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Home Sweet Home ... and Beyond

The Importance of Understanding Your Aviation Environment

When it comes to landscape variety, the United States is all over the map, literally. I often think about how lucky we are to live in a country that's a near perfect microcosm of the planet's best geographic features and natural wonders. Everything from majestic snow-capped mountain ranges and balmy beaches, to bone-dry deserts and wildlife-rich wetlands, it's all here for us to see and enjoy. And thanks to the robust general aviation infrastructure we have here in the U.S., many of these areas are just a cross-country flight plan away.

But while we may revel in the variety of landscapes our nation has to offer, that luxury does come at somewhat of an "extreme" price. Pilots might be surprised to know that the United States is home to some of the hottest (*Death Valley, Calif. 134 °F*), coldest (*Prospect Creek, Alaska, -80 °F*), windiest (*Mt. Washington, N.H., 231 mph*), wettest (*Kauai, Hawaii, 350 days of rain per year*), snowiest (*Mt. Baker, Wash., 95 feet in one season*), and sunniest (*Yuma, Ariz., 4,000-plus hours of annual sunshine*) places on Earth. And these aren't just national records — we're talking global!

These types of extremes implore us to be more mindful of the environmental challenges often associated with exploring new locations. You may know your own backyard environment like the "back of your hand," but beyond that, there are likely to be some unknowns you'd be well-advised to learn more about, or steer clear of altogether. This also may hit home for many of the thousands of pilots that set off from all four corners of our country to get to aviation's "Mecca," or AirVenture, in Oshkosh, Wisconsin, in late July.

Westward Ho!

Although I've never (yet) had the chance to fly in to AirVenture, I can recall one of the first opportunities I had to travel beyond my aviation "comfort zone" during my private pilot training. I was to fly a solo cross-country to Fort Ticonderoga, New York (K4B6), an airport located in the heart of the Adirondacks and nestled between two of New York's most scenic lakes, Lake George and Lake Champlain. With most of my flight training taking place in the congested metropolitan New York City area, it was initially a shock to see so much open green space below me. Long Island's vast — and flat — network of beaches, roads, and ubiquitous over-sized mall parking lots provided peace of mind that an emergency landing area was never far away. While flying into this vastly different frontier, complete with mountains and endless wilderness, I realized I had to be on my toes in case I had to set my Cessna 172 down sooner than planned. A little extra pre-flight planning proved helpful in ensuring an uneventful flight.

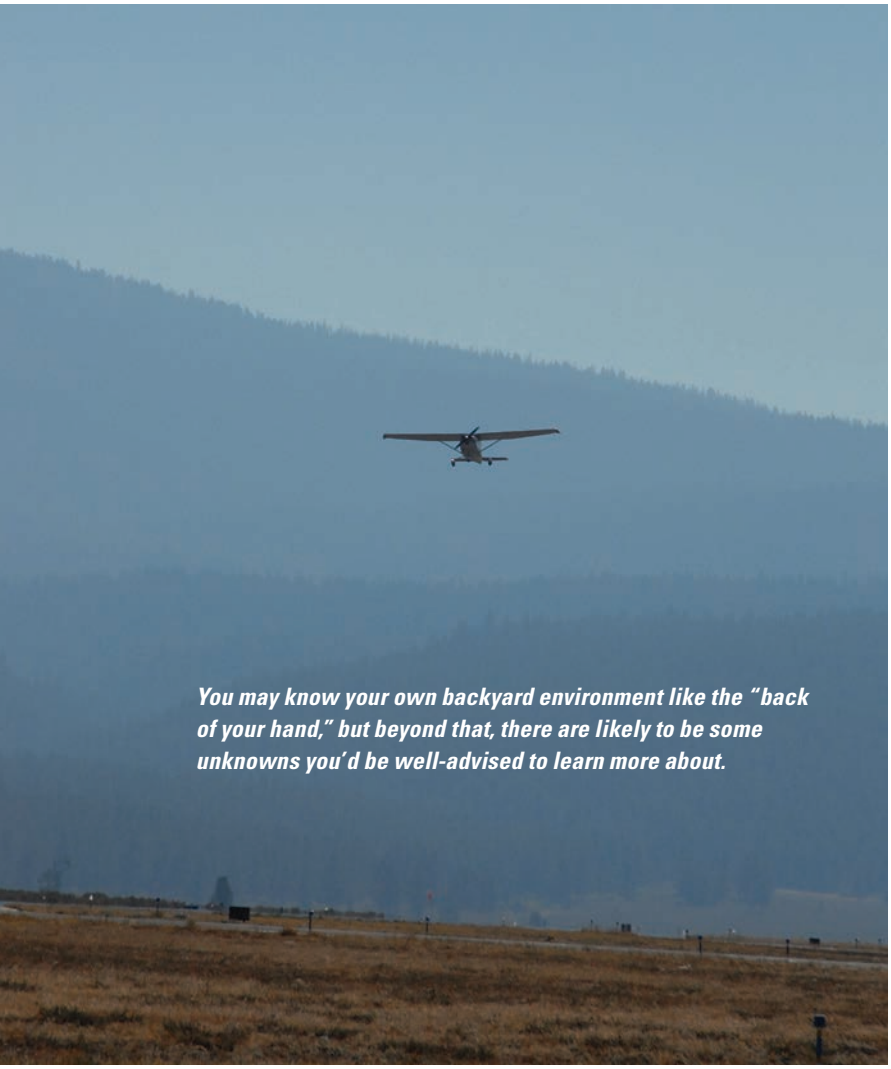

Photo by H Dean Chamberlain

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Although I've made several similarly successful flights, I'd be the first to admit that my aviation environmental expertise is fairly limited to the northeast quadrant of the United States. Planning a flight outside this area would require a greater level of scrutiny on my part to better understand the lay of the land. For example, before a flight into unfamiliar territory you might ask yourself:

- Is the area prone to any particular weather phenomena outside your normal experience?
- Are you familiar with all of that area's topographical features and how they could affect your flight?
- Have you scoured the sectional(s) and taken note of all the minimum safe altitudes as well as remote areas? How about airspace types? Do you have a plan B at the ready? (A plan C and D wouldn't hurt either.)
- Do you have survival gear/supplies appropriate for the area you are flying through or to?
- And, have you computed a risk factor that *honestly* reflects your personal minimum parameters?

Let's have a look at a few flight scenarios in different areas of the country where we can address these questions and explore what mitigation strategies might be appropriate.

April Showers Bring May Flowers (and Tornados?)

Spring storms bring welcome relief to our plants and flowers, but they can also harbor one of nature's most destructive forces — tornados. As you might have guessed given my "extreme" theme, the United States has more tornados than any other country in

the world (about 1,200 per year). That's more than ten times the amount second place Canada receives! Our nation's unique geography is chiefly to blame for that. The lack of a major east-west mountain range means that there is nothing to impede warm, moist tropical air from colliding with the cool, dry arctic air over the mid-west states. Thanks to this phenomenon, the swath of land from Texas to the Dakotas has garnered the dubious nickname of "Tornado Alley."

Despite the deceivingly cool temperatures of early spring, a pilot unfamiliar with this area would be well-advised to keep watch for tornados as well as their more common predecessor, thunderstorms. This is especially true for pilots whose experience with thunderstorms might be limited to the summer-afternoon-convection variety. It goes without saying that the best mitigation strategy here is to avoid tornados and thunderstorms at all costs.

A good way to avoid unwanted weather encounters is to familiarize yourself with the big picture of weather in a particular area weeks, or even months, before your trip. A regular review of frontal activity and weather reports (e.g., METARs, TAFs) will give you time to study the differences, as well as spot any weather trends or patterns, from the safety of your home. For example, a first-time flyer to the southeast in the summer may notice a recurring pattern of afternoon rain showers and thunderstorm activity. In this case, simply adjusting your arrival time to early morning or evening might help you bypass any delays or diversions.

Where is Everybody?

As I mentioned earlier, one of the options you may face on a long cross-country is flying over remote areas or large bodies of water (and, by the way, Lake Superior just happens to be the largest fresh-water lake in the world). While it might be more convenient to cut across these areas to save time and fuel, there may be better (and safer) options.

A good example would be a flight that involves transiting the Everglades in Florida. "A shortcut over the Everglades may not be the best option," comments Jeffrey Smith, a manager in the FAA's General Aviation and Commercial Division and former flight instructor in the Fort Lauderdale area. "Should something happen to you, there's little to no help available and emergency services may have a really hard time getting to your location." That's if the alligators don't get to you first, of course.

Whether it's transiting harsh or dangerous terrain, or large bodies of water, try to extend or alter your trip legs to stay over land or at least within proximity of resources. "Daytime can be your friend in this type of situation," says Smith, adding that nighttime flight over dark terrain with no visual markers will only increase your risk. You'll also want to know what kind of radar coverage you'll have in these areas and if there are any gaps you can avoid.

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If your flight plan does call for transiting a large body of water, be sure you have the proper safety equipment, to include life preservers and a signaling device, onboard. (See 14 CFR section 91.509 for more on overwater equipment requirements.) On the flip side, when transiting large expanses of hot and dry desert area, be sure you have plenty of food and especially water on hand in addition to your normal emergency kit. It could be a long wait before a rescue vehicle arrives.

Clear on Class

Depending on where home is, the closest thing to ATC interaction for some pilots might be making position broadcasts on your airport's UNICOM frequency. If you're a Class E or G cruiser heading out for a long trip, you'll want to pay special attention to your routing and plan any airspace encounters you may have that require radio communication and/or permission to enter. Also keep in mind the differences with cloud clearance limits, VFR visibility minimums, and transponder requirements. In a few high elevation areas of the country, Class G airspace goes all the way up to 14,500 feet mean sea level. However, once you're above 10,000 feet, visibility and cloud clearance requirements are the same as Class E airspace.

Finally, review any special use airspace areas you might encounter along the way. Mid-flight is not the time to figure out how to transit something like the Washington, D.C. Special Flight Rules Area. Make the Aeronautical Information Manual (AIM) your go-to resource for brushing up on airspace intricacies.

Hot, High, and Heavy

If you're a regular reader of this magazine, you may have noticed an emphasis on articles dealing with density altitude in the last few issues, and for good reason. It's an insidious danger that frequently catches pilots off guard, especially those unfamiliar to flying at higher altitudes. For example, at Colorado's Leadville Airport (the nation's highest at 9,927

feet), on a 23°F standard day, a normally-aspirated engine can develop only 70-percent of its rated horsepower. That's like taking off at a cruise power setting. At 63°F at the same airport, density altitude would be about 12,500 feet, higher than many light single-engine aircraft's service ceiling!

"When it comes to environmental factors that can affect flying in the western and southwestern United States, density altitude is at the top of the list, hands down," says Mark Spencer, Public Lands Director and Arizona State Liaison of the Recreational Aviation Foundation (RAF).

A few tips Spencer recommends you keep in mind include keeping your aircraft at least 10-percent below maximum gross weight, flying when temperatures are cooler, and leaning your engine for peak take-off performance (consult POH). At airports along the front range of the Rockies from New Mexico to Wyoming, leaning for takeoff is in fact the only way to get the expected performance from a normally aspirated engine.

Remember that high density altitude is not just limited to the western U.S. Given the right conditions, its performance-robbing effects can be found at lower altitude airports in any area of the country. For more about the dangers of density altitude, see the article "Hot, High, and Heavy" in the March/April 2015 issue of *FAA Safety Briefing*.

In addition to density altitude, the western half of the United States is home to some landscape features that also deserve careful attention. In a span of just 800 miles, we go from the highest airport at nearly 10,000 feet to the lowest at -210 feet in Furnace Creek, Calif. Around and in-between are some of the world's most beautiful mountains, valleys, canyons, and deserts. While awe-inspiring to view, each of these features has its own unique set of dangers to pilots, from treacherous mountain waves to being lulled into a box canyon. If you're not used to flying in these areas, you'll need to invest in acquiring ground school time for sure. The FAA produces several good educational products that can get you started.

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There's also some welcome news that may help provide hundreds more landing options in some of these remote areas. Memoranda of Understanding have recently been signed by both the U.S. Forest Service and the Bureau of Land Management to help identify, and potentially open up several backcountry strips that have been closed for decades. A recent inventory revealed over 100 airstrips that exist on USFS lands alone. The RAF is currently working with land managers to chart the more heavily used airstrips and open previously closed airstrips where warranted. Pilots can also find information on airstrip locations by going to www.backcountrypilot.org or www.shortfield.com.

"Having these airstrips open provides extra planning and safety options for pilots," said Spencer, whose championing efforts helped implement the MOUs. Spencer personally lent a hand in helping to reopen Grapevine Airstrip in Arizona's Tonto National Forest; a gleaming example of a once shuttered airstrip brought back to life.

Make It Personal

An article on facing aviation challenges outside your home environment wouldn't be complete without mention of personal minimums. Every pilot should develop, abide by, and regularly reassess this set of flying criteria that helps determine whether, and under what conditions, to operate. Personal minimums act as a "safety buffer" between the demands of the situation and the extent of your skills, and are an essential part of any flight. For more on this topic, as well as a personal worksheet you can use to inventory your own skills and comfort levels with different scenarios, see the March/April 2015 issue of *FAA Safety Briefing*.

It would be pretty hard to cover every type of environmental challenge you could encounter in the United States, but hopefully this article will get you thinking about some of the extreme as well as garden-variety pitfalls you might encounter on a flight outside your home 'drome. With the right training, tools, and preparation, our beautiful nation is yours to explore.

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FAA Tips on Mountain Flying
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