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Lake Amphibian

Also With This Article

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Accident Scan: Flying With The Fishes

Water pilots who want a hull instead of floats have only one practical choice, a single-engine offspring of Grumman's grand old flying boats

Unless you're going to fly off the water, there is no reason in the world to consider buying a Lake Amphibian, the one and only production flying boat still made in the United States—barely. (Another airplane, the Seawind, is undergoing certification.) Lakes are still built, but only to order by Armand Rivard's factory in Florida, which also makes parts for the fleet of perhaps 700 used Lakes still out there. Many of them are refurbished and sold by Armand's son Bruce at his sales and service "Team Lake" headquarters in New Hampshire.

Except for the 270-HP turbo version up at 20,000 feet, where Bruce Rivard says it will do 155 knots at 78-percent power, the four basic versions of the Lake are slow, inefficient and quirky. Because of their lives on the water, they are susceptible to corrosion problems and damage from rocks, debris, banged docks and sandy or gravel beaches.

That's the bad news—and it's all stuff that a happy Lake owner considers almost trifling. The wonder of the Lake is what it lets you do and where it lets you go, with a huge inventory of places to land that are inaccessible to the land pilot. Despite maintenance hassles and handling quirks— and the challenge of staying proficient at water operations —the Lake is a lovable airplane for the right kind of owner.

Model History

The Lake evolved from a design developed by Grumman, the maker of now classic multi-engine flying boats, as a potential entry in the civilian market after World War II. The company built a prototype but decided not to go any further, letting two of its engineers—Dave Thrust and Herb Lindblad—take the design, which Grumman called the Tadpole, and start building it in 1948 in Sanford, Maine as the three-seat 150-HP Colonial C-1 Skimmer.

Ten years later, they made it a four-seater with a 180-HP engine and called it the C-2. In 1960, they extended the bow and wings and dubbed it the Lake LA-4. About 250 Skimmers and LA-4s were built before production ended in 1962. There were some company changes that saw the manufacturing side become a separate entity, called Aerofab, from the sales and service side, an arrangement that continues today. The type certificate was acquired by Consolidated Aeronautics in 1963, which moved it corporate headquarters to Texas but kept the factory in Maine.

The Lake Buccaneer (LA-4-200) was born in 1970 when Conaer put a 200-HP fuel-injected Lycoming on the LA-4. Over the years, a few turbo models were made and so were non-amphibian water-only models.

In 1979, Armand Rivard, an independent Lake distributor, bought the company and moved it to Kissimmee, Florida. He introduced the LA-4-200EP. To reduce cooling drag and noise, it had a new nacelle and its prop shaft extended five inches farther aft. It also had "batwing" fillets at the wing/fuselage junction to improve low-speed handling by eliminating eddies and turbulence that disrupted prop performance.

Rivard also introduced the Renegade in 1979, a six-seat version with a 250-HP IO-540, a beefed-up structure, a rear cabin door and larger tail. It easily outperforms its predecessors and is even more stable on the water.

Beginning in 1981, the Lakes all got more grease fittings, polychromate primer, an improved canopy and more rust-resistant cabin vents.

A turbo version of the Renegade became available in the late 1980s through an STC, so technically it is a mod done by the factory. Its Lycoming TIO-540 is rated at 270 HP.

The LA-250 and its turbo version remain in production, according to Bruce Rivard, but only by special order. The factory will still build one for you from scratch for some hundreds of Ks (ask Rivard for a number; he's at 603-293-8200 or bruce@teamlake.com.)

Since 1991, the company also has been making the Seafury, a Renegade with lift rings, survival equipment, a custom tool kit, aux power receptacle and stainless steel brake discs, plus extra corrosion-proofing in an extra coat of chromate primer inside and out and a ceramic coating on the steel parts. The Seawolf is a Seafury modified for the military as a patrol and special ops aircraft.

Clifford Maine's wife Betsy and their fl y-ing buddy. The cargo hatch is a welcome feature. Earlier Lakes didn't have it, although it's available as a mod.

The company had a hiccup when Armand Rivard decided to try retirement. Bruce had no interest in taking over the factory so, in 2002, Armand sold his end to a Maryland FBO operator, Wadi Rahim, who called the company Global Amphibians and shut down the Maine factory.

Only two of its veterans moved to a new factory he opened in Florida, according to Bruce Rivard. Things did not work out and before long his father got the company back. Bruce handles North American sales and service out of New Hampshire (go to wwwteamlake.com), including finding good used Lakes and upgrading them for sale with a warranty, while Armand, despite those longstanding retirement plans, oversees the Fort Pierce, Florida factory.

Market Scan

Prices have a very wide range from $17,000 average retail for a good C-1 Skimmer (a rare

find; fewer than 25 were built) to $455,000 for a 1997 LA-270 Turbo Seafury, according to the Fall 2006 *Bluebook.*

Prices have been trending down, as they have been for many airplanes, although the EP model has shown some price resiliency. It has been praised as the best compromise among Lakes between cost and performance. *The Bluebook* puts a 1983 LA-4-200EP at $93,000 average retail.

Depending on age, average prices for an LA-4 ranged from about $35,000 to $46,000; for a Buccaneer from $53,000 to $93,000; for an EP from $93,000 to $115,000; and a Renegade from $140,000 to $370,000 for a 1997 model. The 270-HP turbo Renegade starts at $230,000 for a 1989 model, according to the *Bluebook,* and ranges up to $410,000 for a 1997 airplane. Expect to pay from about $250,000 for the earliest Seafury (1991) and $280,000 for the turbo version.

Performance, HANDLING

"Instant vacation" is what one owner has called the Lake experience and Lake fans say there is nothing else short of homebuilts and a couple of exotics (anybody know of a clean Seabee?) that lets them fly as easily into a remote lake or stretch of river as on or off a runway. But that flexibility comes at a price in cruise efficiency. The airplane, for its power, does not go fast.

A 200-HP Buccaneer performs on a par with a 150-HP landplane. Despite book numbers, owners report cruise speeds in the 105-115-knot range with fuel consumption of about 10 GPH. A Renegade cruises at about 122 knots and one owner told us he burns 13.5 to 14 GPH. The turbo version shines up high with cruise speeds closer to 150 knots.

The EP does better than the Buccaneer, cruising at about 120 knots. It also has hull strakes that improve water handling and allow the hull to break free of the water at a lower speed, 45 knots instead of 53 for a Buccaneer (50 knots with a batwing mod). A Renegade pilot told us, "The EP is the best of the lot … It's almost as fast as the Renegade, it has better short-field performance and it's more economical. An 88-gallon EP has a nine- to 10-hour range."

Company specs for the 250-HP Lake list cruise as 132 knots true at 6000 feet with 75-percent power with a 900-FPM best rate of climb at sea level. The turbo version, with its 270-HP, has the same performance except up high, where true airspeed is said to reach 155 knots. The EP's best rate of climb is 980 FPM, according to company specs in the *Bluebook*, and the Buccaneer's rate is optimistically listed as 1200 FPM. An LA-4 with 180-HP is said by the book to climb at 1000 FPM.

Clifford Maine's Renegade rests at a mooring. There's good corrosion pro-tection on the airplane but it needs special care and careful inspections to avoid problems.

Owners have complained that a heavily loaded Buccaneer (it can carry about 1000 pounds) is sluggish during climb. Some call it a two-place airplane with baggage or a four-place airplane with reduced fuel and bags. Lake's 180-HP models should be avoided by buyers looking to carry a lot. At gross weight, climb will be around 500 to 600 FPM and cruise will be about 105 knots, max.

The Lake's tendency to nose down when power is added and to rise when power is reduced because the engine is mounted high above the CG requires getting used to. There's no evidence in the accident record that it has led to any serious problems and pilots don't mention it as a big issue. Another thing to get used to is the overhead location of the engine power controls.

In flight, the airplane is agile by seaplane standards. The ailerons are light but the rudder is a bit heavy and flying the Lake well requires good rudder skills in the air and on the water. Stalls occur just above 42 knots or so, indicated. Recovery is gentle and predictable.

Having a Lake is not so much about its cross-country flying abilities, which are fine for shorter flights up to 300 miles or so. It is all about getting yourself right into the countryside for whatever fun you have in mind. The airplane shines on the water, owners say, because its hull is inherently stable and strong and its CG is low. Marc Rodstein of the Lake Flyers Club says a proficient pilot can make a step-turn takeoff, rising off the water in a circle in case of a tight fit.

On a hot day, it takes precise technique to get a heavily loaded Lake on step for takeoff, especially the older models without hull strakes, available as a mod to reinforce the hull and reduce water drag. They also add more stability in turns.

The accident records are loaded with water mishaps. Catching a sponson in the water landing in a gusty crosswind can cause an upset and a lot of damage. Bad landings or rough water can end with the Lake trying to play submarine. In anything but calm air, docking is a major challenge because the mid-level wing and its sponson may not clear the deck.

On the ground, the Lake pilot needs a knack for steering with differential braking because the plane does not have a steerable nosewheel.

It's absolutely essential—and required for insurance coverage—to get Lake-specific training. The factory and the club can provide a list of highly qualified Lake CFIs (not to mention knowledgeable Lake shops, an absolute must for any pre-buy inspection).

Lake Aircraft's Team Lake in Gilford, New Hampshire, offers a one-day introductory ground school that opens the new Lake owner's eyes to what the airplane can do and what to be careful about, not the least of which is the lack of a gear-warning horn and the potential for landing gear up on a runway (not so bad) or gear down on the water (very bad). Also note there's no squat switch to prevent a gear collapse on the ground if you accidentally flip up the gear switch. Lake also offers a five-day ground and dual course. Be prepared to work.

Loading, comfort

Useful load in real life averages about 800 pounds for a 180-HP Lake without an IFR panel. It's about 950 pounds for the 200-HP version and 1200 pounds for the Renegade.

Lakes tend to be nose heavy, a trait that is aggravated by the fact that the CG moves forward as the airplane is loaded. Marc Rodstein of the Lake club, however, says his forward CG problem goes away when passengers get in the back of his airplane, making ballast unnecessary. The point is it's not a load-and-go airplane. Having the CG beyond limits for a gross-weight takeoff with a lot of pine trees beyond the beach is asking for trouble.

Only mods and the Renegade airframe have a back-seat/baggage hatch so expect to utter a few expletives when it's time to get in all your fishing and camping gear through one of the two front clamshell doors.

Fuel capacities, as listed in the *Bluebook*, range from 30 gallons in the Skimmers and 40 gallons in the old LA-4s. The Buccaneer had a 55-gallon option and the Renegade carries 85. There's a mod available for the older Lakes to put fuel in the sponsons, adding 14 gallons total.

There is elbow room up front, a bit less in the back. In older models, the hard seats adjust only fore and aft and the cabin is noisy. The EP model has more foam and customized features and the Renegade has the nicest interior of all; its price reflects it.

There's no muffler cuff ahead of the firewall to collect heat for the cabin. Through 1973, Lakes used Janitrol gasoline heaters, for which an AD required complete overhauls every two years. Lake switched to Southwind heaters in 1974, but they had only on and off switches so the choice was cook or freeze. Lake went back to improved Janitrols in 1983.

Maintenance

For a complex airplane that performs in a tough environment, the Lake has amazingly few ADs. There are only two that affect a large part of the fleet. One is AD 2005-12-02, which superseded a 1998 AD that required inspections of the horizontal and vertical stabilizer fitting gap in accordance with a factory bulletin due to fatigue cracks. The newer AD requires inspection, adjustments and replacing parts if necessary to prevent a tail failure. It affects all

Lakes through the 200-HP models.

The other serious AD is 2000-10-22, which requires the installation of a spar reinforcement kit in case of cracks in all Lakes from the LA-4 up to the 250-HP models.

Hydraulics are used extensively on the Lake, running trim, flaps and gear all through one accumulator, pump and reservoir. All the actuator static and dynamic seals are plain "O" rings and the failure of one will incapacitate the whole system. "You may replenish the supply from your squirt bottle and position the gear, flaps and trim," an owner told us, "but the flaps and trim will bleed to the trail positions."

A big issue, of course is corrosion. During the 1960s, the 180-HP Lakes had no zinc chromate treatment and some didn't have alodine. Check for a faint gold tint to the aluminum on the interior structure of any pre-1970s airplane. No tint, no alodine.

The absence of green zinc chromate primer makes the airplane susceptible to corrosion, especially if it flies into salt water, and a bad case of corrosion can render a Lake worthless. Starting in the 1970s, all Buccaneers were alodined and zinc chromated; starting in 1983, an additional polychromate primer was applied.

Corrosion isn't the only water worry. Lakes take a beating from waves and junk in the water that can lead to dings and dents. Gravel, rocks and sand strip paint and gouge the hull. Watch for it. Also check for internal damage at bulkhead station 97, a stress point for the hull. It was beefed up beginning with 1982 models.

There have been a few complaints about the turbo 270 model. Oil dripping from the crankcase breather tube makes a mess of the tail. Another problem, owners have said, was premature mag failures, maybe because the mags are close to the hot turbo. There also have been reports of cracked exhaust pipes, malfunctioning electric boost pumps, cracked cowl hinges and a broken accumulator in the hydraulic system.

A search of Service Difficulty Reports going back a decade did not yield a lot of them and there was no pattern to speak of with one exception, although cracks and corrosion were often mentioned as a problem. Surprisingly, 25 percent of the SDRs had to do with propeller woes ranging from eroded leading edges and worn-out or corroded hubs to damaged, corroded or broken blades.

Mods, Owner Group

Bruce Rivard's Lake Aircraft is praised for good service and accessibility, although there were some grumbles when the company sued a Canadian competitor over the patent for a cheaper spar repair kit it sold to address AD 2000-10-22. Otherwise, customers tell of parts packages FedExed to Europe overnight and the ease of getting Armand or Bruce on the phone.

Camaraderie with other owners can be a big part of the Lake experience. These Lakes converged for the 2005 Northern Lake Amphibian Pilots fl y-in in Killarney, Ontario. Their Web site is www.lakeamphibianpilots.com

The Lake Amphibian Flyers Club in Boca Raton, with about 450 members all over the country and a Canadian affiliate, has a newsletter and fly-in but not a web site. Marc Rodstein, the executive director, is highly knowledgeable and accessible by phone or email. He can give you a list of experienced Lake CFIs as well as shops for mods, repairs and inspections. He's at 561-483-6566; email him at contact@lakeflyers.com.

Popular mods are wing fillets or "batwings" to smooth airflow into the pusher prop and improve low-speed performance. Vortex generators also make for better slow-speed handling. There's a "hydro-booster" kit to fit strakes on the hull to stiffen it and allow for easier water liftoffs. A cargo door is a boon for getting into the back seats and the cargo area. Adding hatch holders is a good idea and turning the sponsons into auxiliary tanks is another option.

In addition to Lake Aircraft itself, there are four recognized shops that are Lake specialists: Lake Central in Gravenhurst, Ontario (www.lakecentral.com; phone 705-687-4343), which offers both training and maintenance; Talon Aviation, a shop in Puyallup, Washington (www.talonavn.com; phone 253-840-1012); Amphibians Plus, a shop in Bartow, Florida (http://server1.info/amphibiansplus.comx/index.htm ; 863-534-3706); and Aircraft Innovation and Repair, a shop and training facility in Winter Haven, Florida http://aircraftinnovation.com ; phone 863-299-4655.

Owner Feedback

In the last 16 years I have owned all three models of Lake Amphibians: a Buccaneer (200), Lake EP and Renegade (250). Each model has its own strengths and weaknesses. The basic 200 (Buccaneer) or 180 are wonderfully capable amphibians that, with a hands-on owner, can be relatively inexpensive to purchase and operate. These aircraft usually have basic avionics and tend to be somewhat older models (1960s through late 1970s). Cruising speed is 105 knots.

The EP is a significant step up with the aircraft from later model years (1980 to 1983) and with the most desired modifications, including the prop extension and batwings, which can increase performance. The EP model is a good compromise between the utility of the basic Buccaneer and the Renegade. Cruising speed is 112 knots.

The Renegades (250/270T) are the best performing, most versatile amphibians available. These are later model aircraft (1986 through 2004). This aircraft is equally at home flying into a remote lake or landing at a large metropolitan airport. Renegades usually have updated avionics and updated interiors. Cruising speed is 122 knots.

Lakes, such as this early Renegade, are comfortable up front and the double hatches make access easy to the front seats if not those in the rear.

Owning the aircraft can be expensive as it regularly is operated in water and off-airport. Imagine leaving your Cirrus or Cessna sitting in the water over the weekend on a regular basis. I have annuals done only by qualified Lake Amphibian shops, which provide expert maintenance based upon the many Lake aircraft that they service every year. Annuals typically run between $4000 and $7000 per year. A typical annual will include replacing or upgrading some equipment or including modifications (such as vortex generators). Insurance through the AirSure Lake Insurance Program requires annual recurrent training (a good idea). The maximum limit available is $1 million smooth. Include $250,000 of hull insurance and the annual premium is $5400 for an experienced Lake pilot.

The best things about flying a Lake:

1. Fantastic versatility, fun to fly and an attention-getter on any ramp or lake.

2. The aircraft is well-supported by expert Lake Amphibian shops, Amphibians Plus (Harry Shannon), Lake Central Air Services (Elton Townsend), Aircraft Innovation and Repair Services (Paul Furnee) and Talon Aviation (Ron Van Slooten).

3. The Lake Flyers Association and their annual meetings in Florida and Killarney, Ontario.

The worst thing about a Lake Amphibian would be not owning one.

Clifford G. Maine
Grand Rapids, Michigan

After 25 years and 3000 hours of flying, the Lake changed my thinking about airplanes. (I have a 1983 EP model.) Slow and clumsy as it is, the Lake stole my heart when I purchased a half interest in a 1970 Buccaneer. The versatility of an amphibian has to be experienced to be appreciated. Now, when I spread out my sectional chart, where I used to see 25 possible landing sites, I see 100 to 150.

The Lake has an extraordinary combination of land and sea characteristics. On water, it's stable and can handle a lot of sea conditions. It can get into and out of some fairly small areas when competently flown. Its major shortcoming is the difficulty of docking. The low wing (actually a mid-wing configuration) is at dock height and unlike a floatplane, will not easily clear a dock, but rather will tend to crash into it.

So I (and most Lake pilots) have forsaken docking in all but the calmest conditions. Lake pilots love a good ramp, where they can merely lower the wheels and taxi right out of the water. Lacking that, a good sand beach makes a proper parking place. The aircraft is nominally four-place, but with four pax, there's hardly any room for luggage. Useful load is plentiful but CG bears careful watching. I carry 33 pounds of lead in the bow locker when solo, but don't need it when carrying passengers.

My EP cruises at about 110 knots burning 10.5 GPH at 72 percent power. Climb is about 700 FPM at sea level, tapering to about 150 FPM at 11,000 feet.

Some useful mods which I have are: batwings, which enhance slow speed characteristics; an optional baggage loading door, without which baggage and rear seat passengers have to be loaded over the front seats; canopy door holders, which hold the canopy door open for ingress and egress and while taxiing and yoke mounted electric pitch trim. Many useful mods are marketed by two exceptional Lake shops: Lake Central in Ontario 705-687-4343 and Aircraft Innovation and Repair in Winter Haven, Florida, 941-299-4655. Among the best maintenance available for Lakes come from Harry and Cathy Shannon, who run Amphibians Plus in Bartow, Florida at 941-534-8025.

A Lake is different from any other aircraft, and requires very specific training. Pilots flying this aircraft need type-specific training. Those who are trained by approved instructors and who keep current in their training are eligible for preferred rates from the Lake insurance program which is run by Airsure, Inc. (303-526-5300) for Phoenix Aviation Managers.

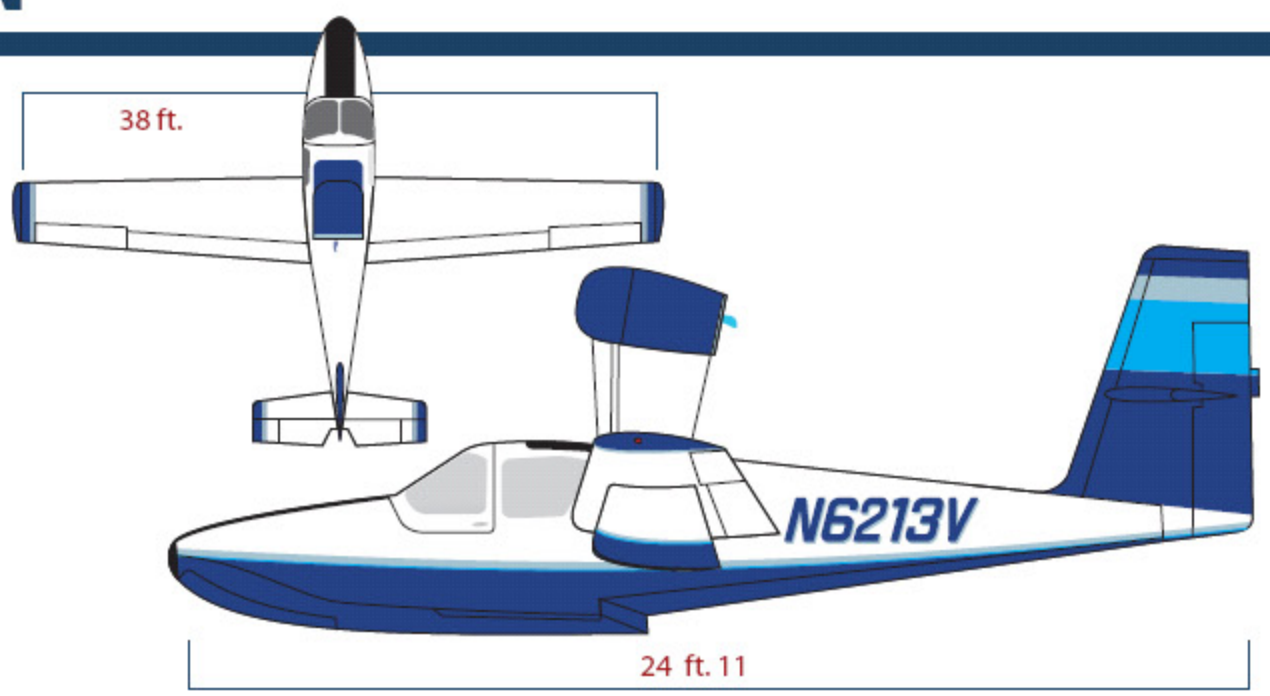
Maintenance is a bit on the high side, comparable if not more than a high-performance single, say a Bonanza or 210. The Lake factory is dormant but there have been no serious parts shortages and expert maintenance support is readily available from a half-dozen shops which specialize in Lakes.

There is more satisfaction available from flying this airplane than from any other plane I have flown, and I have flown lots of them. It looks great, flies well (for a duck) and takes you places an ordinary airplane cannot go.

Marc Rodstein, Executive Director
Lake Amphibian Flyers Club
Boca Raton, Florida
Harrison, Maine

LAKE AMPHIBIAN

Photo courtesy of www.teamlake.com.



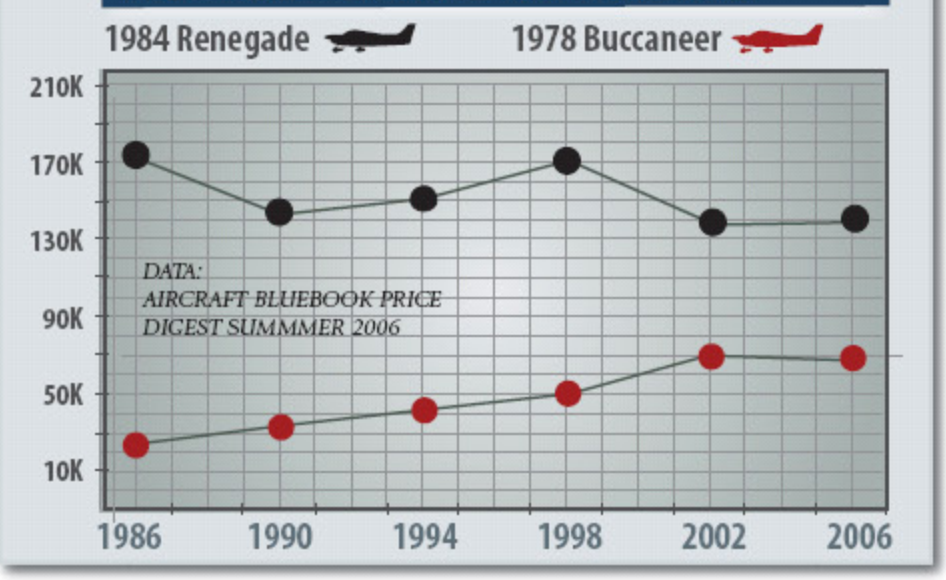
Drawings courtesy www.schemedesigners.com

LAKE AMPHIBIAN BASIC MODEL HISTORY

FROM FALL 2006 BLUEBOOK

MODEL YEAR	ENGINE	TBO	OVERHAUL	FUEL	USEFUL LOAD	CRUISE	TYPICAL RETAIL
1957 C-1	150-HP LYC O-320-A2A	2000	$16,000	30	700	97 KTS	$17,000
1958-1959 C2-IV	180-HP LYC O-360-A1A	2000	$19,000	30	830	117 KTS	$28,500
1960-1971 LA-4	180-HP LYC O-360-A1A	2000	$19,000	40	845	114 KTS	±$41,000
1970-1982 LA-4-200	200-HP LYC O-360-A1B	2000	$21,000	40/55	1135	130 KTS	±$72,000
1983-1987 LA-4-200EP	200-HP LYC IO-360-A1B	2000	$21,000	48	1030	127 KTS	±$110,000
1984-1997 LA-250	250-HP LYC IO-540-C4B5	2000	$26,000	76/90	1290	122 KTS	$150K-$370K
1989-1997 LA-270	270-HP LYC TIO-540-AA1AD	1800	$41,000	76/90	1065	155 KTS	± $230K-$410K

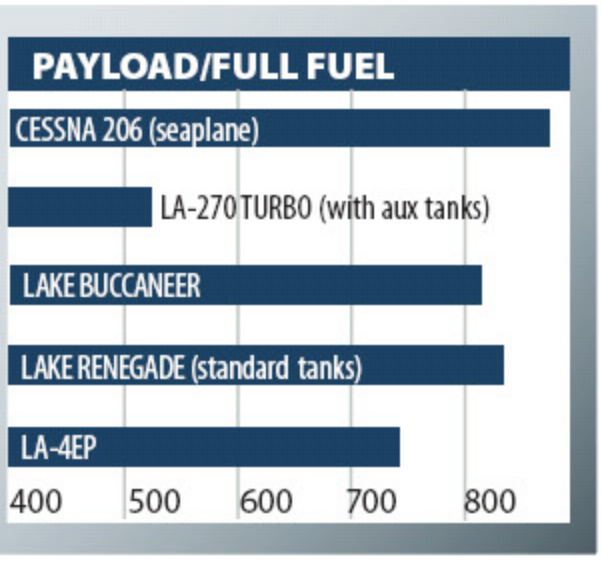
LAKE AMPHIBIAN RESALE HISTORY

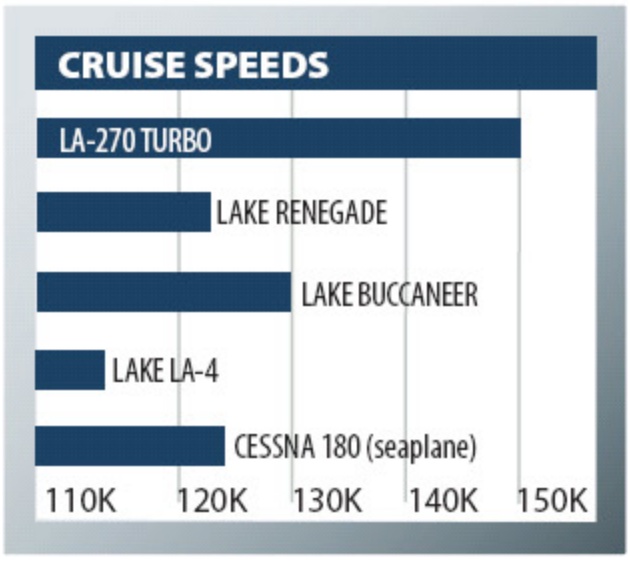


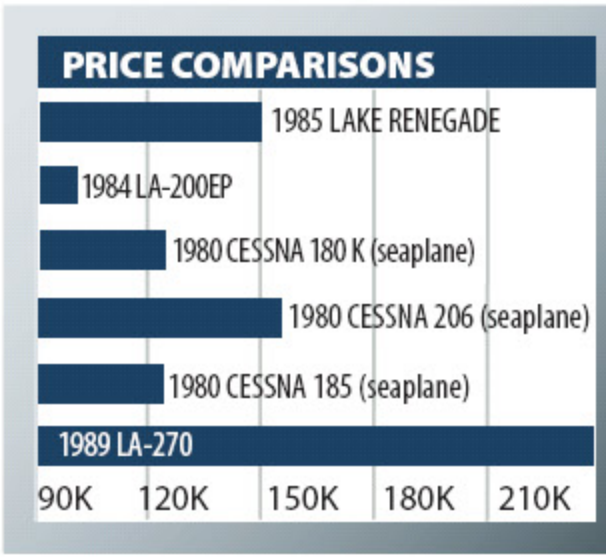
SELECT HISTORICAL ADs

AD 2005-12-02	HORIZ STABILIZER ATTACH FITTING
AD 2000-10-22	WING SPAR REINFORCEMENT KIT
AD 1986-23-05	MODIFY FUEL SHUTOFF VALVE PLATE
AD 1978-14-05	WING MAIN BEAM CRACKS
AD 1976-12-11	FUEL FILTER HOUSING CORROSION
AD 1976-02-01	WATER IN AUXILIARY FUEL TANKS

SELECT LATE-MODEL COMPARISONS







ACCIDENT SCAN: FLYING WITH THE FISHES

Surprise! Mishaps on the water are the most common kind of accidents endured by Lake Amphib pilots, according to a sampling of NTSB findings for the past 20 years. Nearly 40 percent of the accidents sampled involved loss of control on the water during landing or takeoff (WLOC).

Add other water woes—hitting a submerged object and hitting the water while flying low over a glassy surface, the ratio inches up to 45 percent.

Lakes require water skills as well as flying skills. They also are exposed to water hazards so it's no wonder their pilots occasionally lose it after hitting boat wakes, misjudging flares over smooth water, bouncing off a wave or dragging a sponson in a "step turn" takeoff or a gusty crosswind.

It's also no surprise that clipping trees is a factor in 8 percent of the crashes sampled. Lakes are flown out of places—lakes, rivers, ponds and bays—with tight approaches and nearby pines— at least in the north country where Lakes are ubiquitous. Add controlled flight into terrain as well as trees and the rate is 12 percent.

The Lake is a tough bird and the rate of fatal accidents is low at 14 percent.

Pilots and passengers seem to escape most water mishaps, which often end with the nose digging into the water and the airplane flipping over, with minor injuries or none at all. Of the eight fatal crashes, there's no pattern: one was a low flyer who caught a sponson cruising over a glassy lake; one was a trans-Atlantic ferry pilot who went missing about the time his fuel would have run out; one was a scudrunner who climbed into IMC and hit a ridge; one followed the failure of a badly maintained engine; and one came after a botched, downwind go-around over a lake, ending in the trees.

Bad landings led to three fatal crashes (while there were very few injuries in 16 other cases) and drowning was usually a factor. There were rare serious injuries, but no deaths, after a collision with a submerged object on landing that crushed the hull.

Of the non-fatals, there's also no discernable pattern after those that involved loss of control on the water. Engine failure was a factor in 16 percent, with half from unknown causes (including one fatal) and half due to fuel contamination or exhaustion. Runway loss of control accounted for 12.5 percent, not a high rate.