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## **Electric Shock Drowning Incidents – Marinas©**

(In-Water electrocution fatalities included)

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James D Shafer began the research journey in 2000 to discover how electricity in the water can incapacitate and kill. He was joined by Capt. David Rifkin in 2021, and together they embarked on a 2-year research project which took them to marinas across the country. The study was funded by the US Coast Guard and administered by the American Boat and Yacht Council (ABYC).

The study determined the nature and behavior of electrical currents leaking into bodies of water at marinas. Send an email to [qualitymarinesvcs@comcast.net](mailto:qualitymarinesvcs@comcast.net) to request a copy of the study. This study led to the new ground fault protection levels and installation requirements in Article 555 of the National Electric Code. Based on reports of Electric Shock Drowning-related events, it appears that the rate of losses may be on a downward trend. This is based on the improved access we have with the internet, and protection equipment now required by various codes and standards.

Ground fault leakage into the water causes electrical gradients to form. If a person gets in one of these gradients, a current will flow through the body. Currents as low as 10ma can cause paralysis of limbs preventing a person from staying afloat, resulting in drowning (for comparison a 60 watt light bulb draws 500ma). Higher currents can cause the heart to fail directly resulting in death. There is no warning of this situation, and there is no post-mortem indication available absent any burn marks associated with direct contact with an electrical source. Witness reports (from touching the water or hearing the victim shouting they are getting shocked) often substantiate the presence of electricity on the water.

This is predominantly a low-conductivity-water phenomenon. When water gets saltier or higher in conductivity it competes for the current flow path more favorably than the body, so the current appears to go around the body. In freshwaters the body is more conductive than the water so electrical gradients can establish and act as a voltage source to drive current through the body.

There are likely hundreds or more deaths and injuries associated with electrical leakage into the water. It happens in swimming pools and spas as well. But unlike marina facilities, these are designed for swimming and have more extensive protection equipment installed, along with stricter grounding and bonding requirements. The below list are the known fatalities and “near misses” (where a person in the water gets shocked by survives). We know there many more...

If you encounter a person struggling in the water and suspect it’s an electrical condition, don’t jump in the water. Rather start securing sources of power nearby, call 911, throw a life ring to the individual, or try to push

them *away* with a nonconductive pole (this can move them out of the electric field). We have cases where rescuers were also killed trying to help people and pets being shocked in the water. Our research shows that most accidents happen relatively close to potential sources (20 feet or less) but it depends on the source voltage and conductivity of the water among other factors discussed in the US Coast Guard study.

Electric shock drowning can also be caused by submerged irrigation pumps. These pumps require Ground Fault Circuit Interruption (GFCI) protection at their sources. Sadly, many of these are purchased at home stores and installed by homeowners using extension cords. And people are swimming right over them, with a few feet.

The bottom line is DON'T SWIM WITHIN ABOUT 50 YARDS OF ANY KNOWN ELECTRICAL SOURCES. Marinas are required to have an annual inspection of the electrical system to include ALL connections. Conduct of these inspections is few and far between.

If you are contacted about an electric shock drowning incident, take measures to get the evidence secured and have a quick investigation to determine the cause. My contact information is above, and I welcome any questions you may have, or reports of an ESD to document and learn more about this silent killer.

## **ELECTRIC SHOCK DROWNINGS**

1. Feb 7, 2023 Detroit, MI. Man electrocuted while working in a flooded home basement. He was snaking a drain when flood water poured in and filled the basement. The electrically charged water caused the death. The exact source is unknown. Took 45 min for EMS to get the power off to retrieve the man.
2. Aug 16, 2022 Louisville, KY. Ohio River, Prospect Yacht Club. A diver was killed while diving on a barge being readied for a local festival. The coroner's report said there was electricity in the water but no specific source was identified.
3. July 4, 2021 Monongahela River Monongahela, PA. A 23 year old man was found unresponsive Beach Club Marina on the Monongahela River. He was swimming near his boat. Reports say that 3 others were shocked in the same area which makes ESD a likely cause.
4. June 4, 2021 Mission, TX. A 14-year-old boy was electrocuted when he stepped in a puddle containing a live extension cord. Extension cords are only for temporary use and this one was likely always exposed to elements and had breaks in insulation.
5. June 3, 2021 Lake Clyde, Clyde TX. An 18-year-old boy was killed when the sailboat he was swim towing struck a power line. The line broke and fell in the water electrifying the water near the boat. Could have been an electrocution or an electric shock drowning. Power crews secured power to the line before retrieving the boy.
6. Nov 4, 2020 Bradenton Beach, FL. During tropical storm ETA a man was sand bagging the outside of his home. He went into the ground floor storage space where there was 3" of standing water. He was electrocuted in the water. Authorities report the clothes dryer was the source of the current.
7. Aug 30, 2020 Harris County, TX, hotel pool. A teenager was killed by electricity in a hotel pool that was not permitted to be open. Light fixture wires were exposed and the teen allegedly came in contact with them. The pool failed several inspections prior in an attempt to open.
8. July 12, 2020 Peoria AZ, Scorpion Bay Marina, Lake Pleasant. 2 brothers were killed in the water after the first started screaming when he jumped in next to their boat. Two others jumped in and were rescued and treated. Investigators found a modification to the shore power cable system which energized boat's underwater metals. Took 10 min to get the power secured for rescue operations.
9. Sep 19, 2019 Jefferson County, TX. A 19 year old man was electrocuted while trying to rescue a horse in the flood water aftermath of Tropical Storm Imelda. There was a lightning storm at the time. The source of the electricity was not reported.
10. July 19, 2019 Citrus Heights, CA. A 9 year old girl was killed while swimming in a pool at her home. She grabbed a wire attached to one of the underwater pool lights that were under repair, Sacramento Metro Fire said. Four other children in the pool were not injured.
11. Apr 2, 2019 Dixon, CA. Irrigation canal. Two highschool boys were electrocuted while trying to rescue a dog who had fallen into the canal. Three boys and a girl, with the dog, were crossing a narrow bridge over the canal. The dog fell into the canal. The dog's owner and another boy jumped in. They reached up slow their movement and touched the bridge they were crossing and were electrocuted. The other boy jumped in and broke the 2 boys from their grasp and also saved the dog. It is unknown if he got shocked as well. Investigation by authorities in progress. Something energized the bridge, and a lack of ground likely prevented a breaker trip.

12. Sep 30, 2018 Oklahoma City, OK. Bricktown Canal. One man was electrocuted after falling into a canal in the city. He reached up to grab a light post to get out and received a fatal electric shock. Another man jumped in trying to help. He received a strong electric shock and was hospitalized (no status on the rescuer). Electrical fault and lack of grounding was cause.
13. Sep 1, 2017 Houston, TX. 5 men were conducting rescue operation from a boat in the flood waters of Hurricane Harvey. The boat drifted into live powerlines killing 2 of the men. The other 3 were rescued downstream and suffered electrical burns.
14. Aug 29, 2017 Houston, TX. A 25 year old man was trying to reach a house flooded by Hurricane Harvey to rescue the family cat. He stepped on a live electrical wire and fell against the lamp post using that wire. He was killed by the electric shock.
15. Aug 11, 2017 Columbia River, Pascoe, WA. A 15 year old was killed while swimming with friends in the Columbia. The teens were gain access to the river at an old pump station which was isolated by a wire fence and barbed wire. One teen grabbed an irrigation pipe and was shocked and fell into the water. He disappeared. Friends got help. Rescuers felt a tingle in the water and one was shocked by the same pipe. An electrical fault at the pump station is the likely cause of the death.
16. Jul 12, 2017 Lovington, NM. A teenager was killed while in the bathtub using a cell phone. The phone was connected to a charger plugged into a damaged, non-GFCI protected extension cord. It is believed she touched the frayed part of the cord and was electrocuted in the tub.
17. Jun 23, 2017 Turkish water park, Akyazi, Turkey. Normally European and Asian continent ESD deaths are not included on the list. This could have happened in the USA. 5 people, including 3 children were killed in a pool at a waterpark. The park manager and his son jumped in to help 3 children. They all died from the electrical exposure. One other was injured.
18. Jun 18, 2017 Toms River Lagoon, NJ. An 11 year old girl was killed when she touched a boat lift that was electrified. She and 2 friends were swimming and on a raft near the lift. The 11 year old reached up to touch the boat lift and was electrocuted. The boat lift had not been used in years. The electrical junction box was corroded from the weather. The girls were wearing life jackets. The other 2 girls were not injured.
19. Jun 17, 2017 Put-In-Bay, OH, Lake Erie. A 19 year old boy was killed by electricity in the water around the family boat docked at the Miller Marina. The boy's father jumped in to the water to rescue the family dog who had fallen in. The man struggled and went under. His two boys jumped into rescue. Both were shocked. The mother pulled the plug for the boat and the electricity stopped. The 19 year old was unresponsive and died.
20. May 22, 2017 Mandeville, LA. A 23 year old man was electrocuted when he extended an aluminum pole into the water around his sailboat at his dock. He received a fatal electrical shock and died. The cause of the electrocution is unknown. The water may have been electrified, or he might have made direct contact with an electrified metal object.
21. May 22, 2017 Laredo, TX. A young boy and his brother were killed when they stepped into a large puddle of water in a field. A storm had downed trees and powerlines in the area. One of the live powerlines was electrifying the water. The boys frequently played in this field near their home.

22. May 19, 2017 Florence, AL. A man and his son were killed in a swimming pool. The man in his pool for cleaning was found submerged by his son who jumped in to rescue. The son was also overcome by electric shock and later died. The wife was also injured by electrical shock trying to help the son. Exact cause is unknown.
23. Apr 14, 2017 Lake Tuscaloosa, AL. Two women went missing after sunbathing on a dock at the lake. Their bodies were found the next morning. At least one investigator felt an electrical shock on the dock during initial emergency response. The accident has been ruled an Electric Shock Drowning. Technical details will be updated when known.
24. Mar 29, 2017 Oakland Lake Park, Ft Worth, TX. Two brothers (11 and 12 years old) were playing in a field after a large storm downed power lines in the area. One boy stepped in a puddle that was electrified by live wires down in the area. He was electrocuted. The brother jumped in to help him and he was also killed. The area was in a very remote low traffic area which delayed investigation of the downed power lines.
25. Sep 10, 2016 South Bend, IA. A woman was found dead in 6" of water in a flooded basement after heavy rains. A box fan was found submerged nearby. Authorities concluded she was electrocuted in the water. There was nothing mentioned about ground fault protection (GFCIs) being used.
26. Sep 3, 2016 Raleigh, NC. A 17 year old girl was found unresponsive in a community swimming pool. She was the lifeguard on duty and was shocked when reaching into the water to check pool chemistry. Another pool worker received a shock trying to pull her from the water. A faulty pool pump and broken grounding wire are cause. The required GFCI was not installed. The pool was in correct configuration for the 1978 NEC. Some rewiring in 2011 should have required a permit which would have triggered an inspection requiring a GFCI. Community pools in some areas must be inspected annually.
27. Jul 3, 2016 A Tennessee Lake, TN. A 13 year old boy was swimming from a boat. He was noticeably in trouble when 2 adults jumped in to rescue. They were both overcome by electric shock. They were able to save the boy. Exact time and location are unknown. Story reported by WSOCTV.com in Charlotte, NC.
28. May 29, 2016 Silver Spring Township, PA. An 8 year old girl was among 8 kids swimming in a backyard pool. When the pool light was turned on 7 other kids were able to get out of the water. The cause was a faulty pool light circuit. Last known in critical condition.
29. Jun 27, 2016 Phoenix, AZ. 27 year old man in a private pool was trying to repair a broken light fixture. He was shocked and killed while working on the light. The exact cause of the accident is unknown.
30. May 28, 2016 Wildwood Crest, NJ. 34 year man was found at the bottom of a motel pool unconscious. The exact cause of the accident is unknown but a pool drain is suspected. Owner said pool was recently inspected and bonded. Last known in critical condition.
31. Apr 16, 2016 Smith Lake, Princeville, AL. Two teenage girls entered the water from a private dock. Both girls were getting shocked in the water. One girl drowned, the other treated and released from hospital. The victim's father and his son jumped into the water to assist. The father blacked out after both were feeling the shocks. The power was turned off at the house, after which the father came to and survived along with son. A missing ground and faulty lighting fixture are suspected to be the cause.

32. Mar 27, 2016 Palm Springs, FL. Six people were shocked in a private swimming pool, one of them a man who jumped in to rescue his daughter. He was overcome by electric shock and pronounced dead at the hospital. The 5 others were treated. The man's daughter, 10 years old died at the hospital. Faulty pool wiring is suspected as the cause. Homes were built in 1963, but not sure of the age of the swimming pool.
33. Aug 8, 2015 Lake Tuscaloosa, AL. A 37 year old man went swimming from his pontoon boat after cutting grass. He was found on the bottom near the boat in 4 feet of water. Investigators say he was shocked by electricity before he drowned.
34. June 21, 2015 Lake of the Ozarks, Woods Hollow Cove, 22.2 mile marker, MO. A 21 year old man and fellow swimmer felt electricity in the water near a dock. The 21 year old grabbed a dock ladder to get out when he was electrocuted and fell back into the water. Someone ran ashore and turned off the power likely saving the other man in the water. A faulty junction box between dock and residence is suspected. The occupants tried to reset the circuit breaker but it would trip after 10-15 seconds of being turned on. The last attempt to turn the breaker on coincided with the 2 swimmers being near the dock as it got dark (breaker controlled dock lights).
35. Aug 24, 2014 Lake Bruin, Tensas Parish, LA. Two teenage girls were shocked when trying to exit the water using a ladder on a pontoon boat. The 13yo died, the 17yo was hospitalized. A faulty boat lift is blamed for energizing the ladder of the boat.
36. Aug 2, 2014 Puyallup River, WA. An 18 year old girl died while tubing with a friend down the Puyallup River. At one point her legs became numb and she lost consciousness. She could not be revived. Inspectors found a close by irrigation pipe energized to 280v and suspect this is the cause. No reports of injuries to the friend.
37. July 20, 2014 Piney Shores Resort, Lake Conroe, Conroe, TX. 8 year old boy was sitting at the end of a dock and dangled feet in water. He had an unusual movement and fell into the water. Later found unresponsive by father and pronounced dead at hospital. Exposed electrical wiring was found on the dock. Electrocution, not drowning was determined to be the contributing cause of the death.
38. June 10, 2014 Lake Powell, UT. A 22 year old man jumped off the stern of a boat docked at the Bullfrog Lake Marina. He surfaced briefly then went back under. His death was caused by electric current leaking into the water from a boat docked at the next slip over. The cause of the leakage is being investigated.
39. Apr 23, 2014 North Miami Beach, FL. A 7 year old boy was electrocuted at his home in the family swimming pool. An older brother felt a shock and urge the victim and a younger brother to get out. The victim did not hear his brother, and immediately thereafter was killed. A rescuer performing CPR put his hand in the water and felt a shock. A faulty swimming pool light is the likely cause of the accident. The presence of a GFCI was not mentioned in the newspaper reports.
40. Sep, 2013 Houston, TX. An older man was killed in a swimming pool attempting to rescue a child. Faulty pool lights were suspected as the cause. Date approximate (Labor Day weekend, 2013).
41. July 25, 2013 Ellijay, GA. A 19 year old girl was electrocuted after a power outage at a home where she was watching a 5 year old girl. A power line came down about 25ft from the house. She went outside to investigate the power outage and either stepped in puddle of water or soggy ground. The voltage gradient from the downed power line was enough to electrocute her.

42. July 19, 2013 Syracuse, NY. A 12 year old girl was electrocuted while filling an inflatable pool in her backyard. Witness say she picked up an extension cord or electric pump plugged into a receptacle, and began shaking. She then fell into the pool. Rescuers received shocks trying to get her out of the pool. Although not mentioned, it was likely that the receptacle was not protected by an operable GFCI as required by the National Electric Code for all outdoor receptacles.
43. July 17, 2013 Davidson County, NC. An 11yo girl was electrocuted in a swimming pool. It was reported that a power line wire came down in the parking lot near the pool. The girl touched the ladder of the pool and was shocked. Rescuers trying to help the girl were also shocked. Electricity was likely flowing from the downed wire into the earth, and passed through the pool enroute to its source.
44. July 4, 2013 Eagle Lake in Orrick Township, Sherburne County, MN. A man was holding a plugged-in battery charger while standing in 20" of water. He was preparing to connect the charger to his houseboat. He slipped and immersed the charger which resulted in a severe electrical shock. He died on 7 July. A woman who went to his aid was also shocked and unconscious but was revived at the scene. It is unknown whether the charger was properly grounded.
45. June 30, 2013 Pulaski County, KY, near South Fork of Lake Cumberland near Garland Bend. A man swimming at a private dock reaches up to pull a ladder down to exit the lake. The ladder contacted a frayed electrical wire energizing the ladder. The man was electrocuted, but was able to move his 2yo son out of danger. Others felt shocks trying to help the man.
46. May 20, 2013 Grayson County, KY, Rough River Lake. A 36 year old man and one of his dogs were lost near a marina boat slip. He jumped into the water when the dog was having problems. Witnesses report the man's eyes rolled back and he went under the water suddenly. Inspectors found a shore cord (with a submerged coupling between two cords) was energized and reported this was the cause of the electrocution. The man was reportedly 10-15 feet from the houseboat. They found multiple NEC violations at the marina.
47. Sep 27, 2012 Tims Ford Lake, Franklin County, TN. A 39 year old man was swimming from a dock when he died from electrical shock. Faulty wiring on the dock is blamed for the death. The home had been struck by lightning in the recent past but it is unknown if this is related to the electricity in the water that killed the man.
48. Sep, 2012 Americus, GA, South Georgia Technical College. A 19 year old woman was electrocuted in a fountain pond while retrieving her young son's ball. Efforts to assist her were thwarted by others receiving electrical shocks. Investigators found 17 violations in the electrical supply to the pond. One month earlier another student reported shocks (the pond was only drained and cleaned as a result).
49. Aug 30, 2012 Bingham County, Idaho. Two men and a woman were electrocuted in an irrigation ditch. The woman went in to rescue a dog, and the 2 men tried to rescue the woman. A faulty irrigation pump was responsible for this tragedy.
50. Aug 22, 2012 Los Angeles, CA. A man speeding in a car hit a fire hydrant and electrical pole. The energized from the pole ended up in the large puddle created by the broken fire hydrant. 2 women were electrocuted when they entered the puddle to try and assist the driver.
51. July 25, 2012 Tampico, IL. A 14 year old boy and girl were electrocuted while detasseling corn in an IL cornfield. A lightning strike is suggested to have destroyed the grounding system for an irrigation pump. A fault in the pump then leaked electricity into the ground creating electrical gradients across puddles and other wet areas.

52. July 25, 2012 Cohasset, MN, Pokegama Lake. Two men and a woman were shocked by an extension cord in the water, presumably from a boat lift. One of the men could not be revived and died. The other two were hospitalized in serious condition.
53. July 7, 2012 Lake of the Ozarks, MO. A 26 year old woman was swimming with her 2 stepbrothers when the brothers felt a tingling. The boys swam to one dock and were unharmed. The woman swam to a different dock, apparently where there was faulty wiring. She may have been electrocuted when she touched something metallic on this dock. She could not be revived at the scene.
54. July 4, 2012 Lake of the Ozarks, MO. A 13 year old girl and her 8 year old brother were killed by electricity while swimming near a private dock. The hot wire to an electrical outlet had chafed and shorted to the dock framing steel. This steel structure was not bonded, nor was there GFCI protection as required by the National Electric Code.
55. July 4, 2012 German Creek Marina on Cherokee Lake, Bean Station, TN. A 10 year old and 11 year old boys were killed by electricity in the water at a TN marina while swimming between 2 docked houseboats. An 8 year old girl also swimming with the boys was shocked but pulled to safety. Several adults and another 12 year old boy were shocked trying to rescue the 2 boys. Faulty houseboat wiring on one of the boats is believed to be one of the causes.
56. June 27, 2012 Celebration, FL. An 11 year old girl was electrocuted when she reached into a mini golf pond at an Orlando, FL resort to retrieve a golf ball. A man trying to help her was also shocked. The cause was faulty pond pump that was not protected by the required GFCI. Water came in contact with the pumps windings and electrified the small cement pond on the mini golf course.
57. May 5, 2012 Lake Sinclair, Putnam County, GA. A 25-year-old woman was apparently electrocuted when she reached from the water and touched either a box or bare wire on the dock (it was being worked on at the time). Another woman in the water was shocked when she pulled the 25 year old away from the dock and held her head above water. She could not be revived at the scene.
58. Aug 15, 2011 Traverse City, MI, Clinch Marina. An 18 year old boy died in West Arm Great Traverse Bay when an electrical fault (reportedly from dock wiring) caused current to enter the water where the boy and a friend were swimming. The friend reported feeling electricity in the water. "No Swimming" signs were posted in some locations in the marina.
59. May 28, 2011 Lake City, MN. A 50 year old man was electrocuted in Lake Pepin near a boat lift which had exposed wiring. His dog was in the water and was shocked and began to sink. Another man jumped in to rescue the dog but was shocked (he escaped the water). The 50 year old man then jumped in for his dog and appeared to have been electrocuted.
60. July 26, 2010 Lake Freeman, Carroll County, IN. A 13 year old boy was swimming with 3 other children when they started to feel a tingle. The 13 year old attempted to exit the water at the dock but fell back into the water. The other children managed to exit the water. A water-soaked electrical junction box was located on the dock nearby and is the likely source for the electrical current in the water.
61. Removed.



62. July 10, 2010 York, SC. A 54 year old man died after jumping into a swimming pool to help his granddaughter. The granddaughter was receiving a shock from the pool's railing when the man jumped in to help her. He grabbed the pool's railing and reportedly "stuck" to it. His grandson reported that he had felt electricity in his chest when near the edge of the pool (until a light was turned off). Electric shock is the probable cause of death.
63. June 21, 2010 Smith Lake, Birmingham, AL. A 16 year old boy was climbing a dock ladder when he suddenly fell back into the water. He was immediately unresponsive when recovered by friends. Electrocution (from an energized dock ladder) is suspected as a possible cause of death.
64. June 2010 Lake Waccamaw, NC. A boy was killed swimming near a boat lift. A the owner was told by another child that he was feeling tingles in the water. The owner reached up, touched the boat lift and was shocked. He told the other kids to get out of the water. After exiting he noticed one boy face down in the water. He could not be revived at the scene. There was an open ground in the lines from the house to the dock, and one of the small junction boxes under the dock was filled with water. The cause may have also been a fault to the lift motor.
65. May 29, 2010 Stonewall Jackson Lake, WV. A 15 year old boy was climbing onto the swim platform of a boat. When he touched the ladder he received an electrical shock and he fell back into the water and reportedly drowned. A girl still in the water felt the shock and was treated and released from a local hospital. Cause was improper repair of the pedestal end of shore cord (hot and ground were reversed). It is likely this was an electrocution rather than a drowning.
66. Aug 23, 2008 Lake Hamilton, Hot Springs, AR. 14 year old girl swimming near a metal swim ladder with a 7 year old boy and his mother near by. Without warning the boy began to scream and his mother became incapacitated on the swim ladder. As the girl attempted to help the boy she sank out of sight. The boy's father pulled him to safety and helped his wife onto the dock. Preliminary investigation revealed an unbonded metal pole, welded to the dock, on which was mounted a halogen light, which had just been turned on by its photo cell, and had an AC fault due to chafed wires which energized the dock frame and ladder. Boy and mother required hospitalization. Voltage to ground on the ladder measured at 103 VAC. The girl was recovered later that night.
67. July 28, 2007 Lake of The Ozarks, MO Twenty four year old female attempted to exit the water using a metal ladder at the end of a private dock. She apparently experienced a paralyzing electric shock which caused her to fall back into the water and drown. Several people had reported being shocked by the ladder and the dock owner had gone to shut the power off. The dock power wiring termination was found submerged under the dock near the exit point.
68. July 24, 2006 Lake Lanier, Cumming, GA. Seventeen year old boy in water near a private dock, working on a jet ski with two friends, was overcome by electric shock. Extension cord with damaged insulation caused the metal dock to become energized. Friends also shocked, and partially disabled, could not help their friend. Father of victim fought paralyzing shock and pulled unconscious son away from dock – he could not be resuscitated. Investigation planned.

69. July 14, 2006 River Street Marina, Port Huron, MI. A 20 year old man jumped, or fell, into the water from the pier behind a 29' boat, moored stern too. He became disabled as he attempted to climb onto the swim platform. Two friends attempting to pull him onboard reported being shocked. He could not be resuscitated. Shock induced ventricular fibrillation likely cause of death. The next day an inspector reported 107vac in the water behind the boat. Subsequent investigation confirmed the voltage behind the boat. The cause was an AC to DC fault in the battery charger energizing the underwater gear and no AC to DC bonding connection.
70. June 24, 2006 Brady Mountain Resort, Lake Quachita, Hot Springs, AR. A 14 year old boy died from electric shock while swimming near a houseboat. A friend was also shocked and taken to a hospital and released. A man jumped in to help and was rendered unconscious but was unharmed after regaining consciousness. The cause appeared to be inserting a shore cord with a 30A/125V (L5-30) plug (with the grounding pin bent back) into a 50A-125/250V receptacle in such a way so as to energize the neutral, which was connected to the bonding system, thereby energizing the hull.
71. June 10, 2006 Lake Michigan, Racine Harbor, WI. A 56 year old man was killed when he went swimming from the stern platform of a boat. Inquest listed death as "Accidental Electrocution" and did not establish a root cause. Victim's wife stated that the Reverse Polarity light flickered on and went out when power applied to vessel. Comment: A reverse polarity situation along with a grounded neutral can energize underwater metals on a boat.
72. May 22, 2006 Weiss Lake, Cherokee County, AL. A 24 year old young man was killed while in the water near a pier. He was attempting to rescue his friend who had become paralyzed by an electric shock while trying to exit the water via a metal ladder. Another friend was also disabled by shock as he entered the water to assist. The two young men, who were shocked, were not seriously injured. There was an electric windmill on a metal tower attached to the ladder, and was apparently powered by an incorrectly modified extension cord, and which may have been connected to a non-functioning GFCI outlet. A bystander on the dock pulled the power cord just in time, or there may have been two more victims. Investigation underway.
73. Mar 18, 2006 Summerset Lake near Desoto, St. Louis, MO. In the early evening a teenage boy became paralyzed by electric shock, and drowned, while attempting to swim toward a metal ladder attached to a private dock. Two friends were rendered unconscious but were resuscitated and required hospitalization. During several investigations, initially and over the next months, it was determined that the dock wiring was properly installed, the metal dock frame and ladder were bonded, and no loads were operating at the time of the accident. However, clamping the dock supply cable with an AC ammeter disclosed 10 amps flowing (likely in the ground wire) and 4-6 VAC was measured approximately 2 ft. away from the ladder on several separate occasions. The subsequent legal action resulted in a jury finding the local utility at fault. It seems that a near-by underground power distribution cable had a defective (or missing) neutral which caused the neutral current to seek a path back to the substation through the earth and into the lake. This earth leakage current concentrated at the bonded swim ladder resulting in a lethal gradient of more than 2 V/Ft near the ladder. These earth leakage currents are fairly common but this is the first serious incident we have recorded due to this phenomenon.

74. June 27, 2005 Scott's Creek Marina at Cave Run Lake, Moorhead, KY. A 19 year old girl drowned, while in the water near a houseboat, due to electric shock caused by a battery charger in the engine compartment which had become partially submerged and energized the hull. Owner had rewired the boat with no bonding system. Another girl sustained burns on her legs while reaching into the water to help the victim. A nearby rescuer swam toward the scene and was shocked and paralyzed by the electrical field. Only two feet from the victim he had to turn around and swim out of the field to survive.
75. Sept 2004 Lake Of The Ozarks, MO 22 year old male stepped on an electrical cable upon exiting the water after swimming behind a private residence – fell face down into water unconscious – could not be revived. No information on cable.
76. Sept 13, 2004 Ross Barnett Reservoir, Ridgeland, MS. A 16 yr old boy was swimming in the marina when he approached a houseboat. He screamed as if in pain and disappeared under the water. He could not be revived after divers recovered his body. A friend in the water also felt a shocking sensation. The cause was a home made shore cord, hard wired to the panel which was passed through a hole in sheet metal siding with no chafe protection. The insulation was cut by boat motion and shorted the hot conductor to the siding. The siding was not adequately grounded to the shore grounding system but was connected to the boat's bonding system, which caused the hull to go up in potential killing the boy.
77. Aug 8, 2004 Lake Travis, Austin, TX. Young man, in good health, swimming, in evening, unobserved, between two sections of marina dock – disappeared. Came to surface two days later. No toxic substance found on post mortem, but Joule marks (electrical contact points) found on right wrist and left leg and shin. Suspected electric shock drowning. Accident under investigation. (See follow-up, last page)
78. June 19, 2004 Lake Waccamaw, NC Ten year old boy drowned while swimming with friends near a private dock boat lift that had just been raised from the water. An adult reported a heavy shock when touching the lift and several children in the water reported being shocked. Victim was noticed motionless face down nearby – could not be revived. Lift frame had become energized and the bonding conductor from the supply panel was not connected.
79. June 5, 2004 Lake Wylie, Charlotte, NC. Two young boys swimming at bow of houseboat called for help. Father of victim and friend rushed forward – boy on ladder said he was being shocked, other boy in water not moving. Friend rushed aft to pull shore cord as father went onto water – his son could not be resuscitated. May not be exact sequence. Causes of energized hull were substantial errors in wiring on the dock as well as on the boat, apparently done by non qualified individuals.
80. Aug 3, 2003 Bull Shoals Lake, Bull Shoals, AR. Diver found Aug. 5 in shallow water 8 ft. from his dock, drowned. Incorrectly wired dock junction box caused 117 VAC to appear on metal dock components. Rescue diver reported feeling shock sensation 20 ft. from dock!
81. June, 2003 Allatoona Lake, GA. Six wildlife fatalities (ducks!!) Houseboat pulled away from the dock and still connected shore power cord separated in middle and fell into water. Six dead ducks found floating nearby.
82. May, 2003 Cape Coral, Florida. Double drowning, section of re-bar driven through power cable to back yard boat lift caused line potential to appear on lift frame, salt water. Ventricular fibrillation likely cause of death – not confirmed.

83. May 31, 2002 Lake Cumberland, Monticello, KY. Double drowning (mother and daughter), fault on houseboat, fresh water. 125V plug at boat end of shore cord rewired by owner for 220V – L2 connected to “GR” pin - ground lead in 4 wire cord cut and taped off! Hull rose to line potential.
84. March, 2002 Bay Marina Boat Works, Biloxi, MS. Some electrical work had recently been done at this yard, which resulted in reverse polarity connections at the shore cord receptacles for the stored boats. Over a short time period several boat owners reported being shocked as they worked on their boats, and one owner was electrocuted. The possibly of a missing ground combined with a ground- neutral connection on the lethal boat was not investigated.
85. Sept 15, 2001 Farr Shores, Lake Hamilton, Hot Springs, AR. Girl receiving electric shock after water-sliding into water at stern. Man attempting rescue drowns. Reverse polarity, neutral to ground fault in a light fixture on the boat, and poor bonding to the service caused the accident, fresh water. Boat unplugged in time to save girl.
86. June 6, 2001 Residence, Timber Ridge Dr., Dumfries, VA, Lake Montclair. Two young boys entered water near pontoon boat. Battery chargers (2) connected to modified extension cord from house. Electric shock drowning – cause of energized hull not reported.
87. May, 2001 New Orleans, Electrocution – Boy using conveyor to transfer shrimp – no ground, salt water.
88. Apr 10, 2001 Norris Lake, Lafollette, TN. Two teenage boys swimming behind house boat. One boy climbed onto swim platform complaining of feeling severe shock – other boy fell back from ladder– his head *not* below water (ventricular fibrillation?). Could not be resuscitated. Damaged power cable to boat, black lead energized hull, ground wire burned in two – breaker did not trip due to incorrect connection (may not be exact sequence).
89. 2000 or 2001 Put-in-Bay, Ohio, Grand Banks 42. Owner’s prescription sunglasses went overboard. Young bystander disappeared while trying to retrieve glasses, electric shock drowning.
90. Sept 30, 2000 Tims Ford Lake, Winchester, TN. Two boys (21&22). Electric shock drowning. Rescue diver felt electric shock. Live wire in water near dock.
91. Aug 1, 1999 Multnomah Channel, Portland, OR. 8yr old boy tubing with friends in freshwater marina along slow moving river. Boy decides to swim to dock (was wearing type 3 life vest). Suddenly he rolled over on back near the stern of a boat. Mother enters water and helps get boy on dock (she felt tingle in water). Diagnosed as electrocution (head was above water almost all the time). Cause was AC to DC short on boat and no connection between AC ground and DC ground. 84vac measured behind stern upon subsequent investigation.
92. July, 1999 Lake Mohave, AZ. Young man swimming toward stern of a house boat became disabled and drowned, fresh water. Boat had a neutral-ground bond. Home made shore cord “Y” became partly disconnected causing hull to become energized. 17vac measured behind stern-drive.
93. July18, 1999 Cedar hill Lake, Smithville, TN. Two young boys, with flotation devices, were discovered in water, face down, a few feet behind a houseboat. 7 year old could not be revived. 8 year old recovered. Electric shock drowning suspected.
94. July, 1999 S. Carolina, single drowning – 3 feet of water, woman in great distress, husband attempts rescue and drowns, fresh water.

95. Approx. 1999 Rio Vista, CA. Several boys reported a tingle while swimming in this fresh water marina and got out of the water. A short time later two other boys, 8 – 10 years old, drowned at the same spot. Forty-year-old power wiring running under moored boats found to have substantial fault to ground because of insulation failure.
96. Sept 1998 Lake Sonoma, CA. Single drowning, young girl in great distress, fault on dock, fresh water.
97. Approx. 1998 AF Base, Washington, DC, boy walking on ice slipped and grabbed exposed wires on dock that were supposed to have been de-energized, electrocuted.
98. July 1997 Lake Mead, NV. Single drowning, fault on houseboat, freshwater.
99. Feb 1995 Bolling AFB, Washington, DC. Young boy reaches from water and grabs support structure for electrical junction boxes receiving lethal shock. Bare energized wires found touching metal case inside junction box. Grounding wire had been cut and never reattached to the junction boxes.
100. Approx. 1994 Texas, single drowning, fault on boatlift, salt water. Cause of death not available.
101. Sept 1993 Oklahoma, single drowning, fault in submersible pump, fresh water.
102. August 1993 Alexandria Bay, NY. Double drowning. Two teenage girls snorkeling near dock were paralyzed by electric shock and drowned. Fault was in dock wiring gnawed by rodents. Two bystanders entered the water to lend assistance, but were shocked by the voltage in the water (they were treated at hospital and released).
103. July 1993 Oklahoma, single drowning, fault in dock lights – energized dock frame, fresh water.
104. May 11, 1991 Lake Hamilton, Hot Springs, AR. A canoe carrying four young boys tipped over a few dozen yards from a dock. As they swam toward the dock they felt a light tingle. Three of the boys diverted away from the dock while the fourth boy continued into the electric field and drowned. Cause was broken insulation on a dock wire hanging in the water.
105. July 1991 Oklahoma, single drowning, fault in dock wiring, fresh water.
106. Dec 1989 Oklahoma, single drowning, fault in submersible pump, fresh water.
107. Apr 23, 1988 New York State University at Albany. Sophomore waded into a pond on campus and was electrocuted. Several others injured in rescue attempt. Cause was broken electrical cable under the ground.
108. July 1988 Park Township, MI, Lake Macatawa, Bay Haven Marina. 18-year-old boy falls off dock, in great distress, two attempts to assist thwarted because of severe electric shock as rescuers entered water.
109. 1987 or 1988 (A) Gross Pointe Yacht Club, single drowning, diver, fresh water  
(B) Petosky, MI, single drowning, diver, fresh water. NOTE: Both incidents relayed 3rd hand.
110. July 29, 1986 Harrods Creek, Lexington, KY – Ohio River. About 2030 two dogs jump into water from owners 20 ft. runabout, and were observed to be in great distress. Owner's wife jumps in to help and was immediately in trouble. Husband goes in to save his wife – both drown. Rescuers felt strong electric shock and could not approach victims, but were able to rescue dogs later. Faulty light switch and missing ground on nearby houseboat determined to be the cause.

111. June 8, 1986 St Croix River, Prescott, Wisconsin. 44 year old swimmer dove off of the dock near his 28' power boat. As he approached the swim platform he said he felt like he was being shocked, and was becoming numb, and then disappeared below the surface. Recovery and attempted resuscitation in a matter of minutes were unsuccessful. Battery charger had faulted to its metal chassis, and the boat's mfr. had deliberately **not** installed the AC grounding wire to the boats bonding system – as required – causing AC potential to appear on the underwater metal gear.
112. Date Unknown Community swimming pool in Oklahoma, 10 year old electrocuted while inserting coins in a soda vending machine. Power cord damaged by one of the 4 legs, grounding pin on plug missing, machine chassis later measured at nearly line voltage, NO GFCI.

### **ELECTRIC SHOCK – NEAR MISSES**

(Additional ones included above)

1. Nov 4, 2020 Bradenton Beach, FL. During tropical storm ETA a man was sand bagging the outside of his home. He went into the ground floor storage space where there was 3" of standing water. He was electrocuted in the water. A friend walked in the water in an attempt to rescue but received electrical shocks and had to abandon the effort. Authorities report the clothes dryer was the source of the current.
2. Aug 12, 2020 Peoria AZ, Scorpion Bay Marina, Lake Pleasant. 2 brothers were killed in the water after the first started screaming when he jumped in next to their boat. Two others jumped in and were rescued and treated. Investigators found a modification to the shore power cable system which energized boat's underwater metals. Took 10 min to get the power secured for rescue operations.
3. May 11, 2020 Lewis Smith Lake, Alabama. A woman received electrical shocks when entering the water at her non electrified dock. Electricity was leaking into the water from the dock next door. She was able to swim toward shore away from the dock. She grabbed a dock cable and was shocked even worse. A friend used a pole to pull her out of the water at the shore line. She said her feet were paralyzed and burning.
4. July 19, 2019 North Potomac, MD, Westleigh Recreation Club. An adult and child received electrical shocks while swimming in the pool. Neither person's injuries considered life threatening. Fire department said an electrical hazard ended up in the water from an unknown source.
5. Jun 2, 2019 Universal Studios, Orlando, FL. Numerous people, including staff and guests received electrical shocks in the water at the Volcano Bay attraction. No reports of injuries after hospital and paramedic examinations. One lifeguard reported anonymously that a water coaster had developed a short circuit. Update to follow if more is learned.
6. Nov 6, 2018 Laconia, NH. Paugus Bay. A dog jumped into the bay and was electrocuted. A woman, the dog's owner began to wade into the water to rescue the dog. She felt a strong electrical shock but no report of further injuries. The power pole had been placed in the water near the dock for a flood light. The electric line that branched off the dock service to supply the flood light was in the water. The wire was disconnected to facilitate retrieving the dog.

7. Sep 30, 2018 Oklahoma City, OK. Bricktown Canal. One man was electrocuted after falling into a canal in the city. He reached up to grab a light post to get out and received a fatal electric shock. Another man jumped in trying to help. He received a strong electric shock and was hospitalized (no status on the rescuer). Electrical fault and lack of grounding was cause.
8. Jul 4, 2018 Canfield OH. A mother was sitting at her pool with legs in the water. She began to feel a tingle. Then felt it with her hands in the water. Ordered son to get out of the pool. Electric company it's just a stray voltage. Faulty pool wiring is suspected as the cause. No mention of GFCI use.
9. Jul 3, 2018 Lake of Ozarks, MO. Rocky Mount on 5 Mile Marker. A woman received an electric shock as she grabbed onto a metal dock ladder. An arc crossed from the dock ladder to a ring she was wearing. Authorities measured 15volts AC in the water. There were also several children in the water. No reports on if they were affected. A faulty water heater in the home was determined to be the cause. There had to be some open grounding as well.
10. Jun 11, 2018 Camelot Cove, Camdenton, MO. Lake of Ozarks. Swimmers (number unknown) felt an electric shock in the water while swimming. An energized wire was found dangling from a nearby dock.
11. Jun 5, 2018 Smith Mountain Lake, GA. A 17yo girl was shocked in the water when touching a metal object believed to be part of a boat lift. She was taken to a hospital and released. Officials stated that the electricity came from aging wire on a boat lift. No mention of GFCI use.
12. May 14, 2018 Lake Taney Como, Branson, MO. A man's grandson received a shock in the water around their dock. The cause was a faulty electrical system THREE docks down.
13. Sep 1, 2017 Houston, TX. 5 men were conducting rescue operation from a boat in the flood waters of Hurricane Harvey. The boat drifted into live powerlines killing 2 of the men. The other 3 were rescued downstream and suffered electrical burns.
14. Jul 24, 2017 Kelowna, British Columbia. A man was walking his dogs when they bounded into a creek. The dogs started yelping in distressed. The man reached in to help the dogs and was badly shocked. The dogs died. The man survived the shock. A faulty pond pump is responsible for the accident.
15. Jul 3, 2017 Lake Keowee, SC. A woman's son was under their boat investigating a faulty speedometer. He grabbed a crossmember of the boat lift and was shocked. He responded to treatment in the ambulance and recovered quickly. The boat lift was not properly grounded.
16. Jul 7, 2017 Canyon Lake, CA. 2 kayakers felt an electrical tingle in the water. Authorities were investigating. No updates.
17. Jun 27, 2017 Menemsha Beach, Martha's Vineyard, MA. A group of third graders felt a tingle in the water at the beach. Management also felt tingles at the nearby dock. The power was immediately secured. The area is being repaired. Exact cause unknown.
18. Jun 17, 2017 Put-In-Bay, OH. A 19 year old boy was killed by electricity in the water around the family boat docked at the Miller Marina. The boy's father jumped in to the water to rescue the family dog who had fallen in. The man struggled and went under. His two boys jumped into rescue. Both were shocked. The mother pulled the plug for the boat and the electricity stopped. The 19 year old was unresponsive and died. The father and other brother survived after receiving electrical shocks.

19. May 19, 2017 Florence, AL. A woman was injured by electrical shock when trying to help her son who went into swimming pool to rescue his father. The father and son both died. Cause is unknown.
20. May 8, 2017 Ottawa, Canada. A man ran into a flooded street to stop a motorist going to fast. He fell and contacted an electric cord powering a submersible pump. He was shocked and taken to the hospital. There was no ground fault protection for the pump. Unknown if he survived.
21. May 1, 2017 Rochester, NY. A homeowner rigged a portable electric sump pump to pump out a flooded backyard. He stepped into the water to turn on the pump and received a significant shock in his legs. Had he fallen he likely would have been killed. The motor had an electrical fault and it was not connected with through a GFCI protected outlet.
22. Oct 7, 2016 Shiloh, MO. A worker was pulled from an electrified puddle of water at a business. He was using saw to cut concrete. A second worker tried to pull him out of the water but was shocked. Rescuers were able to get the man out, perform CPR, and revive him. The electrical source for the tool was likely not protected with a GFCI (as would have been required at the construction site).
23. Jul 3, 2016 A Tennessee Lake, TN. A 13year old boy was swimming from a boat. He was noticeably in trouble when 2 adults jumped in to rescue. They were both overcome by electric shock. They were able to save the boy. Exact time and location are unknown. Story reported by WSOCTV.com in Charlotte, NC.
24. May 29, 2016 Silver Spring Township, PA. An 8 year old girl was among 8 kids swimming in a backyard pool. When the pool light was turned on 7 other kids were able to get out of the water. The cause was a faulty pool light circuit.
25. Apr. 16, 2016 Smith Lake, Priceville, AL. Two teenage girls entered the water from a private dock. Both girls were getting shocked in the water. One girl drowned, the other treated and released from hospital. The victim's father and son jumped into the water to assist. The father blacked out after both were feeling the shocks. The power was turned off at the house, after which the father came to and survived along with son. A missing ground and faulty lighting fixture are suspected to be the cause.
26. Mar 27, 2016 Palm Springs, CA. Six people were shocked in a private swimming pool, one of them a man who jumped in to rescue his daughter. He was overcome by electric shock and pronounced dead at the hospital. The 5 others were treated, and one young girl remained hospitalized in critical condition. Faulty pool wiring is suspected as the cause. Homes were built in 1963, but not sure of the age of the swimming pool.
27. Aug 25, 2015 Portsmouth, NH. A diver in mid 20s was shocked while cleaning a boat at Portsmouth Naval Shipyard in NH. Faulty wiring is suspected as cause.
28. June 21, 2015 Lake of the Ozarks, Woods Hollow Cove, 22.2 mile marker, MO. A 21 year old man and fellow swimmer felt electricity in the water near a dock. The 21 year old grabbed a dock ladder to get out when he was electrocuted and fell back into the water. Someone ran ashore and turned off the power likely saving the other man in the water. A faulty junction box between dock and residence is suspected. The occupants tried to reset the circuit breaker but it would trip after 10-15 seconds of being turned on. The last attempt to turn the breaker on coincided with the 2 swimmers being near the dock as it got dark (breaker controlled dock lights).
29. Apr 27, 2014 Hialeah, FL, condominium community pool. At least 3 children and 2 adults were shocked from an electrical fault in an improperly grounded pool pump. The children recovered after 4 days in a hospital.



30. July 4, 2014 Lake of the Ozarks, MO, 7 mile marker. Several people were swimming at a private dock when they started feeling tingles. Turning off power at the dock did not solve problem. Contractor found a electrical short to an abandoned boat ramp about 100yds away. Power was disconnected and the electricity in the water ceased.
31. July 2013 Lake Norman, NC. Time frame approximate. Man swimming off docked boat feels shock and paralysis from electric current. He is able to move far enough away to regain control. Cause unknown.
32. July 11, 2013 Lake of the Ozarks, MO, 35 mile marker. 8 college age girls were swimming around some docks with electrical service. One of the girls felt her arm go numb. She swam the other direction and the numbness went away. Several other girls felt tingling and were shocked trying to exit at a nearby dock.
33. June 18, 2013 Scott City, MO. After the neighborhood became flooded, a woman went down her flooded basement attempted to rescue a cat. She began unplugging electrical cords when she began getting shocked. She rescued the cat and got on top of some floating furniture until rescued. Likely the circuits involved were not protected with GFCIs.
34. May 27, 2013 Lake Lanier, Gainesville, GA. A man and his 6yo daughter were swimming 10ft from a dock when the man received an electric shock in the arm. He grabbed his daughter, swam to the dock and lifted her to safety. Then he was shocked at least 2 more times, but survived. Appears to have been an intermittent problem possibly correlated to a power outage in the vicinity. Cause is unknown.
35. Aug 14, 2012 Garden Grove, CA. Two girls (15yo and 23yo sister) were swimming in a swimming pool when the teenager called out and went face down in the pool. The older sister's legs and arms went numb. The father was able to get the girls out of the pool (and was also shocked when pulling the girl out). Paramedics were able to restore the teenager's breathing and pulse. She is expected to make full recovery. Cause unknown but work had just been done on the pool which had underwater lights.
36. Aug 4, 2012 Gravois Arm of Lake of the Ozarks, MO. A woman received a shock as she reached for a dock ladder while swimming. She swam away from the dock. Her husband did the same and confirmed the shock. They both swam away and exited the water at a neighbor's dock because of awareness following 3 deaths from electric shock a month earlier.
37. July 23, 2012 Lake of the Ozarks, MO. Two children and one adult were swimming near a dock undergoing electrical repairs. They all felt an electrical shock in the water. Power to the dock was turned off. The swimmers exited the water without serious injury. Exact cause is under investigation.
38. July 4, 2012 German Creek Marina on Cherokee Lake, Bean Station, TN. A 10 year old and 11 year old boys were killed by electricity in the water at a TN marina while swimming between 2 docked houseboats. An 8 year old girl also swimming with the boys was shocked but pulled to safety. Several adults and another 12 year old boy were shocked trying to rescue the 2 boys. Faulty houseboat wiring on one of the boats is believed to be one of the causes.
39. June 27, 2012 Celebration, FL. An 11 year old girl was electrocuted when she reached into a mini golf pond at an Orlando, FL resort to retrieve a golf ball. A man trying to help her was also shocked. The cause was faulty pond pump that was not protected by the required GFCI. Water came in contact with the pumps windings and electrified the small cement pond on the mini golf course.

40. May 28, 2012 Lake of the Ozarks, MO. 3 women were shocked while swimming near a dock. Someone turned off the power fast enough to save them. One needed CPR at scene. All survived. The older dock had no GFCI protection and an “inadequate ground wire from dock to shore”.
41. Aug 28, 2011 Near Shady Beach, Norwalk, CT. A dog was electrocuted in floodwater from recent storm (Hurricane Irene). The two women walking their dogs felt electrical shocks (other dog, leashed, survived). Witnesses report “water boiling” where a grounding cable was entering standing water. This is indicative of electrical current in the water.
42. June 21, 2011 Charleston, Kanawha River, Lou Wendell Marine, WV. A woman entered the water via a boat ladder for a swim. She was overcome by electrical current and reportedly could not escape, then sunk below the water for approx 90 seconds before being rescued. An electrician reportedly found a grounded neutral in the pedestal, but the exact fault is unknown.
43. March 18, 2011 Houston, TX. A dog jumped into a neighborhood retention pond with fountain and was killed by an electric current in the pond. A man went in after the dog but when he was ankle deep he could feel the strong electric current in his feet so he retreated. Power was secured to the fountain. Comment: Had the man dove into the pond, he could have become a casualty as well.
44. Sept 5, 2010 Lake at Perrine Wayside Dog Park, Miami, FL. Man playing fetch with dog threw object into a lake. The dog jumped in and swam toward a fountain in the center of the lake. The dog began yelping and struggling. The man went in the water to help his dog, but was stopped by electric shocks and could not reach the dog. The dog died, the man survived. The fountain was turned off but it was still putting electrical current into the water. It was removed for inspection.
45. Sept 5, 2010 Hartwell Lake, Anderson, SC. A 12 year old girl was playing in the water near a dock with a friend. She grabbed an electrical wire and went into cardiac arrest. She was resuscitated by her father and airlifted to a hospital. The police report stated that there was a grounding problem on the dock.
46. Aug 8, 2010 Green River Lake, Campbellsville, KY. A woman swimming behind a houseboat was seen arching back and sinking in the water. She surfaced long enough to scream for help. A man on the boat attempted to pull her out but was badly shocked as he was trying to help. Another man on the boat was able to pull both of them out of the water using a rope after turning off the boat’s power. Another houseboat owner attempted to swim to them but was turned back due to the electrical current in the water. The woman and man pulled from the water were treated and released from the hospital.
47. July 31, 2010 Lake Champlain, VT. A father and his two 13-year-old sons were shocked, but survived. No further information.
48. July 3, 2010 International Harbor, Friendsville, TN. Three females, 12, 20, and 30 years old were shocked while swimming near a docked boat. When the boat’s power was turned off, the electrical current went away. Two of the three swimmers were injured and required hospitalization. One was not breathing when EMS arrived. They were able to revive her. A 63 year old woman was shocked trying to assist the other three in the water. She also required hospitalization. The cause was never determined.

49. June 24, 2010 Lake Travis, TX. A 15 year old girl and her 8 year old sister were swimming by a private boat dock when they were shocked in the water. The older sister was unresponsive at the scene and was in critical condition in the hospital. Shoddy wiring of boat lift resulted in direct hot to frame short with no grounding connection. Girls survived.
50. May 24, 2010 Clear Lake, IA. A man was throwing balls to his dogs from the dock behind his house. One dog approached the boat lift and went under. The man jumped in and received an electrical shock in the water. Family members quickly turned off the dock power. The man survived, the dog did not. Exact cause of fault not known.
51. Sept 2007 Franklin Lock Campground on the Caloosahatchee River, FL. Boat docked in freshwater marina receiving AC shore power. Owner was cleaning prop shaft under the boat using a metal scraper. As his foot touched the bottom and the scraper connected the shaft and the strut he felt an electric shock which caused his "teeth to clench and muscles to contract". He also saw blue sparks at the scraper. After the shock he was able to exit the water and observed that one of two 30amp shore power breakers had tripped. He was not wearing a wetsuit.
52. Aug 28, 2007 Private pond, Eden, NY 22 year old male entered the pond in an attempt to rescue his dog, which was in great distress, and was thrown back and lay unresponsive. His father dragged him from the water and started CPR which was continued by the rescue squad on the way to the hospital, where he is still recovering as of 9/1. Submersible irrigation pump was considered likely cause.
53. July 20, 2007 Lake Arcadia, Edmond, OK Adult male entered water at the end of a private dock and was immediately paralyzed by electric shock, and began to sink. His wife, reaching from the dock, kept his head above water. A bystander, entering the water from his boat was also shocked so he got back into the boat and assisted the wife in pulling the man onto the dock. High water had submerged the electrical outlets at the end of the dock.
54. July 1, 2007 Collins Bay, Lake Ontario, Kingston, ON. As a SCUBA diver, with no wet suit, approached a moored sail boat he felt a tingling sensation. Approaching closer he experienced a moderate electric shock so he backed away. Later examination disclosed damage to a steel dock section at the boat's stern and the battery charger was found to have a "short circuit". The condition of the bonding system was not reported.
55. August 2006 Lake Michigan, Racine, WI. Owner decided to check underwater as he was having vibration on one engine. He donned scuba gear and jumped in water. When he touched the bronze prop he was hit with current that almost paralyzed him causing great difficulty in breathing. He was able to get away from the zone of danger. Cause is thought to be the boat in the next slip. A yellow barrel connector on the water heater Neutral #16 wire was loose, due to the terminal being the wrong size and not correctly crimped. It heated up which burnt terminal insulation and shorted the hot to the grounded case. As the phase did not see excessive current, the breaker did not trip. The neutral dock pedestal socket pins had corroded due to poor connection and the ensuing heating so that eventually only intermittent connection was made. The diver's wetsuit may have saved his life. He was only inches from the neighboring boat when touching the prop on his boat (which provided the path back to the source).

56. July 2, 2006 Lake L'Homme Dieu, Douglas County, MN. Three men were nearing an aluminum dock in an outboard boat (aluminum hull?) when the prop caught on an extension cord laid under water (powered a boat lift), and were severely shocked as they entered the water. Possibly two of the three men entered the water to rescue the third man who had fallen face down into the water, half out of boat, and was not moving – exact sequence not known. A bystander unplugged the cord. The third man spent several days in the hospital. No investigation planned.
57. July 2005 Brooklyn, NY. A diver went into the water behind a boat in this small, private marina. He surfaced seconds later complaining about tingling and pain in his arm. A probe in the water measured 40vac to ground behind the boat. Cause was determined to be a neutral-ground short on a recently installed water heater (although there was most likely a bad ground too at that pedestal to cause this). He was wearing a short, spring wet suit.
58. June 24, 2005 Lake Ontario, NY. A man was badly shocked and paralyzed on a ladder going into the lake from his boat. The power was turned off and he regained feeling and control of lower body. He was connected to the dock via an extension cord. The reverse polarity on the boat lit up but since everything was working he ignored it. Later found that there was no green ground wire in the dock's electrical wiring. He likely had a grounded neutral on the boat which allowed the boat's hull to be energized to line voltage.
59. July 2004 Sahauro Lake, AZ, a man-made, freshwater lake near Phoenix. A man was diving to perform maintenance on a dock structure. He left the water after feeling a tingling sensation in the water near a pontoon houseboat. The shore cable was disconnected from the boat and the diver resumed his work without further incident. The cause may have been an improperly wired battery charger on the boat.
60. July 2004 Sacramento River, CA. Man entering water around several boats (being supplied by genset power from one of the boats) receives shock in water. Two other men jump in to rescue man. One of the 2 rescuers became imperiled. Generator secured immediately. Incorrect wiring on one boat caused a ground fault which introduced current into the water between boats.
61. May 31, 2004 Lake Barkley, Grand Rivers, KY. After receiving permission from marina two adult women went swimming near their rented houseboat. As they started back to the boat from the swim slide entry point both felt a strong electric shock sensation, and had the presence of mind to *swim away* from the boat! A relative entered the water and felt the same thing – which disappeared when the boat was disconnected from shore power. Close call was brushed off by staff so no action was taken to locate source of fault current. A fatality waiting to happen!
62. August 2003 Green River, Campbellsville, KY. Marina manager using Hioki clamp-on ammeter checking shore cords for leakage and discovered one houseboat with 4 amps on one of two shore cords. Hull potential to dock ground 8 VAC and owner commented that one of his children reported a tingle in the water!! Boat had just been reassembled after being trucked from Texas and problems were being experienced with 120 VAC deck light. Deck lights were rewired and neutral / ground fault in inverter was cleared – leakage current no longer exists.
63. July 2002 Allatoona Lake, GA. Three swimmers in great distress near houseboat, by stander pulls shore cord, all saved, one spent several days in hospital, fresh water, and fault on boat.
64. Fall 2002 Lake Murray, SC. Swimmer reports strong tingle, hi-level fault currents in dock frame, fresh water.

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|-----|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 65. | Date Unknown            | Man jumps into water to rescue dog, feels high level tingle, cause unknown, fresh water.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 66. | 2002-2003               | Florida, interviews with divers – many reports of high level tingle while cleaning bottoms, all salt water, and no fatalities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 67. | Sept 2000               | Niagara River, Grand island, NY – On the dock behind his home the owner watched his dog sink near a steel piling while retrieving a ball. He jumped into the water to rescue the dog and found himself sitting on the bottom in 5’ of water completely paralyzed. In a few seconds he began getting tunnel vision and assumed he was going to die. Within the next few seconds a slight current moved him about 4’ away from the steel pile. He was able to get his head above water and move another 8’ to a ladder. A romex cable, which powered a light on top of the piling, had chaffed and caused the energized conductor to contact the pile. The dog was lost. |
| 68. | Date & Location Unknown | Swimmer feels a tingle as his hand enters the A/C discharge stream. Cause not determined, salt water.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 69. | July 3, 1998            | Lake Chelan, Chelan, WA. 21 year old exiting water – shocked on swim ladder – 48 hours in the hospital – rescuers shocked.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 70. | August 1995             | Lake Cumberland, KY, Jamestown Resort and Marina. Seven children swimming behind houseboat received electrical shocks (no fatalities). Lights went out on boat and children immediately started screaming. Cause was loss of neutral, a neutral-ground connection on the air conditioning system and a poor grounding connection on the shore cord. The grounding connection deteriorated when cooking loads were energized causing a loss of return path to the source (reason lights went out).                                                                                                                                                                      |
| 71. | 1982                    | Egg Harbor, WI. A 23 year old woman was swimming from a dock, when she grabbed onto a dock cleat to pull herself out of the water. She screamed “I can’t let go!”. Her hand went completely numb. A passerby kicked her hand off the cleat causing her to fall back into the water. There were no reported injuries. An open neutral was found afterwards which likely contributed to the mishap.                                                                                                                                                                                                                                                                      |
| 72. | July 1981               | Brackish water on the Connecticut River in Essex, CT. Diver checking zincs felt strong “electric pulses” as he approached the boat so he backed away. After securing power to the boat, the electric pulses were gone (exact fault unknown)                                                                                                                                                                                                                                                                                                                                                                                                                            |

### CODE VIOLATIONS

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|----|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | January 1994 | Oklahoma State Department of Health (OSDH) inspected eleven commercial docks and five private docks, and an earlier (1989) inspection of 116 commercial docks, found 96% not in NEC compliance; most common fault was <b>open</b> ground.                                                                                                                                                                           |
| 2. | Aug 8, 2004  | Follow-up to #9 in the Electric Shock Drowning Section above:                                                                                                                                                                                                                                                                                                                                                       |
|    | Follow-up    | Lake Travis, Austin, TX. Because of this accident the manager of a neighboring marina now shuts down power to the docks whenever an employee enters the water to do any kind of service. In Nov., 2005, an employee who was in the water, to move the feeder cables that run near the pier access ramp, discovered badly damaged insulation. A fatality was likely prevented because the power had been turned off. |