



Wave action normally is a reliable guide to the wind velocity at the surface of the water. The Beaufort Scale, a guide to wind action on water, would indicate that the wind velocity was between one and three m.p.h. when this picture was taken over Long Island Sound.

# OVERWATER FLYING

by HANS GROENHOFF • AOPA 5503

*Leaving land behind on short hops shouldn't be feared if your plane is functioning properly and you have made adequate preparations in advance. Veteran pilots give their views on what should be included in this planning*

• EDITOR'S NOTE: This is the third in a series of articles designed to help pilots in their flying over land and water. The first in the series told you about the special conditions you might encounter in flying over desert areas; it appeared in the May, 1960, issue of The PILOT. Navigating by watching the ground alone was the subject of the second article in the series, "Terrain Flying," which appeared in the June issue. This article discusses special conditions you may encounter, and the preparation you should make, for short overwater flights. It should not be interpreted as a blueprint for transoceanic flights, which is an entirely different field.

Our country is nearly surrounded by water. It is ringed by more than 12,000 miles of coastline, it is indented by large gaps and bays and it embraces some of the greatest lakes in the world.

The more you fly for business or pleasure, the more often you will come to the end of land, where the track projects out over water. On your course you may be cutting a slice through one of the Great Lakes, you may be jumping a broad inlet or you may be reaching for one of the many islands that beckon so near to our coasts. It is the type of flying that involves only short open water crossings. It is qualified by its limited nature and must be distinguished from transoceanic flying which is in a category of its own and calls for different considerations.

Ask the man on the airport about flying over water, and he will have one of two ready made answers. One will throw up his hands and proclaim, "Not for me, mister, unless I'm loaded with equipment and have two or four fans going." The next one will just as readily assure you that "There's nothing to it at all. Engines never skip a beat, and it's just like going from St. Louis to Kansas City." Both are wrong and presumptuous, and the true answer lies somewhere in between. However, an appraisal of all the aspects involved in limited overwater flying will show that the answer comes close to the second statement.

The pilot who is unconcerned when he travels from coast to coast, over square miles of boulder strewn areas, over vast stretches of timber pickets and over barriers of jagged mountains, should have no cause for alarm when his course takes him out over water. The truth is that limited overwater flying in a light aircraft, single-engine or twin, is no more hazardous than routine cross-country, if equipment

and know-how are standard, if certain precautions are observed, and if the rules are strictly followed.

In the United States there is no other area where as many overseas hops are logged as in South Florida. The airports of Miami, Fort Lauderdale and West Palm Beach are the jumping-off points each year for thousands of lightplanes bound for the Bahamas, the Caribbean Islands, and to Central and South America. The Bahamas start about 60 miles out and range east and southeast in a continuous sweep to Haiti, where the West Indies form a closely linked chain to the South American mainland. Cuba lies only 90 miles south of Key West, and when its skies open up again, it will once more be the bridge to Jamaica, the Yucatan, Mexico and all the Central American countries.

While no accurate statistics are available on overwater movements of general aircraft, U. S. Customs officials at Broward International Airport in Fort Lauderdale estimate that the average there has been about 225 to 230 per month. Add West Palm Beach and Miami, and the total should be about 400 per month, or between 4,000 and 5,000 per year for the entire area. Although it is only an estimate, this is indeed a respectable figure.

The U.S. Coast Guard headquarters for the district reports that they recorded only 13 calls for assistance from general aircraft over a 12-month period. More significant even is the fact that six of these were false alarms; all six were either lost or unreported and were finally located. Of the remaining seven, three made safe intermediate landings, one crashed on an airport takeoff and only three were lost at sea. Of the latter group, two went down in the evening and darkness interfered with the search. The remaining one left no clues or explanation.

We have talked to a good number of pilots who have logged many hours over water. They profess no fears and few qualms, and their key answer is usually: "Don't get your feet wet." In other words, take all the precautions and use all your know-how to forestall ditching in deep water. Much more than on land, emergency landings on water are unpredictable and fraught with perils, and they should be distrusted. Even if the ditching is successful, the odds of survival are not always the best. However, with proper care and precaution the emergency should not arise.

"Red" Gamber (AOPA 79931) of Red Aircraft Service at Fort Laud-

THE AOPA PILOT





*Photos by the author*

Flying in pairs always is a safe practice when you leave land behind. These two Piper Apaches are on a flight off the coast of southern Florida.



Clouds tell the overwater flyer much about conditions on the ground. Quite often they indicate an island, particularly in tropical and semi-tropical climates, but if you are on a VFR overwater flight, you shouldn't attempt to "fly on top" of clouds such as these. Go around them, or go back, if your course is blocked.

Survival equipment is a must for planes on overwater flights. Brilliantly painted life rafts, such as this one, help rescuers find you, if you have to ditch while flying offshore.







When the flyer from the United States approaches Bahama Islands, Hopetown on Great Abaco quite often is one of the landmarks he seeks. Special water conditions sometimes help pilots find the Bahamas (see accompanying article).



Good visibility is vital in overwater flying. Wave action gives you the direction of the wind and cloud formations tell you what to expect ahead. When low scud rolls across your path, or rain obliterates the horizon, it is time to head back to land.

erdale Airport flies regularly to the islands and has seen literally thousands of small planes off on overseas ventures. He comments, "Wherever you fly, the engine of a well maintained airplane just won't quit so dead that it can't be nursed along for a stretch, unless it dies from fuel starvation."

Bob Iba, who runs Aircraft Ferry Company in Fort Lauderdale, which has flown more light aircraft overseas than anyone else, and who has made numerous Atlantic crossings, places uppermost emphasis on fuel supply and navigation. "The record shows," says Bob Iba, "that almost in every instance where airplanes had to be ditched, they ran out of fuel or they became lost and ran out of fuel. Our experience proves that there are two all-important safeguards, a good, well compensated compass and barrels of extra fuel."

Red Gamber adds that he is appalled at the number of pilots he has observed going out to sea with no more care than on overland cross-country. One of the precautions of overwater flying is careful plotting. [Planning charts, supplemented by WAC's, are available from AOPA's chart department, as are radio facilities charts.—Ed.]

The intrinsic problem of navigating over water stems from a deficiency of the sea: it has no terrain, no distinctive features; water is barren and trackless; it provides no footholds or check points. Horizons are faint, often extinct. Small masses of land tend to blend with the sea and look much like cloud shadows. To go from land to land over water,

navigation must be exacting. There can be no margin for faults and failures. Over distance, a slip of a few degrees on the compass can grow to a disastrous error. Make sure that your radio equipment is efficient and accurate and that you have all the necessary radio facilities charts. Plot your course on the chart and carefully study the outline of your landfall. By checking the coast at your destination, rivers and inlets, settlements, landmarks and the shapes of small islands, you will know where to turn and avoid straying over more water than you were prepared to negotiate.

On all overwater flights, even on short hops across lakes, bays and inlets, you must know how to tell winds and weather and recognize sudden changes. Above all, protect flanks and back, have an escape planned to an alternate and keep the rear secure for a 180.

Small ragged patches of gray seen drifting low over shorelines or water are danger signs. They may close and turn into fog or low ceilings, and obscure both the landfall and the horizon. Areas of rain should be shunned for the same reason. When low scud rolls across your flight path, or when precipitation blots out the horizon, it is high time to do a 180.

Good visibility is vital in overwater flying. Make certain you can see down and ahead. By looking down, you can check wind direction and velocity by streaks and white caps on the surface. With good visibility ahead you can pick off weather barriers, spot land and check your heading against the contour of the shoreline. Don't fly on top, when there are only scattered holes. You may overfly land and may be startled to find that the openings reveal nothing but water. Don't fly over the sea at night.

Low ceilings, scud and fog are rare over southern shores. But when they occur at the point of departure, accept them as warnings to stay on the ground. Even if your destination is reported open, as it often will be, such conditions may strip you of one of your best safety devices, the 180° turn.

High buildups, thunderstorms and heavy showers are the year-round weather traps over southern oceans. They are signposts of treacherous turbulence and should be skirted. While they billow up and spread out rapidly under the rays of the tropical sun, they can as a rule be easily dodged. The same clouds can be a great aid in overseas navigation. They form quite regularly over is-

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## Overwater Flying

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lands, and where they loom in massive humps over the horizon, they often are skymarkers indicating land.

Bob Iba places much emphasis on the ability of his pilots to read wind clues from signs on the water.

"I cannot recommend too strongly," he said, "that the flyer who goes out to sea should be acquainted with the Beaufort Scale describing wind velocities over water. If turbulence is encountered in clear air and curving windstreaks are seen on the water, or a line that looks like a rip tide, it is almost certain that there is going to be a severe wind shift and that the wind factors will have to be recomputed. If you are in a small airplane and encounter velocities in excess of 25 knots, you will be exposing yourself to the risk of not getting where you are going. A windshift at this velocity is dangerous, if it isn't readily noticed and countered by a heading correction."

The Beaufort Scale reads as follows:

Wind Velocity (in knots)	Description of the Sea
1 or less	Sea flat, like a mirror.
1-3	Ripples with the appearance of scales, but without crests.
4-6	Small short waves. Pronounced tops have a glassy appearance, but do not break.
7-10	Waves are bigger. Crests begin to show and foam has glassy appearance. Some scattered whitecaps.
11-16	Waves growing longer. Fairly frequent whitecaps.
17-21	Moderately big waves, taking a more pronounced long shape. Many whitecaps. Chance of some spray.
22-27	Large waves. White foam crests everywhere and more extensive. Some spray.
28-33	Sea wallows heavily and white foam is streaking in wind direction.
34-40	High waves of increased length. Crests break into spindrift. Foam blown in well marked streaks in wind direction.
41-47	High waves. Dense streaks of foam. Sea is rolling. At low altitude spray may affect visibility.
48-55	Very high waves with overrunning crests. Dense foam in broad streaks. On the whole, the surface takes on a white appearance. Rolling of sea is shocklike. Visibility is affected.

From this description, the principal warning signals and clues to high winds are pronounced whitecaps indicating approximately 20 knots, and streaks of spray and foam at about 30 knots.

The same as the marks on the water tell about winds, the coloring of the sea provides clues as to its depth and the nearness of land. Deep water, like the Gulf Stream, has a metallic, opaque appearance and the color is dark green, blue or purple. Where it is shallow over banks, shoals and reefs, and where it approaches a shoreline, the water becomes translucent and the hues change quite abruptly to light greens, blues and yellows. The breaks, where



the color changes, can be used as check points for shoals indicated on charts, and can usually be taken as signs that land is near, even if it cannot be seen.

Red Gamber has this to say on the subject: "If I were on a flight to the Bahamas and had run way past my ETA, I'd turn into a wide circle and start looking for light-colored water, and by tracking the brighter colors, I'm sure I could find a recognizable island."

The magnitude of the risk involved in flying over water is determined entirely by the distance. On a short haul, negotiated with ordinary care, the hazard is slight. Extended flights over water naturally entail greater hazards. Yet, Aircraft Ferry Company, which has made more than 600 ferry flights overseas within the past six years, has a record of only two ditchings. In both the pilots survived. Only one was an up-to-date airplane. The other one was a spent warhorse, with Iba himself as the pilot. More remarkable even is the fact that more than 90% of the flights were completed in single-engine aircraft. The record of Aircraft Ferry Company proves how small the risk is with proper safeguards.

Although the rules and precautions for short overwater hops are elementary and should be known to all pilots, they are too often ignored or forgotten. They cannot be repeated too often. These are the 10 commandments of overwater flying:

1. Be sure that your airplane and its navigational equipment are in first rate condition, that compass deviations are up-to-date.

2. Plot course carefully in advance. Note radio facilities and study the contour of the land within a broad radius of your destination.

3. Check winds and weather. Obtain forecasts at your point of departure as well as your destination. Do not fly if bad weather is threatening at either location. If you can't get there, you must be able to get back. Do not go late in the day and do not fly overseas at night.

4. Carry basic survival equipment: Life vests for all, and for longer hops a life raft, a signaling mirror, flares and a flashlight. Life vests should be worn, and all occupants should be briefed in the use of the equipment.

5. Be sure tanks are full. Fuel reserve should be 100% throughout the flight.

6. File a flight plan. It is your most dependable lifeline.

7. For your course over water, choose the shortest land to land route, even if it adds mileage. Don't be in a hurry.

8. Climb high while still over or near land, and maintain altitude all the way to your destination. If you stay high, you will see better, get better clues on weather, you will be safer, feel safer, and maintain better radio communication. From high altitude you may also be able to close your flight plan while over your destination.

9. Keep close track of time and headings, especially when winds or weather cause you to stray from your course.

10. Maintain radio contact without intermission. In case of an emergency, get on the mike without touching the dials.

Of all the safeguards over water, altitude is priceless. Howard Piper (AOPA 97315), vice president of Piper Aircraft Corporation, who has flown high and wide over land and water and who has crossed the Atlantic in an *Apache*, has this comment to make: "If I were going on an island hopping flight in a single-engine airplane, I would probably use the altitude technique of going as high as possible between land areas. I would climb above 10,000 feet while still in sight of land, and then there would be only a few minutes during which I couldn't reach one side or the other."

Red Gamber has deep respect for the sea, also for the frailties of the average pilot. He is always preaching the same sermon, and he obeys it in practice: "Go high on your climb-out, and if your engine should quit anywhere over 10,000, you can be almost certain that you can glide to land with a windmilling propeller."

Howard Piper suggests that, if you can manage to stop the propeller, distance and time can be stretched. He recalls that John Thorp, a fellow designer, told him that he once glided a *Comanche* with a stopped propeller over a distance of 40 miles from a height of 12,000 feet. When you add up all the benefits gained by flying high, it is difficult to understand why pilots persist in crossing water low on the deck. In case disaster should strike on a crossing, the prospects of survival are eminently superior with height.

It is the good fortune of island hopping flyers that their overwater travel is constantly guarded by the U.S. Coast Guard. The protective arm of the Coast Guard reaches far beyond our coasts. For example, in the Southeast, the Coordination Center and the Air Station for the entire seventh district are located in Miami. Their radius of operation is far-flung. It ranges north to the Carolinas, east through the Bahamas as far as Bermuda, and south throughout the West Indies to the South American coast. Little do flyers know that if they go over water on a flight plan, they are under the constant protection of these Argus-eyed guardians.

The Coast Guard Rescue Coordination Center is linked to all radio channels. A call for aid on any channel will either be heard on one of the open lines at the Air Station, or else it will be received by the Center, and relayed to the Air Station.

A spokesman at the Miami Air Station suggests this: "A pilot in distress can be of material assistance if he leaves the dials alone and makes his call on whatever channel he is using before he does anything else in the cockpit. He should mention the frequency he is tuned to, and make a change only after communication is established if he is so advised. Next in importance is information as to the nature of the emergency and precise location. As soon as



we have something to aim at, we'll get there the fastest and with the mostest."

If an aircraft is overdue on an over-water flight plan, ATC will alert the Coast Guard and a search will be started promptly.

Communication and time are the essence of a search and rescue operation. Time is the criterion of survival. Once an airplane is down on water, there is no telling if and how long it will keep floating. It may go straight down on impact or it may stay afloat for hours. Without the remains of the airplane, any survivors in life vests are not easily detected, especially in rough sea. Moreover, in cold water a man may survive only a brief period. At 32° he may last less than an hour, at 50°, one to six hours; above 70°, however, he may live more than a day.

In tropical waters sharks present a real danger. Nobody knows if and when they will attack, but it is a fact that wounds will cause them to strike. There is no known effective repellent. The repellent supplied in vests and life rafts, however, provides some degree of protection in that it muddies the water and screens a swimmer.

The Coast Guard is systematic and indefatigable in its rescue work. They regard life vests as being only minimum protection. They advocate strongly that signaling devices be also carried. They should include signal mirror, a water proof flashlight and day and night flares. Dyemarker, which is found in the pocket of a life vest, is important for recognition. They point out that a lone swimmer, even in a yellow vest, is too small a target to be easily detected and that a signaling or recognition device of any nature will materially improve and hasten the prospects of rescue. For the same reason they also believe firmly that on any but very short hops over water a life raft should be carried. The large yellow patch of a raft can be spotted from a considerable distance. A raft also serves the important function of sheltering the victim from the bite of the sea and its predatory creatures.

Charles Manhart, a veteran pilot who operates Pan Avion, Inc., a survival equipment sales and rental business at Miami International Airport, has this to say: "A life vest is only the basic item in a complete list of safe overwater equipment. The raft is by far more valuable and effective. With each raft Pan Avion supplies a complete set of other essential equipment. This includes first aid kit, flares, flashlight, mirror, water and rations, and other essential items. If you carry a fully outfitted raft, you will need no additional equipment."

Life rafts come in all sizes and hold from one to seven persons. The smaller types suitable for light airplanes are packed in tight bundles and do not add much weight.

Rafts may be rented by the day, week or month, and if they are ordered in advance, they will be waiting at the airport of departure.

Ditching an airplane at sea cannot be taken lightly. Bob Iba, usually buoyant and cheerful, wrinkles his brow

into a frown when his one experience is mentioned.

"Any ditching," he said, "is definitely dangerous and frightening. There are too many unpredictable factors." A reported ditching is a real cause for alarm to the Coast Guard and will send them scurrying in a total effort.

Elaborate procedures for ditching have been devised by the airlines and the military forces. None are foolproof. However, there are some basic rules that fit any aircraft. If there is a spark of life left in the engine, by all means keep it going and head for the nearest land or shallow water, for a known shipping lane, or towards a ship, if you can spot one. With or without power, maintain safe flying speed all the way down to the water. Don't stall before making contact, or your nose will drop and hit hard. Just before touchdown, pull the nose up a few degrees and try to hit with the tail low. On the way down, open a window and unlatch the door, if the design of the airplane permits it, or else pressure and impact forces may jam the door and block the

escape. Also, move any massive loose objects to the floor of the cabin, where they cannot turn into dangerous missiles.

In a moderate sea, line up with the swells and try to touch down in a trough. In high winds, however, you cannot risk a crosswind landing, but must take a chance of a hard bounce across the waves. The impact is hard and sudden. It is likely that the cabin will be submerged. At that instant you must move swiftly and use your survival equipment. If the airplane remains afloat, stay with it. If your predicament is known, help will be on the way. But save your signaling devices until rescue is in sight.

When all is told, and the aspects of limited overwater crossings are carefully weighed and respected, there should be no cause for concern. With ordinary care and foresight, there will be no extraordinary hazards, no crisis, and the mere hurdle of a shoreline should not thwart a pilot from his plotted course or from a route to pleasure and adventure.

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