

ALL ABOUT
LAKES

**HELPFUL HINTS FOR
THE SAFE OPERATION
OF YOUR LAKE AMPHIBIAN**

By JOHN STABER
Sponsored by
Lake Amphibian Club, Inc.
www.lakeamphibclub.com

second edition

Edited by

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John started his Lake career in 1964 with Colonial Skimmer serial number 12 and over the years bought and sold 15 others. He now owns serial number 1 Colonial Skimmer N6595K which he restored over an 11 year period with the help of several Lake owner friends. To date he has flown over 6600 hours with at least 5000 of them in Skimmers and Lakes; a large part of which was instruction given. He has worked for Lake Aircraft in Tomball, Texas, Laconia, New Hampshire and Kissimmee, Florida. He has published *The Chronicle of Skimmer N6595K* available in book form and *1946-History of the Lake Amphibian-2016* available on CD.

**This compendium of helpful hints is dedicated
to the memory of
Paul M. Furnee,
A director of the Lake Amphibian Club
and the most experienced Lake
pilot and instructor
with over 15,000 hours of Lake flying!**

Preamble

Since the Skimmer was first introduced in 1956 there has been a need for a “how-to” manual for the operation of the Skimmer and Lake Amphibians.

When the new Lake Amphibian Club was formed in 2016, among other items, the directors undertook to update the antiquated list of qualified Lake Amphibian instructors.

After lengthy discussions with many “old time” instructors it was decided we should also publish a compendium of basic items that each instructor should teach new students pertaining to the fact that there is no other plane similar to the Lake Amphibian and it is just different enough from other aircraft that an unwary new Lake pilot could get into trouble.

Within, you will find basic operational pointers and some handy “tricks of the trade” to make your Lake flying more fun and much safer.

The entire contents of this booklet, and much more information about Lake Amphibians and the Lake Amphibian Club can be found on our website located at:

www.lakeamphibclub.com

This site is open to the public and you will find our club history, the aircraft history, applications for joining the club, planned fly-ins, our LakeFest convention and registration, members' photos, members' forum AND updates to this booklet and much, much more.

+ IMPORTANT +

Instruction from a Lake qualified Flight Instructor is highly advised!

The Lake Amphibian Club and its directors disclaim any representation or warranty express or implied, concerning published data or communications and in no event shall we be liable for any loss or damage claimed to have arisen as a result of their use. Readers must accept full responsibility for their own interpretations, decisions and activities, whether or not inspired in any way by the club, its members, writers, editors, personal communications or publications. It is all "hangar flying"; mere snapshots of casual, continuing conversations expressing beliefs, opinion and thought between club members. Therefore, it must not be accepted as authoritative, factual, safe or reliable.

That being said; the material herein has been derived from many instructors over many years of teaching in the Lake Amphibian.

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Prototype C-1 Skimmer N6595K over Long Island, New York, 1955.

Different Models

Colonial Aircraft Corporation

David B. Thurston, president

150 HP C-1 Skimmer 1956-1957 - 23 made

180 HP C-2 Skimmer 1958-1959 - 18 made

Lake Aircraft Corporation

Jack F. Strayer, president

180 HP LA-4 Lake Amphibian 1960-1961 - 24 made

Aerofab, Incorporated

Herbert Lindblad, president

M. L. (Al) Alson sales

180 HP LA-4 Lake Amphibian 1963-1969 - 161 made

Aerofab, Incorporated

Herbert Lindblad, president

M.L. (Al) Alson sales to 1979

Armand Rivard after 1979

200 HP LA-4 Lake Buccaneer 1970-1986 - 685? made

The last 43 were LA-4-200EP models.

Aerofab, Incorporated

Herbert Lindblad president

Armand Rivard, president after 1985

250/270T LA-250 Lake Renegade 1983-2003

Lanshe Aerospace

Wadi Rahim, president

250/270T HP LA-250 Renegade 2003-2005

**A few Renegades were built from remaining fuselages
by Armand Rivard after his regaining the type certificate
from Lanshe Aerospace, totaling 137.**

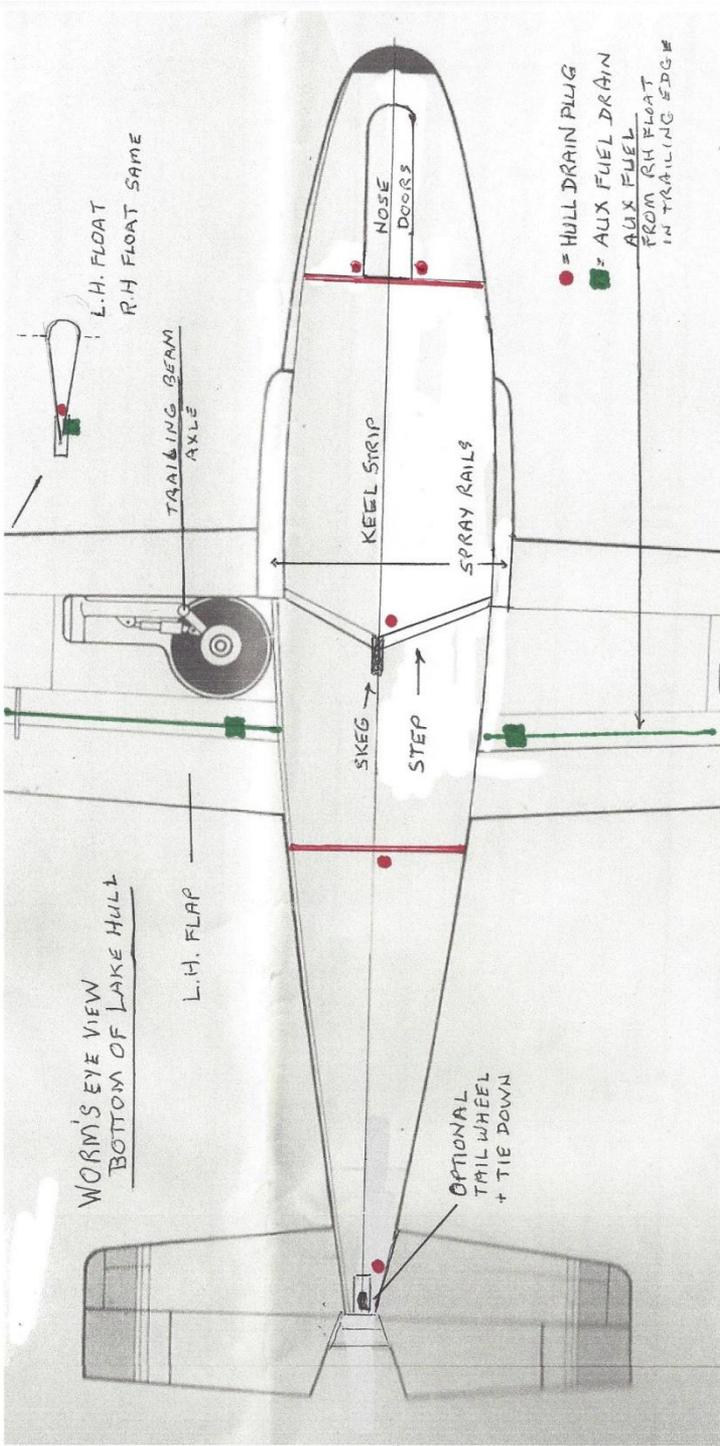
Preflight Inspections

Two of them. *THE BOAT* and the aircraft.

In case of interruption, start all over again!

Before you do anything unlock both windscreen hatches and lower the water rudder and check that it moves freely. There is nothing more frustrating than a sticking water rudder as you drift towards a dam or dock. While your head is in the cockpit, check the **fuel quantity gauge**, which you will confirm visually later. It is wise not to move the Lake until you have some **hydraulic pressure** showing on the gauge and that the gear selector is in the down position. This is a good time to exercise the hand pump if the pressure has bled off over time.

HULL DRAIN PLUGS. There are 5 drain plugs in the hull at the lowest point of each watertight compartment and one in each wing float at the lowest point. The most aft plug is in case the aircraft is parked tail-low. Rain can get in any of the compartments so if you are parked outside, you should remove the plugs and store them in a tin in a safe place in plain sight and labeled "**HULL PLUGS**". A **daub of grease is handy in the tin.** Keep only the 7 plugs in this tin so you know that they are *all inserted when the tin is empty.* A couple of extra plugs should be kept separate. Should you develop a leak in a quick-drain, these plugs have the same thread and can be used as a temporary substitute. It would not hurt to have a spare wrench handy in case you lose one in the water. Store in a snug fitting rubber clamp in an easy spot to get at. There are some Lakes that don't leak a drop except in a rain storm. Most have leaks and you should know how badly your Lake leaks for obvious reasons. Even if your Lake does not leak, always drain the hull upon returning from water landings. **It only takes one popped rivet!** While all we expect is water from the drains, if there is a systems leak inside the hull we could possibly get just water in the nose; water and or fuel from the floats; water and hydraulic fluid from the tail compartment; and water, fuel, hydraulic and brake fluid (same), battery acid and possibly engine oil from the step drain.



Important items.

- In freezing weather stick the long end of the wrench up in the drain hole to check for ice formation or other blockage.
- Always insert hull plugs even though you are not planning a water landing, in case of a forced landing or a change of mind. Ask me how I know.
- Insert plugs snugly, not super tight; use grease or “never-seize”. The editor has never lost one.
- Water can freeze in the main hull and prevent rudder and elevator bell cranks from moving. It has happened.
- Make sure a paddle that floats is on board and several mooring lines.
- An anchor is handy when you have rocky shorelines. You should have 7-10 feet of anchor rode for each foot of depth.
- Ensure personal floatation gear is on board and that you are wearing it.
- Duct tape can temporarily patch a hole or slice in the belly.
- A popped rivet hole can be temporarily filled by breaking off a pencil or a golf tee.
- Make sure both left and right hatches are unlocked before flight as they do not unlock from inside cockpit.

AIRCRAFT PREFLIGHT INSPECTION

HYDRAULIC FLUID. While you have the hull plug wrench in your hand we start the **aircraft preflight** by checking the hydraulic fluid in the reservoir which is found on the right hand side of the nose on the Buccaneer and in the anchor compartment on the 180 horsepower Lake, except for the later models. Unless placarded, the fluid level should be between the holes at full system pressure. Many aircraft have been modified and the location can vary. If over-filled, fluid will blow out the vent as the accumulator pushes fluid back to the reservoir during operation. The accumulator is a canister under the panel that has a 350

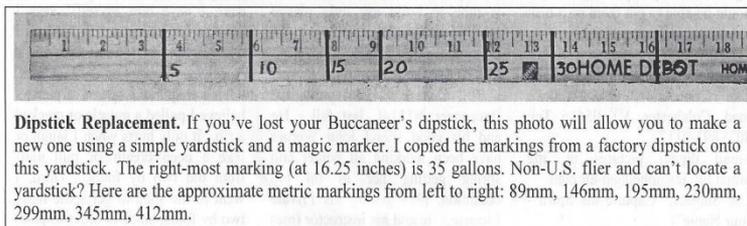
pound pre-charge of nitrogen. It is connected to the high pressure side of the hydraulic system. When the gear selector is operated this pre-charge increases the speed of gear extension or retraction greatly. Most Renegades, except the early ones, have the hydraulic reservoir on the right top near the propeller and the vent below. All Lake Amphibians use hydraulic pressure to actuate the gear, flaps and trim. The exception being the trim on the C-1 Skimmer.

Important items.

- A fully charged accumulator is needed for fast gear retraction and therefore is a huge safety factor.
- Hydraulic fluid is mil. Spec 5606. Red.
- Buccaneer fuel filters from the factory located behind the front pylon fairing are deemed insufficient for various reasons. Recommend replacing with STC SA00333BO. Call Willard Greenwald, STC owner at 413-207-2020 for info.
- **Lake Amphibians suffer from a “collapsed bladder syndrome”.** The bladder can become unsnapped from the walls of the box that holds it, and it then folds in as fuel is used. Occasionally it presses down on the fuel quantity sender causing the gauge to read empty. It is possible when filling the tank, that you see the fuel rise to the filler neck and think it is full. ALWAYS wait a minute or two to see if the level goes down. If it does, the bladder has become unsnapped. It is possible to put another ten gallons in as the bladder expands again. There have been several “fixes”. Check with a qualified Lake mechanic. Early amphibians have snaps and later have buttons that fit in a slotted hole. **Several forced landings have occurred where the pilot thought he had 40 gallons on board, when in actuality it was only 30.**
- Do not drill through from the outside of the fuselage in the area of the fuel bladder.

FUEL LEVEL. The **Buccaneer** main tank under the pylon holds 40 US gallons and it is all usable. The only way to visually tell how much is in the tank is when it is full. A marked fuel dipstick is required equipment. It should be inserted into the tank so the bottom of the stick is in the center of the aircraft and slightly aft of the fuel scupper to get the correct reading. Caution should be used not to puncture the bladder or disrupt the finger screen at the bottom. Not all aircraft have fuel tanks in the wing floats. They are placarded as holding 7 gallons, but this writer has never been able to get more than 6.3 gallons in them. ***There are no quantity gauges.*** This fuel should be pumped into the main tank starting when the main tank shows $\frac{1}{2}$, and you must turn on the circuit breaker on the panel to activate the pumps. You will see the level rise on the fuel quantity gauge. The lights indicate only that power is available at the transfer pumps unless modified to indicate fuel flow. ***Use of float tank fuel prohibited after a water landing until checked for water.***

The Renegade main tank is identical to the Buccaneer and the Skimmers as are the optional float tanks. In addition there are two 19 gallon (17 useable) integral wing tanks forward of the wheel wells; one in each wing. These gravity feed the main tank at the base of the tank and have in-line check valves to prevent reverse flow. **Fill the main tank first.** Due to fuel injected engines the Buccaneer and Renegade both have high pressure (25 psi) fuel pumps. 180HP Lakes and Skimmers have a carburetor with a low pressure (6-7 psi) pump.



THE ENGINE: *Skimmers and Buccaneers.* Since we are getting closer to the engine after shutting the fuel scupper door we need

to give the engine a good look-over. The first panel of the top wing skin is heavier thickness to allow standing on. The skin above the cockpit is lightweight aluminum or fiberglass, therefore, one should **stand on the rivet lines** above stiffeners. Undo the two hooks near the engine hold-down struts by moving the little lever toward you and pull the base of the nosebowl toward you. Push up on the safety catch(es) to allow the nosebowl to open completely. The oil dipstick is to your right and marked with an 8 quart capacity. It should be filled to 7 and kept up to 6, with a minimum of 4 quarts. About every 25 hours lower the side panels of the cowling to allow viewing of the entire engine compartment. **If anything comes loose up here it will eventually end up going through the propeller causing damage to the prop and possibly the wing or the "turtleback" below.** Check for any loose screws and bolts, cracked brackets and exhaust pipes, chafing lines, wires and cowling, not to mention oil leaks. Pay particular attention to the governor for leaks and the control rod end plus the line back to the propeller. **Remove any bird nests completely**, as it affects cylinder cooling. Alternator belt tension and bolt tightness of brackets should be checked. Check propeller for damage and erosion. The **crankcase breather tube is supposed to have slit in the top** shortly out from the top of the case as a safety valve. Mechanics have been known to replace this hose, thinking it was a defect. The condensate can should be drained every 25 hours. The smaller vent tube is from the mechanical fuel pump. Any evidence of fuel or oil leakage indicates a broken diaphragm and mandates a fuel pump replacement. **The side cowl fasteners should not have any tension on them**, but hooked with a slight pull on the cowling to eliminate the possibilities of cracks forming under the latch resulting in the eventual departing of all or part of the latch, through the propeller. Keep them lubricated. While atop the aircraft check the heater bonnet screws for security and freedom of fan movement. Cracks in the cowling should be addressed soon. It is the editor's belief that most are caused by improper starting and shut-down techniques. Perfect the smooth start. It does make a difference.

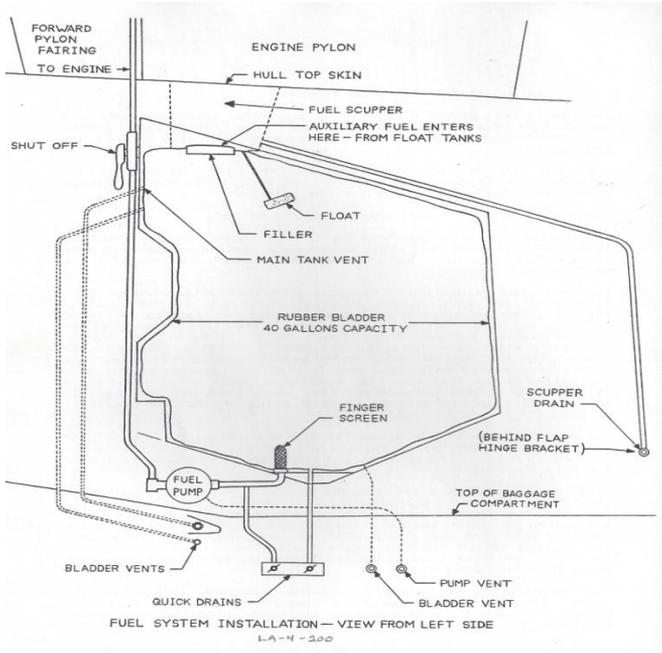
The Renegade oil dipstick is located behind the left side cowling at the top of the engine. The capacity is 12 quarts with a minimum of 8 quarts. The above advice about skin thickness pertains to the Renegade also. Those aircraft that have screwed on front and back cowling like the Renegade and 200EP should follow the 25 hour inspection rule.

Important items

- **Always latch cowling. Report of C-1 forgot side cowl on takeoff. It was almost uncontrollable. Damaged cowl.**
- **Several reports of crankcase breather freezing over with total loss of oil overboard resulting in forced landing. Make sure slot is cut in the top of the breather tube to prevent pressure build up in crankcase.**
- **Turbo-normalized engines have many different parts installed. You should be familiar with what to check.**
- **The editor puts a dab of high temperature sealant on each and every nut or screw to prevent its loss through the propeller.**
- **DO NOT run engine with either pylon side panel removed.**

VENTS AND WITNESS DRAINS AND OTHERS. *Starting from the nose.* Buccaneer hydraulic reservoir vent; right hand side just below filler/dipstick. 180 HP LA-4; right hand side below cabin longeron. Keep it clear as a plugged vent makes the reservoir act like an accumulator resulting in abnormal actions. *Fuselage under the left wing;* under the little venturi cap is the main fuel tank vent to the inside of the bladder. During annual inspection clear the line by air pressure from the inside of the cabin. Just below is a vent to the area between the bladder and the box, near the top. Clear at annual. The large vent is the discharge for the bilge pump. Below the above drains are two open witness drains, one for between the bladder and its box, located near the center of bladder near the outflow to the engine. Keep clean. The other is for the electric fuel pump and any leakage mandates immediate service of the electric pump.

The two Curtiss-quick drains should be checked for leakage and free flow. All are subject to mud wasps building nests, as are pitot tubes. It is common to find one that barely flows and it is usually detritus in the 4 little holes and farther up the line. Remove the quick-drain and clean the holes and the lines until the fuel flows properly (here is where the extra hull plugs come in handy as they are the same thread as the quick-drains). Now is a good time to check the quick-drains on the float tanks and in the lines at the root of the wings (these done with fuel transfer pumps operating). These **quick-drains require special hard-to-find O rings. Curtiss recommends unit replacement (CCA-1600)**. The final item is the fuel scupper drain located out of sight behind the first flap hanger. If you over fill the main tank and it goes into the scupper, this is where it will come out. We have all done it. We have all left the scupper door unlatched, too. Some owners glue small screens over vent holes. The fuel quantity sender on 180HP is on back wall of bladder box. Several of the vents have been added by service letters over the years. If they were not complied with years ago, a few of the vents shown might not be on your aircraft.



THE WINGS. Check and lube flaps and aileron hinges and pushrods. Check rubber accordion pushrod seal in wheel wells. Lube flap torque tube bearings at wing root. Check landing light and **pitot** (180) at leading edge left wing. Buccaneer is just behind spar; Renegade pitot is outboard of the left float; some landing lights on front engine cowl. Check float attachment points. Landing gear has many moving points. Lube everywhere. Check freedom of trailing beam axle by pressing up on bottom of wing with your back. Check brake wear and rotor condition and tubing. Check actuators for leaks, kinked hoses, bent pistons. Make sure up and down locks and “fickle finger” are lubricated. Check condition of wiring on lock switches and operation of micro switches (listen for click). They are wired in series so all must be closed to get a gear position light. ***However, if one is frozen “closed”, the safety feature is lost, and you will get the light even though one is not in the selected position.***

Important items.

- **Wing floats without tanks weigh 8 lbs. Full fuel tanks weigh over 50 lbs. Keep them empty on a rough, windy day when on the water.**
- **Floats without tanks are more susceptible to kinking their side skin.**

THE TAIL. The tail is the most sensitive part of the Lake Amphibian, after the nose gear. Because it is located directly behind the propeller, it is subjected to many types of airflow, most of which are disturbed. If the tiny little covers for the horizontal mounting bolts are missing it will create a “rudder walk”. The large trim tabs, if allowed to get too much play and slop at the moving bolts could develop a flutter at certain airspeeds and rpm of the engine. A fast downward movement of the elevator when leveling off creates a side to side movement of the rudder quite noticeable at the rudder pedals. A gap created by

the airflow at the area where the horizontal stabilizers meet the vertical causes problems and a flapping piece of gasket channel where the two meet creates a strange sensation when the flaps are down where it feels like the controls are jammed. **However**, this does not happen on every plane and there are cures for all. An easy fix is to run a bead of sealant where the horizontal and vertical meet to smooth out the area and prevent the airflow from pressing in on the vertical skin. Check the horizontal fin mounting brackets for cracks. Check logbook for remaining time on aluminum brackets.



Replacing the bolts at annual every few years in all of the trim mechanism will help tightness, or use tapered pins in their place. Occasional lubrication is a must, while you are lubricating the control surface hinges. Replacing the bolt at the rod end of the rudder pushrod is recommended at the same time. The **rivets holding the brackets for this rod end** should be inspected for looseness, plus checking the condition of the water rudder cable sheathing for brittleness.

If you look closely inside the vertical fin you will find a rubber accordion pushrod seal and if you peer around the rudder to your right you will find a little hole. This **should be attached** to a flexible tube from the lowest part of the rubber seal. This is to prevent water from getting into the rear watertight compartment when the tail is way down in the water, during rain storms, or from the rooster tail. I say *should* be attached. Many become loose which allows water into the hull from the boot OR from the small hole. Sealant and a tiny clamp should fix it. There should be two grease fittings on the water rudder pivot area. Lube them and also where the axle goes through the base of the rudder. Inside the vertical fin on the right side is the actuator for the trim...out of sight behind an inspection cover. **Check this for hydraulic leakage around the piston.** If there is fluid present

have the actuator removed for O-ring replacement. If you see **this leakage at the hull plug it is unusual as it has to work its way down through bulkheads and it dries enroute...but not always.** The Renegade trim actuator is out in the left horizontal fin just forward of the trim tab. Check for cracks at the mounting.



Important items.

- **Never paint “wingwalk” at the root of the wing, It disturbs airflow through the prop and over the tail.**
- **Tire pressures should be at least 45 pounds.**
- **Fairings for the wing root to fuselage, and for the horizontal fin and vertical fin joint are available from Lake Central Air Services at Muskoka Airport, Gravenhurst, Ontario Canada lakecent@muskoka.com 705-687-4343.**
- **Check remaining time on Lake aluminum fin brackets.**
- **AD 2013-08-14 (Horizontal fin brackets) One-time steel replacement fittings are available from Lake Central Air Services. Aluminum fittings have 800 hour life. See logs.**
- **AD 2002-21-05 (wing spar doubler) available above.**
- **Quick drains (CCA-1600) Curtiss recommends replace unit. “O” rings are not standard.**
- **Leaky main drain – steal one from unused aux line. Plug with extra hull plug.**
- **Glue small screens over witness drains to prevent mud dauber nests. Golf tees work but must be removed.**

THE NOSE. The other sensitive spot on the Lakes and Skimmers. This area bears the brunt of the nose-down thrust from the engine, measured at over 900 pounds at standstill

with a running Renegade at almost full power. Needless to say, the tire requires plenty of air. The nose oleo should be filled with nitrogen so that it is fully extended with no load in the aircraft, but compresses about 2 inches when taxiing with a load aboard. It takes some experimenting to get it right. Once again, grease or oil everything that moves, except the shimmy damper which is located at the top of the fork to the rear of the oleo tube. This must be kept clean and dry, and be tightened enough to turn the wheel with a bit of effort, but not so loose as to cause shimmy at high speeds. It also takes some experimenting to get it right.

The whole gear assembly pivots upward on two pins through bearings mounted on the side skins of the nose gear hole (the nostril). There are grease fittings in the top of the casting, each side for lubrication of the pivot pins. The most common problem is **bending of the oleo tube**. This can happen by “stubbing” the nose wheel against the end of a concrete ramp underwater while under power, or hitting an underwater pothole or rock while under power to beach the aircraft wheels down. Because of age and constant squeezing of the O-ring hidden at the very top of the casting, air might leak causing the oleo to go flat over a long period of time. Since the assembly takes a beating over years of use, things tend to wear a bit, therefore periodic adjustments and rebuilds are required every so often. Best done at annual. If this is the case, it is quicker to remove the entire assembly and replace all the O-rings at the same time. Spring-loaded door openers need to be lubricated inside from the top. Check the nose door hinges for cracks at the narrowest point.

Several aircraft have experienced **actuator piston breakage** at the base of the threads due to improper thread cutting at the factory. Inspect this area with a 10 power magnifying glass. The factory stopped using a restrictor in the hydraulic line to the nose actuator around 1970, causing the gear to slam up and down and eventually causing damage and mis-

adjustment. It is recommended that if it hasn't already been done, insert a restrictor in the line. Adjustment of the locking mechanism and the "fickle finger" can be time consuming. The casting should not rest in the saddle, but be slightly forward of same. Due to the age of the fleet there have recently been failures of the horizontal beam at the top of the drag strut so once again use the magnifier.

Important items.

- ***Most of the repair items in the nose gear well should be accomplished by a licensed mechanic.***
- **To prevent a bent nose oleo always walk the area where you plan to ramp or beach out with the wheels down and to make sure the surface is firm enough so that you won't get stuck.**
- **Wear foot protection. Ask me how I know.**
- **Do not retract the gear with a flat oleo as there is the possibility of hanging up in the nose gear.**
- **The nose doors are not supposed to seal water out of the area.**
- **Check the door hinges for cracks at the narrowest point.**
- **If doors are damaged, take them off. Remember, the C-1 Skimmer had no nose doors.**
- **Check axle bolt nut cups for security and cracks.**
- **Carefully check the base of the threads on the hydraulic piston for cracking.**
- **Check the top mounting cross tube of the drag arm for cracking around the welds.**
- **Keep the shimmy damper collar free of lubrication of any kind.**
- **It is preferred to NOT have inexperienced Lake personnel tow from the nose gear with a tug unless they are familiar with the castering limitations and the fact that there is very little weight on the nose when empty of passengers.**

THE FUSELAGE. The editor's pet peeve is filth in the bilge. At the bottom of each bulkhead above the keel is a small opening to allow water to flow to the lowest point. It is known as a "limber hole". It is essential to keep these open, but impossible if the hull is filthy with oily sand, insulation, coins, leaves and repeated coatings of preservative. When I bought #12 for parts in 2005, I swore it had not been cleaned since I last sold it in 1966. The trim indicator pieces had gone missing long ago, but common sense told me that they should be in the filthy bilge...and they were. Several hulls I have seen appeared to be coated with tar on the inside...limber holes and all. It is much easier to check for leaks if you can see the inside bottom skin.

There are several areas that do not have weep holes like under the foot wells for the rear seat that should be remedied to allow standing water to drain. The rivet line in the middle is a great source of leaks as the rivets are too far apart in an area that gets a lot of flexing. Just aft of the step has the same problem with flexing, an even thinner skin, and rivets that are too far apart.

Beware the battery and ground strap. At least one Lake has "literally" *blown out of the water* due to an arcing ground strap and a mild fuel leak where it exited the bottom of the tank. Any odor of fuel in the cockpit should be immediately investigated and **FIXED!** Keep the manifold vent open if so equipped, to avoid trapped fumes.

From about serial number 32 the Renegades use a 24 volt system and the batteries are on a shelf under the propeller. Do not accidentally touch a "hot" jumper cable to the starter wire on its solenoid. **Beware the spinning propeller.** Make sure you have a good charge at all times and replace the batteries fairly frequently since it is almost impossible to find a vehicle on a lake or in the boonies with a 24 volt system nor cables and necessary adapters. It was very enlightening watching the jumping of a 24 volt Renegade from a second 24 volt Renegade. It took several hours and much running around. Luckily we were at a local fly-in. Had

the dead battery been alone on Lake Faraway, he would have been in a serious bind!

In the Buccaneers, the battery and starter solenoids are directly behind the big screw heads under the right wing. Occasionally I hear of a battery solenoid that won't close...out in the boonies. A quick slap on the outside of the fuselage in that area generally gets you home. In 180 Lakes the battery is generally under a removable panel on the left side of the nose, unless modified. They came without a battery master solenoid and it is recommended that one be installed for a safer system. Items like bilge pumps are required to be fused within 4 inches of the battery. There are certain aircraft that have the starter solenoid by the engine mount and care should be taken when working in that area with the master switch on.

Trim actuating lever springs have been known to break sending the aircraft into a severe climb or dive. Put a bead of oil or grease in the little hole where they hook and round the edges of the hole. It is difficult to fly the aircraft and hold the lever centered. Keep an extra spring handy or replace periodically. Use any means possible to keep the handle centered.

Important items.

- **Bulkheads under the rear seat are subject to damage from heavy rogue waves coupled with a super nose-high attitude.**
- **Do not wipe plexiglass windscreens when dry and never use paper towels. "Pledge" eventually fills mild scratches.**
- **Carry a couple of "sand-free" bath towels for both you and the windscreen.**
- **Renegade owner reports a lot of water trapped between aft-most bulkheads due to plugged limber holes. Bad.**
- **Trim indicator cable can bind in old, cracked sheathing.**

Starting and warm-up

All models equipped with light-weight, high-speed starters should be started on the LEFT magneto only. The Skimmers and 180 HP Lakes have carburetors and no primer system. The engine is primed by pumping the throttle handle through its full travel allowing the accelerator pump to prime the intake manifolds. Three pumps when cold; one pump when hot. Mixture should be rich and the throttle opened just slightly above idle. Depress the starter button or turn the mag/starter switch clockwise until the engine begins to run. Allow it to warm for a reasonable time and it is ready for flight if the throttle can be opened without the engine faltering. If you *do not read any oil pressure* within 30 seconds, shut the engine down by closing the throttle fully and moving the mixture control to full lean/idle cutoff. Troubleshoot.

Buccaneers and Renegades are fuel injected and require a different technique. The engine is primed with the electric fuel pump until you see maximum fuel pressure on the gauge...20psi. with the mixture rich and the throttle open.

Cold start – throttle just off idle, mixture full rich. Operate starter.

Hot start – If *pressure shows* on gauge, throttle just off idle, mixture at idle cutoff. Operate starter. Richen mixture slowly when engine fires. If *no pressure shows* on gauge, increase fuel pressure to above with mixture at idle cutoff and operate starter. Richen mixture slowly when engine fires.

Flooded start – When nothing else works. **Bear in mind that the engine will fire only when the mixture of fuel and air in the cylinders is correct.** Deliberately flood the engine with the fuel pump running and throttle open and mixture rich. Shut off fuel pump. Open throttle fully. Set mixture at idle cut off. Operate starter continuously until engine fires. It will run rough. Retard the throttle to idle and richen the mixture slowly to about ¼ travel. Things should start to run smoothly by now. If you are in a

rush to richen the mixture before you retard the throttle you will actually put the fire out by more raw fuel. It had started because the mixture in the cylinders was ready to support combustion. Therefore, retard throttle first, then slowly richen mixture. Take your time. Warm up is identical to carbureted versions.

Braking and ground operation

In almost all cases parking brakes are applied by stepping on the toe pedals and pulling out a knob on the panel. They are released by depressing the pedals and pushing in the same knob. The nose wheel is castering and **one must be moving in order to get it to turn** to one side or the other. It helps to have the wheel pointed in the direction you wish to go before you enter the cockpit. Usually a push on either side of the nose is enough to caster the wheel in the desired direction. Get the aircraft moving by using a bit of throttle as the nose wheel **won't swivel unless you are moving**. *If you are new at this, allow plenty of room* to learn the process. To turn the opposite way use rudder in that direction and tap on that brake all the while moving ahead. A little power never hurts. Practice until comfortable in wide spaces and you will soon be ready to taxi for takeoff. You will find that the faster you are moving (within reason), the easier it gets. It is not unlike taxiing a tail wheel aircraft. **Remember the shimmy damper?** The tighter the damper is, the harder it is to steer.

While some aircraft are equipped for tow-bars, for a short distance move it is easier to lift up the nose of the Lake to the balance point and move it by hand. Ask helpers to push at the wing root to make it easier to steer. **Advise ground crews not to move the aircraft with a tug** unless they are familiar with the nose caster limits and the fact that there is very little weight on the nose. There are tie-down points at the floats and the tail skid.

Run-up and checklist

The run-up is similar to any single engine aircraft at 1800 to 2000 rpm, bearing in mind the 180HP Lakes and Skimmers need to check carburetor heat operation. The propeller should be cycled three times when cold, one when hot, and magneto drop should be smooth. Shut off the electric fuel pump for a bit to check engine pump.

LAKE LA-4 CHECK LIST	
TAKE OFF	LANDING
BATTERY.....ON	FUEL PUMP..... ON
GENERATOR.....ON	HYD. PUMP.....ON
FUEL PUMP.....ON	MIXTURE.....RICH
HYD. PUMP.....ON	PROP.....HI-RPM
FUEL VALVE.....ON	CARB. HEAT.....AS REQ.
MIXTURE.....RICH	FLAPS.....DOWN
PROP.....HI-RPM	GEAR-DOWN.....(LAND)
CARB. HEAT.....COLD	GEAR-UP.....(WATER)
TRIM.....SET	
FLAPS.....DOWN	
ENGINE INST.....CHECK	

LAKE LA-4-200 CHECK LIST	
TAKE OFF	LANDING
MAGNETOS.....BOTH ON	ALTERNATOR SWITCH...ON
MASTER SWITCH.....ON	FUEL BOOST PUMP..... ON
ALTERNATOR SWITCH...ON	HYDRAULIC PUMP.....ON
FUEL BOOST PUMP... ON	WHEELS DOWN...(LAND)
HYDRAULIC PUMP.....ON	WHEELS UP.....(WATER)
FLAPS.....DOWN	FLAPS.....DOWN
WATER RUDDER.....UP	WATER RUDDER..... UP
TRIM.....SET	TRIM.....SET
PROPELLER.....SET	PROPELLER.....SET
MIXTURE.....SET	MIXTURE.....SET
FUEL VALVE.....ON	
ENGINE INSTR...CHECK	
CONTROLS.....FREE	

Note the differences, but still pretty basic.

Check lists vary from aircraft to aircraft and pilot to pilot. I have had students in the Lake that had a checklist so long I had to go back and take another pee before takeoff. And then of course, there are the folks that seem not to have one at all, and randomly run their hand over the panel and *ask me* if we are good to go.

The Flow checklist. This is the one I like best and it follows the LA-4-200 visually around the cockpit and it is easy to memorize since it is the way our hands and eyes follow switches and gauges around the panel. Setting flight instruments is the only thing missing, but if we do that first before the “flow” list, then when the checklist is done we can go flying...as long as our **seatbelts** are on and the **hatches** are latched. Visualize the cockpit as you are running your finger down the list. Starting with the magneto switch BOTH (touch), circuit breakers ON (touch), gear handle down (touch), flap handle down (touch), hydraulic pressure gauge up (touch)...look down...water rudder up (touch), trim set up (check indicator and look back at the tabs on the tail)...look up...fuel selector on...look forward...mixture, propeller forward (touch). DO NOT GRAB handles...touch. Now you may ask me if we are good to go. Magneto switch location varies on LA-4-180. Fuel selector on ceiling or left side wall in Renegade.

Important items. Take your time.

- **There have been a few instances where children in the back seat have shut off the fuel selector in flight resulting in a forced landing.**
- **Touch, don't grab levers and knobs as your mind might suddenly think it should be moved.**
- **Visually inspect trim tab all models. If you can't see it check before entering cockpit. Do not rely on indicator.**

We are going flying!

From this point on, every time you lift a glass of your favorite beverage, say out loud,

“This is a water landing and the gear is UP!”



At least eight hours from bottle to throttle.

Plant firmly in your mind:

Use flaps for all takeoffs and landings!

In fact, for short term parking, leave ‘em down.

Use rudder for all turns!

An amphibian pilot must always be uncomfortable when the gear is down!

The reaction of the Lake is just the opposite of tractor powered aircraft in the fact that a power reduction causes the nose to go up and addition of power causes the nose to go down. You must react accordingly.

In the event of a power loss the first thing you should do is lower the nose to maintain airspeed!

Members of the Lake Amphibian Club have access to an on-line forum where varied discussions take place ranging from maintenance items, modifications, flying techniques, parts and aircraft for sale, up-coming fly-ins and sharing information about our great Lake Amphibians.

Here are some thoughts to ponder. It hopefully will make more sense by the time you are finished reading the “handbook”.

HELPFUL HINTS FOR NEW AND OLD LAKE PILOTS

Or common mistakes

Attempting to fly in conditions beyond the pilot’s proficiency -

No more comment.

Over-control of the elevator (pitch) in rough water – Pick a point in the distance to help hold the **attitude** the same throughout takeoff and landing, rather than adjusting pitch for each wave passing under the hull.

Attempting to “put” the airplane on the water after a skip or bounce – Never try to “put” the aircraft on the water with forward wheel or down elevator. Hold the landing or step **attitude** righteously and control the rate of descent with **small** adjustments of the throttle **if needed**, and wait for it to land itself. Relax back pressure ever so slightly after touchdown. Wings must be level. Do not be in a rush to transition to a full stall landing, as you probably have excess speed and are not high enough off the water to execute a tail low landing.

Not recognizing when to transition to a full stall landing – The general rule is when all else fails during a step landing. In most cases, if the **attitude** is still correct after a skip-out and very little altitude is gained, the aircraft will remain on the water at the next touchdown. The cause of the skip is several things – excess nose high **attitude**, excess speed, excess rate of descent or flying out of a wind gust. The common mistake is excess up elevator upon the next contact with the water, resulting in the aircraft skipping out again and again. There is no hope of saving the step landing at this point. Therefore, reduce power to idle and slowly apply up-elevator without ballooning, and execute a full stall arrival. No full stall landings allowed with Renegade.

The wheel must be held full back with no power or you will continue to skip out again and again.

Not recognizing when to execute a glassy water landing – anytime the surface is questionable due to sun reflection, overcast sky, or mixed glassy and ripples. **It is the most dangerous condition of seaplane flying. Power lines come next on the list.**

Failure to use full control input when needed – Getting on the step in a crosswind. Tight step turns. Crosswind land landings. Full stall landings.

Failure to look out the window during gear repositioning – We can see all three gear, why not look out at them, not only during a landing check, but also when we have asked it to come up or down. We will see immediately if there is a retraction problem. **It is possible to have a gear light with one gear in the wrong position.** All it takes is a switch corroded or stuck in the closed position on the problem gear. **Look out the window!**

Failure to use rudder to control direction – this applies whether high or low speed, in the air or on the water, on the step or in displacement. Ailerons should be used only to keep the wings level or to plant the inboard float firmly on the water in a step turn. **Rudder only** should be used to change the direction of step turn.

Entering step turns with excessive water speed - All step activity should be done at reduced power settings so as to keep the speed under control, with the majority of the weight of the aircraft on the hull, not on the wings. Change the rate of turn with the rudder, not ailerons.

Failure to use enough up elevator in step turns - Just as in the air, the nose wants to go down in a turn, therefore back pressure is required. The aircraft wants to slow down in a turn, therefore power must be added forcing the nose down, therefore, more back pressure is needed. With this extra back pressure, the aircraft wants to slow down, resulting in more power which requires more back pressure until finally a happy medium is reached. The friction of the hull contact with the water adds to this slow down. Without this back pressure the center of buoyancy is ahead of the center of gravity resulting in a very unstable condition which can result in a quick 180 degree, out-of-control change of direction known as a water loop. **Up trim is a must.** In rolling out of the turn, with rudder, power must be reduced along with the extra back pressure.

Misuse of full power close to the surface, water or land - When executing a go-around, **smoothly apply about one-half throttle**, assume a level attitude and slowly increase power to full, compensating for the downward pitch of the nose. If you have a sink rate started, immediate full power will pitch the nose down and accentuate the sink rate and it is possible that the aircraft will touch down again. Therefore, **we must be in the correct attitude**, which is the level or water landing **attitude**. If you are nose high, speed will not be gained, and of course, the wings must be kept level. **Do not climb out of “ground-effect” until best flaps down climb speed is reached.**

Allowing the aircraft to leave rough water before it is ready to fly – By rough water I mean over 12 inch waves in the Buccaneer and 15 in the Renegade. Generally there is an embedded rogue wave every 20 to 30 waves, which is higher than the rest. Any wave hitting the hull at speed will tend to push the nose up, but this one is the worst. Care must be taken to keep the nose at the proper **attitude** when crossing it. A slight relaxation of back pressure may be necessary to prevent being propelled skyward.

Should this happen, maintain the same correct **attitude (the step landing attitude)** righteously. If the aircraft is not ready to fly, it will descend and re-contact the water at the proper **attitude** and fly off again when it is ready. If the **attitude** is not kept level, the speed will not increase for takeoff.

Waiting too long to abort the takeoff - Bearing in mind the amount of nose down thrust developed at takeoff, it is important to **make the decision early** as to whether to abort. When close to takeoff speed, if you rapidly reduce the throttle to idle, you are going to takeoff. Therefore make an early decision and reduce power slowly and relax back pressure to compensate for the nose-up tendency with reduction of power. More than one Lake pilot has been left hanging, nose high at 20 feet of altitude with no power and diminishing airspeed due to no elevator compensation. Should this happen, first level the **attitude**, with an immediate increase of power to half throttle. Stabilize the aircraft, slowly add full power, increase the airspeed to flaps down climb speed and continue the takeoff. It is possible to re-contact the water and you will be in the proper attitude for the landing and will fly shortly after (as in the previous example).

ATTITUDE ATTITUDE ATTITUDE ATTITUDE ATTITUDE ATTITUDE

You must be aware of the ATTITUDE and water speed of the Lake Amphibian while on the water at all times. You must be aware of wave and water conditions, power settings, water speed, airspeed, and you must do most of it by the “seat of your pants” and the sight picture, and the sound of the water passing under the hull...the only thing you MUST perform “by the book” is the glassy water landing. It MUST be done right every time.

Flight at last – Before we enter the cockpit, stand back and look at the attitude of the Lake on the tarmac. Note that the lowest part of the plane is the **step** and the skag. Note that it is directly below the engine and the fuel tank and horizontally at the same station as the landing gear. When we make a step landing we will be in this same attitude.



Check that the trim tabs are up at least 30 degrees. If you could see the elevator at this point, you would notice that it is down a few degrees. It is caused by springs behind the panel to give artificial “feel” to the controls. It takes about 2 inches of pull on the yoke to get it level for our takeoff run. Now hop in and note again, the attitude. This is what the sight picture will be from the cockpit but without the landing gear, and when you are about 6 inches off the water. Remember this. After you have buckled in and started the engine, head for the end of the runway. It is important to stay in the center of the taxiway to insure the **floats** do not hit a **taxiway light**. In northern climes these lights can be pretty tall due to snow banks. As mentioned before it is easier to taxi with some extra speed, but under control. You will find that the rudder alone gives you a little bit of turning, providing there is no crosswind. When you have reached the “hold short” line, stop and do a run-up and use the **pre-takeoff check list**. Unless, the wind is blowing a gale, keep pointed down the taxiway. While you are a beginner, **more than likely the nose gear is going to caster as you stop**. You are going to need lots of power and rudder and brake and room to get rolling straight again. It is not unusual for the instructor to get out and grab a wingtip to straighten things out.

Taxi onto the runway and once you get lined up **add full throttle slowly, slide your feet down away from the brakes** and use the rudder to keep you straight down the runway. As you pick up speed keep adding back pressure (remember the nose-down thrust) and between 55 and 60 mph you will lift off. Once airborne, relax a little back pressure and allow the **airspeed** to increase to **65 mph** (best flap down climb speed). **Renegade 70 knots**. Now is the time to retract the landing gear. **Grab** the wheel shaped handle, pull it out of the detent, and smoothly raise the handle to the full up position. We know you have a lot to do now and things are happening quickly, BUT, glance out the window to see if the gear is doing what you asked it to. *Do this every time you select a different position*. You should hear the hydraulic pump running and see the pressure building on the gauge.

Reset trim if necessary, and move the **propeller rpm** lever slowly rearward until you see **2600** on the tachometer. Renegade **2500**. Leave the **throttle** at **FULL**. Leave the **flaps down** until at least 500 feet AGL; preferably higher. The reason for this is that the flaps are hydraulically operated and it takes a few seconds for them to actuate fully. In the event of an engine failure and a forced landing we want the flaps down again. Therefore, *do not be in a rush to bring them up*. By now we should have enough altitude to raise them. Trim slightly down and **grab** the flap-shaped handle, pull it out of its detent, and smoothly raise the handle to the full up position. Trim down immediately and allow the **airspeed** to climb to **85 mph** (best flaps-up climb speed). **Renegade 76 knots**. Reset **trim** if necessary.

Leveling off should be done with the same power setting as the climb. When you reach your desired altitude, lower the nose for cruise flight. *For most Lake owners the horizon should be about 3 inches above the bottom of the windscreen*. Hold that attitude and trim the aircraft down until the airspeed stops climbing and all the while using the trim to relieve pressure on the yoke.

Now, and only now reduce power to 24 inches of manifold pressure and 2400 RPM (approx. 75%). Renegade 2250 RPM and 25 inches manifold pressure. This technique gives you maximum cruise airspeed immediately after level off.

If you reduce power at the desired altitude without lowering the nose to the proper attitude, you will end up nose-high, about 20 mph slower, mushing through the air, and going nowhere fast. Very frustrating to a seasoned instructor.

Now fly straight and level for a while relaxing and getting the trim exactly right with short jabs (full travel) of the handle fore and aft. **Try some hands off flying.** The Lake flies itself much better than a novice (and some seasoned pilots). At this point your instructor will demonstrate the effects of power changes on pitch (attitude). Without touching the wheel, he will retard the throttle to idle slowly and you will see the nose rise, and the airspeed reduce. As the airspeed reduces, the nose will start down and the aircraft will start gliding. During the glide, he will then increase the power to cruise power and the nose will initiate a dive and as the airspeed comes back up, the nose will do the same. He will then demonstrate the same thing, but controlling this oscillation by up and down elevator. When the nose comes up, use forward pressure (down elevator) and when the nose goes down, use back pressure (up elevator). You will get used to this quite soon and your instructor will remind you until you start doing it by second nature. It is extremely important during an **engine failure**, that you do not have to think twice about **lowering the nose immediately** to prevent speed reduction below glide speed.

Turns. You might have noticed that I have inserted occasionally in this handbook– *make all turns with the rudder*, or make any directional change with the rudder. Now you will see why. With your feet on the floor try making a turn with aileron only. AHA!

When you turn the wheel to the right, the nose goes left. Try it

back and forth a few times and you will have the nose swinging back and forth, uncoordinated and in the wrong direction. Now try it with rudder alone and hands off the wheel. Another AHA! moment...in fact, once you have established an angle of bank take your feet off the rudders, add a little up trim, and you can fly in circles all day long, hands and feet off. Practice some coordinated turns, leading with the rudder with the help of the ailerons. This phenomenon is called “adverse yaw, or aileron yaw” and every airplane has it, but the Lake demonstrates it the best thanks to the long wide ailerons way out on the wing. The shorter winged Skimmers have it too, but it is not as pronounced.

I had given it no thought over many years until I corresponded with another instructor who was involved in a wreck of a Lake with a student on a gusty crosswind day. They ended up off the side of the runway. I’ll bet the student was trying to compensate for the drift with mostly aileron and got the nose swinging wildly. Each time he let up on the aileron, the drift would start again, farther off the runway. All this with little thought of using the rudders to keep his direction and the aileron for drift control. *In landing crosswind, never let up on the aileron* for this reason.

And then I got thinking some more (uh oh, you say). What about step turns on the water. If you are making a left turn and feel it is getting too tight...if you use right aileron to correct, the nose is going to go left, making the turn even tighter. On top of this, the nose tends to go down in a turn. So you basically have the makings for a **water loop** (and we haven’t even started our water work yet). **Excess speed, nose low, and a too tight turn.**

Winter driving – if you start to skid turn toward the direction of the skid. Same thing with the too-tight step turn, use the opposite rudder to stop the skid by reducing the rate of turn. Has this all along been the reason that Lake Amphibians have been lost executing step turns at too high a speed?

The editor has found while giving recurrent training the Lake pilot tends to get a bit lazy with the rudders over time, so please try to prove me wrong.

Slow flight and stalls. It has been recommended that these be done with flaps down at a safe altitude. While maintaining level flight, reduce manifold pressure to about 18 inches, slowing the airspeed with back pressure until minimum controllable speed is reached. Do it gear down also. This should be about 50 mph in the Skimmers and LA-4-180 and 45 in the 200 and maybe lower with VGs. If needed, increase power to maintain altitude. Slowly increase the back pressure until you feel the stall burble and hear the prop cavitating due to disturbed airflow from the high angle of attack. Most Lakes at full power and the elevator full up, barely stall at all. The nose bobs up and down alternately flying and stalling and this usually results in a gain of altitude. Immediate control is regained by relaxing back pressure. **The Lake will spin...quite quickly I am told**, but I don't want to see how fast. For this reason power-off stalls should be done carefully as there is very little, if any warning, in both the Buccaneer and Renegade (more apt to drop a wing). The same is true for flaps up stalls. Recovery should be done immediately and generally with some power added, especially in the Renegade. "Feel" is quite different without propeller blast on the tail.

While you have some altitude and the gear and flaps down this would be a good time to demonstrate the Lake's ability to make an emergency descent. Reduce **power to zero** and point the **nose down**; I mean really down. You will not come close to the maximum gear and flap down speed. When you have had enough of that bring the attitude back to level flight and note how fast the airspeed bleeds off. You will be amazed. **Remember this as you will use it all the time.** Now, off to your water landing area once again checking that the gear is up for water landings.

Important items.

- Flap and trim systems have restrictors in-line to slow the action to safe speed.
- Landing gear does not have restrictors except for nose gear in Skimmers and 180s. Some newer modified.
- Old adage if uncoordinated. Step on the ball.
- Amount of trim varies with CG and weight and airspeed.
- From Aircraft Flight Manual: *Do not use full nose up trim for takeoff in the most rear c.g. reduced weight condition since engine failure in such configuration will result in inability to pitch nose down when the gear and flaps are retracted.*
- Editors note: For this reason when raising the flaps ALWAYS trim down immediately.
- Always raise the landing gear once a climb has been started from a land takeoff. Old adage about leaving it down until end of runway increases the chance of forgetting to do so.
- An amphibian pilot must always be uncomfortable when the gear is down.
- Check lists should be said out loud so your passenger has a chance to catch you saying one thing and doing another.
- Take your time. Start over if interrupted.
- During glide the feel of the rudder will be totally different
- Use rudder to turn and change direction.
- Engine failure – lower the nose first. Really lower it !
- Emergency landing - It is safer to land wheels up on an unknown surface and a checklist for the desired landing used, especially if on water.
- ALWAYS look out the window when retracting or extending the landing gear
- ALWAYS look out the window during a water landing checklist to make sure there are no gear down.



Approach and water landing

Bet you thought we would never get here. Before you even get to your water landing area, look outside and check landing gear up and *say it out loud!* **This is a water landing and the gear is up!** Descend to about 800 feet above water level and circle your landing area flaps down, 20 inches MP. We are looking for: *WIRES, GLASSY WATER, wind direction, depth of, and water surface conditions and floating debris, plus boats and boat wakes.* We are looking for: *the best approach path and departure path and of course, the useful length of our water. Most important is a "go-around" point/and abort takeoff point.* **WIRES are not usually visible from all directions, but if you circle and concentrate on looking for poles along the shoreline, sooner or later you will spot them.** They are sometimes located between the shore and close-to-shore islands. Look up-stream and down-stream, left and right, for *vessels that might have gone through your area, but are now out of sight. They are, but their wakes are not.*

On navigable rivers, note the buoys that mark the channel. This area because of the tide and current will generally develop a bad swell, however the water on either side is shallower and usually usable.

The step landing. Once you have made your decisions about landing, fly a **downwind** by your wet runway, repeating your **checklist out loud**, moving mixture to rich and propeller to high

RPM (this can wait until final if in a noise sensitive area-but don't forget it). Turn **base leg** and **reduce power** to 18 inches MP and start your **descent**. 75 to 80 mph is nice, nose down. Repeat gear up **checklist**. Continue a steady descent passing over the tree line comfortably. **Nose down more** and reduce power to 12 inches MP. Trim if necessary. Continue nose down descent until about **10 feet** over the water while repeating gear up checklist out loud. At this point, start a slow change of attitude to the water landing attitude ending up about a foot off the water (remember when we first got in the plane on the ramp – same attitude). **Wings level. Hold attitude and wait. It will land itself.**



Don't be in a rush, as the Lake knows what to do. Once you have touched down smoothly and are planing over the water, slowly retard the throttle to idle. As you do this, ease forward on the wheel without changing the attitude (relax backpressure) and let it slide out into the displacement mode (off the step) all by itself. During future training complete power-off landings will be practiced. Quite a thrill, especially when you see how deep you sit in the water. Note the floats just skimming the surface, making for a rock-solid ride with no danger of tipping. Now...**wipe that silly grin off your face!**

Back to work! Don't ever fight the Lake. It does a better job than most pilots. Use just a little power (not over 1000 RPM) and full rudder and do some turns. Now you know why the huge tail feathers. Back into the wind, and put down the water rudder and use no power and do a few turns. A very positive feel and a really tight turn, even in a stiff breeze.



High RPM power in the displacement mode does nothing more than make **noise** and create **spray** on the windscreen. Open the hatch wide and enjoy running your hand through the water. Stand up in the cockpit and look around and see what is happening outside.

Displacement taxi. If there is no appreciable wind, taxiing is easy and it is permissible to do it with the hatch(es) open. However, it does not take much wind to blow the hatch closed if you don't have struts to hold them open. Many a Lake driver has a permanent dent in his elbow from the hatch blowing closed. Put the gear down to see how much it slows the forward motion. Select one magneto and you will be even slower. This will be useful later when docking or mooring. When you have a breeze blowing, the aircraft will weathercock into the wind and it is a good way of knowing what direction the wind is from if you are not sure. There are times when it will be so strong that even with the water rudder down, it is unable to turn downwind. In this case turn about 20 degrees to the right of the wind, then full left rudder and about 1000 rpm of power and get a rotation started to the left. Keep the power on and rudder in, until directly downwind. Center the rudder and reduce the power. *This is the only time to use power while in displacement.* The turn from downwind to upwind demands no power at all, since a stiff breeze with power will generally bury the outboard float. If it is strong enough, it will also **bury the wingtip**. If this happens simply bring the power to **idle**, **retract** the water rudder, and it will easily come about into the wind. Allow time for the wingtip to drain. Do not panic.



Getting on the step. Use full power. In lower powered Lakes, a lot of the work of getting on the step is done by the hull, helped along by the smoothness of the water and the nose-down thrust of the engine. On its own, hands off, the Lake does a fine job of getting on the step by itself when properly trimmed (full up) with a **smooth application of power**. Use full up-elevator and slowly add full throttle smoothly. When the bow wave reaches your sight in the lower corner of the windscreen it is clear of the nose gear doors, relax all up elevator and allow the nose to lower to the proper step taxi attitude and stop the nose descent with some up elevator to prevent a porpoise just before the right attitude is reached. You are now on the step, but not yet under control. Reduce power to half throttle. If all is correct, you should be able to taxi hands off. If the nose bobs up and down, you need more up trim, more back pressure, or less nose down thrust. **Reduce power if necessary.**

With a heavy load and little wind it can sometimes be difficult to get on the step. Using full forward and back motions on the wheel can sometimes help. Using less up trim might help. Smoother water helps. Starting with the flaps up is recommended by some Lake pilots, but **do not forget to put them down again** once the step has been attained.

This instructor does not recommend the latter because it means making changes while in motion which could affect the attitude, which could lead to other problems. Forgetting is the worst.



Step taxi. This is planing on the surface like a boat in exactly the same attitude as the step landing, only slower, and with the weight of the aircraft on the hull. ***It is critical that the speed be kept far below flying speed.*** If you sense you are tail low and nose high, add more power. You will sense it if that is the case. Should you not get on the step, or fall off the step, retard the throttle to idle and start over as you are doing nothing more than making noise and spray along with losing your momentum.

Porpoising must be stopped immediately as it will get worse if left alone. It is similar to a boat with too much weight in the nose and under power. The nose will continue to bob up and down with the amplitude getting greater with each cycle. The pilot must keep the center of buoyancy farther aft on the hull near the center of gravity. This is done by using more up-elevator until it stops, and it will do so immediately. It is caused by excess weight in the cockpit, not enough up-trim or up-elevator, and too much power for the speed desired resulting in a nose-low attitude. You will be able to feel that “sweet spot” where the combination is correct. If you are unable to control the porpoise, slowly reduce the power and “fall off the step” before damage is done.

Water Loops are caused because the nose is too low during step taxiing or takeoffs with the center of buoyancy way forward of the

center of gravity. It is the fastest, most uncontrolled 180 degree turn you will ever want to make on the water and usually does some damage. It is the reason we mention ATTITUDE ATTITUDE ATTITUDE constantly.

Step turns. Just as it does when airborne, the **nose wants to go down in a turn** and then back up when straightening out. *Have I mentioned making all turns with the rudder?* Now that we have everything under control and are at a comfortable water speed, depress either rudder pedal lightly to initiate a turn using no aileron. Notice the nose going down. Apply back pressure to correct the attitude.

As you roll out of your turn with rudder, the nose will come back up, therefore reduce your back pressure, exactly like you do when airborne. While straight ahead, try to make turns with just the aileron and watch the nose. It turns the wrong way! Aileron yaw –uncoordinated. Rudder only – nice and comfortable...exactly like when airborne. Until you are more proficient, straight ahead and mild turns should be enough. More on step turns later.



The only LA-4 with no wheels. s/n 410. 1969 Memphis TN. Staber photo.

Water takeoff. After using your checklist, it all starts with getting on the step as we just discussed. This time we do the same thing...onto the step, reduce power to about $\frac{3}{4}$ throttle...stabilize attitude, check water conditions and slowly add full power. You will need even more back pressure due to the extra power and the friction of the hull on the water. You should achieve lift off at about 55 mph. DO NOT rotate off the water, but allow it to fly itself off. The faster you go the more back pressure is needed. Once airborne, level off to allow the water to drain away from the fuselage, accelerate to 65 mph (flaps down best rate of climb speed). Renegade 62 to 70 knots. **There is no rule stating that you must continue the takeoff if you don't like the conditions. Abort sooner not later!**

Twenty-six miles across the sea. Since we are on the river today (a long lake works, too), a great tool to get used to being near the water is to fly a long ways up the river into the wind at reduced power and airspeed, just over the surface. We must remain in the water landing attitude but not touch and carry just enough power to keep us from touching until we find a nice spot and then reduce power by a couple of inches of manifold pressure, touch down, add our power back, and continue just off the surface. It is kind of like a 26 mile glassy water landing, but without the glassy water. We are now –

“Reading the water!” To boaters, this comes easy. I learned in my Skimmer; whether to land before, during or after the wind gust (cat's paw) and what to expect when you fly out of one when your speed has deteriorated while letting down in the gust (usually a skip and then a full-stall landing). All this can be seen from above also. Once you master reading the water; and it is never the same, your landings become much better, along with your decision making. When you get back to the airport, you will not have all these nice signs to tell you about the crosswind or the gusts. While you are maneuvering **close to the surface DO NOT bank your turns**, meaning wings level, shallow bank, kick-it-

around-with-the-rudder type turns. The floats are designed to plane on the surface with forward speed, but not the wingtips.

Important items for a step landing.

- Use water checklist on final. Gear is up. Flaps down. Prop control forward. UP – DOWN - FORWARD
- Approach the water landing with a fairly steep nose-down descent. Wings level.
- About 10 feet off the water break the glide and feel for the water while leveling at the same time. Use very little power. You should be at the correct attitude at a foot or less from the water.
- Wait for it to land itself, then slowly relax back pressure as you reduce throttle to idle.
- **Do not** make a long shallow power on approach, reducing power just before touchdown. Guaranteed to skip out due to nose up tendency, and totally different “feel”.
- If at any point you feel uncomfortable do not hesitate to go around and set everything up again properly.
- Remember. Add ½ power, stabilize attitude, full power then climb.
- Should you skip out and are not very high, maintain the **correct attitude and wait** for it to land again. More than likely it will stay on the water this time.
- Should you skip out and you are more than 5 feet, go around using the proper procedure.
- If your forward speed has deteriorated, reduce the throttle to idle and execute a “full stall” landing by up elevator without ballooning, until the tail enters the water, followed by the main hull, fully stalled. It won’t be smooth, but it is very safe. At this point the control wheel should be full aft, preventing the aircraft from flying. Common mistake is to relax or stop back pressure as the tail touches. This lessens the angle of attack and allows the wing to fly again, causing more and more skips.

- NEVER aim directly at another vessel when landing and taking off, but make it obvious to them that you see them.
- Because the Lake is a pusher propeller it is impossible to “hang it on the prop” as one can do with a front mounted puller engine. You must have climb speed to fly away out of ground effect.
- If, at any point a hatch pops open ignore it as the forward speed will keep it shut. Wait until things are under control and then shut it. On a hot day it can be used to cool the cockpit.
- Always leave yourself an “out”; a place to abort a takeoff or a landing with room to climb away. In other words, DO NOT land directly towards shore or any other obstructions like boats or docks. If something goes wrong you need a place to get away. Up on shore or on top of a boat or dock is NOT that place.

Full stall landing. Do not execute a full stall landing with the Renegade models due to the extra-length fuselage and the heavier weight. This is not as limiting as it sounds. Due to both of those reasons, it can operate on much rougher water conditions than the LA-4-200 and is more docile. As long as you have come close to doing a step landing correctly it will generally make a passable landing. “It takes a pilot to fly a Buccaneer, while anyone can land a Renegade” is the joke amongst Lake Buccaneer owners.

There are two times when you want to do a full stall landing.

1. When the wind is howling up a storm and big waves are closely placed. Look at it this way. If you are landing into a 25 kt breeze and the Lake stalls at 45; you are only touching down at 20. Those who have experienced this say they could have walked faster and it was not uncomfortable. Turning out of the wind was. The landing

must be done correctly, though; completely stalled...wheel full aft.

2. When you have “blown” a step landing and have run out of options and airspeed at the same time. Or generally, if you have skipped twice already, full stall it in. A supreme effort must be made NOT to balloon even higher by raising the nose even higher than it might be already, but level the attitude and allow it to descend to within 2 feet of the water. Then follow the procedure at the bottom of page 42.
- **Full stall landings can be fun, but must be done properly. Most common mistake is not keeping full up-elevator after touchdown, resulting in skipping out.**
 - **Very rarely does one accomplish a smooth full stall landing. Common mistake is touching down before fully stalled.**
 - **No full stall landings allowed by Renegade.**



GLASSY WATER LANDING. *The most dangerous operation in water flying.* Every glassy water landing must be done correctly and by the numbers. Here is where the “seat of your pants” flying does not work. There are different types of glassy water, but there is one thing the same about them – you will have no visual reference as to where the surface of the water is. In the above photo, out by the island, you will see really glassy water, and close in you have glassy water.

DO NOT ever think that you know where the surface is when making a glassy water approach and landing because YOU WILL BE WRONG EVERY TIME. There are seaplane pilots who thought they had landed but were still 50 feet in the air. There are seaplane pilots that knew they still had altitude to lose, and flew into the water unprepared at the wrong attitude. The actual touchdown can be so smooth that one does not know that they are on the water...**obviously we had better do it right...by the numbers.** Remove headsets as we need to hear the sound of the water.

Glassy water approaches and landings should be executed at any time there is a doubt about where the surface is: when there is very little wind and a slight ripple making part of your landing area glassy and part not. It could change to totally glassy in the time it takes to say “this is a water landing and the gear is up!”. Or that same condition with an overcast sky, which is reflected by the wave-less water surface. Then there is that hazy, lazy days of Summer; hot and humid without a breath of air stirring. A good day to go swimming...or boating...**leaving glassy wakes spreading out behind. Caution** – As we have high density altitude, glassy water, and glassy boat wakes!

Speaking of swimming. It is great fun to go swimming from the Lake. Diving off the wings or the cabin roof. **NEVER jump in the water from your Lake without a line in your hand. One that is attached to the plane.** The Lake will drift faster in a breeze than

you can swim. At least one soul that the editor knew made his final water landing in the sky swimming after his Lake.

When you feel the need to make a glassy water landing after circling your landing area, stay at altitude for a bit and set up a glassy water approach. Your flaps should already be down. Reduce the power to 15-16 inches of manifold pressure and slowly raise the nose to slightly above the horizon. How do you know, you may ask? If you look across the cabin at the co-pilot's window base and "eyeball" the horizon in the distance you can come pretty close. By this time we should be getting our airspeed down around 60. At this point, you should see a descent started. We are looking for 150-200 feet per minute down. Let things stabilize for a bit. If everything is correct we should end up somewhere close to 58 mph. Check attitude and rate of descent again. Add power if rate of descent is too high in ½ inch increments. Now we head for the water at pattern airspeeds after completing our checklist. If we start our glassy water approach too high it we will cover too much time and distance. Therefore, make a normal approach and let down to a last visual reference (LVR). This where you dial in the settings that were correct at altitude.

If you bleed off the airspeed first before adding power you will get a sink rate started greater than the 150 fpm that you want and need. In order to get out of that sink rate you will need lots of power and altitude (that you don't have) and you have ruined that nice stabilized approach that you had going.

If possible, ALWAYS approach and land parallel to shore which will give you a LVR about halfway down the trees or about 15 feet above the water. **NEVER land way out in the middle of a body of water** with no visual reference. Now it is a matter of waiting. Hold the attitude precisely and DO NOT FLARE. At 150 feet per minute descent we should be on the water fairly soon. AND you can glance quickly out the window at the shore to see how you are

progressing. If you don't seem to be descending, reduce the manifold pressure by ½ inch increments. Throttle controls descent. Elevator controls airspeed and attitude. If you are running out of room, go around and try again. Don't forget that for every water landing you need that "down and stopped" or "go-around" decision point.

Use everything you can think of to get you as close to the water as possible. Land in the reeds at the water's edge if possible. Or use them as an LVR; like buoys in the river or anchored boats. Look in the distance at the far shoreline.

The landing is basically an **instrument approach to a step landing**. Any attitude upon contact that is more **nose high is going to result in a skip out of the water which is the last thing we want on glassy water**. It cannot be done as in a float plane where as long as you are nose high with minimum descent rate you are safe. If you skip out, you **do not know how high you are** and you are at a **reduced power** setting and have **lost your correct attitude**. **NEVER attempt a glassy water landing in a Lake without a checkout from a qualified Lake instructor.**

The eagle has landed. But we are not done yet. After touchdown do not do anything unless it is a very, very slight pitch change if you sense you are too nose-low. **DO NOT yank the power off** in case you are not really on the water, but wait for the drag of the hull on the water to slow you down until you actually see your own bow wave out of the corner of your eye. Then and only then, should you reduce the throttle to idle. Should you yank the power off you will have a sudden lack of nose-down thrust which will allow the nose to come up and you stand the chance of going airborne again, now with no power or any idea of how high you are. By leaving your power on after touchdown, you have the chance of flying away from the landing if you don't like the water conditions. That should be done very, very carefully with

absolutely no nose down pitch as power is added (remember the skipped landing procedure).

Glassy water takeoff. Care should be taken to **not fly back into the water after takeoff** by ensuring a rate of climb immediately until visual references have returned. Getting on the step will take longer and contrary to the landing, you will need to **feel the attitude by the sound of the water and feel for the sweet spot where you gain speed rapidly.** Your takeoff run is going to be longer due the glassy surface of the water. There is a very narrow pitch window and it might take a few minute (tiny) adjustments.

Important items.

- **Glassy water is the most dangerous situation for seaplane operations. Never think you know where the surface is. You must do this landing correctly!**
- **Never attempt a glassy water landing without a checkout from a qualified Lake Instructor.**
- **Never attempt a glassy water landing way out in the middle of a large lake with no visual references at all.**
- **Glassy water manifold pressure settings depend on the density altitude and the weight carried. Set up an approach at altitude for changing conditions.**
- **Glassy water landings use up much more distance.**
- **Glassy water takeoffs may use miles instead of feet.**
- **If you have a choice between glassy and ripples, always land on the ripples. Beware flying from ripples to glassy *unless at proper speed, attitude and descent rate.***
- **Wait until you have slowed before reducing throttle. No abrupt motions. Remember the nose-down thrust.**
- **Practicing on light waves or ripples is desired, but when you encounter real glassy water be very careful.**
- **There is no sensation quite like real glassy water. Making several landings is not recommended, but you should be proficient with their execution.**

Forced landings. Never attempt a forced landing on glassy water as you have no reference as to where the surface of the water is. The best you can do if you have a forced landing after takeoff is to get as close to the shoreline as you dare. Land in reeds if you have to. Get the nose down immediately and build up enough speed so you have time to play with the attitude and the altitude. It will probably not be a smooth landing, but keeping the level, water landing attitude is crucial.

Forced landings from cruise altitude should be started by slowing to best glide speed, flaps up. This will give you the most distance to a landing area, and the most time to pick your landing place. Once you are within 1000 feet of the ground, extend the flaps and lower your nose as you are now committed to landing. Do not get a sink-rate started since you have no power to recover from it. *Remember that the minute you raise the nose to level the airspeed is going to bleed off quickly.* Point the nose at the point where you intend to flare, which should be short of your intended landing place. Level off at the flare point, as low as you can possibly descend, allow excess speed and altitude to bleed off and execute a normal power-off landing. ***It helps to be proficient in power-off approaches and landings.***

Unless you absolutely know the surface, it is wiser to land gear-up on land and probably not do any damage. If you are force landing on the water, then do it near shore since you have no power to get you there other than the paddle...and if you're lucky, a tailwind.

Another interesting landing is the semi-stall landing, whereupon as the tail and skeg enter the water, relax some back-pressure and roll the aircraft onto a step landing. It is the slowest and smoothest sensation, done correctly, but not for beginners as it takes quite a bit of proficiency to do it correctly.

Approach and Landing

Ground operation.

Now that we have spent some time on the water, we have a much better feel for the Lake Amphibian. We have used our elevators to the maximum, both ways. We have used our rudders to the maximum. We have accomplished slow flight during our glassy water practice. We have established climbs and glides and controlled descents, changed airspeeds, and done several stalls...all without really leaving our water environment. The long trip up the river was perfect for getting used to being close to the water, especially at reduced power, reading the water as we went along and touching down at good places. But now we must head back to the airport to see how much water we have taken on and how much fuel we have burned and talk about what we did and why. We need to gain a little altitude, at least up to traffic pattern altitude which will give us one more practice at leveling off.

Leaning the mixture. We have not done any yet and now is a good time. As long as you are below 75% power you may lean at any altitude, whether carbureted or fuel injected. For short legs like we have here, carefully move the **mixture control aft to lean** until you feel the engine falter (you will also notice that the nose rises slightly), then forward until it runs smoothly. If equipped with an EGT gauge, lean to the hottest (peak) temperature and then 100 degrees richer (cooler). There are other ways, but too lengthy to go into here. It pays to be more precise on a longer trip. Many a Lake pilot has moved the little knob too far, too fast resulting in a self-induced, momentary engine failure.

Since we want to get in the habit of making both water and land traffic patterns the same, as we get near the airport prepare to enter a downwind leg, just as we did for water. But now our checklist is going to change slightly. We are going to put the **gear down and immediately feel uncomfortable!**



Why? Because *amphibian pilots should always feel uncomfortable when the gear is down!* If below 125MPH we put the flaps down, richen the mixture, and the prop at high RPM. And we recite our checklist out loud so our passenger can tell us if we are saying one thing but doing another. “This is a land landing and the gear is down!” Power should be as on the water; 20 inches of manifold pressure and 2400 RPM. Do not descend until turning base leg and then reduce power to 1800 RPM. Fly a close in pattern if possible. Turn base leg when the end of the runway goes behind the float. Adjust power as necessary. 70 to 80 mph is comfortable with a fairly steep nose-down attitude. Once the runway is “made”, reduce throttle to idle, break your glide and feel for the runway, exactly like our water landing and execute a full stall landing, exactly like our water landing. A small amount of power is useful if you are heavy or have gusty winds. Make sure your big feet are not on the toe brakes. In the above photo the pilot is about a foot off the runway and starting to bring the nose up, while looking at the far end of the runway so as not to balloon. As on the water, if you need to change your direction slightly, USE THE RUDDER.

Crosswind landings. Beware adverse yaw. I am repeating this paragraph from page 31. “I had given it no thought over many years until I corresponded with another instructor who was involved in a wreck of a Lake with a student on a gusty crosswind day. They ended up off the side of the runway. I’ll bet the student was trying to compensate for the drift with mostly aileron and got the nose swinging wildly. Each time he let up on the aileron, the drift would start again, farther off the runway. All this

with little thought of using the rudders to keep his direction and the aileron for drift control. In *landing crosswind, never let up on the aileron* for this reason". **This instructor, by the way, was a dyed-in-the-wool floatplane pilot with very little Lake time.** A perfect example of why one should be instructed by a qualified Lake Amphibian instructor. Many NTSB accident reports also reflect this.

Because of all the drag induced by extended landing gear and flaps, and everything else, our power off approach will be quite steep, but remember from our air work how quickly the Skimmers and Lakes lose airspeed. It is essential that we not let the nose get too high, too soon so as to cause a sink rate. Chances are that we do not have enough altitude to fly out of the sink rate with power. In fact, adding power accentuates the sink rate. By relaxing a little back pressure there will usually be enough up elevator left to stop the rate of descent just before the impact...er, landing. We are on the ground. Control your direction with the rudders until your speed bleeds off, then you may use the brakes lightly. Remember, too, that most Lakes have **brake pedals on the left (pilot's side) only** and this is a point where the instructor dare not relax.

The taxi back to the ramp should be done carefully and not too close to other aircraft, since you do not have the braking down to "second nature" yet. If there is no one near the fuel pumps, I generally park with the nose facing the pump since it is a shorter distance to each tank. Use a ladder, or hop up onto the wing and fill the main tank...wait to see if the level goes down to **check for a collapsed bladder**. If we are going off again for more water work, I generally leave the floats empty. After fueling, is a good time to pull the drain plugs to **see how much water we have taken on board**. A slope to the ground comes in handy as the water flows away from us. A cup or two is not considered excessive. A **gallon** or two is **excessive**, and a good close look at your bottom is needed. Obviously, we need to move to dryer ground.

Leaking bottom. The obvious place is along the keel strip where you might find the sealant peeled away, usually due to seeping hydraulic fluid. Popped rivets can be a cause. Sometimes a head pops off a rivet due to corrosion, or an encounter with a rogue wave could have flexed the skin enough to pop a head off. They usually are hard to find and the only two I have popped have been off to the right side, near the chine and under the back seat area. An extremely bad case is where a foot-long line of rivets have popped (like under the battery) and there is no leakage from the outside while you are looking, but if you press firmly up on the skin, it finally becomes apparent. Check aft of the step also up to the water-tight bulkhead, as water entering this compartment ends up at the step drain. **It is super important to make sure that the aft-most compartment does not take on water as your weight and balance will be severely affected. Ask me how I know!**

Directly behind the nose gear where there are several layers of skin, has been known to leak, and at the base of the tail. One “smoking” loose rivet can take on water. A **1/8 inch rivet hole** when sitting on the water **acts like a fire hose** under the floorboards.

That should do it for today. Go home and think about what went right and more importantly what went wrong...and how much fun it is. Next lesson will be beaching and docking and ramping.



Beaching, docking, ramping, mooring And getting stuck!

The picture on the previous page is exactly what we are looking for, especially if we have a gaggle of Lakes looking for a place to picnic. It is sandy (with maybe an occasional rock), it is protected (except from an occasional barge swell), there are outdoor cookers...and **it is tidal** (well, almost exactly what we want). It is on the Hudson River almost to Albany. Check your tide lists. It has been known to have some pretty deep troughs underwater (enough to bend a nose oleo). It is in an area where mud flats abound, although I have been up on the beach when the tide was out, I would not trust it except on the wet sand. **Walk it first!**

Here is what looks like a perfect beach. But it wasn't. Nice hard gravel, it gets deep fast. See the boat behind. It had a fishing tackle box in it. **I blew it over with my prop wash!**



A good one for wheels up or down. Hard sand followed by mowed grass. No tide or wakes.

Always come in wheels down until you know what the bottom is like.



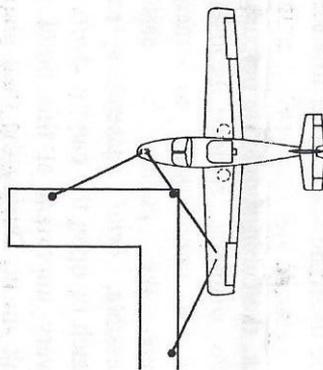
Priest Lake, Idaho. 2016 Unusual to find a beach this size. Judy Staber photo.

To turn away from the beach simply start the engine, water rudder up, use full rudder, lots of power and pivot on the skag. When aiming at deep water increase the power with some down elevator, and you will slide right into the drink, hardly getting your feet wet! Water rudder up of course.

Docking is one of the most difficult things to do with the Lakes and Skimmers, due to the mid-fuselage placement of the wings and the outboard floats that make our aircraft so stable while on the water. Unless the wind is either directly on the nose or tail, it is dicey unless you **have knowledgeable help on the dock**. Nose wind is preferred due to a slower approach speed. There should be no posts above dock height which should be no higher than the nose bumper, and preferably a bit lower. It is helpful if it is low enough to go under the wing and narrow enough not to hit the wing float. This is convenient for simply stepping from the pilot seat to the dock. Flaps should be raised if docking in this mode. Bumpers are supplied on the floats, but may not line up with the dock. Shut the engine down well in advance and head for the dock head on. Be prepared well in advance with a line tied to a cleat on the nose, paddle ready, radios off, water rudder down.

You might need to paddle to reach the dock, or you might be too fast, which means back-paddling and if that is not enough **put the gear down.** "Sculling" with the rudder might be just enough to get you there if you are too short. Last resort is to hop out on the nose if too fast and **push-off with a mighty shove** and leap to the dock just before nose contact and with the line in your hand and attached to the airplane. Be prepared to leap out into the water at any time if you find the need to fend off rocks, etc. **It is doable if ALL of the conditions are right and you are spry.**

The example to the right is supposed to keep you away from the dock under any condition. I have had good luck with tying up on the inside of the "L" once you have unloaded all needed items. Needless to say, make sure you don't leak and your bilge pump is operative.



Ramping is always nice, but there some items to watch out for. **Make sure your wheels are down!** Years ago I was giving rides from my back yard and to keep the weeds and muck out of the wheels, I used the dock. After the last ride of the day to someone who had never flown before, I decided to pull out onto the grass. I lined up, elevator full up, and advanced the throttle to full to get through the weeds. The nose shot up and we lurched forward only to come to a complete stop in the weeds and muck and me with a red face. But I feel better now, after all these years, because I have heard of others doing it, some in front of large crowds...and on concrete. **Make sure your wingspan will fit the opening at the top of the ramp,** since it is impossible to turn around.

Make sure the ramp is wide enough for your landing gear with a good two feet either side as insurance. **Make sure the ramp goes far enough underwater**, deep enough so that you will not “stub” your nose on the end of it. **Beware tidal water for this reason.**

Priest Lake, Idaho. Tanglefoot SPB C-FNUI s/n 1098 Staber photo



The most difficult ramping occurs when there is a **quartering tail wind**. Some of the positive steering of the water rudder is lost due to the landing gear being down and one must maintain a **straight track to the ramp by “crabbing” into the wind** resulting in the arrival at the ramp being at an angle and you must have the downwind landing gear lined up with the ramp. As soon as the **wheel rolls on the ramp add full power** and drive up the ramp. **Do not reduce power until you have reached the top**, as you do not want the nose wheel to turn you to the edge of the ramp. If you **get into difficulties, stop and get help**. If you cannot get the Lake lined up with the ramp, abort the attempt early on, by turning into the wind and raising the water rudder, exactly what you did when turning from downwind to upwind in displacement taxi (page 37). The editor’s rampings at Greenville, Maine were

vividly recalled while writing the above instructions. You may leave the water rudder down until you have calmed down at the parking area.



Renegade N8553Q s/n 232. Note the length of the fuselage. Staber photo

What goes up, must come down. A Buccaneer descending a ramp will generally scrape the tail skid as the nose floats. To eliminate this, just as the nose starts to float, close the hatch, full down elevator, release the brakes and apply a goodly amount of power which will **push the nose down** into the water. When the nose floats up, the tail will be clear of the ramp. The Renegade is even more critical due to the extra length and weight. Use caution.

But back to the top. Make sure you are centered on the ramp and ease over the top keeping the speed at a minimum. It is essential to remain centered and under control by doing the “toe-brake two-step” and riding the brakes until you reach the water line. Since most ramps are slippery under the surface, you will need to prevent sliding by releasing the brakes and generally use the above mentioned procedure to prevent striking the tail skid.

Water rudder should be up during descent for the same reason. It is helpful to have the nose wheel straight when you retract the gear to eliminate nose wheel shimmy during the next ground landing. More than one Lake pilot has forgotten to raise the landing gear before attempting a takeoff. Lots of “sound and fury, signifying nothing”.

Mooring. If a mooring line is attached to the off-center cleat on the nose, the aircraft will not float directly into the wind, but off to the side a bit. This can be solved by using a “Y” yoke to two cleats on the nose. Many owners have mounted a mooring ring just below the rubber bumper and in front of the nose doors and it works like a charm, keeping the aircraft centered without lines chafing the paint on the bow. The Lake will ride out some heavy winds but you must be sure that your anchoring block does not move and that all lines are secure. Also, we should have operating bilge pumps. **Get used to where the water line is on the side of the fuselage as this is the best indication of how much water you are taking on.** The reason for mooring is rocks along the shore making it impossible to drive out of the water. If the aircraft breaks loose from its mooring, it is probably going to be damaged on the rocks. Therefore, if possible, have a safe place at your lake where you can get out of the water, or at least beach it so it can't sink.

On the next page we have another example of beaching. This time it is with the gear down for several reasons. It will take up the shock of large boat wakes that would pound the hull on the Lake bottom. It saves having to get near the sea wall and requires only light tiedown lines...just in case. Upon leaving, one simply retracts the landing gear, and pushes off. If we were just a little closer, we could walk off the nose onto the top of the wall. Note the wooden float just past the left wing. The height is just right for dropping passengers off but there was no cushioning to protect the finish of the Skimmer.



Getting stuck. That part is easy. Getting un-stuck is the hard part. The editor remembers parking wheels down almost on the beach at Cypress Gardens. He was much younger then and had two strong young souls with him. After the water ski show we went to leave but found the wheels almost covered with the soft white sand. **The paddle makes an excellent shovel** and we put it to work to get the wheels exposed. However, it was impossible to push back. The next procedure was to raise the wheels by selecting gear up while holding the nose up, careful not to get fingers pinched in the doors. Then we put the guys under one wing with backs against the spar, and lifted. As that wheel came loose, it retracted and shortly after the opposite wheel retracted leaving us with the hull on the sand, but not yet floating and still pointing at the shore. Making sure the water rudder was up we grabbed wingtips and turned the aircraft 180 degrees and faced out but still firmly lodged on the bottom. Now with a guy under each wing, we started the engine and blasted away from the beach with sand blowing everywhere from the prop blast.

There is a standing rule that when one drives up on the beach wheels down, one should **not stop until a 180 degree turn is made** so as to be facing the water. If you are going to get stuck, at least you will be facing out. This one day we taxied out onto a soft, silty beach along the Hudson. I knew the minute we started that if we stopped we were going to be stuck. We stopped. We were stuck. Full power did nothing more than press the nose gear deeper into the muck and the main gear was almost up to the wheel hubs. Out comes the paddle, but it was obvious that it wasn't going to work. We tried drift wood under the nose gear, to give a bigger "footprint" for the nose-down thrust, but still no joy. We were exhausted. Finally we retracted all three gear and by judicious pushing and shoving, and full power, got her back in the water. Not for the aged and faint of heart. We both were aged. I think I started the engine and walked along outside to keep things lighter while operating the throttle.

Our hydraulic landing gear is a real benefit in these situations and they won't be damaged. If you are parking near a beach with boat wakes, it is perfectly alright to extend the gear even if they only extend partially, to cushion the hull from the pounding caused by the wave action.

Important items.

- **Run aground on a sand bar? Water rudder up. Full rudder, enough power to rotate on skeg. More power to slide off into known deeper water behind us.**
- **Paddle useful as a shovel. Editor has done more back-paddling to slow up than forward paddling.**
- **Good ramps are always hard to find but even more so when you need to teach ramping.**
- **Once you start up a ramp you are committed so keep it moving. Full throttle. It is amazing how steep a ramp the Lake will go up...and down.**



- **No one likes seeing photos like this, but as an instructor I feel it necessary to implant firmly in a Lake owner's mind what happens when their Lake lands in the water with its wheels down. It was a classic example of how these things happen. The owner hadn't flown her since fall; a low-time pilot and a low-time Lake pilot. He got confused by the tower controller and did not raise the gear immediately after takeoff. He went to a nearby Lake and landed without a checklist; without a look out the window. Next thing they knew they were up-side-down in the shallow water. Both occupants came away with minor injuries, but broken hearted.**
- **When docking "knowledgeable help" does not mean a local yokel with big muscles, but a thinking Lake owner type who has done it before and knows where and when to grab.**
- **When departing a dock always paddle far enough away so you have room to turn away from the dock. Use full rudder as you start the engine and immediately add at least 1000 rpms and you will turn quite sharply away, then reduce power to idle.**
- **Know where the "water line" is on your Lake when empty. It is a clue to how much water you are leaking.**

Additional notes and afterthoughts....

After reading a couple of accident reports there appears to be at least two accidents where the pilot made a “quick touch and go” with no regard to speed and attitude. They were much too fast and no where near the right attitude. They flipped on their back immediately due to the immediate sucking down of the nose upon contact with the water. The excess speed tore the nose apart. **The Lake must be landed at the proper speed and ATTITUDE.**

There have been a few accidents where the Lake owner was receiving dual instruction from an instructor with no Lake experience for an Instrument, Commercial, flight review, etc. Several were fatal; all **caused by the instructor not knowing the limitations or flying characteristics of the Lake.**

HYPOTHERMIA

Is the cooling of body temperature. It can kill you or your passengers or the persons that come to rescue you.

It is very tempting in late Fall or early Spring to go out and make that last water landing of the year or the first water landing in the Spring. Or maybe even during Winter when you spot a very inviting stretch of open water. If you are a beginner, or a seasoned Lake pilot, if something goes wrong and you end up in the water, hampered by heavy clothing I might add, it will be a matter of minutes before you are incapacitated.

Lots of us have done it...but it is not very smart...and very dangerous.

Some of us have gotten away with it for a long time.

Service Difficulties

Subject to change. See website www.lakeamphibclub.com

Our fleet of Lake Amphibians are not young anymore, in fact, some are quite old. **This list is far from complete**, but it is hoped that by bringing these items to your attention now, you might save yourself from grief in the future. There are two places that you can read about these difficulties. One is the **Lake Amphibian Club Forum** forums.delphiforums.com/lakeamphib/ where there is a wealth of information about everything "Lake" and the other is **past issues of the club newsletter** available from Marc Rodstein, 15695 Boeing Court, Wellington FL 33414. Phone 561.948.1262. mrodfl@gmail.com They are available on a searchable CD for \$50.00 plus \$4 postage and handling, USD. The following items are **not the "last word"**. **You should consult your favorite mechanic to deal with these items.**

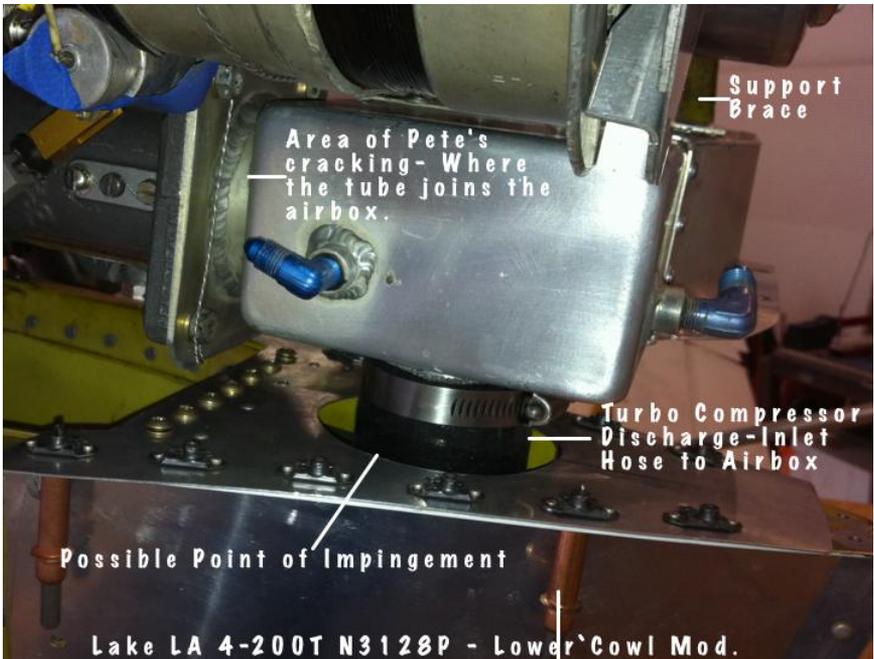
Bendix Fuel Injector Servo filter – mounted on the lower right side of the IO-360 engine where the main fuel line enters. Disconnect the fuel line to remove. It is spring loaded so that if it gets plugged it moves back out of the system and allows fuel to by-pass. Any fuel that bypasses goes directly to the injectors. If there is dirt in the line it will then plug the injectors. It should be cleaned every annual. ***It can get overlooked easily and can result in engine failure.***

Bendix 450 fuel filter - located behind the front pylon fairing near the top. Unscrew the bowl and remove and replace the micron filter. This filter is hard to find and there are various porosities. It is highly recommended that this unit be replaced for several reasons; there is no way to quick-drain the bowl. The in-flow and out-flow holes are only 1/8 inch whereas the main fuel lines are 3/8 inch, therefore the flow is restricted. The aluminum bowl corrodes. It is hidden out of sight and can be ***easily overlooked and can result in engine failure.*** STC SA 00333BO is available from Willard Greenwald, STC owner at 413.207.2020 to replace the above.

It is imperative that aircraft that have been sitting unused for a year or more have the complete fuel system drained and cleaned and inspected before flight.

Engine driven fuel pump – Due to sitting idle for several years it is recommended that it be replaced as the pump can fail due to lack of use.

RaJay Turbo – rajayparts.com Bob Spillman 386.304.7079 Also Main Turbo, Visalia CA. Due to age, inspect regularly. Flapper doors, hinge pin wear. Difficult place made easier by lower cowl removal mod (nutplates and screws instead of rivets).



Fuel seepage at base of fuel tank – This should be fixed immediately if not sooner. There has been at least one instance of a loose battery cable causing an **explosion in the cockpit!**

Electric fuel pump – due to lack of gravity feed this boost pump is a “no-go” item if it fails. Generally you can hear when trouble is not too far away. If you get fuel from the witness drain under the wing on the left side of fuselage, a pump rebuild is mandated.

CJ Aviation, Charlie Duffy 12215 SW 131st Ave. Miami FL 33186
305.378.1469 (recommended by Paul Furnee).

Float fuel pumps – are located in the wing inboard of each float tank. If you are planning a flight using the pumps, actuate them during your preflight to make sure both are working. They are low pressure pumps and are the same as used on carbureted engines.

Collapsed fuel bladder – If the snaps or hooks holding the bladder in place have become detached, the bladder folds in on itself. It is possible to have it press down on the fuel sender resulting in zero or incorrect quantity showing on the gauge. When filling the tank ***always*** watch the level for a few moments. If the level goes down chances are you have an unsnapped bladder. There has been more than one occasion where a new owner thought he filled the tank to 40 gallons, but in fact had much less, ***resulting in engine failure and a forced landing.***

Crankcase breather hose – It is supposed to have a slit in it a short distance away from the engine to act as a safety valve in case the end of the hose freezes over. The condensation can whistle hole can also freeze over. Mechanics have been known to replace this hose thinking it was defective.

Important items.

- **If anything comes loose in the engine compartment it is going to go through the propeller and possibly sheet metal below the propeller.**
- **All hydraulic flex hoses should be replaced at least every 5/10 years.**
- **All hydraulic actuators should be rebuilt at least every 5/10 years.**



Nose gear top cross tube - note breaking of tube to the left of the drag link bolt. Several instances of this have been found. While in this area inspect the threaded area on the actuator piston with a 10 power magnifier. There have been many instances of **cracks or breakage at the base of the threads**. The part attached to the piston is known as the **“fickle finger”**. When it goes up it pushes on the little rod and unlocks the gear and opens the

gear position switch which in turn shuts off the “gear down” light. The bolt that goes through the fickle finger should be checked for bending. While the bolt should slide through the finger, it should not be tight but have very little play.

The tubes at the outer edges are to open and close the doors below. They should be lubricated from the inside. Lubricate everything that moves on the nose gear linkage. Check the nose gear door hinges at the narrowest point for cracks.

The cup holding the axle bolt has been known to crack and fall off resulting in losing the entire wheel and then a landing on blacktop grinding the bottom of the fork away. Look closely during preflight. Keep the inside of the axle and the bolt heavily lubed and the entire hub filled with grease. Pump new grease in after each water landing to remove standing water. Wipe clean of excess grease occasionally.



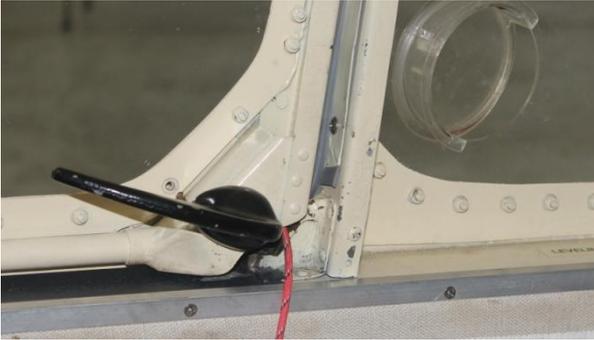
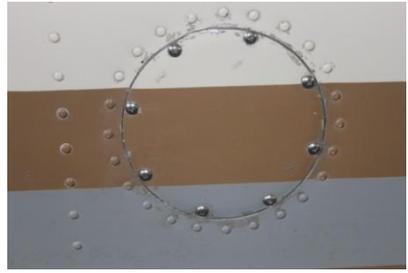
The pivot pins are located at the top of the casting on both sides and slide in and out of bearings bolted to the side walls of the nose gear well (nostril). There is a grease fitting on top of the casting for each pin. The pivot pin bolts go through the casting with the head of the bolt towards the rear of the aircraft for clearance purposes. Because of lots of use and lack of grease these needle bearings can wear out and occasionally need replacing. Newer aircraft have a nylon bearing. By raising the gear up by hand the bolts can be removed and the pins slid back into the casing allowing the complete nose gear assembly to be removed from the plane after disconnecting the actuator at the top and the lower drag-arm at the bottom. It is easier if the heavy nose wheel is removed beforehand. Now one can put it all on a workbench and replace any worn parts and rebuild the oleo with ease. A trick in removal or replacement is to wedge a 2 x 4 between the two sidewalls to spread them apart ever so slightly. Shims will be needed and are not to be lost in removal.

If you have to repair the top nose gear cross tube, you will have to open a hole to the two watertight nose compartments. The access holes can also be used to replace the bearings and blocks if necessary.

At the top of the casting is a rod that holds the oleo together. It is held in by a castellated nut and a washer with a cotter pin. Under this is an "O" ring that seals the hydraulic fluid and pressure inside. Over the years, it gets flattened and hard and will cause the nitrogen to seep from the oleo. Always replace this "O" ring when rebuilding the oleo.

It is recommended that all these items be done by a Lake qualified licensed A & P. It is mentioned here to make the job easier for him and to save you dollars in hourly rates.

Inspection covers that require sealing should not use sealant as it is difficult to get them off for inspections. Use closed-cell camper tape (sticky one side) and cut lengthwise to fit. Melt holes for screws with a hot awl.



Snap vents are inexpensive and let in a lot of air.

Lube the inner hooks and innards of door latches.

When closing the hatch always pull on the U channel above the latch to relieve the tension on the handle and the drift pin. Once they loosen up they always wait to fall into the water. Just like loose sunglasses...

Plastic lines are used for pitot and static lines, autopilot lines, and nylon sheathing for water rudder cable and trim indicator cable. Due to aging they become brittle and break. Check carefully in these areas.

CORROSION CAN BE CAUSED BY CONDENSATION, TOO.

Under the floorboards there are quite a few places that require lubrication; bearings, pulleys, rudder bellcrank and others. A most important one is the rod end at the forward end of the elevator push-rods where it attaches to the bottom of the yoke assembly. **There has been one case where this fitting corroded due to salt use and broke off...just before a land takeoff.** This editor has seen condensation running off surfaces in a closed hangar. Think about a tightly closed amphibian with a watertight hull.....

HOW TO BLEED BRAKES

LA-4-200, 250, 270T

- First, make sure the reservoir vent line is not plugged as this procedure will not work.
- Fill reservoir to full (usually top mark on dipstick).
- Place clean one quart container under brake bleeder of one wheel.
- Open bleeder.
- Turn hydraulic pump ON.
- Place flap handle in bypass position, or operate flap handle continuously if no bypass (older aircraft).
- While pump is running and flap handle is in bypass, pump affected brake pedal vigorously for 30 seconds.
- Turn hydraulic pump OFF.
- Close bleeder valve.
- Test brakes. If still soft, repeat above. When hard, move to other brake.
- Place flaps in up or down position.
- Refill hydraulic reservoir with clean fluid or filtered fluid from bleeding.
- Check hydraulic level at full pressure and adjust level if necessary. (A few aircraft require checking at zero.)

HOW TO FILL ACCUMULATOR

1. Bleed hydraulic pressure to zero with flap handle at bypass. When pressure at zero place flap handle in up position.
2. Attach nitrogen to valve on accumulator and pressurize to 350 pounds.
3. Select flap handle to down position.
4. Pump hand pump two or 3 times. Gauge should now show 350 pounds.
5. Detach nitrogen source. Run pump to full system pressure. Pump should run slower. Shut off hydraulic pump.
6. If on jacks, do a gear retraction check. Gear should operate faster and should come up and lock with existing pressure. (see pages 7 and 8)

LAKE AMPHIBIAN CLUB, INC. A Short History

The original Lake Amphibian Flyers Club was formed by Bill and Louise Goddard of Frostproof Florida in 1988 and it was a huge success. They had formerly managed the International Comanche Society and edited their monthly magazine. After acquiring their Lake, they formed the Lake Amphibian Flyers Club, started the newsletter and in 1989 the first of many all-Lake fly-ins at River Ranch Resort. When they retired in 2000 Marc and Jill Rodstein of Wellington Florida took over the reins because, in Marc's words "I knew how important it was that the torch be kept burning bright". They added the Delphi Forum which was another huge success. Because of River Ranch Resort closing, Marc moved his "Lakeathon" to Holiday Inn at Winter Haven until it got too rundown. Lakeathon then moved to a new Hilton Garden Inn at Lakeland Airport. They finally retired after 15 years of hard work.

Another Lake Club member took over, and immediately started making drastic changes and was not able to make it, due to several poorly thought out ideas. Marc offered to take back the operation of the club, but the new manager refused to give it up.

Thus a committee was formed in 2016 to save the club and prevent this from happening again and changed the name to **The Lake Amphibian Club** with a board of directors and bylaws. The club has been incorporated as a not-for-profit entity, offered the **Lake Club News** either in print or emailed form, published a new website, opened a Facebook page, is reworking the approved instructors list, a maintenance facility list and established contact with a new insurance underwriter. The club has produced this long needed "how-to" booklet and mailed it to all known Lake owners for free and a second printing has been ordered due to many new Lake owners. In the works is another new website to replace the above mentioned site which will incorporate the popular members Forum

and its archived postings and be directly accessible by members for address changes and various payments and registrations, eliminating completely the separate Delphi Forum.

Everyone of the directors owns a Lake Amphibian. The ownership of the prototype Skimmer (John Staber) has been transferred to a former director, Greg Bradford due to John's advanced age. And speaking of age; we need some young blood on the Board of Directors. **Don't be afraid to speak up if you have the slightest urge to assist your favorite club.**

2021 finds the Club in their 33rd year. What the administrators have set up over the years has benefited Lake Amphibian owners worldwide in time saved, money saved, lives saved and operational know-how, to name a few. Not to mention meeting life-time friends from all over.



1960 Bell Aerosystems experimental N1015L s/n 258



1958 C-2 N271B, s/n 129 modified to 200HP at liftoff

MISCELLANEOUS

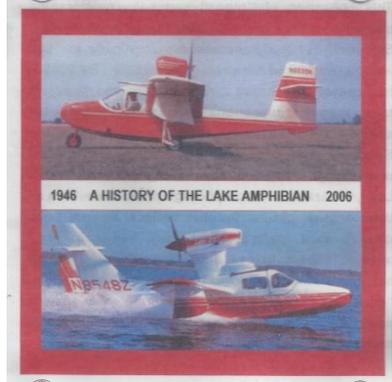


DVD video Lubrication and Maintenance
\$10 plus postage \$2

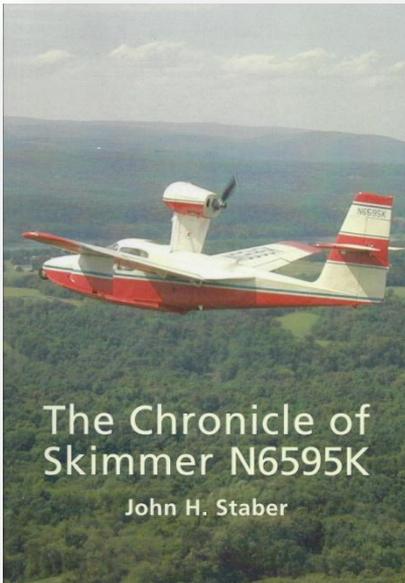
Captain Renegade decals (drawn by Hans)

Two 12 inch x 6 inch sticky vinyl decals (left and right)
\$20 plus \$6 postage (while they last) clear backing

This CD contains almost everything ever printed about Colonial Skimmers and Lake Amphibians. Each has an addenda attached of items found until the end of 2016. It contains builder's photos, brochures, biographies, magazine articles, editorial comment, newspaper articles and much more. It is comprised of well over 2500 scans of the above items and is indexed by different eras and owners of the various companies. Updates available through club website. \$25 plus \$2 postage.



The story of finding, restoring and flying of the prototype C-1 Colonial Skimmer N6595K. Experience the trials and tribulations of this daunting task from the comfort of your home and without shedding blood, sweat and tears.
\$22 plus \$6 postage.



Available from John Staber
PO Box 72, Old Chatham NY
12136 518.794.9091
jx2staber@fairpoint.net

STOP AQUATIC HITCHHIKERS!

Prevent the transport of nuisance species.

When you take your Lake from a weed filled morass to a pristine clear body of water, do YOU stop at a local airport to remove all those invasive species clinging to the landing gear, the water rudder and mooring lines ??

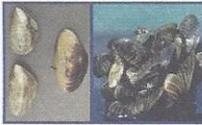
Aquatic Invaders to Look Out For:



H. Smith, APIPP

Water Chestnut

- Triangular leaves with toothed edges
- Sharp-edged seeds
- Can form dense mats



J.E. Marsden, UVM & D. Jude

Zebra/Quagga Mussel

- Tiny D- or oval-shaped striped shells
- Can cover hard surfaces
- Sharp shells can cut feet



E. DeBoldt

Asian Clam

- Light green to brown shells with circular elevated ridges
- Typically less than 1/2-inch in size
- May outcompete native clams/mussels



A. Fox, Bugwood.org & Michigan DNR

Eurasian Watermilfoil

- Feathery leaves in whorls of 4
- Forms dense beds
- New plants sprout from fragments



DFWI & J. Gunderson, MN Sea Grant

Spiny Waterflea

- Tiny crustacean with long, barbed tail
- Competes with small fish for food
- Masses can clog guides of fishing rods



D. Moorhead, R. Videki, Bugwood.org

Hydrilla

- Four to 8 blade-like, slightly toothed leaves form whorls around stem
- Can form dense plant beds
- Thrives in a variety of environments

This booklet has been sent free of charge, to all known owners of Colonial Skimmers and Lake Amphibians. It has also been sent to the instructors and the maintenance facilities listed on our website, along with other interested parties.

It has been sponsored by the **Lake Amphibian Club** with the Intention of making the world of Lake flying safer, and more enjoyable. Hopefully, it will save owners a few dollars in maintenance costs due to a helpful hint passed on.

If you like what you see, consider becoming a member of the **Lake Amphibian Club**. An application and instructions can be found on our website that is open to the public or from the editor.

Once you become a member you will have access to our popular **Forum** and our newsletter, **Lake Club News**, where you can become an author and write articles about your Lake flying!

The best advantage is that of meeting wonderful, life-long friends.

Published 2018 on our website (downloadable) and in printed booklet format.

Please feel free to contact the editor for a current "hard copy" list of instructors and maintenance facilities and additional copies of "All About Lakes" OR with any additions, omissions, comments, changes or corrections that could be utilized in any future publishing of this booklet or announced on the club website if necessary.

John H. Staber (editor)
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Old Chatham NY 12136
Jx2staber@fairpoint.net

Club website - www.lakeamphibclub.com

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THE TAIL END