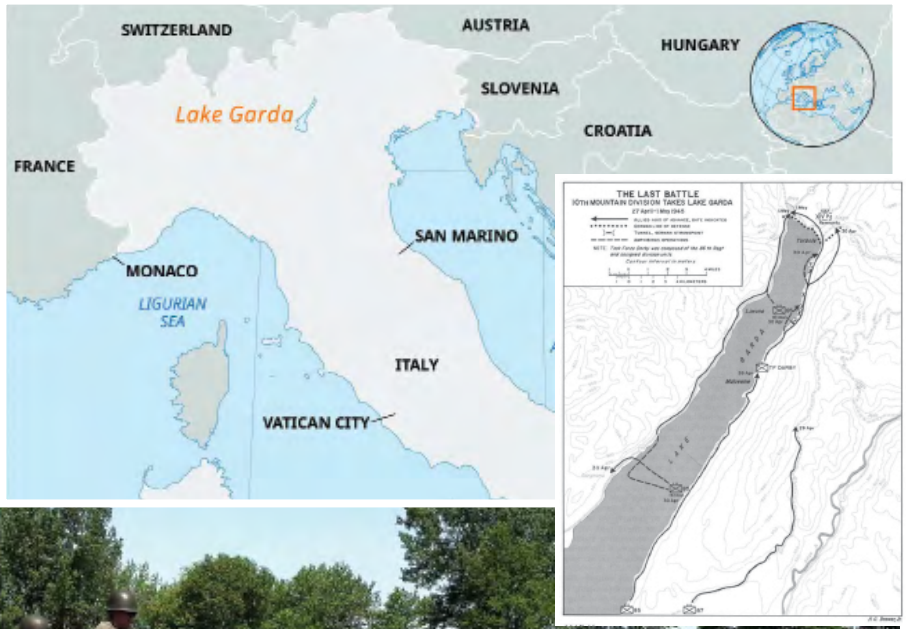
# Tragedy at Lake Garda

By Charles C. Roberts, Jr., MVPA #9732

Activated in 1942, the 10th Mountain Division was stationed at Camp Hale in Colorado. The division took part in the operation to retake the island of Kiska in the Aleutian Islands in Alaska in August 1943. In January 1945, the division was transported to Italy, assigned to the 5th Army, and deployed opposite the border of the Tuscany and Emilia-Romagna regions.

The 10th Mountain Division attacked and broke through the German defensive lines on Monte Belvedere. The offensive lasted from February to March 1945, during which the division controlled the main road to Porretta. In the following mid-April offensive, the 10th Mountain Division reached the Po Valley (*Pianura Padana*) and arrived at the Po River on 22 April 1945.

On the evening of 30 April 1945, three DUKWs carrying members of the 86th Mountain Infantry Regiment departed Torbole for a three-mile trip across the northern end of the Lake Garda. They were to secure Riva del Garda.







Often referred to as a "Duck," the GMC-manufactured DUKW combined the versatility of the 2-1/2-ton 6x6 cargo truck while also being amphibious. This view of an unloaded, late-model DUKW shows the coaming board, an upward extension of the hull meant to reduce the chance of water entry. "Freeboard" is the distance from the top of the coaming board to the water line. In 1945, a DUKW carrying members of the 10th Mountain Division entered the waters of Lake Garda in Italy. Overloaded, the freeboard was less than 1 foot. The results were disastrous — 25 U.S. soldiers lost their lives. *Author photo*

The division advanced to Verona on 26 April with the objective of stopping the German retreat.

It was common toward the war's end to restructure units into task forces to handle specific missions. General George Hays, the division commander, initiated Task Force Darby under the direction of Col. William Darby. Darby was to take the 86th Mountain Infantry Regiment as the lead unit, together with other units, up the eastern shore of Lake Garda.

Led by the 86th Mountain Infantry, the task force traveled up the eastern Gardesana Road on 27 April. It reached Malcesine and Navene next to the partially completed German defensive line in the Alps from Stelvio to the Istria. The rapid Allied advance prevented the Germans from digging in and presenting a formidable defense.

## MOUNTAIN TROOPS GO AMPHIBIOUS

Leaving Navene on 28 April 1945, the 10th reached the tunnels on the Gardesana Road from Navene to Torbole. The Germans had blown the tunnels to stall the advance. An amphibious assault along the shores of Lake Garda was the only means to bypass the blockage in the tunnels. The Fifth Army had anticipated the blockage of the tunnels, however, and had amassed several amphibious vehicles (DUKWs) to transport troops along the lake to bypass retreating German obstacles.

On the evening of 28 April, the task force arrived at Tempesta and later liberated Torbole. On 30 April, Task Force Darby rested while patrols were sent out to determine the retreating Germans' new location. Unfortunately, Col. Darby was killed that day by an air-burst from enemy artillery.

As the Germans continued their retreating through northern Italy, they would usually destroy bridges across rivers. The 10th's new mission was to head from Torbole to Riva del Garda across Lake Garda using their amphibious DUKWs. The plan was to sail into the middle of the lake rather than hug the shore to avoid German artillery and sniper fire between Riva and Torbole, with the 85th and 86th Regiments taking the lead along the eastern shore of Lake Garda at various times.

Three DUKWs were assigned to Battery B and C of the 605th Field Artillery Battalion that was attached to the 10th Mountain Division. Each DUKW was to carry a 75mm pack howitzer, equipment, ammunition, and members of the artillery battalion. Most likely, the pack howitzers were disassembled into pieces that one or two soldiers could carry.

# 10th Mountain Division


The 10th Division was originally organized In July 1918 during WWI as a Regular Army and National Army division. During the Soviet Union's invasion of Finland, November 1939, Finnish soldiers on skis destroyed two Red Army armored divisions. The conflict caught global attention as the outnumbered and outgunned Finnish soldiers were able to use the difficult local terrain to their advantage, severely hampering the Soviet attacks. Upon seeing the effectiveness of these troops, Charles Minot "Minnie" Dole, the president of the National Ski Patrol, began to lobby the War Department of the need for a similar unit of troops trained for fighting in winter and mountain warfare in the United States Army. In September 1940, Dole presented his case to General George C. Marshall, the Army Chief of Staff. Marshall agreed and decided to create a "Mountain" unit for fighting in harsh terrain. On 20 October 1941, the War Department authorized Dole's group, the "National Volunteer Winter Defense Committee," to be the official recruiter for a special mountain-trained unit. At first, planners envisioned ten divisions, but personnel shortages revised the goal to three. Eventually, the 10th Mountain Division would be the only one created.

Constituted on 10 July 1943, the 10th Light Division (Alpine) was activated at Camp Hale, Colorado, five days later. The 10th Light Division was centered on regimental commands: the 85th, 86th, and 87th Infantry Regiments. Also assigned to the Division were the 604th, 605th, and 616th Field Artillery Battalions, the 110th Signal Company, the 710th Ordnance Company, the 10th Quartermaster Company, the 10th Reconnaissance Troop, the 126th Engineer Battalion, the 10th Medical Battalion, and the 10th Counter-Intelligence Detachment. On 6 November 1944, the 10th Light Division was redesignated the 10th Mountain Division.

## 35. AIR CIRCULATION.

***a. Cooling and Heating Air Circulation System Intake.*** Cooling air enters the engine compartment through air intake grilles located in aisle to rear of driver's compartment. The air is drawn forward under the driver's compartment into engine compartment by action of engine fan.

(1) NOTE: *Many of the vehicles are equipped with an auxiliary air scoop located directly in front of windshield on front deck. It has been found through experience that this auxiliary air intake is not necessary providing other air circulation controls are properly positioned. These scoops should be permanently fastened down and sealed as described in paragraph 228f.*

***f. Auxiliary Air Intake Door (fig. 201).*** Additional cooling advantage by use of auxiliary air intake is offset by danger of stalling engine by shipping water through door. Therefore, it is recommended that door be permanently closed on vehicles prior to chassis serial No. 7136 (except Nos. 5671 through 6601) as follows:

(1) Raise engine compartment hatch cover. Remove entire auxiliary

TM 9-802
228-229

*Maintenance Instructions*

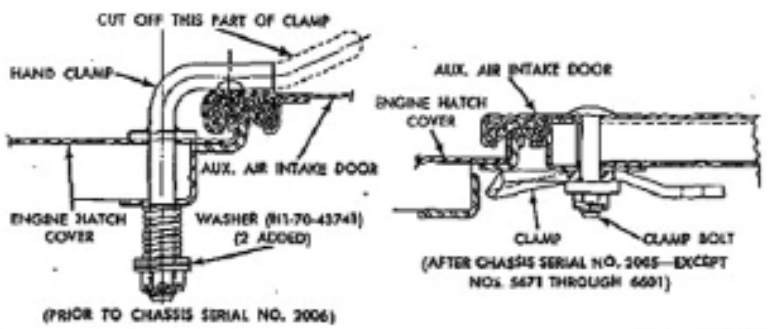



***Figure 201—Auxiliary Air Intake Door Permanently Closed***

air intake door operating mechanism including screen. Do not remove latches.

(2) Cover hole in upper toeboard with any suitable metal plate, attaching plate with screws. Remove "Auxiliary Cooling Air Intake" instruction plate from vehicle.

(3) Inspect air scoop door seal (G501-03-82791) and make any necessary repairs or replacements to insure a watertight seal.

(4) At under side of engine hatch cover, remove nuts, cotter pins from latch bolts. With latch in locked position, install ⅜-inch lock washer, install nut and cotter pin, and tighten securely to permanently close door. On vehicles with hand clamps (prior to chassis serial No. 2006), remove nuts. Install two additional ⅜-inch flat washers (HI-70-4371) on each bolt, then install nut. Make sure clamps are in proper position to lock hatch cover, then firmly tighten nuts to fully compress springs and secure with cotter pins. On vehicles prior to chassis serial No. 2006, cut off ends of clamps. Tack-weld clamps to door, using shielded arc. Avoid heating door sufficiently to burn seal.

This illustration from *TM 9-802,* 23 February 1945, demonstrated how to permanently seal the air scoop on early production vehicles.

### A TRAGEDY OCCURS

As all this equipment and personnel were loaded into the three DUKWs, DUKW driver PFC Nicholas Del Grosso of the 52nd Quartermaster Battalion that provided the vehicles voiced a concern about overloading. Fully loaded, there was less than one foot of freeboard (the distance from the water line to the top of the coaming board) on the DUKW he was piloting!

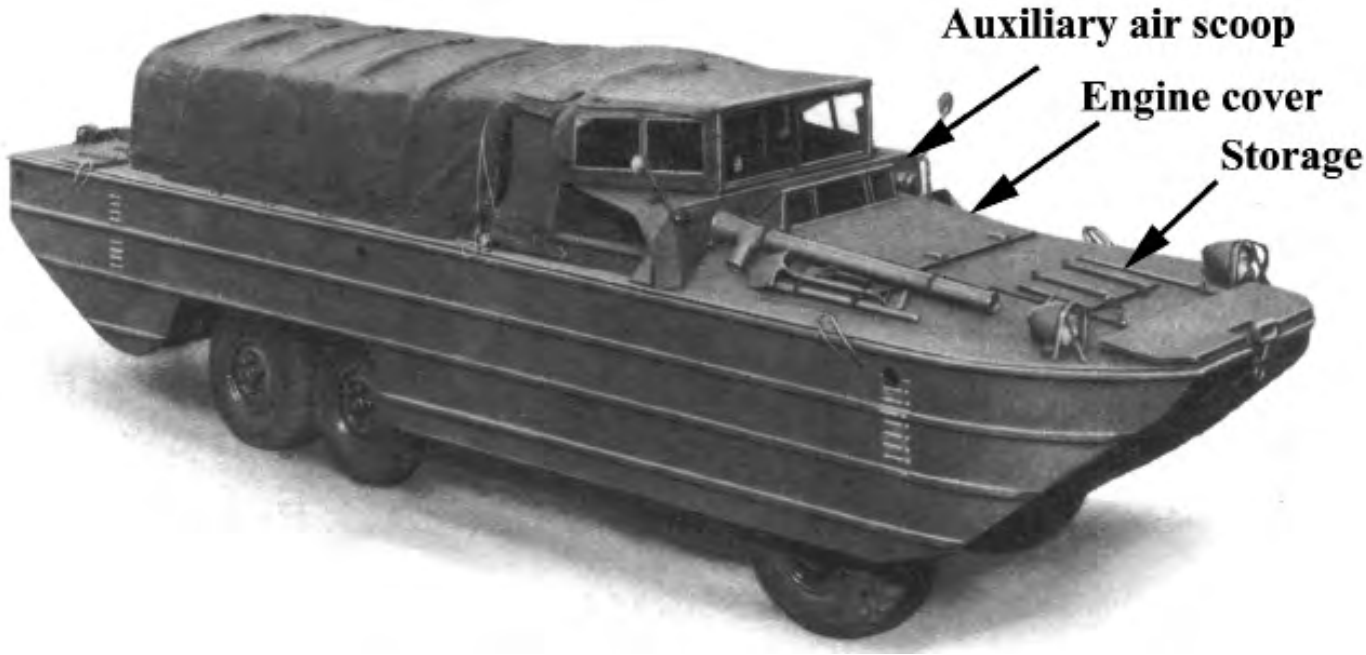
Del Grosso had good reason for concern. His DUKW had men from Battery B and C, a pack howitzer weighing 1,500 pounds, 75mm ammunition, 27 men with 50-pound backpacks, and a .50 caliber machine gun. Assuming each man weighed about 150 pounds, the calculated weight would be 6,900 pounds not including ammunition and the .50 caliber machine gun. The maximum load capacity for a DUKW was 5,000 pounds. According to the operator's manual, 7,500 pounds could be loaded onto a DUKW *in an emergency* (italics added). PFC Kenneth Klahn of Battery C, 605 Field Artil-lery, was removed and sent to another DUKW, thereby reducing the load by approximately 200 pounds.

The three DUKWs set out into Lake Garda, heading towards Riva del Garda in the evening of 30 April. After a storm developed, PFC Del Grosso's DUKW encountered rough water about halfway through the voyage.

Because of the DUKW's low freeboard, the designers had anticipated that water could enter the vehicle in heavy seas. Consequently, a huge bilge pump was provided that was chain-driven from the propeller shaft. It could quickly remove water from the bilge.

According to the lone survivor, Corporal Thomas Hough, the engine quit during the sudden storm. Del Grosso thought water had gotten into the gasoline or flooded the engine compartment, which may have shorted out the ignition system or been ingested into the carburetor. Because the engine was not running, the huge bilge pump was not working.

According to Corporal Hough, Del Grosso opened the forward storage compartment at the bow of the craft to get tools to check out the engine. The forward storage compartment does not allow access to the engine but, if flooded, has avenues for water to flow into the engine compartment. Normally, tools are not stored

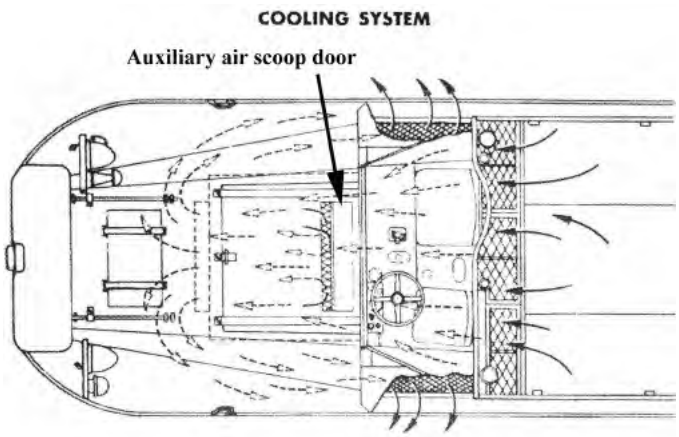



Right front view of an early model DUKW showing the auxiliary air scoop air intake, engine cover, and storage hatch. According to early technical manuals, closing the door on the air scoop is required during water operation. The air scoop air intake was eliminated from vehicles after 1943 because, when left open, wave action would swamp the bow; water would enter the engine compartment, and could stall the engine. *TM 9-2800*

there because of the risk of puncturing the vehicle's radiator. Rather, they are stored in the driver's compartment.

While Del Grosso accessed the storage area, waves probably crashed over the sides, further flooding the hull. It became apparent that the DUKW was going to sink. Soldiers started throwing everything overboard with the hope of staying afloat, including their backpacks, the pack howitzer, the .50 caliber machine gun and all of the ammunition.

Their efforts were in vain. The vehicle rapidly sank, leaving the soldiers in the frigid water of the lake. Several soldiers could not swim and drowned. Others who could




The cooling system on a DUKW is a pusher system where air is pushed forward through the radiator rather than drawn through the radiator, as in conventional land vehicles. The auxiliary air scoop allows cooling air to go directly into the engine compartment, which helps cool, but is a hazard when left open in heavy seas, as mentioned in *TM 9-802*, 1 September 1943


As seen in this photo of a late 1945-vintage DUKW, the auxiliary air intake (air scoop) doors were removed from the design. *Author photo*

float, succumbed to the frigid water and perished. A former lifeguard and strong swimmer, Cpl. Hough swam toward shore and was rescued — the sole survivor of the accident.

Four days later, the hostilities in Italy ended on 2 May 1945. The 25 soldiers who died in the sinking of the DUKW were among the last to die in Italy.

## WHAT HAPPENED?

The DUKW has a pusher radiator fan that draws air through the floor grating in the driver's compartment, then through the radiator, and then pushes the air forward through air tunnels and out vents on the side of the hull. The airflow area over the radiator is essentially that of the fan's diameter, unlike road vehicles that have the benefit of additional air flow from forward movement.

There was a design flaw in the early DUKWs, however. The air intake was located where water could easily enter the engine compartment and stall the engine. The auxiliary air intake door was designed to help get more air into the engine compartment and enhance airflow through the inlet openings in the engine compartment. The problem with the auxiliary air intake scoop was that it easily ingested water in heavy seas, causing the engine to quit and, in some cases, the DUKW to sink.

The opening and closing of the auxiliary air scoop doors is performed by moving a lever inside the driver's compartment. Without the engine running, the large bilge pump is inactive, making the vessel vulnerable to sinking. Furthermore, the DUKW's front deck is sloped downward. It is easily awash during heavy seas allowing water to enter an open auxiliary air intake door. As early as 1943, several updates to U.S. Army technical manual *TM 9-802* discussed the problems with the air scoop door allowing flooding of the engine compartment, and what to do about it for vehicles equipped with these doors.

The Army instituted a design change in 1943, that eliminated the auxiliary air intake door on later models. In addition, it advised permanently sealing the air intake


In 2011, a group of Italian volunteer divers, *Gruppo Volontari del Garda*, located the ill-fated DUKW that sank in 1945. In 2018, ProMare, a team of experienced archaeologists and marine professionals returned to Lake Garda to assist the local authorities in their efforts to monitor and preserve this important military grave site. After a few successful dives using a manned submersible, the site was thoroughly investigated by the scientific team.

The bow view of the ill-fated DUKW at the bottom of Lake Garda shows the auxiliary air scoop door open. This would have allowed water to enter the engine compartment directly, probably shorting out the ignition system and causing the engine to stop. The air scoop door should have been closed. *ProMare photo*

This view of the ill-fated DUKW at the bottom of Lake Garda shows the empty cargo compartment. The plywood floor boards have floated away, showing the support framing and the bottom of the hull. According to the lone survivor, Corporal Thomas Hough, the soldiers threw everything overboard. This photo shows that nothing remains in the cargo compartment. Because of the running gear and suspension system, a DUKW is very bottom-heavy. It sank like a submarine submerging — not rolling over — and settled to the bottom of the lake, upright. *ProMare photo*

doors on older models. According to *TM 9-802*, issued on 23 February 1945, the Quartermaster Corps was supposed to seal all auxiliary air intake hatches shut. It is not known why this had not been accomplished on the ill-fated DUKW.

Additionally, despite being rated with a 5,000-pound capacity, the ill-fated DUKW was carrying approximately 7,000 pounds. While a load of up to 7,500 pounds could be tolerated in emergency conditions and calm water, Del

# THE DUKW

*National Archives via DavidDoyleBooks.com*

Often referred to as a "Duck," the DUKW was manufactured by General Motors during WWII. "DUKW" was a General Motors designation with "D" indicating it was put in service in 1942, "U" meaning it was a utility amphibious vehicle, "K" designating it as front-wheel drive, and "W" identifying it as having dual rear driven axles.

The yacht designer, Sparkman and Stevens, engineered the tub to fit on the 2.5-ton truck running gear of the standard GMC G-508 series of vehicles.

The vehicle weighed approximately 14,500 pounds and was driven by a straight 6-cylinder, overhead valve engine generating approximately 100 horsepower. It could carry 25 soldiers or a load of up to 5,000 pounds at a speed of up to 50 mph on land and approximately 5 mph on water. Tire pressure could be changed from the driver compartment to accommodate various beach conditions such as sand or coral.


PFC Nicholas Del Grosso, the DUKW's driver, had become worried that the engine compartment had flooded due to Lake Garda's rough waters. He was probably correct. A starboard side view of the ill-fated DUKW shows the auxiliary air scoop door open — this would have allowed water to enter the engine compartment, probably shorting out the ignition system, and causing the engine to stop. It should have been closed. *ProMare photo*

A bow view of the ill-fated DUKW shows the bow storage hatch open. According to Cpl. Hough, PFC Del Grosso opened this hatch to get tools to work on the engine. The open bow storage hatch allowed more water to enter the engine compartment and aggravated the flooding, causing the bow to fill with water first. *ProMare photo*

Lt. Col. Woran, Chaplain of the 10th Mountain Division stands in the bed of a DUKW to lead a group of men in prayer at Torbole the day following the unconditional surrender of all German troops in Italy, 3 May 1945. Not present were the 25 soldiers who died when their DUKW sank just days earlier — may they rest in peace. *National Archives*

Grosso was not facing "emergency conditions" before he drove the DUKW into Lake Garda. He was correct in objecting to the overloading.

Twenty-four soldiers drowned, some because they did not know how to swim while others probably succumbed to the frigid waters. Standard equipment issue for a DUKW included 5 life preservers.

Because of the difference in elevation of the lake with respect to the high mountains where cold air mixes with warmer air below, Lake Garda has a history of violent storms. One can get away with over-loading a DUKW with an open air scoop in calm water. Operating a DUKW in heavy seas was inviting disaster. It is not unusual for several factors to come together, resulting in an accident with loss of life. Several factors contributed to the loss of life from the sinking of the ill-fated DUKW — but it was an avoidable tragedy. May those soldiers rest in peace.

## ADDITIONAL READING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ProMare 2018 Expedition to Lake Garda, accessed 18 January 2024, https://promare.org/projects/archive-italy/archive-italy-lake-garda/

"The DUKW, Its Operation and Uses," *U.S. Army Circular N-4477,* 1944.

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*TM 9-802, Technical Manual, 2.5 Ton Amphibian Truck, 6x6, GMC DUKW-353,* War Department, 1 September 1943.

*TM 9-802, Technical Manual, 2.5 Ton, 6x6, Amphibian Truck, (GMC DUKW-353),* War Department, 23 February 1945.

*TM 9-2800, Technical Manual, Standard Military Motor Vehicles*, War Department, 1 September 1943.