

Brace for Impact: Ditching Demystified

by Matt McDaniel

Before you jump to conclusions, this article is not what you might think it is. It is not a “guide to ditching.” For that, go to the AIM, Chapter 6, Section 6-3, which is an excellent overview on that topic. Nor is this a story about the recent US Air ditching into the Hudson River. However, that accident has been all over the news in the weeks leading up to my writing of this article. Therefore, it serves as a perfect backdrop to this discussion on ditching and how we might better think about that topic, in both a historical and operational sense.

Just before 3:30 p.m. on January 15, 2009, US Air flight number 1549 departed New York’s LaGuardia Airport (LGA), bound for Charlotte, N.C. Less than five minutes later, the Airbus A320 was floating in the frigid waters of the Hudson River, only a few miles from its departure point.



US Air 1549 floats in the Hudson River while passengers begin to egress onto the wing and forward slides (which double as flotation devices). Rescue boats were on the scene almost immediately.

I am not unique in that the story immediately drew me in. Yet, I did have a unique perspective on it, having flown that exact same departure profile out of LGA scores of times. I could picture 1549’s position at the time that it suffered a double engine failure after colliding with a flock of geese. I could envision the crew’s immediate thoughts of returning to LGA or heading towards Teterboro, N.J. (TEB). Fortunately, they knew that neither airport location offered them a high probability of a successful dead-stick landing in a 160,000-pound airplane. In an incredible display of split-second decision making and all around airmanship, the pilots picked the Hudson as the only reasonable landing site within the sprawling metropolis below them.

The ditching was as near-perfect as any ever witnessed and the safe evacuation of 155 passenger and crew was pulled off with incredible speed, thanks to the plethora of large boats in the immediate vicinity. To call the flight crew "heroes" is a colossal understatement in the minds of us that have unique insight into the situation they were presented with.

A Closer Look

So, what was it that made US Air 1549 (a totally successful ditching of a commercial airliner) such a rare event? What is the secret formula to ditching and why does it all too often end in tragedy? Of course, there is no one answer and the special recipe is only as good as the ingredients it contains, and the chef who's managing the kitchen that day. Like so much in aviation, the ditching scenario is one with an infinite number of variables.

There is a significant divide between the historical information available surrounding commercial airliner ditchings and those in general aviation aircraft. Obviously, airline accidents typically garner a great deal of press coverage. Yet the vast majority of general aviation (GA) accidents rarely generate any significant press at all. So, statistical comparisons between these segments of aviation are difficult, especially when limiting them to something as relatively rare as ditching. But, upon casual inspection of the one sort of "coverage" that is available (aviation accident reports), it would seem ditching is one of the few areas where GA's statistics are actually better than the airlines, in spite of the fact that the airlines actually provide some level of ditching training to their crews (whereas there are no training requirements for ditching in GA). Undoubtedly, this is due (at least in part) to the lower landing speeds and lighter weights of smaller aircraft, as well as the far fewer number of people involved per occurrence. ▶



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Another thought to consider is that even airline pilots don't practice ditchings in their flight simulators. But, airline crews do train heavily on evacuation procedures and general ditching principals and procedures in their ground training curriculums. Maybe a quick review of some infamous ditching accidents is in order to further bring this topic into perspective. This short list includes only "controlled ditchings," meaning, for this discussion, we are excluding any ditchings that were really just water crashes resulting from spiral dives, hijackings, or other losses of control.

- January 2009: US Air 1549 (Airbus 320), Hudson River after bird-strike induced dual flameout. 155 aboard, minor injuries only; 100% survival rate.
- August 2005: Tuniter 1153 (ATR-72), ditched off Sicilian coast (out of fuel). 39 aboard, 20 survived with serious injuries and burns; 59% survival rate.
- March 2002: A vintage Boeing 307 (recently restored), ditched near shore in Elliott Bay, Seattle, Wash. (out of fuel). Four on board, no injuries; 100% survival rate.
- January 2002: Garuda Indonesia 421 (B-737), ditched into Begawan Solo River, Java Island, after heavy rain and hail induced dual flameout. 60 aboard, one flight attendant killed; 98% survival rate.
- May 1970: ALM 908 (DC-9), ditched into deep ocean waters off St. Maarten (out of fuel after multiple missed approaches). 63 aboard, 40 survivors (37 with significant injuries); 63% survival rate.

What can be seen in the above list is the premise that ditching equals certain death is far from accurate. In fact, one study, which reviewed 179 ditching accidents from 1985 to 1996, concluded that the overall GA ditching survival rate was 88%. Of the 179 ditchings reviewed, only 22 (12%) resulted in fatalities. While looking over a couple dozen airline ditching accident reports online, I found a survival rate slightly lower than that for the big boys (an, admittedly, very unscientific conclusion). While these are encouraging tidbits, they should certainly be taken with a grain of salt. It is pretty obvious just from the short list above, that timing, location, and the proximity of rescuers can make a significant difference in survival rates. To amplify that point, note that many ditchings result in few injuries and the successful egress of all occupants from the aircraft. Yet, statistically, those same ditchings often fall into the fatal-category because occupants died (outside the aircraft) while waiting for rescue.

Also note that of the five examples above, it's the two which occurred in open seas (a.k.a.: "Blue Water Ditchings") that were most deadly. There have been successful open seas ditchings, of course, but they generally were situations where the ditching occurred very near a rescue vessel or helicopter. Let's quickly



A lifeboat from the USCG Cutter Pontchartrain rushes towards Pan Am Clipper "Sovereign of the Skies." Twenty minutes after impact and one minute prior to the aircraft disappearing below the Pacific's surface, all passengers and crew were safely aboard Pontchartrain.

compare two ditchings which occurred in the same year in the same type aircraft (Boeing 377 Stratocruisers) to drive these points home.

- October 1956: Pan Am 943, ditched into the Pacific Ocean after losing two engines en route. With only two engines remaining, the lower cruise speed and additional drag would not allow them to reach San Francisco or return to Hawaii. So, they flew to the position of a Coast Guard vessel, circled it until daybreak, and ditched near it. In spite of the failure of one of its three life rafts, all 31 aboard survived with only a few minor injuries reported; 100% survival rate.
- April 1956: Northwest Orient 2, ditched into Puget Sound just minutes after departing Seattle. The Captain decided to ditch due to a control problem he felt would soon worsen to the point of control loss. A distress call by the crew prior to impact got a rescue sea-plane and vessel to them quickly, but not quickly enough. After a textbook ditching and the apparent successful evacuation of all 38 aboard, four passengers and one flight attendant were never recovered. In spite of rescue being completed within 30 minutes, those five victims are thought to have succumbed to hypothermia and drowned; 87% survival rate.

Increasing Your Chance of Survival

Again we see that, when it comes to ditching, it is all a manner of mitigating circumstances that can drastically affect the outcome of the event. Nonetheless, there are things to consider to effectively reduce the risks and increase your chances of surviving not just the ditching itself, but also the wait for help to arrive. All the obvious things are discussed in the AIM and in a wide variety of articles, books, and websites dedicated to teaching proper ditching techniques and water survival skills; I won't belabor those points. Instead, I will throw out a few lesser mentioned items for you to mull over.

- **Waterlogged:** Most sources encourage pilots to land with the gear retracted and the minimum flaps necessary to keep the underside of the airplane as smooth as possible. It seems like common sense that doing so would lessen the possibility of something “grabbing” the water and flipping the airplane. But, also consider that with the flaps and gear retracted, you are also keeping the belly of the airplane better “sealed” and at least slowing the process of water finding ways inside, potentially extending float and escape times.
- **Birds of a Feather:** Sure the gear and/or flaps could possibly cause the plane to flip. But, so too, could those big props spinning well in front of the C.G. Consider feathering them just prior to impact. PT6 engines allow props to feather quickly and doing so should allow them to slice through the water with minimal resistance, increasing your odds of remaining upright for quick egress.
- **Under Pressure:** It’s hard enough to open an outward/downward swinging airstair door into a water environment; don’t make it impossible by forgetting to depressurize the airplane prior to touchdown. Squawt switches are fairly ineffective in gear-up situations! Ideally, it’s going to be best to escape out the emergency hatches of a King Air, rather than the main door anyway. This avoids the time-consuming door versus water fight and should delay water ingress, as well.
- **Swiss Army Knives Won’t Cut It:** Be properly equipped to survive. One statistic I ran across said that fully 50% of ditching fatalities were “potential survivors” because they survived the impact and escaped the plane, only to find they could not survive the wait for rescue. Is your flotation and survival gear safe, legal, current, and inspected/updated regularly? Have you or your company embraced the latest technologies for survival, such as Personal Locator Beacons (PLBs), 406MHz ELTs, and advanced signaling devices? All should be considered cheap insurance policies.



Personal Locator Beacons are becoming increasingly popular for pilots. This particular unit, the MicroFix™ by ACR Electronics, transmits on 406 MHz via a satellite system with the sender's unique registered, digitally coded distress signal. Emergency officials monitoring the system not only will be able to tell who is sending the signal, but precisely where the signal is coming from as a result of the built-in GPS engine.

I'll conclude by reiterating that, statistically, ditching is not the Grim Reaper event that persistent aviation myths would have you believe it is. Even a casual search of the available reports on ditchings will reveal that the vast majority are survivable, regardless of airplane type or location. Yet, there are certainly some scenarios that are far preferable to others. The real question to me is: When you are faced with the situation, will you focus on the myths and horror stories, or will you focus on the task at hand and strive to survive? I hope you (and I) will never have to know for sure.

About The Author: Matthew McDaniel is a Master & Gold Seal CFII, ATP, MEI, AGI, and IGI. In 19 years of flying, he has logged over 10,000 hours total, over 4,000 hours of instruction-given and over 2,500 hours in King Airs & the BE-1900D. As owner of Progressive Aviation Services, LLC (www.progaviation.com), he has specialized in Technically Advanced Aircraft instruction and services since 2001. Currently, he's teaching clients nationwide, via personal flight training and seminars, providing a wide variety of contract pilot services, and flying a Lear 60 regularly. He's also an airline and corporate pilot, having flown a wide variety of airliners & corporate jets and holds five turbine aircraft type-ratings. Matt can be reached at: matt@progaviation.com or (414) 339-4990. **KA**

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