. These difficulties were offset by his unique experience of actually watching his victim blow up and sink. While patrolling in the Gulf of Siam on 13 June 1945, BERGALL (SS 320), under J. M. Hyde set off an Allied mine and was lucky to escape with reduction gears so badly damaged that she had to return to the States for repair. Patrol reports are replete with similar examples of mine hazards. In April 1945, GUITARRO (SS 363) had to run for miles on the surface under a bright moon, dodging traffic all the way, to reach her assigned position in Berhala Strait. Her skipper, T. B. Dabney, has provided this account of his experience after leaving Fremantle and reaching the area to be mined.

> "We ran on the surface, with all four main engines on the line, since it was a race against time. Arriving in the strait at about midnight, we had loaded our mines in the tubes, in preparation for accomplishing our mission. We were surprised to find two small ships with escorts exiting through the straits. Since we were in the narrow confines of the straits, in shallow water, and small boats all around us, we had to download our mines in the forward tubes and reload torpedoes, in case we were suddenly detected before we could commence our mission. The convoy passed within a thousand yards, apparently without detection. The small fishing boats, although close at hand, gave no indication of giving our presence away. We reloaded our mines and took position to lay our mines in

a sinusoidal curve. We successfully completed our mine field operation... and started our return at top speed on the surface, just before daybreak. We had a hundred miles of open water to cover before arriving at the 100 foot curve, suitable for diving. A Japanese plane spotted us and we had to dive. The bomb load fell around us but there was no damage.

In his patrol report, Dabney aptly referred to the area as *Wader's Paradise.* The water there was only seven fathoms deep.

Thanks to RADM M. H. Rindskopf we have a first-hand account of the Mk 10-1 mine plant laid by DRUM (SS 228) on her fourth patrol. On 12 December 1942, en route to Bungo Suido "in the unfortunate condition of having two of her forward tubes loaded with mines," skipper B. F. McMahon encountered the 13,360 ton carrier RYUHO with a deck load of planes. He fired the available four tubes and obtained one hit, but was driven deep before he could swing around for a stern shot, allowing the damaged carrier to escape. According to Rindskopf, who was a junior officer at the time, two mines were stowed in a tube but had to be fired one at a time.

"We carried mines only forward so with four in tubes (two each) that meant 20 in the room, two to a rack. That meant that we carried four torpedoes in tubes and no reloads forward with four and four aft. It is even possible that the torpedoes in the after room were Mk 15 destroyer type which had to be loaded through the tube because of the length. That was due to the shortage of the Mk 14 early in the War. We did not have to back down to launch as the mine was ejected by the same air impulse as torpedoes. I have some recollection that there were two aspects which might have been affected: first, the gyro spindle in the side of the tube was not required for the mine and might have gotten in the way during loading; second, is the lever at the top of the tube which triggered the torpedo starter. That wasn't required for mines but whether it got in the way or how it might have been withdrawn is fuzzy indeed. The mines may have been the same diameter as the torpedoes or a bit small.... The Mk 10 had the anchor attached

to the case and antenna without any streamlining or outer casing. Shoving them around the torpedo room and loading was no particular problem since we fired at a planned fairly rapid pace. ... We did not stick around long enough to see whether any targets ran through the field.... I do recall that from the continual firing and venting inboard, the pressure in the boat went to something like 12 inches. Since we did not have a compensating depth gauge, the diving officer had to make adjustments in gauge depth to keep us at 62 feet."

Notwithstanding the many problems, senior commanders recognized the mine's strategic value, and mines also constituted an alternative weapon when torpedo shortages would have necessitated going on patrol without full racks. In all, 33 Commanding Officers in 32 submarines planted minefields between October 1942 and May 1945, laying 576 Mk 12 magnetic bottom mines and 82 Mk 10-1 of the tethered type. Of these, 13 Mk 12s were failures, six of which exploded prematurely, and three Mk 10-1s were floaters. Ten patrols were made from Pearl Harbor and 23 from Fremantle, Australia. The only boat to lay two fields was TAUTOG (SS 199), first under J. H. Willingham on 2 November 1942 and then under W. B. Sieglaff on 7 March 1943. Apparently one mine plant per skipper was considered enough of a sacrifice.

British and Dutch submarines, including three designed specifically as minelayers, also laid 30 minefields, at first from Ceylon and later while patrolling from Fremantle under U.S. operational control. Although these are beyond the scope of this article, J. L. McCallum in BREAM (SS 243) had an unsettling experience on a special mission carrying British commandos with limpet mines to attack some anchored Japanese ships. On 14 March 1945 two of the frogmen were launched in a rubber raft but never returned. This demoralizing occurrence did not exempt the crew from planting a regular minefield on BREAM's very next patrol.

What were the results of these heroic efforts? Unfortunately, they are both meager and uncertain. The largest number of submarine mine victims claimed in any official U.S. source appears in the report of the Strategic Bombing Survey (SBS), which was conducted

immediately after the war. Although its main thrust was obviously aerial bombing, it also investigated offensive mining and concluded that 27 ships were sunk and 27 damaged by mines laid by U.S. submarines. As noted earlier, the official JANAC report of 1947 listed only five ships as sunk by U.S. submarine mines, of which four are also claimed by SBS.

Since 1947 significant new data sources have come to light, and I have used these to check the SBS and JANAC assessments. (To save space, these sources are described in the Appendix). My analysis reduces their claims to at best nine sinkings and eight cases of damage that can probably or possibly be credited to U.S. submarine mines. (None are assessed as fully confirmed, because sources are incomplete, indefinite, or even contradictory.) On the other hand, from these additional sources I have identified three cases of possible or probable sinkings and six of damages not claimed by SBS or JANAC. Table I summarizes the 26 cases that I consider credible.

In determining whether a claimed mine casualty should be categorized as probable, possible, or neither, I have tried to take into account all available data including the relative positions of the casualty and the minefield, the age of the mines and likelihood that they could have been swept, or other mines known to be in nearby locations, possible air or torpedo attacks, and the general reliability of the data sources. My conclusions are necessarily subjective and other analysts may differ. New data and information on other sources will be appreciated.

For readers interested in a more detailed analysis of the date, Table II gives particulars of the minefields laid by U.S. submarines. Table III lists all 28 sinkings claimed by SBS and JANAC, with notations to the applicable Japanese sources. Similarly, the 27 SBS damage claims are listed in Table IV, and the nine other cases in Table V.

APPENDIX—
SOURCE DESCRIPTIONS AND ABBREVIATIONS

SBS or Strategic Bombing Survey – The Offensive Mine Laying Campaign Against Japan; originally published 1946, reprinted by Headquarters Naval Material Command, 1969. This survey was conducted immediately after the war and includes many sections and appendices other than the above. The data were derived from intelligence reports but clearly not including naval Ultra intercepts. I am indebted to Ted Hajduk of Detroit for original SBS records detailing the ships attributed to the different minefields.

J or JANAC—Japanese Naval and Merchant Shipping Losses During World War II by All Causes; Gov't Printing Office, February 1947. JANAC counted only ships sunk but excluded merchant types, including small converted naval types with *maru* names, of less than 500 gross tons. Its intelligence sources apparently including sanitized information from Ultra messages and Japanese records captured at the end of the war. JANAC also attributed seven sinkings to British (including Dutch) submarine-laid mines. Only one of these appears in the SBS tally and is more likely to have been sunk by a U.S. submarine.

I OR IJN— The Imperial Japanese Navy in World War II, Part IV, Monthly Losses of Combatant and Non-combatant Vessels; Military History Section, U.S. Army Far East Command, 1952. After the war General MacArthur had Japanese researchers compile an extensive list of all ships believed sunk or damaged during the war, which was issued as a monograph. The ships are listed by month with separate sections for warships and non-combatants. Tables and maps give the date, ship type and tonnage, location, cause, and extent of damage. Not all records are complete, and locations are often given as general areas rather than latitudes and longitudes. This publication contains the most extensive records of damaged ships.

W or WIJN— Jentschura, Jung, & Mickel: Warships of the Imperial Japanese Navy, 1869-1945; Naval Institute Press, 1982. This book is based on data originally compiled by Shizuo Fukui and Erich

Groner in the 1950s and updated in several printings. It covers converted as well as regular warships in considerable detail, but includes little information on damage short of sinking.

S—Translations from Japanese publications by William Somerville of Lincolnshire, England. The major sources are Senji Sempaku Shi (Wartime Ships History, 1991) and Senji Yuso Sendan Shi (Wartime Transportation Convoys History, 1987) both by Shinshichiro Komamiya. The former is an alphabetical listing of ships sunk; the latter lists convoys chronologically and includes much information about the ships involved. Both lists have gaps and occasionally conflict. I am indebted to Mr. Somerville for data from these and other Japanese sources.

TABLE 1—SHIPS PROBABLY OR POSSIBLY SUNK OR DAMAGED

Date	Ship	Type	Tons	Submarine	Evaluation
16 Oct 42	Sydney Maru	AK	5245	THRESHER SS200	Prob Dam
30 Nov 42	Canton	FR APK	1521	TAUTOG SS199 4th	Prob Sunk
20 Dec 42	Mitsuki Maru	AK	3893	TRIGGER SS237	Prob Sunk
29 Dec 42	Fukken Maru	AK	2558	TAMBOR SS198	Prob Sunk
29 Dec 42	Teifuku Maru	AK	5198	TRIGGER SS237	Prob Sunk
20 Jan 43	Hokusui Maru	AK	3964	SUNFISH SS281	Poss Dam
20 Feb 43	Yoshida Maru	XPF	2920	SUNFISH SS281	Poss Dam
7 May 43	Gov Gen Pasquier	Fr AP	1994	GRENADIER SS210	Mines Old?
26 May 43	Palembang Maru	AO	5236	TROUT SS202	Prob Dam
30 May 43	Takamisan Maru	AK	1992	SNOOK SS279	Poss Sunk
30 May 43	Hakozaki Maru	AK	3948	SNOOK SS279	Poss Dam
15 Jul 43	Nagara	CL	5170	SILVERSIDES SS236	Poss Dam
27 Jul 43	Teikin Maru	AK	1972	TAMBOR SS198	Mines Old?
9 Aug 43	Esutoru Maru	Civ	3295	SCORPION SS278	Poss Dam
16 Sep 43	Seikai Maru	XPG	2693	SILVERSIDES SS236	Poss Sunk ½
4 Oct 43	Hyakufuku Maru	XAP	986	SCORPION SS278	Poss Dam
4 Oct 43	W 28	AM	648	SILVERSIDES SS236	Poss Dam
20 Feb 44	Gyonan Maru	Yacht	1243	CREVALLE SS291	Poss Dam
20 Feb 44	Francis Garnier	Fr AK	1243	CREVALLE SS291	Prob Sunk
14 Mar 44	Sanuki Maru	XAP	7158	RAY SS271	Poss Dam
9 Apr 44	Rakuyo Maru	APK	9418	BLUEFISH SS222	Poss Dam
1 JUL 44	Nikko Maru	AK	3098	KINGFISH SS234	Mines Old?
26 Jan 45	Tamon Maru #15	AK	6925	DACE SS247	Prob Sunk
30 Apr 45	Yuno Maru	AO	2345	GUITARRO SS363	Prob Sunk
7 May 45	Hayasaki	AF	920	GUITARRO SS363	Prob Dam
29 Jun 45	Hasu Maru	AO	1914	GUITARRO SS363	Poss Dam

TABLE II—U.S. SUBMARINE MINEFIELDS IN WORLD WAR II

Date	Submarine	Patrol	Fleet	Commander	Position & General Area	Mines
6 Oct 42	THRESHER SS200	5	SWP	Millican	12-50N 100-44E Bangkok Approaches	32 Mk 12 2 failures
20 Oct 42	GAR SS206	4	SWP	McGregor	12-35N 100-45E Bangkok Approaches	32 Mk 12 4 failures
25 Oct 42	WHALE SS239	1	Pac	Azer	33-46N 135-10E Kii Suido	24 Mk 10-1 1 floater
29 Oct 42	GRENADIER SS210	4	SWP	Carr	20-38N 107-04E Haiphong Approaches	32 Mk 12 1 failure
2 Nov 42	TAUTOG SS199	4	SWP	Willingham	11-10N 108-47E Cape Padaran	32 Mk 12 3 failures
2 Nov 42	TAMBOR SS198	4	SWP	Ambruster	20-04N 109-18E Hainan Strait	32 Mk 12 1 failure
14 Dec 42 17 Dec 42	SUNFISH SS281	1	Pac	Peterson	34-28N 137-20E Iseno Umi Bay	24 Mk 12
17 Dec 42	DRUM SS228	4	Pac	McMahon	32-47N 132-10E Bungo Suido	24 Mk 10-1
20 Dec 42	TRIGGER SS237	3	Pac	Benson	35-44N 140-56E Inubo Saki	19 Mk 12
7 Mar 43	TAUTOG SS199	6	SWP	Sieglaff	02-10S 116-40E Tanjong Aru	24 Mk 12
7 Apr 43	TROUT SS202	8	SWP	Ramage	02-00N 109-15E Api Passage	23 Mk 12
19 Apr 43	SCORPION SS278	1	Pac	Wylie	36-05N 140-45E Inubo Saki	12 Mk 12 & 10 Mk 10-1
20 Apr 43	RUNNER SS275	2	Pac	Fenno	22-15N 114-15E Hong Kong**	32 Mk 12
21 Apr 43 22 Apr 43	STINGRAY SS186	7	Pac	Earle	28-10N 121-55E Wenchow Bay	32 Mk 12
30 Apr 43	SNOOK SS279	1	Pac	Triebel	30-21N 122-30E Saddle Island** Shanghai	24 Mk 12
12 May 43 30 May 43	STEELHEAD SS289	1	Pac	Whelchel	42-07N 143-21E Erimo Saki	12 Mk 12
4 Jun 43	SILVERSIDES SS236	5	Pac*	Burlingame	02-36S 150-34E Steffen Strait** Kavieng	24 Mk 10-1 2 floaters
2 Oct 43	KINGFISH SS234	5	SWP	Lowrance	05-10S 119-20E Cape Pepe Laikang Bay	11 Mk 12
13 Dec 43	POMPON SS267	3	SWP	Hawk	08-50N 106-05E Pulo Condore	11 Mk 12

18 Dec 43	CABRILLA SS288	2	SWP	Hammond	10-30N 103-14E Saracen Bay	11 Mk 12
3 Jan 44	BLUEFISH SS222	3	SWP	Porter	04-50N 103-35E Pulo Tenggol	11 Mk 12
4 Jan 44	RASHER SS269	2	SWP	Laughon	09-00N 106-40E Pulo Condore	11 Mk 12
14 Jan 44 15 Jan 44	CREVALLE SS291	2	SWP	Munson	10-33N 108-01E Kega Point	11 Mk 12
29 Jan 44	BOWFIN SS287	3	SWP	Griffith	03-36S 116-35E Subuku Island ** Laut Strait	11 Mk 12
22 Feb 44	RAY SS271	3	SWP	Harral	10-18N 107-50E Kega Point	11 Mk 12
19 Aug 44	REDFIN SS272	4	SWP	Austin	02-00N 109-15E Api Passage	11 Mk 12
14 Sep 44 15 Sep 44	PARGO SS264	5	SWP	Bell	02-39N 108-58E Koti Passage	11 Mk 12
6 Nov 44	GURNARD SS254	7	SWP	Gage	02-08N 109-40E Tanjong Datoe	11 Mk 12
16 Dec 44	DACE SS247	6	SWP	Cole	13-36N 109-18E Pulo Gambir	11 Mk 12 2 failures
2 Apr 45	HARDHEAD SS365	4	SWP	Greenup	08-22N 105-01E Pulo Obi	23 Mk 12
14 Apr 45 15 Apr 45	CHARR SS328	2	SWP	Boyle	08-25N 104-37E Pulo Obi	23 Mk 12
20 Apr 45	GUITARRO SS363	5	SWP	Dabney	01-00S 104-30E Berhala Strait	23 Mk 12
8 May 45 9 May 45	BREAM SS243	6	SWP	McCallum	08-18N 104-49E Pulo Obi	23 Mk12

Notes: All SWP patrols were from Fremantle, Pac patrols from Pearl Harbor.
Roscoe lists Redfin SS272 3rd patrol incorrectly as a mine plant.
Blair lists SALMON SS182 6th patrol incorrectly as a mine plant.
* Patrol was passage from Pearl Harbor to Fremantle
** Mines were also laid by aircraft in the same area.

TABLE III—SHIPS CLAIMED BY SBS AS SUNK (27)

Date	Ship	Type	Tons	Location	Sub	Eval
30 Nov 42	Canton	APK	1521	11-06N 108-17	TAUTOG 4th	Prob
	Vichy French ship, not in other sources					
20 Dec 42	u/i	Frt	8000e	35-45N 140-55E	TRIGGER	Prob
	Mitsuki Maru	C-AK	3893	S of Daiozaki		
	J credits Unknown Maru 4000e tons to USN mine; I-marine casualty; not in S					
29 Dec 42	Fukken Maru	C-AK	2558	20-04N 109-18E	TAMBOR	Prob
	J credits USN mine; I&S-torp (no likely sub attack)					
7 May 43	GovGen Pasquier	AP	1994	20-55N 107-00E	GRENADIER	Old?
	Vichy French ship, not in other sources; mines 6+ mo. Old					
18 Jul 43	u/i	Mer	4000e	20-35N 107-00E	GRENADIER	Unid
27 Jul 43	Teikin Maru	C-AK	1972	19-57N 109-05E	TAMBOR	Old?
	J credits USN mine; I&S-torp (no likely sub attack); mines 7+ mo. Old					
31 Jul 43	Nanshin [M]	Frt	250e	22-15N-114-00E	RUNNER	Unk
24 Aug 43	Shinagawa Maru	XPkt	81	Yertimo Saki	STEELHEAD	Casualty
	I-marine casualty; W-wrecked; not in S; too small for JANAC					
28 Aug 43	Hinode [M.] #8	NG	118	Yertimo Saki	STEELHEAD	Unk
4 Nov 43	Tsukushi	AGS	1400	02-40S 150-40E	SILVERSIDES	Aus mine
	SBS lists as 4000e tons; J-Aus mine; I, W. & S-mine; sub mines 5+ mo. Old					
- Dec 43	u/i	NG	2000e	Kii Suido	WHALE	Unid
- Jan 44	u/i	NG	3000e	Kii Suido	WHALE	Unid
20 Feb 44	Gyonan Maru	NG	NG	Kega Point	CREVALLE	Poss dam

Ex-Hirondelle Ex-Phil yacht, 1243 tons, ident questionable; not in I, W, or S; survived war						
20 Feb 44	Francis Garnier	AK	1243	10-30N 108-00E	CREVALLE	Prob
Vichy French ship; J credits as 639T PR to Army mine 22 Feb; not in other sources						
23 Apr 44	Amagiri	DD	2090	02-12S 116-45E	TAUTOG 6th	Army mine
J-Army mine; I, W, & S-mine; sub mines 13+ mo. Old						
11 Aug 44	Gyoyu [M.]	Mer	300	02-18S 104-55E	GUITARRO	Impos
Mines laid 20 Apr 45; no other record						
12 Aug 44	Tako [M]	Mer	200e	02-20S 104-54E	GUITARRO	Impos
Mines laid 20 Apr 45; no other record						
26 Aug 44	Atago [M.] #3	NG	55	Inubo Zaki	SCORPION	Unk
9 Oct 44	Hato Maru	AK	880	31-10N 122-25E	SNOOK	Army mine
J credits Army mine; S-ran aground; not in I; sub mines 17 mo. Old						
14 Nov 44	Heiyo [M.}	AK	1320	01-45S 116-35E	TAUTOG 6th	Unk
27 Dec 44	u/i	NG	NG	Pulo Gambir	DACE	Unid
26 Jan 45	Tamon Maru #`15	C-AK	6925	13-34N 109-17E	DACE	Prob
J credits USN mine; I & S-mine						
22 Feb 45	Tatekawa M. #2	AO	10045	11-08N 108-44E	TAUTOG 4th	Army a/c
J credits Army a/c & mine; S-mine; not in I; sub mines 26 mo. Old						
25 Mar 45	Houlee	Frt	1339	31-00N 122-20E	SNOOK	Army a/c
Nationality unk; J credits Army a/c; not in I or S; sub mines 22 mo. Old						
30 Apr 45	Yuno Maru	A-AO	2345	00-58N 104-31E	GUITARRO	Prob
SBS lists as Yuno (Uya); J credits Br mine (prob ref to HNMS O-19); S-mine; I-torp (no likely sub attack); GUITARRO plant closer & more recent than O-19's						

8 May 45	u/i	NG	NG	00-58N 103-13E	GUITARRO	Unid
~ 45	Yeshino [M.]	NG	3000e	00-58N 103-32E	GUITARRO	Unk
SHIP CLAIMED IN JANAC BUT NOT BY SBS						
1 Jul 44	Nikko Maru	C-AK	3098	05-39S 119-28E	KINGFISH	Old?
J credits USN mine; SBS lists but not attributed to KINGFISH; I-torp (no likely sub attack); S-mine; mines 8+ mo. Old.						

ABBREVIATIONS:
J - JANAC;
I - Imperial Japanese Navy in WWII;
W - Warships of the Imperial Japanese Navy
S - Somerville translations of Japanese records
Unid or Unk - ship not found in any of the above sources
Ship type prefixes: A - Army; C - Civilian; X - converted naval type

TABLE IV - SHIPS CLAIMED BY SBS AS DAMAGED (27)

Date	Ship	Type	Tons	Location	Sub	Eval
16 Oct 42	Sydney Maru	A-AK	5245	12-50N 100-45E	THRESHER	Prob
No other record						
26 Oct 42	u/i	NG	2500e	33-52N 135-02E	WHALE	Torp
	Kirishima Maru	XAO	5959	33-40N 135-15E		
I-damaged by unk agent, extent unk; S&W - no info						
18 Dec 42	u/i	Frt	NG	Iseno Umi	SUNFISH	Unid
26 Dec 42	u/i	Mer	2000e	Inubo Zaki	TRIGGER	Unid
18 Mar 43	Kasuura [M.]	NG	NG	Tanjong Aru	TAUTOG 6th	Unk
25 Apr 43	Buenos Aires M.	A-AH	9626	Hainan Strait	TAMBOR	Torp
I-minor damage by sub; S-torp; mines 5+ mo. Old						

20 May 43	u/i	Mer	NG	Hainan Strait	TAMBOR	Unid
4 Oct 43	Hyakufu-ku M.	XAP	986	Inubo Zaki	SCORPION	Old?
	W-no info; not in I or S; mines 5+ mo.					
4 Oct 43	Mehaku [M.]	NG	3000e	Kavieng	SILVERSIDES	Unk
4 Oct 43	Kakuya [M.]	NG	3000e	Kavieng	SILVERSIDES	Unk
4 Oct 43	u/i Mine-sweeper	AM	150e	Kavieng	SILVERSIDE	
2 Oct 43	W 28	AM	648	Kavieng Bay		Poss
	SBS attributes 1 u/i ship to SILVERSIDES but does not include 150 tons in total, may refer to this listing. I-light damage to W 28 by mine 2 Oct 43; W-no info; mines also laid by a/c at Kavieng; sub mines 4 mo. Old					
12 Nov 43	Albert Sarraut	AP	2156	Cape Paderan	TAUTOG 4th	Too Old
	Vichy French ship; no other record; mines 12+ mo. Old					
– Dec 43	u/i	NG	2500e	Kii Suido	WHALE	Unid
14 Mar 44	Sanuki Maru	XAP	7158	Kega Point	CREVALLE RAY	POSS
	SBS credits CREVALLE; W-no info; not in I or S; Ray mines closer & more recent					
19 Mar 44	Nankai [M]	NG	544	Hainan Strait	TAMBOR	Unk
9 Apr 44	Rakuyo Maru	C-APK	9418	04-49N 103-36E	BLUEFISH	Poss
	Not in I or S					
9 Apr 44	Shinsho [M]	NG	5136	04-49N 103-36E	BLUEFISH	Unk
23 Jun 44	Tsurush-ima M.	A-AK	4645	Kega Point	CREVALLE	Torp
	J-sunk by JACK (SS259) 24 Jun @14-25N 119-47E; I-sunk by sub (no attack that date); S-left Nhatrang Bay 26 Jun, torp & sunk by JACK 30 Jun @ 14-15N 119-40E					
19 Jul 44	Hokuju [M.]	NG	4246	Iseno Umi	SUNFISH	Unk

3 Sep 44	Toa [M.]	NG	10022	10-16N 107-53E	CREVALLE	Unk
7 Nov 44	Yokai [M.]	NG	2500e	Hong Kong	RUNNER	Unk
16 Nov 44	Yamasac-hi [M.]	NG	5948	Hong Kong	RUNNER	Unk
4 May 45	Hayasaki [M.]	AO	8000e	Berhala Strait	GUITARRO	
7 May 45	Hayasaki	AF	920	01-00S 104-30E		Prob
	I & W identify ship as AF; I-damaged by mine 7 May, extent unk; S-no info; HNMS 0-19 laid mines in same area but GUITARRO closer & more recent					
26 May 45	Mitukig-awa [M]	NG	873	33-52N 135-02E	WHALE	Unk
29 May 45	u/i	NG	NG	Haiphong	GRENADIER	Unid
29 Jun 45	Hasu (Ren)	AO	1953	01-02S 103-32E	GUITARRO	
	HASU MARU	AO	1914	Belok Strait		Poss
	S-was captured ship, hit mine in Belok Strait, Sumatra 3 Jun 45 & sank; not in J, I, or W; HNMS O-19 laid mines in same area but GUITARRO more recent.					
– – 45	Unident	NG	NG	Shanghai	SNOOK	Unid

Notes: See Table III

TABLE V - SHIPS SUNK OR DAMAGED, NOT CLAIMED BY SBS

Date	Ship	Type	Tons	Location	Sub	Eval
29 Dec 42	Teifuku Maru	C-AK	5198	35-45N 140-54E	TRIGGER	Prob Sunk
	J credits TRIGGER torp attack 22 Dec; I-medium damage by sub 29 Dec; S-torp 29 Dec & beached, total loss (no torp attack 29 Dec).					
26 Jan 43	Hokusui Maru	C-AK	3964	Off Lk Hamana	SUNFISH	Poss dama-ged
	I-heavy damage by sub (no likely torp attack); S-no info					
20 Feb 43	Yoshida Maru	XPF	2920	34-30N 137-20E	SUNFISH	Poss dam-aged

I&W-medium damage by sub (no likely torp attack); not in S						
26 May 43	Palembang Maru	C-AO	5236	02-03N 109-11E	TROUT	Prob damaged
I-medium damage by sub (no likely torp attack); not in S						
30 May 43	Takamisan Maru	A-AK	1992	31-20N 122-39E	SNOOK	Poss sunk
J credits SAURY (SS189) torp at 30-07N 124-34E; I&S-mine						
30 May 43	Hakozaki Maru	C-AK	3948	31-20N 122-39E	SNOOK	Poss damaged
I-mined, extent of damage unk; S-no info						
15 Jul 43	Nagara	CL	5170	Kavieng	SILVERSIDES	Poss damaged
SBS lists but not attributed to SILVERSIDES; I-light damage by mine; mines also laid by a/c at Kavieng						
9 Aug 43	Esutoru Maru	C	3295	36-07N 140-45E	SCORPION	Poss damaged
I-light damage by mine; not in S; mines 3+ mo. old						
16 Sep 43	Seikai Maru	XPG	2693	Kavieng	SILVERSIDES	Poss sunk (1/2)
J credits Australian mine; I- mine Kavieng Bay; W-mine off Kavieng; S-disabled by a/c, drifted onto 2 mines & sank (a/c & mines each get half credit); sub mines 3+ mo. old						

Notes: See Table III