

July 19, 2018 Table Rock Lake Near Branson, Missouri

Duck boat sinks in storm

17 people perish

(including 9 members from one family and the driver)

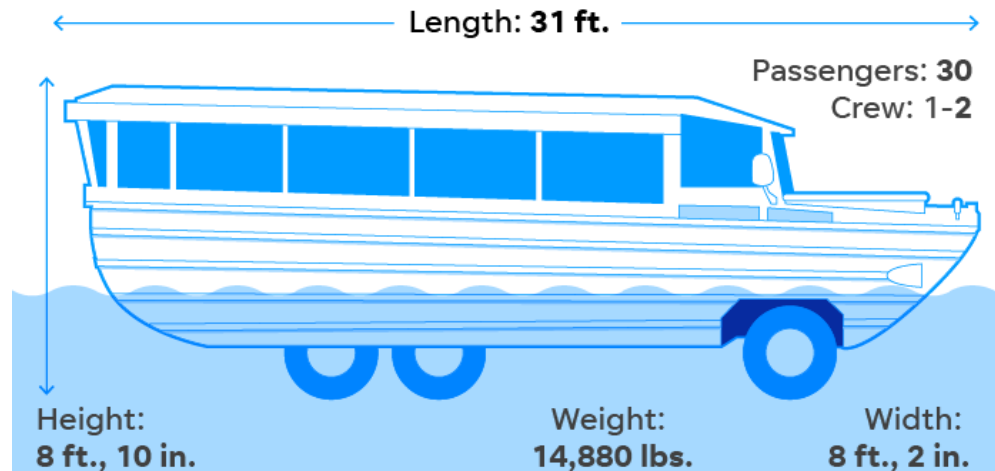
Branson Duck Boat



A Basic Duck Boat

What's a duck boat?

Duck boats are amphibious vehicles that can be driven on land or navigated across water.



They are based on World War II vehicles that transported people and supplies between ships and shore. Today, they're used for tourist cruises in a number of cities.

SOURCE USA TODAY research

The DUKW Name

The name DUKW comes from General Motors Corporation model nomenclature:

D – Designed in 1942

U – Utility

K – All-wheel drive

W – Dual-tandem rear axles

21,147 were manufactured before production ended in 1945.

Decades later, the designation was explained erroneously by writers such as Donald Clarke, who wrote in 1978 that it was an initialism for "Duplex Universal Karrier, Wheeled"

DUKW History

The DUKW was designed by Rod Stephens, Jr. of Sparkman & Stephens, Inc. yacht designers, Dennis Puleston, a British deep-water sailor resident in the U.S., and Frank W. Speir from the Massachusetts Institute of Technology.

Developed by the National Defense Research Committee and the Office of Scientific Research and Development to solve the problem of re-supply to units which had just performed an amphibious landing, it was initially rejected by the armed services.

When a United States Coast Guard patrol craft ran aground on a sand bar near Provincetown, Massachusetts, an experimental DUKW happened to be in the area for a demonstration. Winds up to 60 knots, rain, and heavy surf prevented conventional craft from rescuing the seven stranded Coast Guardsmen, but the DUKW had no trouble, and military opposition to the DUKW melted. The DUKW later proved its seaworthiness by crossing the English Channel.

The final production design was perfected by a few engineers at Yellow Truck & Coach in Pontiac, Michigan. The vehicle was built by Yellow Truck and Coach Co. (GMC Truck and Coach Div. after 1943) at their Pontiac West Assembly Plant and Chevrolet Div. of General Motors Corp. at their St. Louis Truck Assembly Plant. 21,147 were manufactured before production ended in 1945.

Topics and Timelines

1. What happened
2. Weather forecasts and timelines
3. Analysis and comments as reported
4. Other duck boat accidents
5. Duck boat issues
6. Discussion

What happened?

- The two-boat tour was scheduled to **depart at 5:30 p.m.** but departure may have been delayed by a mechanical issue on the boat that did not sink.
- 31 persons were aboard the duck that sank.
- Springfield NWS predicted winds up to 70 mph Thursday, and issued a severe thunderstorm watch from **11:20 a.m. until 9 p.m.**
- “Isolated winds gusts of 70 to 75 miles per hour would be possible.”—NWS

What Happened?

- Video taken from another boat of the moments before the capsizing showed the duck boat battling large waves whipped up by the squall line's strong winds.

What Happened?

- The storm hit the lake with 80 mph winds that kicked up waves 5 feet high—Captain Jim Pulley, owner of Sea Tow, Table Rock Lake.
- 7:09 p.m.: Authorities received their **first call about the duck boat incident.**

NWS & Storm Prediction Center Timeline

- July 18 NWS Storm Prediction Center issues convective outlooks (possibility of strong storms) for the area.
- Through Wednesday night, the storms raced forward around 52 mph, maintaining a nearly constant bearing as they headed southeast for 475 miles before arriving in Branson.
- The storm was part of a complex that originated in northwest Kansas and central Nebraska.
- The responsible thunderstorm **formed 9-1/2 hours before arriving in Branson.**

NWS Timeline, Thursday July 19

Times in CDT

- 11:20 a.m.: Severe thunderstorm watch issued by the Storm Prediction Center, for much of southwest Missouri through 9 pm, **including** Table Rock Lake.
- 5:45 p.m.: First severe thunderstorm warning issued, including northwest Barry County, but **not** including Table Rock Lake.
- 6:07 p.m.: Another severe thunderstorm warning issued including northern Stone and northern Barry Counties, but **not** including Table Rock Lake.

NWS Timeline

- 6:15 p.m.: An update to the 6:07 p.m. warning issued, mentioning wind gusts to 70 mph were possible from the line of storms moving southeast at 65 mph.
- 6:32 p.m.: Severe thunderstorm warning issued for Taney, Stone, Barry counties, **including** Table Rock Lake and Branson, which would remain in effect until 7:30 p.m.
- 6:55 p.m.: The Branson West Airport (FWB) just north of Table Rock Lake recorded a 52 mph wind gust.

NWS Timeline

- 6:59 p.m. radar detected 65-67 mph winds, covering a 1.2-mile wide area, over the central part of Table Rock Lake.
- 7:09 p.m.: Authorities received their first call about the duck boat incident.
- 7:10 p.m.: Branson Airport (BBG) located about 10 miles south-southeast of Branson, east of Table Rock Lake, measures a 52 mph wind gust.
- 7:12 p.m.: Trees reported down north of Branson.

NWS Timeline

- 7:25 p.m.: A gust to 63 mph was recorded at Branson Airport.
- NWS estimates there was at least **23 minutes of lead time** between the issuance of the 6:32 severe thunderstorm warning for Table Rock Lake and the 7:10 report of the 52 mph wind gust at Branson West Municipal Airport north of the Lake.

Weather Analysis

- It is not yet known whether the duck boat would've had time to get safely to shore if it had received warnings with maximum lead time.
- As the storm arrived in Branson, it was in the process of becoming “outflow dominant” at the time.
- It was spitting out more air than it was taking in. As a storm “gusts out,” the exhaust of the storm can often produce damaging and destructive winds.

Weather Analysis

- Wind shear produced tumultuous waves.
- Table Rock Lake is oriented north/south, so that the winds had the entire length of the lake to sweep through.
- The lack of trees/structures over the lake meant very little friction, and that helped the wind reach its maximum potential.
- The strongest wind report from the area was 62 mph, but gusts in the vicinity of the sinking may have reached 65 to 75 mph.

Weather Analysis

- In May 2018, The American Meteorological Society put out a statement advising organizers of sporting, entertainment, and recreational events to have a hazardous weather plan in place.
- “Many venues have inadequate plans, if they have one at all.” AMS cited multiple examples of weather-related tragedies that might have been preventable had more attention been paid to meteorological warnings.

Weather Analysis

- Meteorologists have expressed frustration that this avoidable tragedy occurred, and some confessed that more work needs to be done to ensure people are receiving their warnings.
- The content and dissemination of marine warnings is an ongoing discussion topic for the NWS Baltimore/Washington Marine Weather Users Committee, in which CAPCA participates.

Duck boat accidents on the water

- Duck boat accidents on the water seem to be much less frequent than on-the-road accidents.
- **1999 Hot Springs, Arkansas:**

13 people died after a duck boat sank on Lake Hamilton near Hot Springs. Only eight of the 21 people on board survived.
- The Coast Guard concluded that a dislodged drive-shaft seal allowed water to flood the hull of the Miss Majesty.
- An NTSB investigation concluded that inadequate maintenance caused the vessel to sink.

Duck boat accidents on the water

- **July 2010 Philadelphia**

Two tourists were killed when a tugboat-guided barge struck a Ride The Ducks boat on the Delaware River. The duck boat sank after being struck by the barge.

- The sightseeing duck boat was anchored in the shipping channel after being shut down because the boat's operator saw smoke and feared an onboard fire.
- The driver of the tugboat that was guiding the barge was charged with manslaughter after it was determined he had been distracted by his laptop and cellphone "for an extended period of time prior to the collision."
- The tourists who died were Hungarian students visiting the U.S. on a church exchange. The families of the victims won a \$17 million settlement.

Duck Boat Issues

- NTSB has just begun its investigation of the Branson accident – it may take a year.
- Life jackets aren't required on vessels that have a cover like that of the duck boats. The worry is the life jackets would cause passengers to rise to the surface and be caught in the canopy.
- The duck boat that sank had lifejackets, according to passenger statements, but they were told “they wouldn’t need them.”
- Experts have been debating the use of life jackets on these boats for years.

Duck Boat Issues

- After the 1999 Arkansas capsizing, the NTSB found that duck boats don't have adequate reserve buoyancy and recommended canopies be taken off all duck boats and life jackets be made mandatory until changes were made.

DISCUSSION

- Responsibility of captains
- Responsibility of company, vessel dispatchers
- Access to WX reports & warnings while on the water (VHF and cell phone)
- Visibility of horizon to see approaching WX
- Area of operation considerations
- Other