

## APPENDIX V

### **APPENDIX V**

"U.S. PACIFIC SUBMARINES IN WORLD WAR II", by William P. Gruner is a summary of the U.S. submarine war in the Pacific. It was written by William P. "Bud" Gruner Jr., class of 1935 in the US Naval Academy who eventually commanded USS *SKATE* during WW II.

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### U.S. PACIFIC SUBMARINES IN WORLD WAR II

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### **A Bit of World War 11 History in the Pacific Theater**

The fifty-one submarines at Pearl Harbor, on the west coast of the U.S., and at Manila, Philippine Islands were the only ships of the U.S. Pacific Fleet able to retaliate after the Japanese attacked Pearl Harbor on 7 December 1941. The attack put the U.S. Battle Force out of action. Our Fleet Class submarines had been designed as advanced scouts for that force. However, by good fortune, they had the speed, endurance, and weapon load to make them admirably suited for another role; attacking Japanese shipping throughout the Pacific. As a result they were immediately assigned the new role, and a basic military strategy of strangulation of Japan was fashioned about them.

#### **Cutting the Japanese Jugular**

Japanese shipping routes spanned the Pacific from the Gilbert Islands in the east to the Malay Peninsula in the west, and from the Kuriles in the north to the Dutch East Indies in the south. This ocean traffic was the life blood of Japan's war effort for she had few natural resources and was dependent upon imports of oil, coal, iron, food and other materials for her war effort. Consequently, it was essential that the same Japanese ships that distributed food, fuel, war materials and troops to the many scattered Japanese outposts carry raw materials back to the Empire. Cold statistics on ship sinkings do not describe the plight of the Japanese outposts when guns, ammunition, tanks, fuel and food failed to arrive. Devastating, too, was the loss of thousands of troop reinforcements when they went down with the transports sunk by our submarines. These losses were serious, but a far more serious loss brought about by our submarines was the failure of the Japanese merchant marine to provide the Japanese home islands with critical war materials. They blanketed the areas around the Japanese home islands and outposts throughout the Pacific. They were active off Indonesia, the Philippines, the Gilbert, Marshall, Caroline and Mariana Islands, New Guinea, the Dutch East Indies, and the western Aleutians. They quickly began sinking Japan's merchant fleet, and prevented it from supplying their far-flung empire with arms, fuel, food and troops.

#### **Operation Galvanic**

The U.S. surface fleet was repaired during 1942 and 1943 and augmented by new construction. As things started looking up at Pacific Fleet Headquarters at Pearl in the fall of 1943 plans were made for a big offensive drive. It was to start at the eastern end of the line of Japanese outposts, extend to the Philippines, and continue from there to Japan. An operational concept with ships organized into fast carrier task forces was tested in a strike on the Japanese held Wake Island in early October 1943. Meanwhile, a plan was finalized for Operation "Galvanic", an attack on Japanese bases in the Gilberts. Within two years after the attack on Pearl Harbor, a force of 118 warships was assembled at Pearl. It included 13 battleships, 19 carriers, and 10 submarines.

Japanese outposts in the Gilbert and Marshall Islands, weakened by failure of supplies to get through submarine infested waters, were overrun by our carrier task forces in late 1943. Encouraged by early success, the carrier forces rolled on during the spring and late summer of 1944, mopping up Japanese bases in the Marshalls, the Carolines and the Marianas. In the meantime, while supporting these offensive operations, our submarines continued to take a heavy toll of Japanese merchant and combatant ships throughout the Pacific. Hunting was excellent and submarine sinkings of Japanese merchantmen during 1944 averaged one and a half ships a day.

#### **Japanese Merchant Ship Losses**

The Japanese cargo carrying capacity of 6 million tons at the start of the war was reduced to about 5 million tons by the end of 1943, and to less than 3 million tons by the end of 1944 despite a rigorous

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ship building program. At war's end in August 1945 Japan had less than 2 million tons of cargo shipping, but only 312,000 tons of it was in condition to haul cargo. Despite ship construction of 3 1/4 million tons during the war, replacement tonnage amounted to only about a third of losses due to all causes. Because of shipping losses, Japanese imports of bulk commodities fell from about 20 million tons in 1941 to about 16 1/2 million tons at the end of 1943, and further to 10 million tons in 1944. The importation of materials had essentially ceased by the time Japan surrendered in August 1945. By then Japan's war industry was stalled, and it was impossible for the military to wage war abroad. It was also nearly impossible for the civilian population to exist on the meager rations of food and energy available.

American submarines acted alone to destroy the Japanese ocean transport system during the first two years of the war. Thereafter, other elements of U.S. forces contributed to its destruction. However, our submarines deserve most of the credit, as revealed in the following table.

### **Japanese Merchant Tonnage Sunk, Pearl Harbor to War's End:**

	<b>Tons*</b>	<b>% of Total</b>
Submarines	4,861,300	54.64
Navy Carrier Air	1,452,900	16.33
Army Air	910,100	10.23
Navy Land Based Air	383,200	4.31
All Other Causes	1,289,500	14.49
<b>Total</b>	<b>8,897,000</b>	<b>100.00</b>

\*Tons sunk include only ships of over 500 gross tonnage, and those put out of action for the duration of the war. Included are ships sunk by Allied submarines (2%), by Allied aircraft (12%). 23% of those sunk during the month of July 1945 were sunk by Allied carrier based aircraft.

### **U.S. Submarine Warfare Directives**

The Chief of Naval Operations issued a directive on 7 December 1941 to "Execute unrestricted air and submarine warfare against Japan". The major mission assigned our submarines was the anti-ship (torpedo attack) mission. Early in the war Japanese capital ships were assigned as primary targets. Later, the priority was placed on merchant ships in order to cut off the Japanese supply of critical war materials, fuel, and food to her wide-spread ocean empire and to the home islands.

On 13 April 1944, our submarines were instructed to give priority to fleet destroyers. The purpose was to reduce the major defensive strength of Japanese combatant groups and high priority merchant shipping.

Later still, the highest priority was placed on tankers. The objective was to cut off fuel to the fleet and the Japanese home islands.

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### **U.S. World War II Submarine Operational Summary:**

- Maximum number of U. S. Submarines in the Fleet = 288
- Number that made war patrols = 263
- Number of War Patrols made by Submarines in the Pacific = 1,474
- Number of days at sea by those Submarines = 70,838
- Number of Japanese ships attacked by submarines = 4,112
- Total number of Japanese ships sunk by submarines = 1,392
- Average number of merchant ships sunk/war patrol = 0.80
- Average number of naval vessels sunk/war patrol = 0.145
- Average number of all types of ships sunk/war patrol = 0.945
- Number of airmen rescued by Submarines = 504 by 86 Submarines
- Number of Submarines lost on war patrol = 41, or 1 out of every 6.41 S/Ms = 15.59%
- Number lost due all causes = 52 out of the 288 in the Fleet, or 1 out of every 5.54 Submarines = 18.06%
- Number of U.S. Submarine Commanding Officers = 465
- Duration of the war = 1,347 days

### **U.S. World War II Submarines**

#### **Fleet Type Submarines**

The large long range ocean going Fleet Type submarines comprised the major portion of the U.S. submarine fleet used against Japan throughout World War II. All Fleet Type submarines were similar in appearance, although the later ones were slightly larger than the earlier ones. Built in various classes, they had a length of 300 to 312 feet, beam of 23 to 27 feet, and draft of 14 to 15 feet. They were of double hull construction, with surface displacement of 1125 to 1500 tons, and submerged displacement of 1650 to 2400 tons. They were typically equipped with four main diesel engines, and one smaller auxiliary diesel. The latter was generally used for carrying the "hotel" load. They had a surface speed in a calm sea of 20 to 21 knots on four main engines at full power, and a cruising speed on two main engines of about 15 knots. They were equipped for submerged operations with two 126 cell electric storage batteries. A fully charged battery provided

a maximum submerged endurance of about 36 hours at a creeping speed of about 2 1/2 knots, and a maximum speed of 8 to 9 knots for about 1/2 hour. Oxygen addition and carbon dioxide absorbent was needed after about 12 to 15 hours submerged.

Fleet submarines were designed for a patrol endurance of 8 weeks (56 days). Endurance was limited by personnel, weapon, food and fuel consumption considerations. Most patrols were of 42 to 56 days

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duration. Three boats made patrols of 80 or more days; *BLACKFISH* (Sellars), *THRESHER* (Middleton), and *GUIJARRO* (Dabney).

The typical fleet boat had six 21" torpedo tubes in the forward torpedo room and four in the after torpedo room. They carried a maximum of 24 Mk. 14 or Mk. 23 steam, or Mk. 18 electric torpedoes, or mixed loads of steam and electric torpedoes, or mixed loads of torpedoes and mines. They were armed for surface offense and defense with a single 3", 4", or 5" gun mounted either forward or abaft the conning tower as desired by the Commanding Officer. In addition, they carried 50 caliber, 20 millimeter, and 40 millimeter rapid fire guns.

Early fleet type submarines were designed for a test depth of 250 foot keel depth. This was gradually increased in later boats to 400 feet.

Typical of fleet type submarine crew size in the early days of the war was 55 enlisted men. Of these, 42 were rated men, 7 were seamen, 4 firemen, and 2 mess attendants. Enlisted crew size grew to about 72. The number of officers increased from 5 to 8 or 9. Increases were generally due to added equipment such as radar and new sonar.

In 1942 the U.S. Navy commissioned 32 new fleet type submarines. The numbers on patrol grew as newly built submarines were deployed until in November 1944 our submarines made 250 patrols, the most during any month of WW II.

### **S-Class Submarines**

S-class submarines were the oldest and smallest submarines operationally employed by the U.S. during World War II. S-30 was launched on 1 April 1918 at the end of World War I, and was the oldest to make war patrols. The S-boats were built in various classes. They had a length of about 225 feet, beam of 20 feet, and draft of 15 feet. They were of single hull construction, with surface displacement of about 850 tons, and submerged displacement of 1100 tons. They had four or five 21" torpedo tubes in the bow, and could carry 12 Mk. 10 steam torpedoes. For surface action they carried a 4" gun. Their two main diesel engines gave them a maximum surface speed of about 14 knots in a flat sea. A 120 cell electric storage battery was provided for submerged operations. When fully charged, the battery provided a submerged endurance of about 36 hours at creeping speed of about 2 1/2 knots, and maximum speed of 10 knots for about 1/2 hour. They were designed for a test depth of 200 feet.

At the start of the war the S-class submarines inflicted significant damage on Japanese combatant and merchant ships. Six S-boats of Submarine Division 10 were attached to the Asiatic Fleet and based at Manila. The base was lost in the first month of the war, and these S-boats were sent south to be based on the east coast of Australia. S-boats based at Submarine Base, Coco Solo, Panama, were also sent to Australia. Still others were used for training officers and crews at the Submarine Base, New London, CT, and early in the war some S-boats were sent on patrol off the Aleutian Islands. By 1944, most of the active S-boats were based at the Naval Repair Base, San Diego, California. They were used as targets for training anti-submarine sonar operators from the West Coast Sound School at Point Loma, and pilots of Fleet Air Wing 5 based at North Island, Coronado, California.

### **U.S. Submarine Command Organizations**

Before the war all our submarines were attached to the three U.S. Fleets; Atlantic, Pacific and Asiatic Fleets. In the Pacific, 16 fleet type and 6 S-Class submarines were under the command of Commander Submarines Scouting Force, Pacific Fleet, based at Pearl Harbor. In the Far East 23 fleet type and 6 S-

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Class submarines were under the command of Commander Submarines, Asiatic Fleet, with staff in the submarine tender *CANOPUS*.

Shortly after the Japanese attack, submarines of the Pacific Fleet at Pearl were placed directly under the command of Commander-in-Chief, Pacific Fleet (CinCPac) rather than under the command of the Scouting Force. The new organization was entitled Submarines, Pacific Fleet. Within a year the title was changed to Submarine Force, Pacific Fleet.

In the Far East the Asiatic Fleet submarine command became Commander Submarines, Southwest Pacific (ComSubSoWesPac). Later, all naval units operating in the Southwest Pacific were designated the 7th Fleet, and the submarine command became Commander Submarines, Seventh Fleet.

Each of the submarine administrative commands functioned as separate entities under its Fleet Commander. No official ties bound them all together. The geographical boundary between the operating areas assigned ComSubPac (or ComSubForPac) and ComSubSoWesPac was subject to slight revisions as time passed, but finally was stabilized at a line drawn along the 20° north parallel from the coast of China to a line just a few miles east of the Philippine Archipelago, then directly south to the equator, and then eastward along the equator. Temporary revisions were made to meet specific operational situations, but normally waters north and east of the line were patrolled by Pacific Fleet submarines, and waters south and west by submarines of SubSoWesPac.

Individual submarines were organized into squadrons and divisions for administrative purposes. A squadron consisted of two divisions of 6 submarines each, and each squadron was assigned to a tender or base. Squadron and division

commanders served wholly in an administrative capacity. The Force Commander controlled all combat operations and dealt directly with the Submarine Captains.

### **Japanese Ship Losses to Submarines**

#### **Merchant Ships**

U.S. Submarines attacked 4,112 Japanese merchant ships\* during 1,474 war patrols. Of these, the number of ships sunk was:

<b>Assessment</b>	<b>No.</b>	<b>Tonnage</b>
Confirmed	1,113	4,779,902 or 1 out of 3.69 attacked.
Probable	65	225,872
Total	1,178	5,005,774 or 1 out of 3.49 attacked.

\*Includes only merchant ships over 500 tons.

The average number of confirmed and probable merchant ships sunk/patrol was 0.80. Many were damaged and temporarily put out of operation.



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**Naval Ships**

Assessment	No.	Displacement (tons)
Confirmed	201	540,192
Probable	13	37,434
Total	214	577,626

Average number of confirmed and probable naval vessels sunk per patrol was 0.145. Many were damaged and temporarily put out of operation.

**U.S. Submarines sank the following major Japanese combatant ships of 1,000 tons or more:**

Aircraft Carriers	4 <i>SHINANO@, SHOKAKU, TAIHO, UNRYU</i>
Escort Aircraft Carriers	4 <i>CHUYO, JINYO, OTAKA, UNYO</i>
Battleships	1 <i>KONGO</i>
Heavy Cruisers	4 <i>ATAGO, KAKO, MAYO, ASHIGARA#</i>
Light Cruisers	9 <i>AGANO, IZUZU, NAGARA, NATORI, OI, TATSUTA, TENRYU, YUBARI,</i> and <i>TAMA</i> (in combination with aircraft)
Destroyers	38 (One sunk in combination with aircraft)
Submarines	23

@ Largest warship built up to WW II, converted from battleship hull.

# Sunk by the British submarine *TRENCHANT* off Sumatra.

The total confirmed and probable Japanese Naval & Merchant Ships sunk by submarines was 1,392 ships of 5,583,400 tons. That was 54.6% of all Japanese ships sunk during the war. The average number of naval and merchant ships sunk per patrol was 0.944.

The number damaged is unknown, but was a major factor in impeding Japanese logistic support of its outposts, and its import program.

1944 was a bad year for the Japanese. Submarine deliveries to the fleet began to saturate the western Pacific. Our submarines spent 11,700 days on offensive patrol and fired 6,092 torpedoes. 16 successful attacks were made on April 27 and August 22, and during the month of October 185 successful attacks were made. The most productive day of the war for U.S. submarines was October 24, 1944 when 20 successful attacks were delivered.

Late in the war the area north and east of Luzon was known to the Japanese as "the Sea of the Devil". In 1944 a common saying in Singapore was that "one could walk from Singapore to Tokyo on American periscopes."

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**Causes of Japanese Merchant Ship Losses\***

<b>Cause of Sinking</b>	<b>No. Ships#</b>	<b>% of Total No.</b>	<b>GRT*#</b>	<b>% of Total GRT</b>
Submarines	1,152.5	45.5	4,861.3	54.6
Carrier Based Air	393.5	15.5	1,452.9	16.3
Navy Land Based Air	143.5	5.7	383.2	4.3
Army Air	300.0	11.8	910.1	10.2
All Other Causes	543.5	21.5	1,289.5	14.5
<b>TOTAL</b>	<b>2,533.0</b>	<b>100.0</b>	<b>8,897.0</b>	<b>100.0</b>

\* 1000's of tons. Includes only ships larger than 500 gross registered tons.

# Small variations are due to different criteria and data sources used.

**Miscellaneous Japanese Ship Losses**

Six Japanese ships totaling over 30,000 tons were sunk by inadvertently running over their own mines by the end of May 1942.

**Submarine Attacks on Trawlers, Sampans and Other Small Craft:**

*BLENNY* (Hazzard) sank 63 trawlers, sampans, and other small craft by gun fire and/or grenades during one patrol.

*BUGARA* (Schade) sank 57 small craft by gunfire during one patrol.

*COD* (Westbrook) temporarily lost a boarding party when forced to dive while boarding a small craft.

*SILVERSIDES* (Burlingame) on her first patrol conducted a gun action against a small trawler. Although riddled by gunfire, the trawler's return fire killed *SILVERSIDES'* first loader, Mike Harbin.

*TIRANTE* (Street), when torpedo targets were scarce during her second patrol, put boarding parties aboard several junks, removed their skippers for questioning and set the junks on fire after the crew were put in lifeboats.

*COBIA* (Becker) on 20 July 1944 engaged three small armed vessels in a running gun battle. After sustaining slight damage when one of them rammed her, she sank all three of her attackers.

**Lifeguard Missions**

As the war progressed submarines were assigned to Lifeguard stations in areas where Navy Carrier Task Force operations, and Army Air Corps bomber raids were planned. Their assigned task was to pick up airmen from planes that ditched in the ocean. In late 1943 *SKATE* was the first submarine specifically assigned to Lifeguard duties. Her mission was to rescue airmen shot down at sea in support of the fleet strike by Task Force 14 on Japanese held Wake Island, October 7-10, 1943. She plucked 6 airmen from

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the sea during the strike. One of *SKATE*'s officers was killed by a strafing Japanese aircraft while approaching close to the shore to pick up survivors.

Toward the end of the war there were fewer Japanese ships afloat to serve as targets for our submarines, and more U.S. carrier strikes were conducted. As a result, 380 airmen were rescued in 1945.

86 American submarines spent a total of 3,272 days on Lifeguard stations during the war, and rescued 504 airmen.

*TIGRONE* held the record of 31 airmen rescued. *SEALION* picked up Sgt. B. R. Grier on April 2, 1945 after he had drifted in the China sea for 23 days.

### Special Missions

In addition to anti-ship, anti-patrol vessel, and Lifeguard missions, U.S. submarines were sent on special missions to rescue civilians and troops, transport ammunition and food, conduct sabotage, and other tasks in enemy held territory.

**The following list summarizes most of these other types of missions:**

Land bombardment	15
Landing of military troops, civilians, special agents, food, ammunition and supplies	89
Mine laying	35
Evacuation of military and civilian personnel#	Numerous
Air strike beacon ships	Numerous
Reconnaissance and photo reconnaissance	Numerous
Search and rescue	Numerous
Weather reporting, special strikes	Frequent
Anti-Picket Patrol	Numerous
Mine detection	Several
Demolition	Few

#Includes President Quezon of the Philippines and U.S. High Commissioner to the Philippines, Sayre, and their parties.

During the period 1 February 1943 to 23 January 1945, nineteen of our submarines performed special missions delivering 331 personnel, evacuating 472 personnel and delivering about 1,325 tons of supplies.

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Among the guerrilla supplies that submarines carried to Mindanao was an item called "Padre's Kits." These were 5-gallon cans containing wheat flour for making communion wafers, and sacramental wine. Both were then unavailable in the Philippines.

*NARWHAL* (Holman) in October 1944 returned from a special mission to Negros Island, bringing back 6 men and women and 14 children. She entered Brisbane Harbor flying 12 clean white diapers from her signal halyard.

*STINGRAY* (Loomis) on her 14th patrol, on a special mission assignment to land a reconnaissance party on Majoe Island, was attacked by a TBF bomber. In attempting to abort the attack at the last moment the TBF crashed into the sea killing the pilot. The plane was operating with the same air group which a day earlier had attacked and sunk *SEAWOLF*.

*BLUEGILL* (Barr) put a landing party ashore and "captured" Pratas Island, 160 miles southeast of Hong Kong.

### **Miscellaneous Statistics**

#### **Number of Submarine Patrols**

U.S. submarines made 1588 patrols during WW II; 1474 in the Pacific, 87 in the Atlantic, 22 in Europe and 5 in North African waters.

Forty of our submarines made at least 10 patrols. Thirty nine made 11; twenty eight made 12; 12 made 13; 7 made 14; and 5 made 15. *STINGRAY* was the only one to make 16.

#### **U.S. Submarine Losses in World War II**

Total lost = 52, or 1 out of 5.54 submarines in the fleet.

Losses due to possible enemy action = 41, or 1 out of 6.41 that made war patrols.

Losses due other causes = 11, of which the cause of 8 was unknown.

Number of Japanese ships sunk per U.S. Sub lost in action =  $1,392 / 41 = 33.95$ .

Half of the 52 submarines lost during WW II, were built prior to the beginning of the war.

Of the 73 submarines built at Portsmouth during WW II, only 6 were lost (*RUNNER*, *SNOOK*, *SCAMP*, *CAPELIN*, *SCORPION* and *CISCO*) = 1 out of 12.1 built.

The oldest submarine lost was *R-12*. It was used in training. It was built in 1919 and lost on 6/12/43. The cause is unknown.

Nine U.S. submarine were lost during their second patrols, more than during any other patrols.

#### **Number of Torpedoes Fired by U.S. Submarines**

Total number fired = 14,748

Average number fired per attack = 3.586

Average number fired per ship sunk =  $14,748 / 1,392 = 10.59$ .  
(8 in 1942; 11.7 in 1943; 10 in 1944)

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### U.S. Submarine Sonar Attacks

Only 31 of the 4,873 attacks analyzed after the war could be described as "sound" attacks, and none of these were successful.

### Awards to the Submarine Force

#### To U.S. Submarines

Presidential Unit Citations = 36

Navy Unit Commendations = 53

Battle Stars Awarded = 1,229 to 233 submarines

#### To U.S. Submarine Rescue Vessels

USS *PIGEON* (ASR-6) (Lieutenant Commander Dick Hawes) was the first ship to be awarded the Presidential Unit Citation. It was for action in connection with the bombing of *SEALION* and *SEADRAGON* at Cavite at the start of the war.

### Combat Awards To Submarine Personnel

Submarine personnel garnered many awards for outstanding performance in combat. The highest combat award was the Congressional medal of Honor, followed by the Navy Cross, the Silver Star, the Bronze Star and the Letter of Commendation with Medal. There were many heroes among the officers and enlisted men of the submarine force in World War II. Seven of these were given the Congressional Medals of Honor, the nation's highest ranking wartime award for their outstanding performance of duty.

		They		were:
Captain	John	P.	Cromwell,	USN
Commander	Samuel	D.	Dealey,	USN
Commander	Eugene	B.	Fluckey,	USN
Commander	Howard	W.	Gilmore,	USN
Commander	Richard	H.	O'Kane,	USN
Commander	Lawson	P.	Ramage,	USN

Lieutenant Commander George L. Street, USN

### U.S. Submarine Personnel

Commanding Officers - 465 Commanding Officers made a total of 1,474 patrols during WW II, an average of 3.2 patrols for each Commanding Officer.

The Naval Academy provided all the CO's of U.S. submarines except for a very few Naval Reserve officers who worked their way up during the war. The Naval Academy class of 1935 provided 50 WW II submarine CO's.

Enlisted Personnel - The total number of submarine sailors was about 30,000. This was about 1.6% of the total of all naval personnel. About 16,000 of these made war patrols.

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### Personnel Losses

Officers	348
Enlisted	3,136
Total	3,484*#

\* Not counting 2 Brazilian officer lost in *R-12*.

# There were 60 other fatalities in subs that were not lost. They include 26 lost in the *BASS* battery explosion, three in *GROWLER* (prior to her loss), two in *MINGO* and *PARCHE*, and one each in *BILLFISH*, *BLUEBACK*, *BUGARA*, *CABRILLA*, *COBIA*, *COD*, *CREVALLE*, *GUDGEON*, *GUIVARRO*, *HAKE*, *HALIBUT*, *LAGARTO*, *MUSKALLUNGE*, *POLLACK*, *PUFFER*, *S-31*, *SCORPION*, *SEADRAGON*, *SEAROBIN*, *SEGUNDO*, *SILVERSIDES*, *SKATE*, *SNAPPER*, *SUNFISH*, *TAUTOG*, *TULLIBEE*, and *TUNA*. These made a total loss of 350 officers and 3,194 enlisted personnel for a total of 3,544.

### Torpedo Problems

U.S. steam torpedoes Mk. 14 and Mk. 23 commonly fired in World War II had a number of faults. One was that the exhaust valves often leaked causing the after-body to flood if firing was delayed too long when the torpedo tube was flooded for firing. A corrective step in "routining" torpedoes was to seal the exhaust valves with wax. This was partially successful. A more serious problem was that too many of those which should have been hits were adjudged to be misses. At the start of the war, they ran deeper than set causing them to run beneath the target. Tests showed that they ran 10 to 11 feet too deep. By August 1942 the depth problem was corrected by setting the torpedoes to run at shallower depths than originally designated for various types of ships. Also, many torpedoes did not explode when seen to hit a target broadside. This major problem with the Mk. 14 and Mk. 23 torpedoes was identified on July 24, 1943 in the war's twentieth month by *TINOSA*'s Commanding Officer, Lieutenant Commander L. R. (Dan) Daspit. He spotted the unescorted *TONAN MARU* No.3 west of Truk in broad daylight. She was Japan's largest tanker, rated at 19,262 tons. Daspit initially fired at long range on a large track angle and put two hits into her stopping her dead in the water. He then hit her with two more torpedoes causing her to settle slightly by the stern. Next, he closed to less than a thousand yards and fired eight more fish at the tanker's broadside. Although he witnessed eight more hits, none of the warheads exploded. The problem was obviously in the exploder. Tests conducted by the Submarine Force at Pearl immediately thereafter finally pinpointed the problem with the exploder mechanism.

Other problems were that a few made circular runs, on occasion hitting the firing submarine and some exploded prematurely on their way to the target. In addition, the Mk. 6 magnetic exploder was unreliable. On June 24, 1943, Admiral Nimitz sent a message to all submarines and destroyers directing them to deactivate the magnetic exploder and fire all torpedoes for impact hits.

Production of steam torpedoes early in the war did not keep up with expenditures. The MK. 18 electric torpedo, copied from a German torpedo that ran up on the beach, was put into production as a step in correcting this problem. The Mk. 18 had a top speed of about 30 knots compared to 45 of the Mk. 14 (in high speed) and the MK. 23. Its speed was not consistent, and it had shipboard maintenance problems.

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Due to the steam torpedo shortage in late 1942 and in 1943 it became necessary to send some submarines on patrol with mixed torpedo loads, as well as mixed mine and torpedo loads. The higher speed Mk. 14s and Mk. 23s were generally preferred by Commanding Officers when there was a choice.

### **Submarine Building Yards**

The four primary fleet class building yards were Electric Boat Company at Groton, Connecticut; Portsmouth Naval Shipyard at Portsmouth New Hampshire; Mare Island Naval Shipyard on San Francisco Bay; and Manitowoc Shipbuilding Company on Lake Michigan. Submarines built at Manitowoc were barged down the Mississippi to the Gulf of Mexico. The Cramp Shipyard in Philadelphia also launched 12 fleet class submarines which were commissioned during the war. Two each of these were completed at Boston and Portsmouth Naval Shipyards.

### **Fleet Type submarines commissioned during the war years were:**

<b>Year</b>	<b>Number</b>
1942	39
1943	50
1944	80
1945	32 (Prior to the end of the war.)
<b>Total</b>	<b>201</b>

Electric Boat Company delivered 74 fleet type submarines during WW II.

Portsmouth Naval Shipyard built 79 fleet boats between 1941 and 1945. The first required 469 building days. This was reduced to 173 days in 1944.

Mare Island - 16 submarines were commissioned at Mare Island during World War II. Four of these, TRIGGER, WAHOO, TULLIBEE and TANG were lost.

Manitowoc - 27 submarines built at Manitowoc were placed in commission before the war ended.

### **Patrol and Other Highlights**

Moments of excitement, elation, boredom, fright and outright terror occurred during submarine war patrols. A very few of the memorable events that occurred are listed below. The name of the Commanding or responsible officer follows the name of the submarine.

*TAUTOG* (Duty. Officer, Barney Sieglaff) was moored at the Submarine Base, Pearl Harbor when the Japanese attacked on December 7, 1941. Sieglaff directed the manning of a .50 cal. machine gun. Pasqual Mignon, a torpedoman, shot down the first Japanese plane downed in the attack, the first kill of WWII.

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*GRENADIER* (Lent) on May 8, 1942 sank the 14,457 ton transport *TAIYO MARU* off the west coast of Kyushu. It was transporting a large task force of Japanese scientists and technicians south to organize the resources of the conquered territory for supporting the Japanese war effort. Nearly all of this task force was lost.

After *SILVERSIDES* (Burlingame) sank 3 freighters in a single attack off Truk on January 20, 1943 a torpedo remained stuck in one of her bow tubes. To safely eject the torpedo, *SILVERSIDES* backed down full and successfully fired the torpedo from the tube.

*SKATE* (McKinney)- Just before dawn on Christmas Day 1943 in an area about 180 miles north of Truk, *SKATE* hit the new 73,000 ton, 18" gun Japanese battleship *YAMATO* (largest in the world) with one torpedo in her starboard quarter. The #3 turret upper magazine was flooded, the ship listed 2 to 3 degrees, and slowed slightly. (Japanese records)

*SAURY* (Dropp)- Making a submerged approach on a Japanese cruiser on 31 July 1943 *SAURY* was rammed by a destroyer bending her periscope shears 30 degrees, and making both periscopes and radar useless. *SAURY* was credited with damage to one destroyer.

*JACK* (Dykens) - On April 25, 1944, *JACK* attacked a large convoy taking Japanese army reinforcements from China to Western New Guinea. The *YOSHIDA MARU* was hit and sank carrying an entire Japanese regiment to a watery grave. *JACK* made 30 successful attacks during 9 war patrols.

*HARDER* (Sam Dealey). Between April 13 and June 9, 1944 Dealey sank four Japanese destroyers in separate attacks in the vicinity of Woleai and Tawi Tawi. Dealey was nicknamed "The Destroyer Killer".

*BLUEGILL* (Barr) made 6 successful attacks between 0600 and 2000 on 18 October, 1944 sinking 4 freighters and damaging 2 more.

The Battle of Leyte Gulf Assist - Just before the Battle of Leyte Gulf in October 1944, *DARTER*, *DACE* and *BREAM* put four Japanese heavy cruisers out of action.

*DARTER*, *SHARK II* and *TANG* were all lost on October 24, 1944, a black letter day for U.S. submarines. *TANG* was sunk by one of her own torpedoes which made a circular run.

*BANG* (Gallaher) on the night of 22-23 November 1944 made 7 surface radar attacks on a convoy in the course of 3 hours. He fired all 24 torpedoes and sank 3 freighters and a mine layer.

*ARCHERFISH* (Joe Enright) sank a very large ship on November 29, 1944 She could not be identified at the time, but was later identified as *SHINANO*. Her keel had been laid as a sister ship to the battleship *YAMATO*. She was completed as the world's largest aircraft carrier and became the largest ship ever sunk by a submarine. Enright sank her on her maiden voyage.

*POLLACK* (Lewellen) was suddenly caught in the searchlight beam of an escorting destroyer while making a night surface attack on a convoy. She fired two down-the-throat torpedoes and dove at full speed. The bow planes failed to rig out. Before the dive could be stopped at 450 feet the boat took a down-angle estimated at fifty-three degrees.

*QUEENFISH* (Loughlin) on April 1, 1945 sank the 11,600 ton passenger-cargo ship *AWA MARU*. Only one person survived.

*TAUTOG* (Willingham, Sieglaff, Basket) is credited with sinking 26 ships, more than any other of our submarines.

*FLASHER* (Whitaker and Grider) is credited with sinking 100,231 tons, more than any other U.S. submarine



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*SEAWOLF* ("Fearless Freddie" Warder and R.L. Gross) made 39 successful attacks during her 14 patrols, sank 18 ships and damaged 21 others.

*TANG* (Dick O'Kane skippered the *TANG* on all her five patrols) She is credited with sinking 24 ships for 93,824 tons. In her final attack on the night of October 24, 1944 she fired a torpedo which made a circular run and sank her. Nine *TANG* survivors including O'Kane were picked up by a Japanese destroyer which had also picked up survivors from one of the ships sunk by *TANG*.

*BARB* (Waterman and Fluckey) sank 17 ships totaling 96,628 tons. Among them was an escort carrier of 20,000 tons and an ex-light cruiser of over 10,000 tons.

*THRESHER* (Anderson, Millican, Hull, McMillan, and Middleton) made 33 successful attacks during 15 war patrols. She was credited with 17 ships.

*SEAHORSE* (Slade Cutter) sank 19 ships including a submarine and a converted submarine tender for 72,000 tons in the eight months from early November 1943 through early July 1944.

*PARCHE* (Red Ramage) in a wolf pack with *HAMMERHEAD* and *STEELHEAD* attacked a large escorted convoy in the Formosa Strait to the west of Formosa. Darting in and out, *PARCHE* fired 20 torpedoes in a daring night surface attack within a period of 46 minutes to get 15 hits. Ramage was awarded the Congressional Medal of Honor for his aggressiveness, courage and personal heroism.

*GREENLING* (Bruton, Grant and Gerwick) made 26 successful attacks during 12 patrols and was credited with sinking 15 ships.

*POGY* (Wales, Metcalf and Bowers) made 30 successful attacks and sank 16 ships during 10 patrols for a total of 62,633 tons. Ships sunk included an aircraft ferry, a submarine tender, a destroyer, a submarine, and an ex-gunboat.

*TORSK* (Lewellen) while patrolling in the Sea of Japan on August 14, 1945 (the day before the Japanese surrender), sank two frigates of about 800 tons each. These were the last Japanese ships sunk by any naval vessel in World War II.

### **U.S. Submarine Search Tactics**

The most serious tactical problem in sinking a Japanese ship was that of finding one. The old German recipe for rabbit stew advised one to first catch the rabbit. The same holds for finding suitable ship targets. Laymen who have never been to sea cannot visualize the vastness of the Pacific Ocean. In the early months of the war this problem was made particularly difficult by the threat of attack by aircraft when patrolling on the surface. Consequently, it was common practice to dive at dawn and surface at sundown. Target detection when submerged was limited largely by the range of vision which is limited by the "height of eye" of the periscope lens above the sea, curvature of the earth and atmospheric clarity. A detection range of 6 to 8 miles on a ship's masts showing above the horizon is about average during daylight in good weather.

A periscope moving through the water leaves a trail that can be detected by sharp-eyed airmen. Consequently, it was common practice to use the periscope intermittently at creeping speed which also saved the battery.

Visual detection range on a ship at night varies widely depending upon atmospheric conditions, moonlight, and target size. Normal practice when on the surface was to have five men on the bridge at all times. The Officer-Of-The-Deck (OOD) had the conn, and was assisted by the Junior OOD. Two lookouts were normally stationed in the periscope shears to cover the forward sectors to the horizon,

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and one lookout was stationed aft on the bridge deck. All bridge personnel used 7 X 50 binoculars with coated lenses, and lookouts were required to use them continually.

Only two submarines were equipped with the SD non-directional anti-air-craft radar early in the war, but by about late summer to fall of 1942 all submarines were so equipped. That usually provided warning prior to attack from the air allowing submarines to run on the surface during daylight.

Tactical use of the SD radar varied with the Commanding Officer. Some CO's used it intermittently when on the surface to reduce the probability of interception of the emitted radar signal. Others used it continually.

The SJ surface search radar was first installed in our submarines in about mid-1942. By the end of 1943 all submarines were so equipped. Normally the SJ was used continually when on the surface. It could be used for tracking targets when submerged at shallow keel depths of about 48 feet. Depth control was difficult except in calm seas at that depth. In 1944-45 the SJ antenna was improved and mounted on an extensible mast allowing the submarine to expose the antenna

while running at greater depths. The ST periscope radar was introduced about 1944. It provided good range and fair target bearing information.

The raised periscope was frequently used when on the surface to provide a higher "height-of-eye", and therefore greater detection range.

### **Japanese Counterattacks**

The Japanese were not well equipped for anti-submarine warfare (ASW), nor did they use their equipment in a tactically effective manner during most of the war. For example, they had no ship borne radar installations at the start of the war, and very few on shore. Japanese ship-borne radar would have been a serious detriment to night surface operations conducted extensively by our submarines after they were equipped with radar. Japanese escort vessels and anti-submarine aircraft were not equipped with radar until the fall of 1944, and what they had was inferior to comparable Allied radar. By doctrine it was normally only used at night for fear of revealing the presence of an ASW ship or aircraft. On the other hand, Japanese escorts were well equipped with directional radar intercept receivers early in the war, but there is little evidence that it was effectively employed to detect submarine radar emissions. It was learned after the war that Japanese aircraft had never reached the stage of consistently homing in on our submarine's radar emissions.

A Japanese radio direction finder net was well established at the start of the war. The Commander of a submarine which transmitted a radio message could pretty well be assured that his position was immediately known to within about 10 miles.

The standard Japanese depth charge at the start of the war contained an explosive charge of 240 pounds. By depth charge design or tactical usage these charges were at first usually set to explode at depths of less than 300 feet. By early 1944, however, king sized charges were in service. They contained an explosive charge of 1,000 lbs. and could be set to explode at depth exceeding 600 feet.

### **A Few Submarine Counterattack Experiences**

*THRESHER* (Millican) sank a Japanese torpedo boat tender off Kwajalein on July 9, 1942. *THRESHER* was attacked by planes which could see her submerged silhouette in the clear water. The planes called in surface ships which trailed grappling hooks. Caught by one of these, Millican ordered ahead full, turned

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sharply to the right, and went deep - below test depth. She finally broke loose and escaped without further incident.

On 16 November 1942, shortly after firing at the lead ship of a 5-ship convoy off the Indo-China coast, *SEAL'S* (Hurd) high periscope was rammed by a ship in the convoy. It bent the periscope nearly horizontal.

On June 25, 1943, *SAILFISH* (J. R. Moore) torpedoed the *IBURI MARU* off the coast of Honshu. Over 97 depth charges were dropped in the ensuing two hour counterattack.

On 26 July 1944, *ROBALO* (M. M. Kimmel) was presumably sunk by a mine. Five of her crew swam ashore and were captured by Japanese military police and jailed for guerrilla activity. They were evacuated by Japanese destroyer on 15 August and never heard from again.

*HALIBUT* (Galantin) was so badly damaged in a depth charge attack on November 14, 1944 that she had to be withdrawn from combat.

*SPOT* (Cdr. W. S. Post) was on the surface on March 17, 1945 heading for deep water in an attempt to elude a persistent escort which had closed to 4,200 yards and opened fire. *SPOT* manned her guns and returned fire although wallowing in extremely heavy seas. A lucky 5" shell hit the enemy's forward gun and saved *SPOT* from almost certain damage or destruction.

*ROCK* was struck by a dud torpedo during her 6th patrol.

### **Attacks on U.S. Submarines by Own Forces**

*GRAYLING* on June 7, 1942 at the Battle of Midway dove after being harmlessly bombed by a group of B-17s. They reported that they had sunk an enemy cruiser.

*DORADO* (Schneider), en route from New London to Panama was sunk by friendly aircraft on 12 October 1943.

*SEAWOLF* (Bontier) was probably sunk by friendly aircraft on 3 October 1944 in the southwest Pacific in the vicinity of 2° 30' N, 129° 15' E.

On 26 July 1945 a B-29 dropped a full load of bombs on *SEA ROBIN* (Stimson) missing her by half a mile.

### **Miscellaneous Notes on U.S. Submarines**

Admiral Chester Nimitz (an ex-submariner) raised his flag on the submarine *GRAYLING* when he assumed command of the Pacific Fleet in January 1942. He lowered his flag on the submarine *MENHAYDEN* when he relinquished command nearly four years later.

### **The Japanese Situation at the End of the War**

When the war ended on August 15, 1945, a ring of United States submarines surrounded Japan, the United States Third Fleet stood at the entrance to Tokyo Bay, U.S. Army and Navy aircraft clouded the sky, American invasion forces were assembling at Okinawa, and Allied armies were closing in.

The Imperial Navy was at the bottom of the sea, the merchant marine was reduced to a skeleton transport organization, and scattered fragments of the Imperial Army were marooned in the southwest Pacific. Japan was in a chaotic state, militarily impotent, financially and economically on the ropes, and famine and death stalked the country.

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### **Statements by Japanese Navy Leaders**

Admiral Yamamoto, Commander-in-Chief of the Combined Japanese Fleet from the start of the war until April 1943 when he was killed in an air attack, "In the first six months of the war with the United States, I will run wild and win victory after victory. After that, I have no expectation of success."

Admiral Toyoda, Commander of the Imperial Fleet, from March 1944 to war's end. "I do not believe it would be accurate to look upon the atomic bomb and the entry of Soviet Russia as direct causes of the termination of the war. But I think these two factors did enable us to bring the war to an end without creating utter chaos in Japan."

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