# ACCIDENT INVESTIGATION PARTY SUBMISSION
# BY
# RIPLEY ENTERTAINMENT, INC.

National Transportation Safety Board
Investigation No.: DCA18MM028
July 19, 2018 incident involving Stretch Duck 7

February 14, 2020

Submitted by: Frank English, Party Coordinator

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# NTSB PARTY SUBMISSION - RIPLEY ENTERTAINMENT, INC.

Ripley Entertainment, Inc. (d/b/a Ride the Ducks), on behalf of itself and Branson Duck Vehicles, LLC, who collectively were the owner and operator of Stretch Duck 7 on July 19, 2018, submits this Party Submission. Ripley Entertainment, Inc. and Branson Duck Vehicles, LLC are referred to collectively herein as REI.

As a preliminary matter, REI wishes to acknowledge the heartbreaking nature of this accident, to extend sincere condolences to the family members of those lost in this unfortunate accident, and to express its sympathies to the survivors and their families. REI thanks the National Transportation Safety Board ("NTSB") and the U.S. Coast Guard ("USCG") for the time and effort that their staffs have devoted to the investigation. REI believes that its actions after this incident, in providing financial assistance to the families, in settling their claims expeditiously and in a mutually agreeable manner, and in cooperating fully with the investigations, reflect REI's understanding of the significance of this event and of its impact on those involved, their families, and other interested parties.

REI appreciates the opportunity to make this submission. The submission includes certain facts contained in the NTSB's group factual reports and also incorporates REI's errata submissions regarding the draft group factual reports.[1]

## I. INTRODUCTION - OVERVIEW

The duck boats at issue in this case operated for more than 40 years in this environment on Table Rock Lake, without any significant safety mishap, and certainly never one resulting in the loss of any life. This outstanding safety record was due to an obvious commitment to operational safety over that extended period of time. What occurred on July 19, 2018, was an unprecedented

[1] This Party Submission is submitted without the benefit of, and access to, certain investigative information which REI believes is critical. This has in many ways hampered REI's ability to submit a full and complete assessment of the facts. This submission and REI's proposed findings do not take into account that investigative information to which it has not been provided access. Two areas are most noteworthy.

First, and most importantly, the NTSB has not provided a copy of the video taken onboard with Stretch Duck 7's Brigade video/audio recording system to assist in furtherance of the investigation. This device likely contains important data, including positional information (i.e., GPS), that is essential to understanding the facts. Indeed, the information on this system which was retrieved from other vessels (and which has been produced) provided essential investigative information in regard to facts relevant to those ducks.

Second, REI's responses to the draft factual reports noted that the weather information being supplied by Weather Decision Technologies and Earth Networks—and ultimately displayed on a monitor at the REI facility in Branson—was delayed in its transmission and "smoothed" prior to being broadcast on the display screen. Based on the information available, we believe this delay and smoothing had a material impact on the quality of information displayed and observed on the monitor by captains and others at the REI facility, and likely negatively impacted their assessment of the weather. REI's comments on the draft factual reports was limited due to the fact that large portions of the draft meteorology report were redacted, for unexplained reasons. While these issues are discussed further below, no response was provided on the technical, but substantively important, issues raised in REI's factual submissions. Instead, the NTSB's disposition of these issues simply states: "only the redacted version of Attachment 18 will be released." These issues and factual gaps raised in our errata sheet do not appear to be addressed in the final factual report. Without receiving a response to the issues and corrections set forth in our errata sheets, REI assumes that it is correct that these commercial suppliers "smoothed" the weather data from the National Weather Service, and that there was a significant delay in its transmission to the monitor.

event. While there are always lessons to be learned, this accident occurred primarily due to the extreme, rare, and sudden nature of the derecho,[2] and secondarily, due to an unfortunate confluence of other factors, some of which were within REI's control, but many others that simply were not.

The weather event that struck Table Rock Lake on July 19, 2018 was a ferocious, sudden, and extreme weather event that many witnesses stated they had never experienced. It is undisputed by all who were in the area that afternoon that the derecho arrived suddenly and was especially violent. That fact is corroborated by video evidence. A thunderstorm warning, a regular occurrence in Southwest Missouri in the summer months, could not have fully prepared those who managed and operated the duck boats for the sudden onset of the storm and its unusual intensity. On the evening of the accident, numerous businesses and boaters were caught by surprise by the severity and suddenness of the derecho. Indeed, many found themselves on the water, and the showboat Branson Belle was boarding for its next cruise, as the severe weather arrived. The anomalous and extreme nature of this event was confirmed by the National Weather Service ("NWS"), the agency of the United States government that is tasked with providing weather forecasts and warnings of hazardous weather, in its assessment of the derecho.[3]

Not only was the weather event a rare, sudden, and extreme occurrence, another significant factor that contributed to the accident was that the weather radar information displayed on the Earth Networks monitor—which was used by REI personnel to assess the weather—did not display the dry gust front that preceded the main part of storm by approximately fifteen minutes.[4] To make matters worse, when making observations from the ground—as the captains, drivers and other witnesses did—the available visual and audible information about the nature of the storm system made it appear to be much further from Table Rock Lake than was the actual location of the heavy winds and dry gust front. This mislocation was confirmed anecdotally by witnesses, and the NWS confirmed the anecdotal evidence. See NWS Derecho Assessment at 50 ("This resulted in a situation where people often did not get a visual or audible cue that severe weather was approaching.").

As discussed below, while there are certainly lessons to be learned, this incident was an accident. REI had recently purchased the duck boat operation months earlier, and relied on the prior owner's decades of safe operation in making that acquisition decision. All captains and drivers were thoroughly trained, under a training program that was reviewed and approved by the USCG. The company's operating and safety procedures exceeded those required by all applicable regulations. The vessels themselves were in full compliance with all applicable regulations and were routinely inspected by the USCG. The company provided its personnel with access to a commercial weather system, which itself also exceeded regulatory requirements. The accident is

[2] The American Meteorological Society 2014 definition of "derecho" is: "A widespread, convectively induced straight-line windstorm, more specifically, any family of downburst clusters produced by an extratropical mesoscale convective system." There are various definitions of "derecho" and new definitions have been proposed. See http://www.spc.noaa.gov/misc/AbtDerechos/papers/Corfidietal_def_2016.pdf.

[3] See National Weather Service Central Region Service Assessment, July 19, 2018, Table Rock Lake Missouri Derecho at 50 ("NWS Derecho Assessment") ("The duration of severe winds was anomalous and were of a length that few people would have likely experienced with other severe thunderstorms.").

[4] As explained further below, a key characteristic of a derecho—in this case and others—is that the main storm system is preceded by a "dry gust front." This includes heavy winds, with negligible or no precipitation, prior to arrival of the main storm system.

attributable to a severe, unexpected, and unprecedented weather event that most people have never even heard of, let alone experienced—a derecho.

## II. BACKGROUND - Ripley Acquisition of RTDI Branson operations

In December 2017, after several months of due diligence, REI acquired the Branson duck boat operation, which consisted of approximately 22 amphibious vessels that operated solely in the Branson, Missouri area, from Ride the Ducks International LLC ("RTDI"). Historically, RTDI and other entities operated duck boats in various locations around the United States. (The NTSB's investigation showed that RTDI operated 95 vehicles in six locations, which collectively carried over 1,500,000 passengers every year.) The business REI acquired had been operating in the Branson area for over 47 years, during which there had been no significant incidents. After the December 2017 acquisition of the Branson operations, REI did not make any major changes in the management, personnel, policies, or procedures at the Branson operations.

## III. TRAINING, LICENSING, & EXPERIENCE

### a. Captain Training

REI's formal training consisted of three components: (1) an operators course for new captains, (2) annual refresher training for captains at the beginning of each season addressing both land and water operations, and (3) monthly mandatory safety meetings with mandatory attendance of all personnel.

The REI captains were trained using a rigorous training program that was approved by the USCG. The approved course curriculum included approximately 278 hours of instruction, consisting of 124 hours of classroom training and 154 hours of practical and on-water training. See USCG Approved Course Curriculum at RTD_000382. The curriculum included performance and enabling objectives for a variety of topics, with approximately 89 hours of the course dedicated to water emergency and other related on-water training, specifically including training on the procedures for responding to severe weather while the vessel is on the water. The entire course took place over a period of approximately eight weeks. Included in this training was basic weather and meteorology for mariners, including specific training on recognizing approaching storms, and observing waves, wind, and current. See Captain Course Instructor Notes, RTD_000447. Additionally, each captain trainee was provided supplemental training materials to aid in the training, which included materials on basic weather and meteorology for mariners, and a bank of weather related questions that were used for training and testing purposes. See Supplemental Training Materials (weather and supplemental test questions) (submitted with Errata to Operations Group Draft Factual Report).

The training program instructed captains to take action in response to various hazardous conditions, including situations which may necessitate abandoning ship, sounding of bilge alarm, collision, grounding, fire, fume detector, heat sensor, loss of propulsion, loss of steering, and severe weather, and included training on instructing passengers to don their personal flotation devices ("PFD").[5] Procedures for waterborne emergencies existed and prescribed the following steps for bilge alarm and severe weather incidents: don PFDs, raise the side curtains, and immediately head for shore.

[5] Stretch Duck 7 carried more PFDs than were required by the Certificate of Inspection.

The training topics address and test the operational competencies needed for responding to severe weather. Several witnesses testified that the training addressed and incorporated severe weather topics, scenarios, and responses. The mandatory training also included training on Certificate of Inspection ("COI") operational restrictions, which also addressed aspects of severe weather, including operational wave and wind speed restrictions for the vessels (described in further detail below). The Captain of Stretch Duck 7 was himself a designated trainer responsible for administering on-water training to driver/deckhand trainees on various emergency response topics, including responding to severe weather on the water.

Completion of the approved course and exam qualified trainees to apply for a USCG Limited Captain's license, without taking any additional USCG examination. In order to qualify for the license, the individual must also complete 50 round trips in a supervised role, successfully complete a separate boating safety course, obtain a first aid and CPR certification, and pass a physical and drug tests, among other requirements. Once these requirements were satisfied and proper documentation submitted to the USCG, the USCG would issue the captain's license.

Full-day, annual refresher training was conducted for each captain. This training was administered by a designated captain trainer, who confirmed the individual captain remained fully competent with respect to the operation of the duck and handling of various safety and emergency contingencies. Under REI's policies and procedures, this training was conducted, and each captain was required to be certified as having completed it, before the tour season started each year. Records of this annual training were provided dating back to at least 2011, showing the Captain of Stretch Duck 7 had regularly completed this training. The Captain of Stretch Duck 7 most recently completed his refresher course on February 19, 2018, and the training log for that training listed sixteen different emergency response training topics, including: bilge alarm, abandon ship, hull breach, intentional grounding, and emergency egress procedures, among others. RTD_002367-2368. His record of training is signed and dated by the designated captain trainer.

In addition to the training described above, periodic training on emergency response procedures on the water, and other safety topics, was conducted during monthly mandatory safety meetings for all personnel. During USCG annual COI inspections, as part of USCG examinations of the vessels, emergency response training was regularly conducted and observed by USCG inspectors. In April 2018, a USCG inspector conducted this on-water emergency response training with the Captain of Stretch Duck 7. See NTSB Transcript Massey at pages 30-31.

**b. Driver Training**

The REI drivers also completed a duck-specific training curriculum and program. While the vessel's COI did not require a deckhand for its normal daytime operations, the REI driver curriculum included topics to allow drivers to effectively assist captains as a deckhand while the duck was on the water. In this regard, the training curriculum included training of drivers to assist in most of the on-water emergencies listed in the guidelines of USCG Navigation & Vessel Inspection Circular ("NVIC") 1-91, including emergencies involving severe weather and abandon ship.

One driver who completed the driver training course in 2017 and who was also a school bus driver in Branson described the REI driver training as more extensive than what he received for driving school buses. He also described the inspections they performed on the ducks (pre- and post-trip) as similar to what was performed on school buses. See Attachment A, November 12,

2019 deposition of Damian Rodriguez at 48.

### c. Experience & Credentials -- Captain and Driver of Stretch Duck 7

The Captain of Stretch Duck 7 was very experienced. Captain McKee received his first license at the USCG Regional Exam Center in St. Louis, Missouri in 1993, and became employed by RTDI as a duck captain in 2001. His license—Master, Self-Propelled Vessels not Including Auxiliary Sail of Less than 100 Gross Register Tons (GRT) above Mile 225.0 on the White River and Impoundments in Missouri and Arkansas—was most recently renewed in January 2018, was valid for five years, and was valid at the time of the accident. His license exceeded that which was required to act as captain of a duck, which is a much smaller vessel of approximately 4 GRT. He had decades of experience as a captain of vessels in the Branson area, including the 149-passenger Polynesian Princess, the 149-passenger Branson Lake Queen, and nearly twenty years of experience as a duck boat captain, and before that as a duck boat mechanic. He was also a trainer for the duck drivers.

The driver of Stretch Duck 7 last renewed his Commercial Driver's License ("CDL") license on September 18, 2015. That license was valid for three years, and was valid at the time of the accident.

As the NTSB investigation revealed, and as noted in further detail below, other captains, drivers, and trainers consistently expressed high regard for the competency and safety awareness of the Captain of Stretch Duck 7.

## IV. STRETCH DUCK 7 -- USCG GUARD CERTIFICATION & VESSEL DESIGN

### a. USCG Certification

The USCG has established regulations under 46 C.F.R. Subchapter T to govern small passenger vessels under 100 gross tons like Stretch Duck 7.[6] Following the loss of the Miss Majestic in 1999, the USCG published NVIC 1-01 to provide additional guidance with respect to the application of these regulations to amphibious vessels. After its original certification by the USCG in March 2001, Stretch Duck 7 was inspected on an annual basis under this regime, and it passed its last inspection in November 2017. The USCG's inspection included, among other things, a shore-side hull and machinery inspection, a waterborne test, and the performance of various emergency drills. Stretch Duck 7 had a valid COI at the time of the July 19, 2018 incident, certifying that the "vessel, in all respects, is in conformity with the applicable vessel inspection laws and the rules and regulations." See COI.

The COI restricted Stretch Duck 7's operations to "Table Rock Lake and Lake Taneycomo; not more than one thousand (1,000) feet from shore unless a VHF marine band radio is properly installed and licensed by the FCC." Stretch Duck 7 maintained a properly installed and licensed

[6] REI notes that the U.S. District Court for the Western District of Missouri recently found, on November 27, 2019, that Table Rock Lake is not a "navigable waterway" for purposes of admiralty jurisdiction. For this reason, the applicability of 46 CFR Subchapter T to vessels operating on Table Rock Lake is in significant doubt. See 46 CFR 175.110(b) (small passenger vessel regulations do not apply to vessels operating exclusively on inland waters that are not navigable waters of the U.S.) For the purpose of this Party Submission only, REI assumes that those regulations apply. REI reserves all rights with respect to the issue of navigability.

VHF marine band radio. The COI also prohibited the vessel's operation on the water when winds exceed 35 mph.[7]

Until February 2017, Stretch Duck 7's COI contained no wave height restrictions, and included a general prohibition that the vessel should not be operated waterborne "when a potential for downflooding exists due to waves." See COI dated February 7, 2012 (expired February 7, 2017). With expiration of the vessel's COI in February 2017, the local USCG issued a new COI with the operational wave height restriction of 2.0 feet, which was in effect on the date of the accident. There was no explanation in the record regarding the basis for this operational restriction.[8]

The vessel and equipment were inspected annually. Stretch Duck 7 was last inspected by the USCG in November 2017 and was credited with a successful annual inspection and successful biennial hull/drydock exam at that time. With respect to REI's other vessels, the USCG was at REI's Branson facility on a monthly basis throughout the year performing inspections.

Stretch Duck 7 was also regulated by the National Highway Traffic Safety Administration and the Federal Motor Carrier Safety Administration and met all applicable requirements.

After the incident, Stretch Duck 7 was inspected and no regulatory or NVIC 1-01 deficiencies were noted. While it was noted a light on a life ring was apparently missing, no light is required unless the vessel is operating in evening hours. Similarly, REI is not aware of any finding that a mechanical or other defect in Stretch Duck 7 existed at the time of the accident.

**b. Stretch Duck 7 Vessel Design & Configuration**

This section addresses certain general design, configuration, and equipment factors regarding ducks boats and certain specific issues related directly to Stretch Duck 7. First, this section describes the side curtain releases, canopy configuration, and the sea chest installed on Stretch Duck 7 and other vessels to address certain recommendations made in connection with the Miss Majestic incident. All ducks acquired by REI in 2017, including Stretch Duck 7, had been

[7] As discussed herein, at the time Stretch Duck 7 entered the water, the conditions were well within the restrictions of its COI.

[8] In prior accidents involving the loss of inspected small passenger vessels in heavy weather, the USCG has consistently opposed environmental operational restrictions, when such Safety Recommendations have been made by the NTSB. See Safety Recommendation M-06-009 (Capsizing of the passenger vessel LADY D), Closed Unacceptable Action. In the USCG's April 10, 2007 letter to the NTSB, it explained its basis for not adopting such a requirement in the small passenger vessel regulations as follows:

> ….limiting winds speeds and wave heights alone cannot adequately define a safe operating envelope, even for a particular vessel. Many other conditions involving both the vessel and its environment must be constantly observed, monitored, interpreted, and responded to by the Master in order to evaluate the advisability of embarking on a voyage, or of continuing on a voyage when conditions progressively deteriorate. Not only does the Master have the responsibility to make this determination, he is the only one capable of making that determination. This is consistent with the policy established by Seaport Taxi, as indicated in the NTSB report. While the Coast Guard has suggested voluntary observance of certain limiting conditions beyond which it may be unreasonable to operate, members of the passenger vessel industry have since offered compelling reasons why they consider this approach to be overly restrictive. Vessels come in all sizes, types, and sea keeping abilities. Attempting to take a one-size-fits-all approach by specifying limiting environmental conditions for vessel operation, even if only applied to pontoon boats, is fraught with difficulty and may well have unintended consequences.

modified in various ways to address those recommendations.[9] After a discussion of these specific items, the submission outlines certain additional design issues pertaining to Stretch Duck 7.

### i. Side Curtain Releases

NVIC 1-01 contains general guidelines and standards regarding the installation of curtains in a manner that would allow escape from the vessel without impeding passenger egress. The emergency curtain release arrangement on Stretch Duck 7 satisfied these standards and was approved by the USCG. The release allowed the main side curtains in the passenger area to be released by dropping from where they were attached to the top of the canopy frame. The port curtain could be released from a handle directly above the driver's seat near the top of the port side curtain, and the starboard curtain could be released from the corresponding location on the starboard side.

When investigators examined the recovered Stretch Duck 7, they found the main starboard curtain in the passenger area in place, and the main port side curtain in the passenger area disconnected and released. The Captain of Stretch Duck 7 informed investigators he was able to release the port side curtain, and this account was corroborated by passenger statements.

### ii. Canopy

The spacing and configuration of the canopy supports were adjusted so as not to impede egress of passengers, by increasing the height of the canopy and spacing the vertical supports so they line up with the seatbacks. The modified configuration was in conformity with NVIC 1-01 and was approved by the USCG.

### iii. Bilge System

Traditionally, many ducks were fitted with a Higgins Pump, which allowed the bilges to be pumped out if water entered the hull. The Higgins Pump had a capacity of 250 gpm with the engine and propeller engaged at full throttle. However, this pump only functioned if the engine was running and the propeller shaft was rotating, and its pumping rate increased or decreased with propeller shaft rotation speed. Hence with any loss of engine power/propulsion, the Higgins Pump would not work at full capacity, or at all. With the approval of the USCG, the Higgins Pump on Stretch Duck 7 was replaced with three electric bilge pumps. In contrast to the Higgins pump which relied on the vessel's propulsion being engaged and operable, the replacement pumps that were installed on Stretch Duck 7 were electrically powered by the duck's battery/alternator, and would function independently of the engine and propeller shaft.

To minimize the risk associated with a shaft boot failure, the vessels were fitted with a sea chest. The sea chest enclosed all through-hull penetrations (except 3/4 inch drain plugs in the hull) in a single watertight compartment, which had the effect of significantly mitigating the risk of flooding. In the event of a boot failure (as occurred in the Miss Majestic incident), only the small sea chest compartment would flood. The sea chest contained a bilge alarm. Installation of the sea chest and related modifications were approved by the USCG (see further discussion below).

Stretch Duck 7 was equipped with three Rule 2000 electric submersible bilge pumps, each rated at 2000 gallons per hour (33.3 gpm), for a total rated capacity of 6000 gallons per hour (100

[9] In addition to addressing specific issues raised by the Miss Majestic incident, additional safety improvements were made to the Branson duck fleet. For example, to improve safety and visibility on land and in the water, RTDI installed cameras on the ducks in September 2015.

gpm). Installed adjacent to each bilge pump was a "Rule-a-Matic Plus" automatic float switch, which would automatically activate the bilge pump when the water level in the bilge reached approximately ½ inch. A separate yellow indicating light on the dashboard at the captain's station illuminated if the pump was in operation. The three Rule 2000 pumps were equipped with 1 1/8-inch diameter plastic discharge hoses which discharged at the gunwale, two on the port side of the passenger area, and one on the starboard side. Stretch Duck 7's bilge pumping system design and alarm arrangement were approved by the USCG, with the current design approved in 2005, and were inspected and tested during routine annual USCG inspections. They were also approved by a Registered Professional Engineer ("P.E."). As such, these systems installed on Stretch Duck 7 complied with all applicable regulations. See J.D. Ray, P.E. Bilge Pump Flooding Analysis To Support Removal of the Higgins Pump, dated April 30, 2005; USCG approval letter dated June 14, 2005; USCG approval letter dated August 13, 2002, and J.D. Ray, P.E. Electrical System Plan submitted to USCG dated July 25, 2002.

In addition to the bilge pumps being activated automatically, two of the bilge pumps could be activated manually. A single switch labeled 'bilge switch' was located on the dashboard. This switch would allow the captain to manually operate both aft bilge pumps simultaneously for any reason. This capability was in addition to, and independent of, the automatic activation of the bilge pumps described above.

The bilge pumps on Stretch Duck 7 exceeded the USCG regulatory requirements for pumping capacity. The minimum required bilge pumping capacity for a USCG inspected small passenger vessel the same size as Stretch Duck 7 is 10 gpm. 46 CFR Table 182.520(A). In general, because amphibious vehicles such as Stretch Duck 7 typically have more hull penetrations through which water can possibly ingress, the minimum requirement has been modified by the USCG. Specifically, NVIC 1-01 states that sufficient bilge pumping capacity should be provided "which can offset uncontrolled flooding of the largest penetration in the hull…" NVIC 1-01 at 32. As a general matter, for vessels like Stretch Duck 7, for which the USCG approved removal of the Higgins Pump and the installation of the watertight sea chest, the risk of progressive flooding through the hull penetrations was significantly reduced. Under the additional guidelines in NVIC 1-01, the minimum required total bilge pumping capacity for Stretch Duck 7 is approximately 52 gpm. With a combined rated pumping capacity of 100 gpm, the pumps on Stretch Duck 7 exceeded the requirements by nearly a factor of 2. As noted, the USCG approved this arrangement for Stretch Duck 7 by letter dated June 14, 2005.[10]

The vessel was equipped with a total of six bilge alarms located near the bottom of the various bilge compartments, which, when activated, provided audible and visual signals on the starboard side of the captain's station under the dashboard. The engine compartment forward of the axle, the sea chest, and the two aft compartments on either of the shaft tunnel each contained one bilge alarm. In the midship section there were two alarms, one on each side of the vessel. The structural configuration of the midship section of the vessel allowed for water to flow freely

[10] In implementing requirements for bilge pumps, the USCG does not intend that bilge pumps installed on small passenger vessels be designed, and have the capacity, to prevent the effects of catastrophic flooding of a vessel, as occurred here. See NVIC 1-01, Enc. 1 at 31-32. Instead, as noted in NVIC 1-01, the "Coast Guard's approach to a bilge system for small passenger vessels is for it not to serve as the primary deterrent against the ingress of seawater due to flooding." Id. (emphasis added). Instead, "[t]he bilge system serves to evacuate accumulation that results from normal vehicle operations." Id. In other words, the bilge system on Stretch Duck 7 worked as designed, and as approved by regulations.

between the port and starboard side of the vessel, while the sea chest remained watertight. Thus, flooding of either the port or starboard side in the midship section would result in both bilge alarms and the bilge pump being activated. Alarm lights located on the dashboards, indicate which alarms and bilge pumps are active.

Upon recovery of Stretch Duck 7, the bilge pumps and bilge alarms were inspected, tested, and found to have been operating as intended.

### iv. Ventilation

The design of the engine ventilation system, fire dampers, engine hood, and forward hatch, were approved by the USCG and satisfied all applicable regulatory requirements.

The main engine compartment's large hood that was left partially open during operation in order to provide ventilation/cooling of the engine space, but could be closed by the use of a handle/lever in the captain's station if water intrusion were expected. The captain testified to having closed this hood, in accordance with REI's procedures, during his efforts to reach land and its closure was confirmed by the investigation. There was also a smaller ventilation hatch forward of the hood. This too was closed by activating the same hood closure lever. When closed, it was held in its "up"/closed position by the force of springs. Although the engine compartment was not watertight, nor was it required to be, closure of the hood and ventilation hatch would have mitigated the risk of flooding if water came over the bow of the vessel.

The dampers on the port and starboard side of the vessel were required by regulation and were designed to be closed by the captain in the event of an engine fire, to assist in fire suppression. Closing the dampers cuts off air flow to the engine. Investigators found the two side engine compartment exhaust vents open, as expected because the engine of Stretch Duck 7 was operating at all times.

On many traditional vehicles the engine's coolant system is exposed to the environment, which aids in keeping the engine cool. By contrast, the engine compartment on a duck is weather-tight. To cool the engine, the engine's air flow is directed through the partially open engine hood. It then flows through the radiator forward of the engine. The air flowing through the radiator is then dispersed out the port and starboard side vents. Closing the side vents stops the air from flowing to a fire, but it also stops the flow of air through the compartment and coolant system (i.e. radiator).

By closing off the side vents, the ventilation or air flowing through the engine compartment is diminished causing the engine to overheat. When the vessel is waterborne the travel speed is slow therefore the air flowing through the radiator is significantly reduced. To compensate for the lack of air flow the duck has been outfitted with external keel coolers. These coolers only aid in the cooling of the engine during waterborne operation but alone are not sufficient to allow the engines hood to remain closed during normal operation. Leaving the side vents open while the engine hood is closed allows the heat in the compartment to dissipate out of these vents. For this reason masters train to close the engine hood, not the side vents, and head immediately to shore. During the act of heading to shore the master will likely increase engine RPM causing the engine to operate at higher temperatures then normal furthering the risk associated with engine failure due to overheating. For these reasons, closing the fire dampers, that are located just above the gunwale, is not a realistic means to mitigate the risk of flooding.

### v. Open Boat - Damage Stability/Survivability Requirements

The USCG considered Stretch Duck 7 (and similar duck boats) to be an "open boat," which "means a vessel not protected from entry of water by means of a complete weathertight deck…" 46 CFR § 175.400. Given the size of the vessel, the number of passengers it carried, and its operating route, the USCG did not require the Stretch Duck 7 (or other duck vessels) to meet damage stability or other survivability standards. See 46 CFR § 175.212(a).

As a result of the Miss Majestic incident, the NTSB issued a Safety Recommendation to the USCG to require all duck boats to install "reserve buoyancy" so that the vessel will remain afloat and upright in the event of flooding. See NTSB Safety Recommendation M-02-001. The USCG formally declined to follow that Safety Recommendation, and, on May 6, 2003, the NTSB classified its Safety Recommendation to the USCG as "Closed-Unacceptable Action." The NTSB issued a virtually identical Safety Recommendation to duck boat owners. See Safety Recommendation M-00-5. RTDI (former owner/operator of the Stretch Duck 7) took a variety of steps to enhance the stability and survivability of its vessels. As a result, by letter dated February 4, 2008, the NTSB classified this Safety Recommendation with respect to RTDI as "Closed Acceptable Alternate Action."

## V. EARTH NETWORKS - WEATHER DATA PROCESSING & DELAY

To provide current weather information for captains, managers, and other personnel at duck headquarters, REI subscribed to Earth Networks, a paid weather service that transmitted weather radar and other data on its internet based platform, referred to as StreamerRT. This weather information was displayed on screens (46 inch and 24 inch television monitors) in the Captain's Lounge and manager on duty's ("MOD") office.

The manner, timing, and processing (smoothing) of the radar images has operational significance. As set forth below, based on the information available to us, delays in processing and smoothing of the weather radar data materially affected the quality of information displayed and observed on the Earth Networks monitor available to captains and others at duck headquarters, and likely negatively affected their assessment of the weather.

### a. Sources, Transmission, and Delays in Processing

The NTSB's investigation reveals that Earth Networks did not obtain the weather radar data (that it processes and ultimately broadcasts) directly from the NWS. Instead, Earth Networks obtained radar data from a third party commercial provider, Weather Decision Technologies, Inc. ("WDT"). WDT received constant Level II radar data from NWS. Once WDT received this data, WDT processed the data through its "quality control (or QC) process" in order to "smooth" out the images, removing radar images it deemed "non precipitation." Due to this processing, the composite mosaic radar images transmitted by WDT to Earth Networks was delayed for up to six minutes while WDT received, processed, and then transmitted the data. See attachment 18, to draft NTSB Meteorology Report at pdf pp. 83-84.

Once Earth Networks received a composite mosaic radar image from WDT, Earth Networks then applied additional "smoothing on the boundaries of the radar images," and after the smoothing process was completed, this final mosaic would be "stored" at Earth Networks, until publication. Earth Networks publishes the stored mosaic radar image to its customers every 5 minutes. Id. As an example, a WDT mosaic radar data transmitted to Earth Networks at 7:01PM (which is based on radar data received from NWS at 6:54 PM), would not be published by Earth

Networks to its customers until 7:05 PM. In this example, when Earth Networks publishes this radar data to its customers on StreamerRT, it would be marked with a "timestamp" of 7:05 PM, even though the "valid time" marked by WDT is 7:00 PM, and even though the radar data was transmitted by NWS to WDT at 6:54 PM. Further detail on the timing and sequencing of the publication of radar data on the StreamerRT platform is discussed on pages 2-3 of our Errata to the draft Meteorology Group Factual Report.

The net result is that Earth Networks publishes its radar images on the StreamerRT up to eleven minutes after those images are made available from the NWS. In other words, the images published by the Earth Networks StreamerRT platform could be up to eleven minutes behind actual environmental conditions happening on the ground. This delay, between real time weather observation data from the NWS radar and the Earth Networks broadcasts, is not disclosed or explained in the StreamerRT User Guide.

**b. Weather - display and "smoothing"**

WDT processed the weather data it received from NWS to "smooth" it out, essentially removing radar images it deemed not to contain precipitation. Earth Networks also performed processing and further smoothing on the boundaries of the radar images, once they received the mosaic from WDT. Details regarding this processing appears to have been redacted from the information made available. To assess the importance of this processing and smoothing, REI requested access to the redacted portions of Attachment 18 to the Meteorology Group Factual Report, but the request was denied.

Despite lacking access to the redacted portions of the Meteorology Group Factual Report, REI has attempted to better understand how Earth Networks modifies the NWS images, before publication on StreamerRT by examining a number of thunderstorm systems that have outflow boundaries/dry gust fronts, similar to what occurred on the day of the accident. While the tested weather systems are not considered derechos, they do contain outflow boundaries or dry gust fronts ahead of the systems, which permits an analysis of the net effects of the WDT and Earth Networks smoothing and other processing. It appears that Earth Networks StreamerRT, as a result of the smoothing process, does not show these outflow boundaries in its published mosaic. Thus, while the NTSB has not provided any information about the manner in which WDT and Earth Networks alter or "smooth" the radar data before publishing it to customers, the net effects of such smoothing appear significant.

To illustrate, Attachment B shows two screen shots of a weather system in Kansas on July 10, 2019 at approximately 1400 UTC, which had a dry gust front/outflow boundary in front of the weather system. On the top of the figure, NWS Level II radar depicts the storm system with a dry gust front/outflow boundary clearly visible on the radar screen. The bottom figure shows the same storm system on the Earth Networks StreamerRT (which has been "smoothed" by WDT and Earth Networks), but the dry gust front/outflow boundary is not visible at all. Due to the Earth Networks and WDT smoothing process, customers reviewing the StreamerRT mosaic would not be alerted to the dry gust front well ahead of the main part of the storm. REI submitted this information to the NTSB prior to issuance of the NWS Derecho Assessment.

In its Derecho Assessment at 36, NWS confirmed this "smoothing" phenomenon:

> There are limitations to many smartphone apps that smooth or filter low reflectivity values from their radar display making "fine lines" difficult to discern - especially

> when the leading edge of thunderstorm winds are not coincident with or near reflectivity cores. Also, untrained users may not properly recognize or understand that high winds can be associated with gust fronts/fine lines; and incorrect estimates of speed of movement can result in incorrect arrival time estimates.

## VI. VESSEL OPERATIONS - GENERALLY

### a. REI's Safety Management System

REI was not required by any law or regulation to have an operations manual that set out operational and safety procedures of the company. However, REI emphasized operational and safety procedures by maintaining a comprehensive operations manual. Those manuals and procedures exceeded the relevant regulatory guidance.

The USCG's regulations do not require REI to publish or maintain policies and procedures or a formal operations manual with respect to safety. NVIC 1-01 "strongly encouraged" owners and operators to adopt an operations manual and related safety and training standards. NVIC 1-01 at 38. Consistent with this recommendation, at the time of the incident, the duck boat attraction was operated under an Operations Manual that REI's predecessor published in 2012 for its duck boat fleets.[11] The Operations Manual directed the reader's attention to relevant USCG regulations and set out pertinent provisions from the regulations. Operations Manual at 7-13. The Operations Manual established many policies and procedures akin to those required for vessels certified under the International Safety Management ("ISM") Code and 33 C.F.R. Part 96, although Stretch Duck 7 was not subject to these regulations.

The Operations Manual addressed the appropriate actions to be taken in the event of severe weather. The Operations Manual stated that it was company policy to forego water entry if severe weather is approaching the area. Id. at 41. It instructs captains that, if they encounter an unsafe water or atmospheric situation, lose freeboard, or have a system malfunction, they should come off the water and notify dispatch as soon as possible. Id. The Operations Manual (at 52) provides specific guidance to a captain who encounters severe weather conditions.

### b. Weather Monitoring - Legal and Operational Framework

For all USCG inspected small passenger vessels, the regulations (46 C.F.R. § 185.304(a)(3)) require that the vessel be under the direction and control of a licensed master, as follows:

> The movement of vessel shall be under the direction and control of the master or a licensed mate at all times. The master shall operate the vessel keeping the safety of the passengers and crew foremost in mind by directing the vessel in order to prevent a casualty. Special attention should be paid to . . . Prevailing and forecasted visibility and environmental conditions, including wind and waves.

For vessels under 65 feet, such as Stretch Duck 7, the regulations (46 CFR 185.304(b)) require that the master:

> must have means available, satisfactory to the [USCG], to obtain or monitor the latest marine broadcast…

[11] RTD_00077-128. For ease of reference, this citation is to the internal pagination of the Operations Manual.

These regulations establish the legal and operational framework under which licensed vessel masters assume ultimate responsibility for the safe navigation of inspected passenger vessels, including the responsibility to monitor weather.[12] REI's operational procedures were written with this legal framework in mind, and to conform to these requirements. The regulations do not allocate any responsibility to shore-side managers to monitor the weather or advise vessel masters. Not only is there no rule or regulation, but the USCG rulemaking documents contains no discussion or any other indication that suggests shore-side managers should monitor the weather.

Even if one applies the USCG's model safety management system promulgated by the USCG, or the Passenger Vessel Association ("PVA") safety management model under its Flagship Program, those more stringent safety management standards (that Stretch Duck 7 was not required to meet) similarly allocate responsibility for monitoring the weather to the master, and contain no mention of shore-side managers having a responsibility for, or even being involved in, this function.[13] Though Stretch Duck 7 was not required to meet the safety standards in the ISM Code, its weather monitoring procedures satisfy and exceed those requirements as implemented in the USCG Safety Management System Manual.[14] Relevant excerpts regarding weather monitoring procedures set forth in the USCG Safety Management System Manual are attached as Attachment C.

Because shore-side managers are not required to have any form of training on weather (or any other aspect of vessel navigation), even for more highly regulated vessels, it is understandable that no such requirement or suggestion is contained in those model safety management systems, and in any USCG policy or regulation.

As the USCG stated when it adopted the regulation (46 CFR 185.304(b)):

> Ultimately, the master must be responsible for determining whether or not to embark upon or continue a voyage or to seek shelter based on consideration of all relevant factors including prevailing and forecasted environmental conditions….[m]asters are, and remain, responsible for evaluating all relevant factors in order to operate their vessels safely at all times. See 75 FR 78067 (Dec. 14, 2010) at 78067-78068.

Under this legal framework, the regulatory requirements are satisfied so long as the master

[12] These regulations for small passengers, in regard to the legal responsibility for monitoring weather and other hazards, are comparable to the rules and standards expected for larger, more highly regulated vessels (including passenger vessels) that are subject to the ISM Code, implemented under U.S. law pursuant to 46 USC Chapter 32 (Management of Vessels). For these vessels, the USCG has published what it deems to be model safety management system for use by vessel owners and operators, to assist in satisfying the safety and operational standards in the ISM Code. This is referred to herein as the "USCG Safety Management System Manual."

[13] On February 6, 2020, the USCG issued a Marine Safety Information Bulletin 3-20, encouraging small passenger vessels owners and operators to consider using these model safety management systems promulgated by the USCG and PVA.

[14] The guidance in the USCG Safety Management System Manual states: "[i]t is the ultimate responsibility of the master to constantly monitor and assess the weather conditions . . . Crew members are also expected to monitor and assess the changing conditions of the weather." USCG Safety Management System Manual Operating Procedures: Policy No. 2.2, Assessment of Weather Conditions. "The master has overriding authority to make decisions with regard to safety." Id. at Operating Procedures: Policy No. 3.3, Special Requirements for Bad Weather and Fog. None of these sources, or any other industry best practice or standards available to REI, suggest shore-side managers have an obligation to monitor severe weather and advise the captain.

had "means available…to obtain and monitor the latest marine broadcast…" The regulation is satisfied, for example, by the master having access to a radio that broadcast weather information, the use of a weather application on a smart phone, a combination of these, or some other means to provide access to the latest weather forecast information.[15]

As set in the next subsection, REI implemented procedures far exceeding these standards.

**c. Weather Monitoring - REI's Procedures**

REI implemented the weather monitoring provisions of the Operations Manual that are described above, and implemented a training program to adhere to those operational procedures.

Additionally, though not required to do so, REI used a paid weather subscription service (Earth Networks) and installed several display monitors (46 inch and 24 inch television monitors) in the Captain's lounge and the MOD's office at duck headquarters. This allowed captains, managers, and any other personnel to freely access and observe the Earth Networks system to monitor and evaluate the weather at any time. Captains testified that, in addition to reviewing the radar monitor in the Captain's Lounge, they would monitor the weather visually while on the tour, and if there was any concern as they were about to enter the water, they would call back to the duck dock to obtain more up to date weather information from shore-side personnel, if needed. Some captains testified they have made the decision not to enter the water due to weather, or otherwise modify or cancel the tour due to weather. As described further below, the Captain of Stretch Duck 7 (and the MOD) tracked the weather on July 19, 2018, and consulted the radar display before heading out for the 6:30 PM voyage. His actions regarding assessment of the weather are important, as the captain of the vessel is ultimately responsible for determining whether it is safe for a boat to enter the water, under the law and under REI's Operations Manual.

The captain has primary responsibility and authority for safety and navigation while on the water, including the decision to enter the water and get the vessel underway, which is confirmed by REI's Operations Manual. Accordingly, the licensed captain is required to monitor the weather and all other hazards, and never has to enter the water if, in his or her judgment, the conditions are unsafe. The captain is also responsible for abiding by all USCG regulations and conditions imposed by the vessel's USCG issued stability letter and COI. See Operations Manual at 41. Recognizing this need for accountability, as examples, the Operations Manual (at 39 and 47) provides broad grants of authority to the captain:

> The Captain's experience, qualifications and preparedness are respected aspects of our operation. Nothing shall supersede the Captain's safe judgment.
>
> Nothing in this manual or any other directive shall prevent the Captain from making decisions he/she judges are necessary for safety in the event of an emergency.

The shore-side MOD managed the dispatch of the ducks from the duck dock in Branson. The MOD monitored the weather during the day to assist with that role. While the MOD could at

[15] No change has been made to this regulatory framework. Only recently has the USCG addressed this topic in any policy guidance. In this regard, the USCG issued Marine Safety Information Bulletin ("MSIB") 6-18, dated August 1, 2018, which is non-binding policy guidance provided for vessel inspection offices, and vessel owners and operators. In MSIB 6-18, the USCG "recommended" that Owners and operators "take a proactive approach to vessel oversight to include frequent communications with the master for hazard monitoring, to include changes in weather conditions." Despite no regulatory requirement to do so, REI implemented weather monitoring procedures and capabilities far exceeding the minimum standards, and well before the USCG issued advisory guidance in MSIB 6-18.

any time delay or cancel a tour due to weather, or advise or instruct the driver and captain to perform the water portion of the tour first, the licensed captain had the ultimate authority and responsibility to monitor and assess the weather (and other hazards), and decide to enter the water and complete the voyage, or not. The MOD's primary responsibility concerned the dispatch of ducks from the duck dock. Once the ducks departed, this responsibility has been addressed, but the MOD remained available to respond to inquiries raised by Captains as they controlled the ducks on tour.

REI's weather monitoring procedures, and procedures for operating in severe weather, comply with the USCG Safety Management System Manual, published and intended for use by more highly regulated passenger vessels that are subject to the ISM Code. See USCG Safety Management System Manual (Attachment C). The company's weather monitoring procedures are also consistent with the PVA's model safety management system, made available to vessel owners through PVA's Flagship Program. Neither the regulations nor the aforementioned model safety management standards recommend or require the use of a commercial weather service. Therefore, by implementing the use of the StreamerRT service for use by all its captains and shore-side personnel, REI exceeded all applicable standards.

**d. Radio Communications**

Stretch Duck 7, along with all other ducks in the Branson fleet, was equipped with a single radio that could be used to communicate on VHF marine channels (e.g. 13 and 16), or could be switched to VHF repeater channels. The duck boats used the VHF repeater channels while on the road portion of the tour.[16] This system allowed for two-way communication between the shore-side employees and individual duck boats.

Before entering the water, the captains typically switched the radio to marine band VHF channel 13, which enabled the captains to conduct a sécurité call, alert other vessels in the area prior to entering the water, and to communicate with other vessels (or any other station monitoring that channel) while on the water. Just after entering the water, the captain would switch the radio to scan mode, which would allow the captain to monitor channels 6, 13, 16, 72, and to receive incoming calls from the duck dock on the repeater channel. The radio typically remained in scan mode during the entire voyage. While in the scan mode, the radio would receive any incoming communications from the duck dock, and other vessels communicating on the marine channels. Under this system, if the captain picked up the radio to transmit an outgoing communication, the radio would automatically be dialed into the company repeater, and that outgoing communication would be transmitted to land based personnel at the duck dock. Once the duck is out of the water, the crew manually switched the radio back to the designated repeater channel to communicate with land-based personnel only.

A review of the onboard video and audio recorders from Stretch Duck 7 showed that between 1903:23.2 and 1905:48.2, the captain hailed the duck dock four times by radio and no response could be heard on the recordings. However, the audio recorders from Stretch Duck 26 recorded the Captain of Stretch Duck 7 making two radio calls, and, after the second radio call, the mechanic who was driving Stretch Duck 26 back to the duck dock returned the call to Stretch

[16] In the NTSB's review and response to REI's comments to the draft Nautical Operations Group Factual Report, the NTSB asked what frequency the repeater system transmitted on during the road portion of the tour. We have attached the FCC Radio Station Authorization, which sets forth these frequencies. See Attachment D.

Duck 7 to see what he needed, but there is no recording of any response from Stretch Duck 7. See SD26 Video Camera 5 (main cabin) at 1903:23-1903:55. The driver (mechanic) of Stretch Duck 26 can be clearly heard saying "What's up Scott?," but did not receive a response. See Video Camera 5 (main cabin) at approximately 1904:09.[17] Other ducks were able to communicate with the duck dock during this general timeframe. See NTSB Aldridge at p. 27.

As confirmed in the NTSB's investigation, radio communications near the accident site could be impeded by geographic (topography) obstructions. The area near the accident site is described by first responders as a "communications black hole" as there is a large hill between the accident area and their repeater antennae. Taney County Ambulance District responders were not able to talk to their dispatch on a normal repeater frequency during their response efforts. The Captain of the Branson Belle stated he heard the Southern Stone County Fire Protection District boat hailing him on marine channel 16, but he was unable to reach them by radio to reply. NTSB Stroud at p. 8. It is possible communications between Stretch Duck 7 and the duck dock (and between other vessels) were similarly inhibited during the accident period.

REI's communications procedures and capabilities far exceeded what is required by regulation. In fact, no radio communications capability was required for Stretch Duck 7 for operation on Table Rock Lake, because the vessel did not operate more than 1000 feet from land. However, even if the vessel proceeded beyond 1000 feet from land while on Table Rock Lake, the regulations did not require radio communications capability.[18] Despite not being required to have any radio capability, REI equipped the vessel with new marine grade VHF radios in 2011 and instituted the comprehensive communications procedures described above.

## VII. VESSEL OPERATIONS - Stretch Duck 7 - July 19, 2018

### a. Weather Outlook

The NWS had issued a number of severe thunderstorm watches earlier in the day. Numerous witnesses—captains, drivers and shore-side personnel—testified that they were aware of the storm, and were monitoring the weather. See e.g. NTSB Young at 66. At 6:32 PM, a severe thunderstorm warning was issued for twenty locations, which included locations in Stone, Taney, and Barry counties.

### b. Duck Operations - Generally on July 19, 2018

During the day, the duck operations ran normally, as they would on any other summer day. Twelve ducks were in use, and a total of 55 duck tours left the Branson facility. Stretch Duck 7 had completed four earlier trips (with the same captain and driver), departing the duck dock at

[17] In our errata sheet for the draft Survival Factors Group Factual Report, we pointed this out in connection with suggested corrections at 22/1-2 of the draft report. It appears the group chairman declined to put these facts in the factual report regarding the driver of the Stretch Duck 26, stating "NTSB does not have the transcript of SD26." There is no transcript we are aware of. In our errata sheet, we were referring what could be seen and heard on video camera 5 for the Stretch Duck 26. The driver (mechanic) of the Stretch Duck 26 clearly heard the Captain of the Stretch Duck 7, and one can also clearly hear the driver of the Stretch Duck 26 attempt to respond and make contact with the Captain of Stretch Duck 7.

[18] The vessel's COI stated a requirement that the vessel not proceed more than 1000 feet from shore, unless it is equipped with VHF marine band radio. However, even if the vessel navigated more than 1000 feet from shore, Stretch Duck 7 vessel was not legally required to have a radio because it was not "navigated in the open sea or any tidewater within the jurisdiction of the United States adjacent or contiguous to the open sea…" 47 CFR § 80.901; see also 47 USC § 381.

10:00 am, 12:00 pm, 2:00 pm, and 4:00 PM. That evening, three ducks departed at 5:00 pm, three at 5:30 pm, and two at 6:00 pm, prior to the departure of Stretch Duck 7.

### c. Stretch Duck 7 - Departure from Duck Headquarters

The Captain of Stretch Duck 7 was universally regarded as a highly experienced, competent, and very safety conscious captain, who would regularly monitor the weather.[19] Just prior to departing on the 6:30 PM tour, at around 6:25 PM, the Captain of Stretch Duck 7 reviewed the weather on the Earth Networks monitor in the Captain's Lounge,[20] after which he concluded "it was quite a ways away." NTSB McKee at 14.

Due to the approaching weather, before departing the shore-side boarding facility, the captain and driver were advised by the MOD to complete the lake portion of the tour before the land-based portion of the tour (which normally occurred first). See NTSB Safety Recommendation Report at 2.

#### i. Radar Data Sent from WDT to Earth Networks Just Prior to Departure (6:25 PM)

Below is a depiction of radar images sent from WDT to Earth Networks at 6:25 PM local time. See Draft NTSB Meteorology Report, Figure 39. These images would have been processed by WDT, but not yet further processed and smoothed by Earth Networks.

[19] As one captain trainer described him, "[w]ell, he's very precise…[h]e's a seasoned captain and that's all I can really tell you...[a]nd I worked under him with the CDL captains, our drivers…[h]e generally goes right by the letter of everything." NTSB Covert at 38-39. One of those who trained captains stated the Captain of Stretch Duck 7 was "…very professional. I think he's very safety conscious…" NTSB Davidson at 50. "[Captain of Stretch Duck 7] would be the best, most experienced guy that we have. If there's somebody else, I don't know who it would be." Another trainer noted, "…[i]f there was anyone that I would have on the water in the conditions that hit Thursday, Scott McKee would be one of them." NTSB Purma at 30. One of the drivers and operations managers described the Captain of Stretch Duck 7 as "…good captain. One of the safer captains that I've ever worked with." NTSB Demarce at 31.

[20] See NTSB McKee at 13-14. The Captain's testimony that he monitored the weather prior to departure is consistent with other witness accounts. One captain described his interactions with the Captain of Stretch Duck 7 around noon that day, and his work habits regarding weather monitoring generally, as follows: "[s]torms coming. It may have been at noon. … Said okay, because [Captain of Stretch Duck 7] watches. He's -- really loves to look at those, and he watches. Hey, it looks like it's -- it may have been in Kansas at the time… [Captain of Stretch Duck 7] is always on that computer…" NTSB Young at 65-66 (emphasis added).

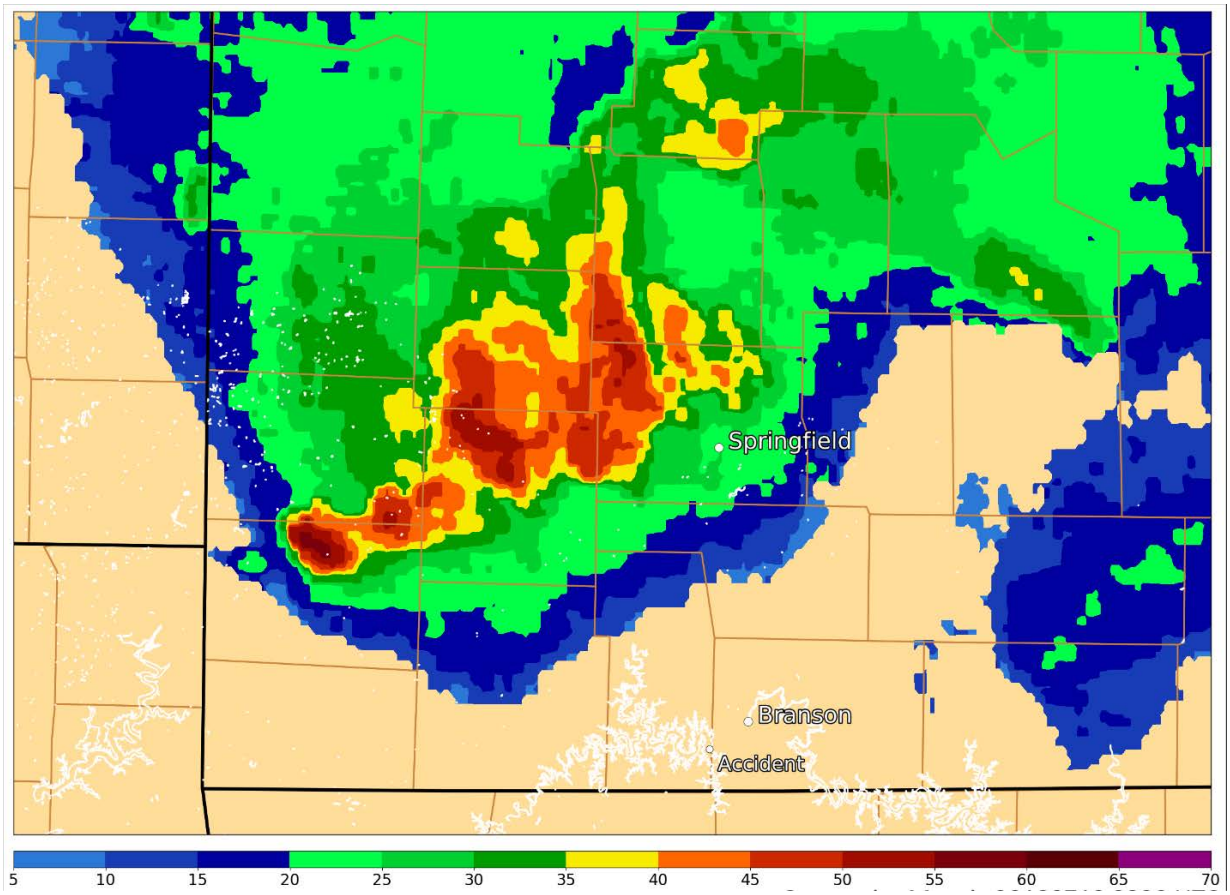



**Figure 1**

As shown above, the main part of the storm system that would naturally appear to present the most operational concern for mariners and others (i.e. red/orange) is depicted approximately 45-50 miles away from the accident site.

### ii. Radar Data Sent from WDT to Earth Networks "Geolocated" on StreamerRT

Below is a depiction of radar images sent from WDT to Earth Networks that were "geolocated" to the StreamerRT platform, and at the earliest, this radar image would have been displayed on Earth Networks was 6:25 PM. See Draft NTSB Meteorology Report, Figure 51.

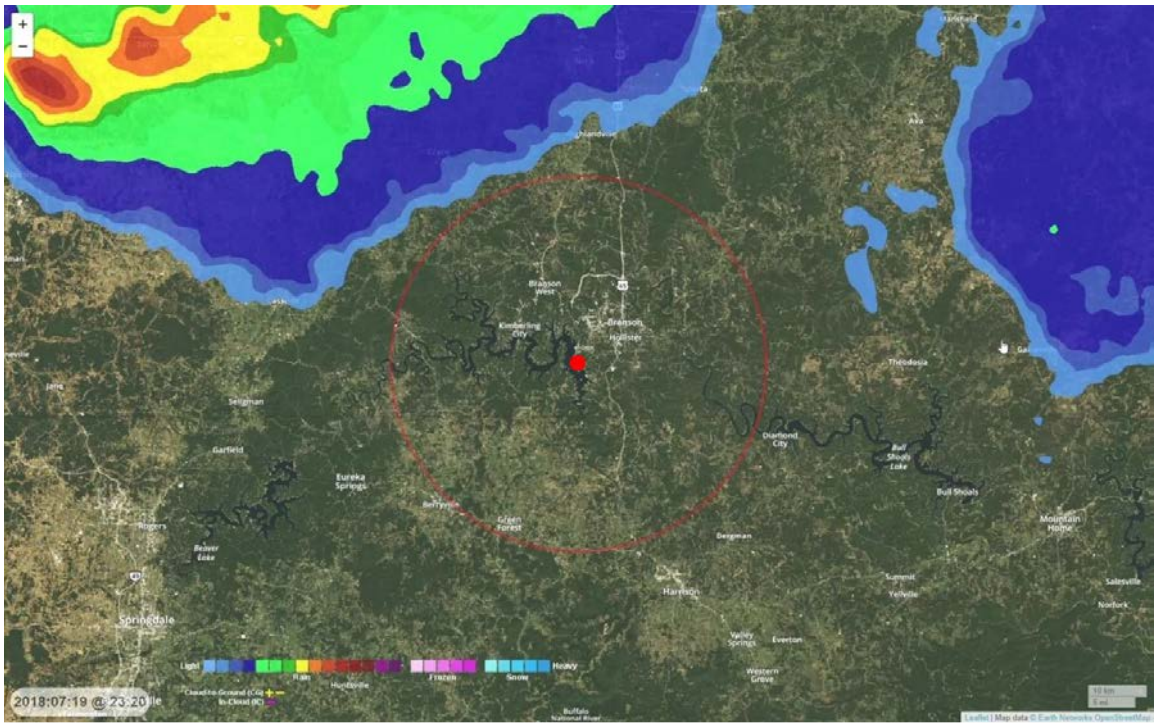



**Figure 2**

As shown above, the main part of the storm system that would naturally appear to present the most operational concern for mariners and others (i.e. red/orange) is depicted approximately 50-55 miles away from the accident site, at 6:25 PM.

### iii. Radar Data Depicted by StreamerRT File Produced by Earth Networks - timestamped 6:26 PM

In connection with this investigation, Earth Networks produced a StreamerRT file entitled "2hoursWith5minInterval.mp4". This image below is a screenshot of that file, timestamped on the StreamerRT, as "2.18.7.19.2326" (which is 6:26 PM).

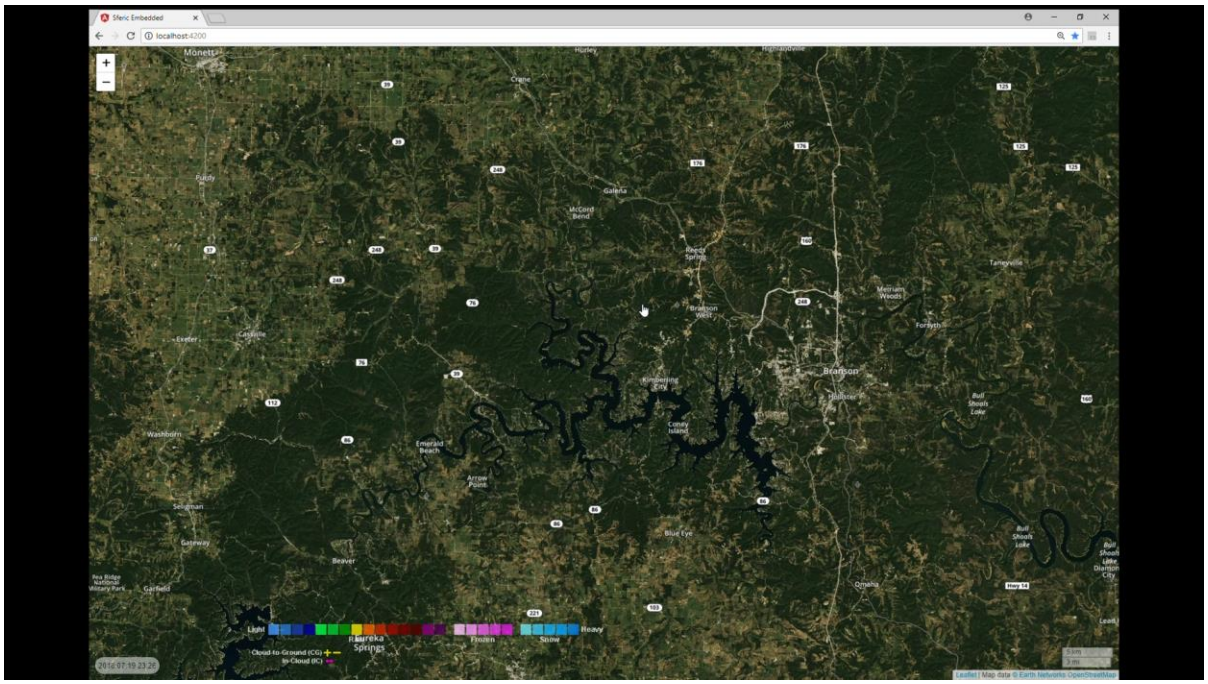



**Figure 3**

As shown above, no portion of the weather system is depicted on the StreamerRT monitor. Under this graphic, the main part of the storm system that would naturally appear to present the most operational concern for mariners and others (i.e. red/orange) is depicted (off this screen) to be at least 50-55 miles away (possibly further) from the accident site, at 6:26 PM.

**d. Vessel Arrival at Table Rock Lake South Ramp, Entry Into Lake ~6:55 PM - Witness Observations**

At the time Stretch Duck 7 arrived at the lake and entered the water, there were three ducks on the water ahead of Stretch Duck 7.[21]

The Captain of Stretch Duck 54 described the lake as "just like a little pond. I mean, glass. It was just crystal clear. The water was perfect." Stretch Duck 54's driver similarly stated: "the weather was good. The water was calm. It was even glassy. I remember looking back after we put in and you could actually see the reflection of the trees in the water. I had never seen this lake that calm before." NTSB Aldridge at pp. 24-25.

The Captain of Stretch Duck 17 also stated he was aware of the approaching storm, and monitored the weather during his transit across the dam, to the top of Baird Mountain. He described his observations as follows: "I check on top of the mountain, pull up on the flat area looking around, checking again in the direction they said might be a storm. There was nothing." NTSB Young at 18.

The driver of Stretch Duck 17 also noted upon arrival at the Lake, "[t]he water was calm and the sun was shining. I mean, looked, it looked good then." NTSB Marotti at 17-18.

[21] Stretch Duck 27 (6:00 PM departure from the Branson facility) was the first to exit the water, at approximately 6:55 PM. Stretch Duck 17 (6:00 PM departure from the Branson facility) was the second to exit the water, at approximately 7:01 PM. Stretch Duck 54 (5:30 PM departure from the Branson facility) departed the water at 7:07 pm.

The Captain of Stretch Duck 7 noted that prior to entering the lake it was calm, with light winds. NTSB McKee at p. 16. Stretch Duck 7 entered the water at approximately 6:55 PM.

### i. Weather Radar Data Available at 6:55 PM

At approximately 6:55 PM, the weather radar data being transmitted by WDT to Earth Networks shows the main part of the storm system that would naturally appear to present the most operational concern for mariners (i.e. red/orange) depicted 20 miles or more away. See Draft NTSB Meteorology Report, Figure 57. Around this time (~6:59 PM), according to the NTSB's draft metrology report, at 6:59 PM the weather radar data indicated that "the event was expected to reach the accident site about 20 minutes later." See Draft NTSB Meteorology Report at 36 of 92. This estimate would have had the storm event arriving at the accident site at 7:19 PM.

The weather radar data produced by Earth Networks, and depicted via StreamerRT, shows the system even further away. This image below is a screenshot of that file produced by Earth Networks in the investigation, timestamped on StreamerRT, as "2.18.7.19.2356" (which is 6:56 PM).

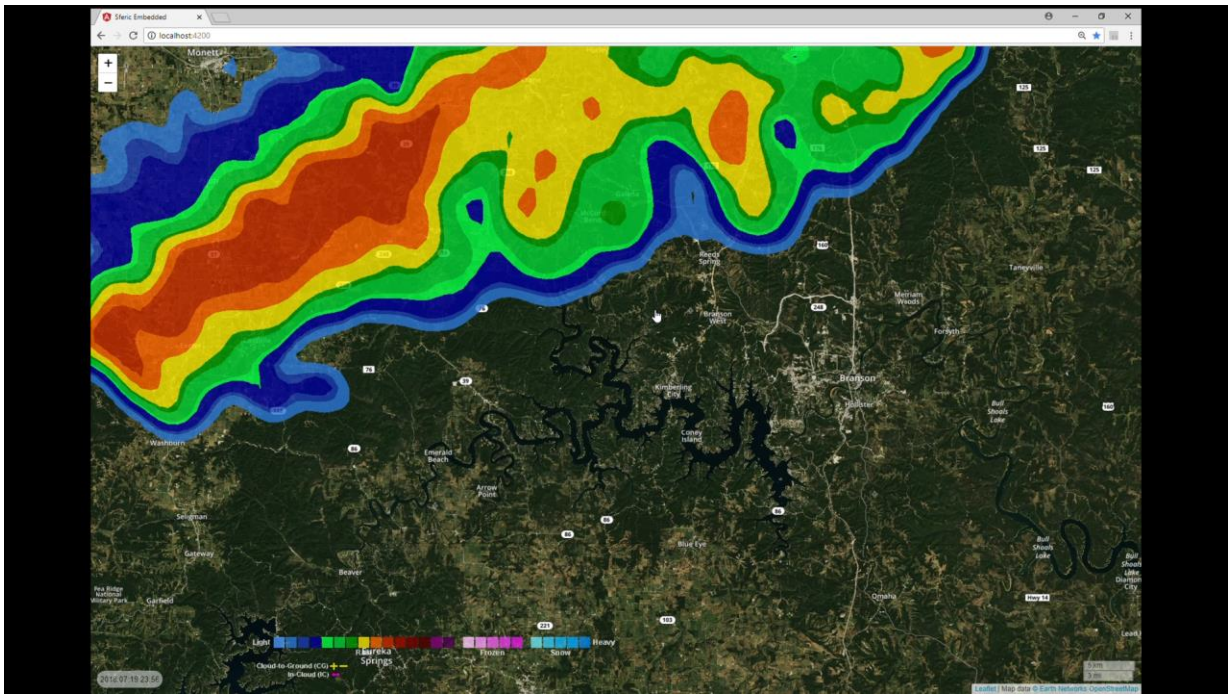



**Figure 4**

As shown above, at 6:56 PM, the main part of the storm system that would naturally appear to present the most operational concern for mariners and others (i.e. red/orange) is depicted to be at least 25-30 miles away from the accident site.

### e. Arrival of Derecho & Dry Gust Front ~ 7:00 PM - Witness Observations

About 5 minutes after the vessel entered the water from the south ramp, the derecho passed through the area generating waves estimated by witnesses to be 2-6 feet, with the highest wind gust recorded at 73 mph.

The sudden, unique, and dramatic change in whether conditions was observed by numerous witnesses as follows:

The Captain of Stretch Duck 17 described that he "…[w]ent in the water, calm. Went, took my regular tour….came all the way around to the north side of the island…and I looked…[the]water was disturbed in a line…I presumed there was wind coming…[a]lthough there was no indication of a storm…[n]ot anything bothersome at all…maybe a storm but 20 miles away maybe. But that wind…something was causing the water to do that, and at that point I took over and we went quickly to the exit." NTSB Young at 18 (emphasis added). These observations were made around 7:00 PM, just before Stretch Duck 17 departed the lake.

The driver of Stretch Duck 17 similarly noted, "Once we got on the water and got around the island, you could see a front way, way off, I mean, as far as my eyes could see, I could see something and my [Weather Channel app], I went on there and they didn't -- he didn't show that it was -- it looked like it was in the other side of the Ozarks….[o]n my phone, that's what it looked like." NTSB Marotti at 17-18 (emphasis added). Below are photographs taken by the driver of Stretch Duck 17, as they departed the lake around 7:00 PM.

**Figure 5**

**Figure 6**

The driver of Stretch Duck 17 further described the sudden and unusual nature of the derecho: "I've been here eight years…[t]his is the first time I've ever seen it and I've talked to people that have been here 25, 30 years and one guy lives just right over here…and he said Gerry, it did come up fast. I was in my yard and the sun was shining and all of a sudden, here it was." NTSB Marotti at 22.

When describing the onset of conditions on Table Rock Lake, when viewed from land, the driver of Stretch Duck 27 stated "… it was nothing I never seen before. As we were looking out there, there was this, a jet ski with a man on it, and he lost control and it threw him off the jet ski over by the dam, and I told them, I said, you know, folks, look at the dam, or look at the lake because it's not something you would normally ever see again." NTSB Ferguson at 17-18.

Captain of Stretch Duck 54 made a similar observation, noting "…off in the distance quite a ways you could see some dark clouds. I'm doing, continuing on with the tour. All of a sudden there was -- you could just see the water just erupt and turn white coming towards up. …I saw the storm coming and knew that I needed to get off the water…as soon as possible." He further stated, "I've never fought waves like that before … I would assume, 4- to 5-foot waves" and it came up "[i]nstantly. Just like that." NTSB King at 17.

The Showboat Branson Belle had started boarding passengers at 6:50 for their scheduled 8:00 PM sailing. The relief captain of that vessel stated the winds increased from 5-6 mph to over 50 mph in 90 seconds. The strength of the storm caused the Belle to surge, pinning her gangway, and forcing them to stop boarding and to operate astern propulsion and thrusters to free the gangway and avoid further damage where they were docked.

A crewmember working onboard the Branson Belle made similar observations about the weather. He stated "[w]hen we started boarding [at around 6:50 PM], our weather was extremely calm." NTSB Stroub at 14. He further stated, "…we had been tracking a storm system, me and James, all day long. Everything had dissipated as it came towards us. So we started boarding about 10 minutes till 7. And we was well aware of another large storm system coming at us. Right

around 7:00 the storm system hit us. We actually stopped boarding because it became too windy and too unsafe. James asked me to go down to the boat. He was on the phone with weather spotters and so he asked me to go down the boat, just so a captain was on the boat, just in case of an emergency….[s]o as I proceeded down to the boat, I noticed our boat was also having problems. Some of our lines had become extremely tight. Our passenger boarding ramp was in excessive danger of being ripped off of our dock. So I had our propulsion brought up. And which case I went to the wheelhouse and started using our propulsion to help fight the wind…[a]t this time, we was getting winds in excess of 60 miles an hour. None of our equipment is capable of handling that. So at that point we were unable to assist [the ducks] in any way." NTSB Stroub at 5-6.

**f. Radar Weather Data Available at 7:00-7:05**

At approximately 7:00 PM, the derecho arrived on Table Rock Lake near Stretch Duck 7. The weather radar data being transmitted by WDT to Earth Networks shows the main part of the storm system that would naturally appear to present the most operational concern for mariners (i.e. red/orange) depicted approximately 20 miles away from the location of Stretch Duck 7. The approximate same distance is depicted for 7:05 PM. See NTSB Meteorology Report, Figures 57 and 58.

The weather radar data produced by Earth Networks in the investigation, and depicted in the StreamerRT, depicts the system even further away. This image below is a screenshot of that file produced by Earth Networks in the investigation, timestamped on the StreamerRT, as "2.18.7.19.0006" (which is 7:06 PM).

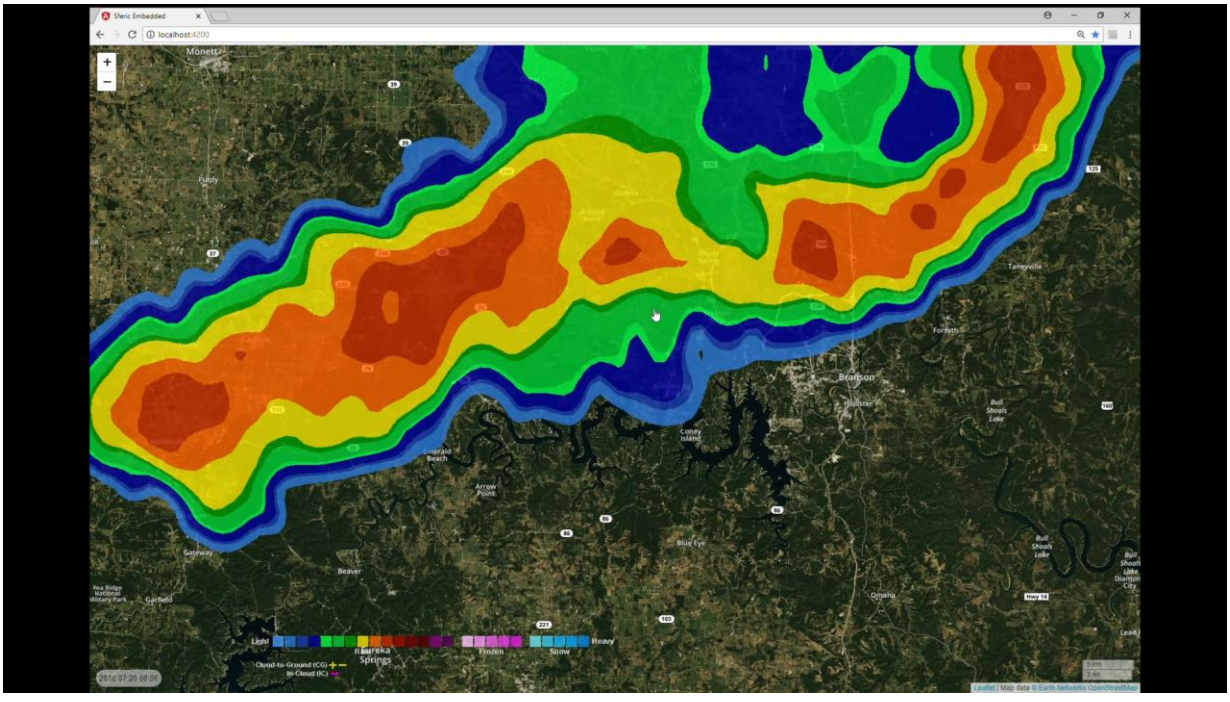



**Figure 7**

As we know from the investigation, by 7:06 PM, the Stretch Duck 7 was in heavy seas and 60+ mph winds, and beginning to take on water, yet the radar images available, as shown above depict the main part of the storm system that would naturally appear to present the most operational

concern for mariners and others (i.e. red/orange) to be at least 10 miles away from Stretch Duck 7's location.

The severe winds, and other effects of the derecho are clearly not depicted on the above "smoothed" radar images.

### g. Captain Decision-making

When the Captain of Stretch Duck 7 observed the wind and sea conditions intensifying, he changed course, shortened the tour, closed the main engine compartment (hood/hatch), and immediately headed to shore. He testified that he felt he was closer to the north exit ramp than to the south ramp. It is pure speculation to now suggest that his chosen direction was somehow improper or that another direction would have been better. The reality is that a captain on a vessel confronting worsening conditions makes an informed decision and executes on that decision. There are competing factors to be weighed, including: a vessel generally can handle seas better on the bow than on the beam or stern, the duck had side rails and a stern transom that were lower than the bow, turning through seas can dangerously expose the vessel to beam seas, and running with the waves would expose the low transom. It is safe to assume that remaining "bow to" for as long as possible was preferred over being "beam to" or "running with" the seas. The Captain decided to head in a direction generally with his bow to the seas and towards shore, just north of the Branson Belle. His decision to head in that direction at full speed, and any other decisions made while in an *in extremis* setting, cannot now be challenged as the incorrect decision.[22]

Unfortunately, water continued to enter the vessel resulting in progressive flooding and eventually in its sinking.

## VIII. POST-INCIDENT EVENTS AND ACTIONS

Immediately after the incident, REI committed to prompt and significant efforts to make whole the victims of the accident and their families. REI offered to pay all medical bills and funeral expenses associated with the incident, which offer was accepted by several victims' families. And, REI has entered into settlement agreements with all victims and families. These settlements have been, or are in the process of being, approved by the courts. In addition, REI has cooperated, and continues to cooperate, fully with the various investigations regarding the incident. Further, REI closed its Branson duck operations and converted the facility into an unrelated operation, preserving jobs for any employee that wanted to stay.

## IX. CONCLUSION

The derecho that struck Table Rock Lake on July 19, 2018 was a ferocious, sudden, and extreme weather event that many witnesses stated they had never before experienced. In fact, the NWS confirmed the anomalous nature of the weather event characterizing it as one that "few people would have likely experienced with other severe thunderstorms." NWS Derecho Assessment at 50. It is undisputed by all who were in the area that afternoon that the derecho arrived suddenly and was especially violent. The video evidence confirms this. Secondarily, an unfortunate confluence of other events contributed to this heartbreaking accident. A significant factor was that the weather radar information displayed on the Earth Networks monitor—which was used by REI personnel to assess the weather—did not display the dry gust front that preceded

[22] The Captain of Stretch Duck 54 apparently made the same operational decision, and headed towards the exit ramp north of the Branson Belle and was just in front of Stretch Duck 7.

the main part of storm by approximately fifteen minutes or more. To compound that deficiency, when making observations from the ground—as the captains, drivers and other witnesses did—the nature of the storm system gave the appearance of being much further from Table Rock Lake than the heavy winds and dry gust front actually were. All of the other vessels on Table Rock Lake operating that evening—not just REI's captains and drivers—were similarly unable to see and predict what was about to suddenly hit them. This, too, was also confirmed by the NWS in its assessment of the derecho, noting that "people often did not get a visual or audible cue that severe weather was approaching." Our captains, drivers, and other personnel were well trained, and safety conscious. They were also equipped with tools and procedures that far exceeded minimum regulatory requirements, and were operating vessels that were well maintained and fully inspected, certificated, and fit for their intended service. While REI acknowledges there are certainly lessons to be learned for our company, our personnel, and the industry with the benefit of clear hindsight, this heartbreaking tragedy was the result of a confluence of unfortunate events and factors, some of which were within the control of REI, but many significant ones that were not.

Set forth below are proposed findings and proposed probable causes for your consideration.

Thank you again for the opportunity to participate in this investigative process. Since the beginning of the investigation, REI has been committed to fully assisting at every stage, in as transparent a way as possible. REI hopes its active participation has aided the NTSB and USCG investigations, and that those efforts will advance the cause of vessel and passenger safety, and will help prevent such accidents from occurring in the future. REI again expresses its sincere condolences to the victims and their families who were so profoundly impacted by this accident. Addressing those impacted in a respectful manner, and helping find answers to why this tragic accident occurred, has been our company's approach all along.

**********

**Proposed Findings**

1. REI acquired the Branson duck boat operations in December 2017 from Ride the Ducks International, LLC, which operations had been conducted in Branson for over 47 years without any significant accidents.

2. After the acquisition in December 2017, REI did not make any material changes in the management, personnel, policies, or procedures at the Branson operations.

3. Captains at the Branson operation were required to complete a training course that was approved by the USCG. It consisted of 278 hours of instruction: 124 hours of classroom training and 154 hours of practical and on-water training.

4. This training included basic weather and meteorology for mariners, including specific training on recognizing approaching storms, and observing waves, wind, and current.

5. Through the company's training program, and its operating procedures, captains were instructed on the actions to take in response to various hazardous conditions, including abandon ship, sounding of bilge alarm, collision, grounding, fire, fume detector, heat sensor, loss of propulsion, loss of steering, and severe weather, and on when they were required to instruct passengers to don their PFDs.

6. The training and procedures also included instruction on COI operational restrictions, including wave and wind speed restrictions for the vessels.

7. Successful completion of the approved course, an exam, and various other requirements (for example, a first aid course) would allow a trainee to apply for and be issued a USCG license to operate the duck boats.

8. The Captain of Stretch Duck 7 received his first license in 1993, before being employed by RTDI as a duck captain in 2001. His license—Master, Self-Propelled Vessels not Including Auxiliary Sail of Less than 100 Gross Register Tons (GRT) above Mile 225.0 on the White River and Impoundments in Missouri and Arkansas—was most recently renewed in January 2018, was valid for five years, and was valid at the time of the accident. His license exceeded that which was required to act as captain of a duck (Stretch Duck 7 was 4 GRT).

9. The Captain of Stretch Duck 7 had decades of experience as a captain of vessels in the Branson area, including the 149-passenger Polynesian Princess, the 149-passenger Branson Lake Queen, and nearly twenty years of experience as a duck boat captain and before that as a duck boat mechanic.

10. The Captain of Stretch Duck 7 was a designated trainer responsible for administering on-water training to CDL driver/deckhand trainees on various emergency response topics, including responding to severe weather on the water.

11. A full day, annual refresher training course was required of each captain. Only captains who demonstrated competence with all safety operations were approved to act as a captain in the upcoming season. The Captain of Stretch Duck 7 completed his 2018 refresher course on February 19, 2018.

12. During mandatory monthly captain meetings, safety topics and on-water emergency response procedures were discussed.

13. Emergency response training is conducted and observed by USCG inspectors as part of annual examinations of the vessels. In April 2018, a USCG Guard inspector conducted this on-water emergency response training with the Captain of Stretch Duck 7.

14. The Captain of Stretch Duck 7 consistently was found competent in all areas, receiving satisfactory findings in all training and "refresher" categories. He had a very good reputation and other captains, drivers, and trainers held his competency and safety awareness in high regard.

15. The driver of Stretch Duck 7 last renewed his CDL license on September 18, 2015. That license was valid for three years and was valid at the time of the accident.

16. Stretch Duck 7 had a valid Certificate of Inspection, issued by the USCG, at the time of the July 19, 2018 incident.

17. The vessel and equipment were inspected annually. Stretch Duck 7 was last inspected by the USCG in November 2017, at which time it was credited with an annual inspection and the biennial hull/drydock exam.

18. Post-incident inspections of Stretch Duck 7 found no regulatory or NVIC 1-01 deficiencies and no mechanical or other defects were noted in Stretch Duck 7.[23]

19. The USCG fully approved Stretch Duck 7's equipment and configuration as those existed on July 19, 2018, including approval of the following:

    a. the side curtain releasing mechanism;

    b. the canopy support configuration;

    c. the bilge pump and bilge alarm configuration;

    d. the removal of the Higgins Pump and installation of the sea chest; and

    e. the engine compartment ventilation, openings, and closure mechanisms.

20. With a combined rated pumping capacity of 100 gpm, the pumps on Stretch Duck 7 exceeded the regulatory requirements by nearly a factor of 2.

21. In post-incident tests, the bilge alarms and bilge pumps were found to be operating satisfactorily.

22. The bilge system on Stretch Duck 7 was not designed to, and was not intended to, prevent sinking when progressive flooding occurred as it did on July 19, 2018.

23. Stretch Duck 7 possessed all required communications equipment and it was operable.

24. Radio "dead zones" were reported in the area of the incident as a result of the nearby terrain, which could make it difficult to communicate by radio.

25. While not required by any law or regulation to have a safety program (that is, a safety management system), REI created and implemented a safety program. The safety instructions in its Operations Manual met and exceeded the applicable regulatory guidance.

26. REI's stated policy was to forego water entry if severe weather was approaching the area. If a captain encountered an unsafe water or atmospheric situation, loss of freeboard, or a system malfunction, the stated procedure was to come off the water as soon as possible.

27. The Operations Manual provides general instructions to a captain who encounters severe weather conditions to, among other things: immediately increase speed and head to shore, continually monitor freeboard and bilge pumps, close the main engine compartment hatch if conditions expose the bow to heavy waves, and not lower the side curtains under extreme wind conditions (as they can affect the vessel's maneuverability).

28. Notwithstanding these general instructions, the Operations Manual authorized the Captain to make decisions he/she judges are necessary for safety in the event of an emergency.

29. The USCG promulgated no regulation, and there are no industry standards or best practices, that required REI to maintain a procedure for shore-side monitoring of the weather when operating a vessel like Stretch Duck 7.

30. While not required, REI subscribed to a commercial weather service and a large weather radar display was available to all captains and other personnel while on shore to consult

[23] It was noted a light on a life ring was apparently missing, but no light is required unless the vessel is operating in evening hours.

throughout the day and before they departed on a voyage. These capabilities and procedures exceed regulatory requirements.

31. The Captain of Stretch Duck 7 tracked the weather on July 19, 2018, and consulted the radar display before heading out for the 6:30 PM voyage.

32. USCG regulations and its Safety Management Systems Manual make it clear that the captain has overriding authority and responsibility for the safe navigation of the vessel, including, but not limited to, making decisions with regard to severe weather.

33. Consistent with the USCG regulations, REI's procedures provide that the captain of each duck has primary responsibility and authority for safety and navigation while on the water, including the decision to enter the water and get the vessel underway. Accordingly, a licensed captain is required to monitor the weather and all other hazards, and never has to enter the water if, in his or her judgment, the conditions are deemed unsafe.

34. The shore-side manager on duty managed the dispatch of the ducks from the Branson facility. To assist with that role, the MOD monitored the weather and could delay or cancel a tour, or advise the driver and captain to perform the water portion of the tour first, due to weather (or other reasons). This did not override the captain's responsibility and authority with respect to the duck under his or her command.

35. In addition to reviewing the radar monitor in the Captain's Lounge, captains would monitor the weather visually while on the tour, and if there was any concern as they were about to enter the water, they would call back to the duck dock to obtain more up to date weather information from shore-side personnel, if needed.

36. USCG regulations and industry model safety management standards do not recommend or require the use of a commercial weather service, nor do they require or provide suggested standards for shoreside monitoring of weather. By implementing the use of the StreamerRT service for use by all its captains and shore-side personnel, REI exceeded these standards.

37. At the time Stretch Duck 7 entered the water, the environmental conditions were well within the restrictions of its COI. All witnesses reported that the conditions at that time were calm, with little or no wind, flat lake surface, and no sign of imminent severe weather.

38. The manner in which this derecho event was depicted on radar imagery available to the public and the company, did not reflect the fact that these extremely high winds preceded the main body of the storm, which led observers to mistakenly believe the storm was further away (up to 20 miles) than the severe wind conditions actually were.

39. The radar images published on the Earth Networks StreamerRT platform were up to eleven minutes behind actual environmental conditions happening on the ground.

40. On all radar images available from around that time period (whether from NWS, WDT, or on StreamerRT, the area of high reflectivity (that is, the areas that observers understand as the areas of severe weather) were many miles away. Indeed, even as Stretch Duck 7 was downflooding from severe wind and sea conditions, those images still showed the visible areas of severe weather concern to be 10 miles away or more.

41. The nature of the storm system, when observed by those on the ground, gave the appearance of being much further from Table Rock Lake than the heavy winds and dry

gust front actually were, resulting in a situation where observers did not get a visual or audible cue that severe weather was approaching.

42. This reality confirms the unique nature of this derecho event: extremely high and sustained winds preceded what was visible on radar displays by many miles, and to observers on the ground. Observers could not appreciate that fact based on available radar imagery from NWS or on StreamerRT, and weather observations on the ground.

43. Another challenging aspect of the event for those on the water during this derecho was the periodicity of the waves. As the NWS observed, "Given the flow direction [the "long" north-south axis of Table Lake], the duration and intensity of the winds, the periodicity of the waves was estimated to be 2.7 to 3.6 seconds, which would mean that [those on the water] were dealing with significant waves in rapid succession." See NWS Derecho Assessment at 49.

44. When the conditions worsened, the Captain of the Stretch Duck 7 took actions to minimize the risk of flooding, including closing the hood, increasing speed, and immediately heading towards the ramp north of the Branson Belle. His decision to head in that direction appears reasonable under the circumstances, given the conditions being encountered and the competing risks he otherwise might have encountered from beam seas or following seas.

45. The conditions resulted in progressive downflooding at resulted in the eventual sinking of Stretch Duck 7.

46. When the Captain of Stretch Duck 7 apparently realized the vessel was *in extremis*, he released the port side curtain but was not able to release the starboard side curtain in time due to the suddenness and strength of the storm. The starboard curtain release was later found to be in operable condition.

**********

## Proposed Probable Causes

1. A rapidly developing, severe weather event (a "derecho"), was preceded by approximately 15 minutes by a "dry gust front" invisible to the naked eye, unaccompanied by precipitation, thunder, or lightning and resulted in unexpected very high wind speeds and wave heights on Table Rock Lake.
2. The radar images published on the Earth Networks StreamerRT platform were "smoothed" out by WDT and Earth Networks prior to being published, thereby removing evidence of, and further obscuring, the dry gust front, rendering it invisible on the Earth Networks StreamerRT platform.
3. The manner in which this derecho event was depicted on radar imagery available to the public and the company, did not reflect the fact that these extremely high winds preceded the main body of the storm, which led observers to mistakenly believe the storm was further away (up to 20 miles) than the severe wind conditions actually were.
4. The radar images published on the Earth Networks StreamerRT platform were up to eleven minutes behind actual environmental conditions happening on the ground.

5. The nature of the storm system itself, when observed by those in the impacted area, gave the appearance of being much further from Table Rock Lake than the heavy winds and dry gust front actually were, resulting in a situation where observers did not get a visual or audible cue that severe weather was approaching.

6. As reported by the NWS, "the duration of severe winds were anomalous and were of a length few people would have likely experienced with other severe thunderstorms." NWS Derecho Assessment at 50. Winds in the system were recorded in the vicinity of the lake at up to 73 mph, producing waves on the lake up to 5-6 feet.

7. As reported by the NWS, aspects of the storm system, including prediction of maximum wind gusts, confounded even its professional forecasters. NWS Derecho Assessment at 18.

8. As a result of these factors above, those in the impacted area were unable to judge the arrival time and severity of the storm, and the Stretch Duck 7 was exposed to wind and wave conditions beyond its intended design characteristics, resulting in progressive flooding and eventual sinking of the vessel.

**********

# Attachment A

BY MR. GOOD:

Q. Damian, I'm going to ask you just a few questions. You've described for us the level and intensity of the training that you received to operate a duck boat. Do you recall that testimony?

A. Yes, sir.

Q. And you also have indicated that you were trained to drive a school bus -- drive children in a school bus, correct?

A. Correct.

Q. How would you compare the level of training for school bus to drive children as composed -- as opposed to driving a duck boat?

A. Duck boats were more extensive.

Q. Now, you've also described inspections. Were there inspections on a school bus?

A. Yes, sir.

Q. And were the inspections on a school bus to drive around children -- how did that compare?

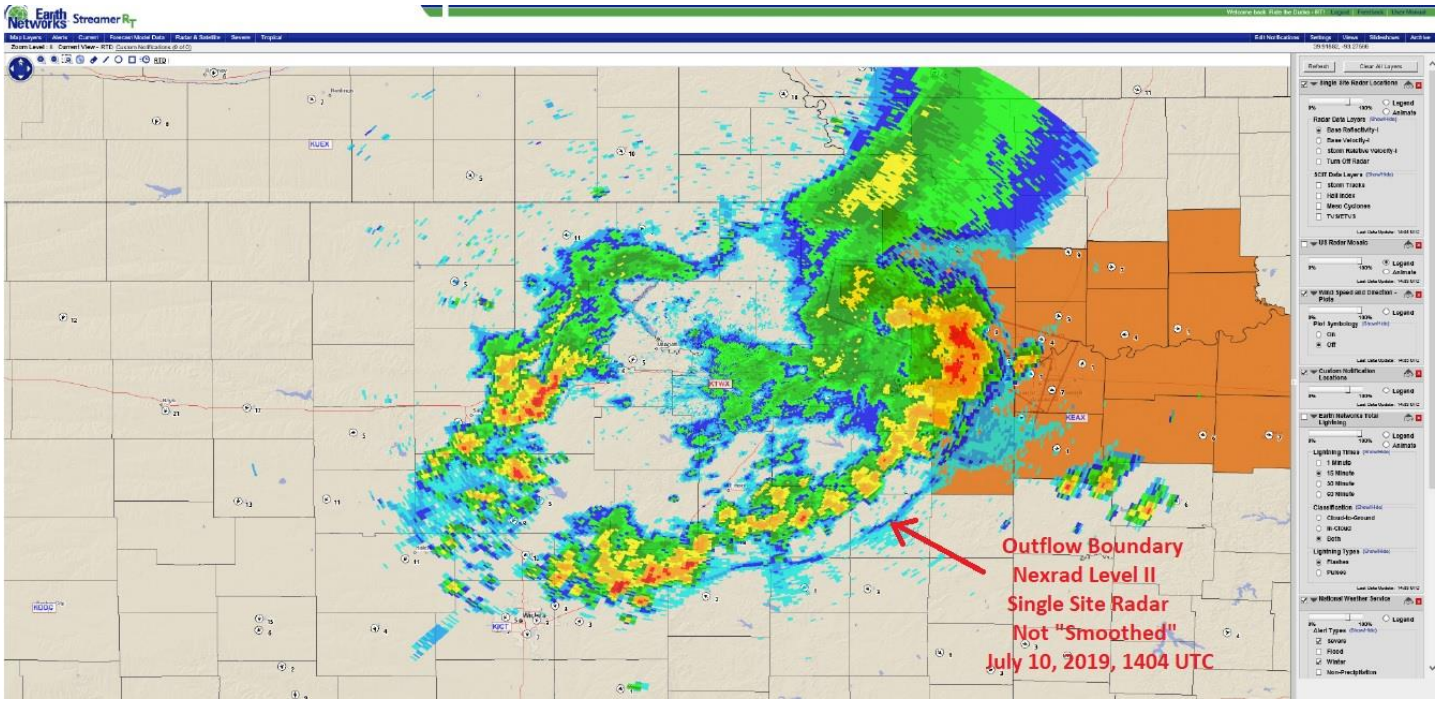
A. Similar.

Q. So you used the same level of inspections for a school bus to drive children as you did for a duck boat?

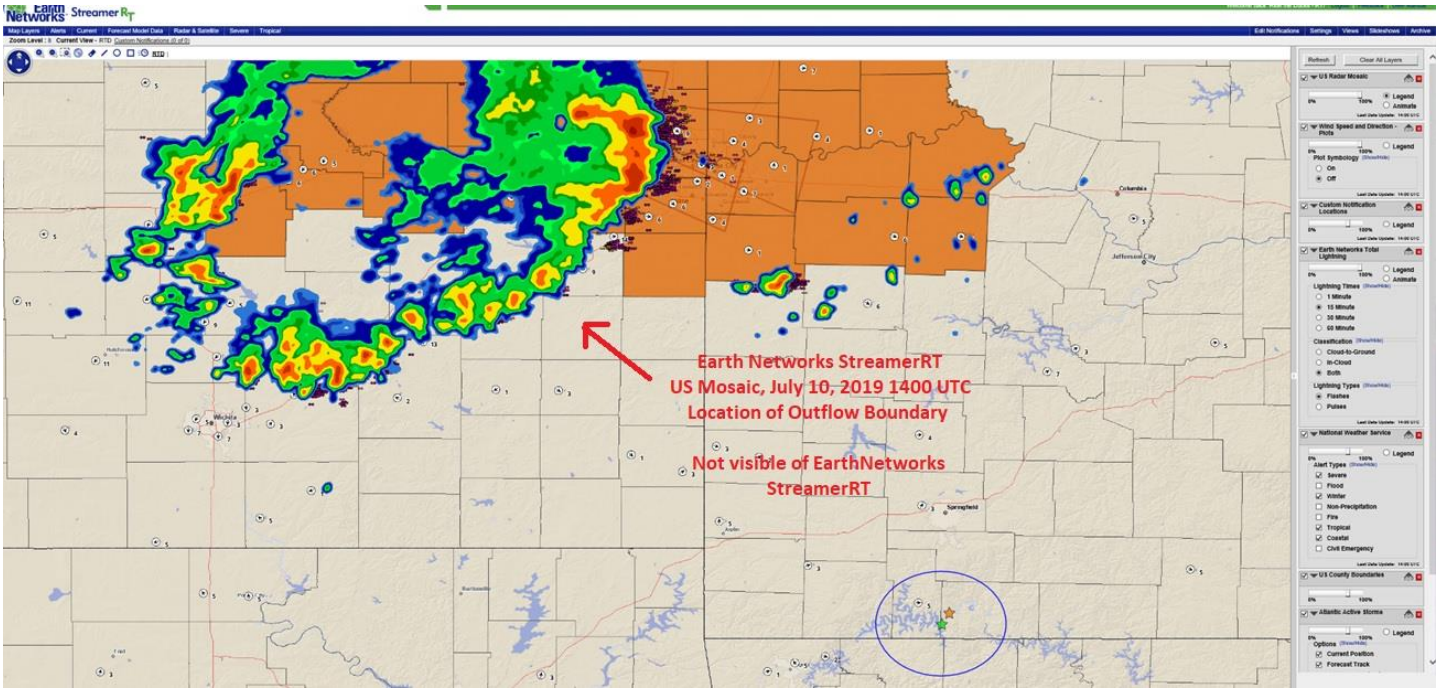
A. Yes, sir.

MR. GOOD: No further questions.

# Attachment B




**U.S. National Weather Service, Single Site Radar Image Not Smoothed**




**Effects of Smoothing - US Mosaic As Displayed on EarthNetworks, StreamerRT**

# Attachment C

**VESSEL OPERATIONAL PROCEDURE**

| | |
|---|---|
| DRAFT | **Policy no.:** 2.2<br>**Page:** 1 of 2<br>**Issue Date:**<br>**Author:** |

**Subject:** **Assessment of Weather Conditions**

## *I. General Description*

The vessel will be required to operate in constantly changing environments. It is important to constantly monitor the changing weather conditions and be aware how the weather can dramatically affect the vessel's behavior.

## *II. Responsibilities*

It is the ultimate responsibility of the master to constantly monitor and assess the weather conditions unless a lookout has specifically been assigned to this task. Crew members are also expected to monitor and assess the changing conditions of the weather.

## *III. References*

46 CFR 185.304

## *IV. Requirements*

The master shall operate the vessel keeping in mind the safety of the passengers and crew foremost in mind by directing the vessel in order to prevent a casualty. Special attention should be paid to the prevailing visibility and weather conditions.

## *V. Procedures*

The master shall:

{Provide vessel specific procedure}

| Signed | Date |
| --- | --- |

**VESSEL OPERATIONAL PROCEDURE**

| | |
|---|---|
| DRAFT | **Policy no.:** 3.3<br>**Page:** 1 of 1<br>**Issue Date:**<br>**Author:** |

**Subject:** **Special Requirements for Bad Weather and Fog**

## *I. General Description*

Bad weather and fog pose particular threats to the vessel and the safety of its crew and passengers. Vessels should not be operated beyond their operating limits and crew should not operate beyond their capabilities. This procedure deals with the preparations for operating in rough weather and reduced visibility.

## *II. Responsibilities*

The master shall be familiar with the content of and make certain that the crew is familiar with the instructions containing the actions to be taken in the event of heavy weather. The master has overriding authority to make decisions with regard to safety. This includes making certain that all crew members are familiar with their duties during an emergency, and the issuance of clear instructions to the crew and passengers during an emergency.

## *III. References*

46 CFR 185.510, 46 CFR 185.512

## *IV. Requirements*

The master is required to be familiar with and to ensure that crew members are familiar with all emergency procedures. The emergency procedures for fog and bad weather should include at least the instructions below.

## *V. Procedures*

Preparations for Rough Weather

1. Secure all hatches; close all ports and windows.
2. Pump bilges dry and repeat as required.

3. Secure all loose gear; put away small items and lash down the larger ones.
4. Break out life preservers and have everyone on board wear them *before* the situation worsens.
5. Break out emergency gear that you might need – hand pumps or bailers, sea anchor or drogue, etc.
6. Check position if possible and update the plot on your chart.
7. Make plans for altering course to sheltered waters, if necessary.
8. Reassure your crew and passengers; instruct them in what to do and what not to do.

Operating in any conditions where visibility is reduced for any reason:

1. Maintain a speed that will enable you to take proper action to avoid a collision and stop within a distance appropriate to the prevailing circumstances and conditions.
2. Display the proper navigation lights and sound appropriate sound signals.
3. Employ all available navigation aids.
4. Station a lookout well forward and away from the engine sounds and lights, to listen and look for other signals.
5. Watch for aids to navigation which do not have audible sound devices.
6. Lay charts with the main course, time, and speed plotted on them.
7. Plot navigational fixes, record times, and positions regularly.
8. Anchor to await better visibility, especially if transiting congested areas or narrow channels.

| **Signed** | **Date** |
|---|---|

# Attachment D

# Federal Communications Commission
## Wireless Telecommunications Bureau

## RADIO STATION AUTHORIZATION

LICENSEE: RIDE THE DUCKS

ATTN: ROBBY HULTZ
RIDE THE DUCKS
PO BOX 1837
BRANSON, MO 65615-1837

| Call Sign | File Number |
|---|---|
| WNWR535 | 0005853802 |

**Radio Service**
IG - Industrial/Business Pool, Conventional

**Regulatory Status**
PMRS

**Frequency Coordination Number**

**FCC Registration Number (FRN):** 0014809552

| Grant Date | Effective Date | Expiration Date | Print Date |
|---|---|---|---|
| 07-17-2013 | 07-17-2013 | 07-13-2023 | 07-17-2013 |

## STATION TECHNICAL SPECIFICATIONS

**Fixed Location Address or Mobile Area of Operation**

**Loc. 1** **Area of operation**
Land Mobile Control Station meeting the 6.1 Meter Rule: MO

**Loc. 2** **Address:** 1 MI S OF JCT HWY 165 & 76
**City:** BRANSON **County:** TANEY **State:** MO
**Lat (NAD83):** 36-37-30.2 N **Long (NAD83):** 093-17-07.7 W **ASR No.:** N/A **Ground Elev:** 370.0

**Loc. 3** **Area of operation**
Operating within a 48.0 km radius around 36-38-14.2 N, 093-14-28.7 W,
BRANSON, TANEY county, MO

**Loc. 4** **Address:** 1 Mile South Jct 165 and 76 Highways
**City:** Branson **County:** TANEY **State:** MO
**Lat (NAD83):** 37-08-13.8 N **Long (NAD83):** 094-28-24.6 W **ASR No.:** **Ground Elev:** 370.0

**Loc. 5** **Area of operation**
Operating within a 40.0 km radius around fixed location 4

**Conditions:**
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.



**FCC 601-LM**
**August 2007**

**Licensee Name:** RIDE THE DUCKS

**Call Sign:** WNWR535 **File Number:** 0005853802 **Print Date:** 07-17-2013

**Antennas**

| Loc No. | Ant No. | Frequencies (MHz) | Sta. Cls. | No. Units | No. Pagers | Emission Designator | Output Power (watts) | ERP (watts) | Ant. Ht./Tp meters | Ant. AAT meters | Construct Deadline Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 000469.65000000 | FX1 | 1 | | 11K0F3E 20K0F3E | 30.000 | 60.000 | | | |
| 1 | 1 | 000159.60000000 | FX1 | 1 | | 11K0F3E | 50.000 | 110.000 | | | |
| 2 | 1 | 000464.65000000 | FB4C | 1 | | 11K0F3E 20K0F3E | 110.000 | 360.000 | 40.0 | | |
| 3 | 1 | 000457.60000000 | MO | 10 | | 11K0F3E 20K0F3E | 2.000 | 2.000 | | | |
| 3 | 1 | 000464.65000000 | MO | 25 | | 11K0F3E 20K0F3E | 30.000 | 60.000 | | | |
| 3 | 1 | 000469.65000000 | MO | 25 | | 11K0F3E 20K0F3E | 30.000 | 60.000 | | | |
| 4 | 1 | 000151.79000000 | FB2 | 1 | | 11K0F3E | 50.000 | 110.000 | 40.0 | 93.0 | 11-01-2011 |
| 5 | 1 | 000151.79000000 | MO | 25 | | 11K0F3E | 50.000 | 110.000 | | | 11-01-2011 |
| 5 | 1 | 000159.60000000 | MO | 25 | | 11K0F3E | 50.000 | 110.000 | | | 11-01-2011 |
| 5 | 1 | 000160.02000000 | MO | 10 | | 11K0F3E | 2.000 | 2.000 | | | 11-01-2011 |

**Control Points**

**Control Pt. No. 2**

**Address:** 2320 W HWY 76

**City:** BRANSON **County:** TANEY **State:** MO **Telephone Number:** (417)266-7615

**Control Pt. No. 3**

**Address:** 4800 State Highway 165

**City:** Branson **County:** TANEY **State:** MO **Telephone Number:** (703)797-5131

**Associated Call Signs**

.

**Licensee Name:** RIDE THE DUCKS

**Call Sign:** WNWR535 **File Number:** 0005853802 **Print Date:** 07-17-2013

**Waivers/Conditions:**

Beginning January 1, 2013, this station must operate on channels with a bandwidth of 12.5 kHz or less, or with equivalent efficiency, regardless of the emission bandwidths set forth on this license. See Section 90.209(b)(5) of the Commission's Rules. Note, however, that the narrowbanding requirement does not apply to specific channels designated in Rule 90.20 or 90.35 for paging only.