

Dr Julian Ash



1<sup>st</sup> January 2021

## **Comment on proposal for Seaplanes to use Lake Burley Griffin.**

### **Summary**

It has long been accepted that high-velocity (>12 knots) powered vessels are not compatible with established 'athletic' water sports on Lake Burley Griffin, and are therefore prohibited. Seaplanes have a landing and take-off velocity ~55 knots (~100 km/hr), and present a severe risk both to recreational users of the Lake and also to the passengers and crew of the aircraft. Seaplanes have a relatively low safety record, and there is an airport in Canberra that offers high standard facilities. There are significant differences (outlined below) between the operation of seaplanes in coastal NSW, notably the extensive Sydney Harbour (55 km<sup>2</sup>), and the relatively small useable part of the Western Basin of Lake Burley Griffin (1 km<sup>2</sup>). Essentially, there is sufficient space to designate separate zones for seaplane operations, and recreational water users in Sydney Harbour, but not on Lake Burley Griffin. For example, during the test flight in December 2020 it was necessary to exclude a substantial number of users for 1½ hours (e.g. CYC Kids Holiday Sailing program). To ensure the continued safe use of the lake for a diversity of water-sports it is recommended that the use of Lake Burley Griffin by seaplanes should not be permitted.

### **Recreational and sporting use of Lake Burley Griffin**

Lake Burley Griffin was constructed by 1963, and soon became a venue for various water-sports. In consultation between the ACT administration, sporting clubs and general public, it was resolved that the focus of use should be sports that are compatible with the scenic location at the heart of Canberra 'the National Capital', and conducive to the health and fitness of the citizens. Active 'athletic' sports such as swimming (by people, dogs, etc), Aqua Parks, sailing, rowing, kayaking, paddleboats, paddling, etc have all been encouraged, in addition to fishing, ornithology, etc. There are public facilities (e.g. boat ramps) and private club buildings dedicated to sailing, rowing, canoeing and Dragon boats at locations around the lake. It was agreed that use of powered vessels should be restricted to certain functions, including Policing, lake maintenance boats (e.g. removing flood washed trees), rescue boats, tourist cruise boats, firework festival boats, fishing dinghies, and electric-powered hire boats. An agreed principle has been that powerboats should not be permitted to travel at high speeds (>12 knots) on the lake, except in an emergency. High-power and high-speed motorboats were allocated an adjacent flooded stretch of the Molonglo River, suitable for water skiing.

The population of Canberra has grown rapidly, and this is projected to continue, notably with high-density development in the 'inner suburbs' near Lake Burley

Griffin. There is continually increasing recreational use of the lake for a growing variety of activities. Current usage includes numerous individual and family activities; private party groups; tourists; club and institutional training of children and athletes; and Club, State and National competitive events such as long-distance swimming, triathlon, and racing. Some of these users of the lake are juveniles or live interstate or overseas so their opinions on lake use may not be registered.

### **Resolving conflict between lake users**

When the weather is favourable the lake becomes crowded, locally overcrowded, with users. To minimise conflicts and danger there are established rules about Rights of Way between different classes of vessel, especially when competing in a race. For example, rules determine how to proceed safely when a vessel approaches a swimmer or fisherman; or when a sail, paddle, motorboat, or ferry approach each other. Rules determine whether to pass to port or starboard, upwind or downwind, what constitutes a danger, etc. In general a power or paddled boat gives way to sail, but not if it is large (e.g. ferry) or at risk of running aground. Under gusty, high wind speeds some sailing boats may become out of control or capsize so their course is hard to predict, and harder to avoid. Always, the over-riding rule is to act safely. Activities such as sailing races are organised (e.g. Canberra Yacht Club, Young Man's Christian Association) into ~9 classes to reduce the conflict between boats with different characteristics. Race committees resolve reported conflicts after the race. Most, but not all, lake users are aware of rules that apply to them and behave safely towards other users. However, there is always a risk that another user (e.g. a child) does not know all the rules, so caution is essential.

The faster the vessel, the greater the risk of a collision, and the worse the consequences (damage  $\approx$  mass.speed<sup>2</sup>). It was to avoid such collisions that fast recreational motorboats (>12 knots, e.g. water skiing, jet skis) were excluded from the lake. The hired electric GoBoat is sufficiently slow that it is easily avoided, and they are mostly used in the Eastern and Central lake basins.

Aerial activity over the lake includes morning flights of hot air balloons, generally across Central Basin and West Lake. Hot air balloon flights can be highly unpredictable. There are occasional fly-pasts by fast military jets, fire-fighting aircraft, training exercises with rescue helicopters, etc. However, these latter aerial activities are infrequent and located to minimise any conflict with other users.

### **Zones of Lake Burley Griffin.**

The total area of Lake Burley Griffin is 6.6 km<sup>2</sup> but only a small portion (~1 km<sup>2</sup>) is suitable for certain activities, including sailing, and this is also the portion that is requested for seaplane operations.

Except for a few exclusion zones (e.g. near Scrivener Dam, Warrina inlet) the entire lake is nominally available to all approved users (health restrictions permitting). However, it is important to appreciate that the lake is a flooded valley, and many parts are too shallow for many classes of boat.

- The **East Basin** is too shallow for large vessels, including most yachts. Much of the eastern lake is only suitable for canoes and dragon boats. Dragon Boat competitions are usually held in this basin, using courses with multiple

buoys. Electric GoBoats, hired from Kingston, have access to the deeper parts of East Basin. Floating timber often enters the East Basin from the Molonglo River, creating a hazard to vessels.

- The **Central Basin** is the visual focus of most tourism in Canberra, and is the focus of tourist water activities: cruise boats, GoBoats, self-propelled paddle-wheel boats, firework displays, etc. The Central Basin is also shallow and inaccessible to large sailing boats.
- The triangular **West Lake**, bounded to the north by Acton and Black Mountain peninsulas, provides the only zone that is mostly both deep enough and broad enough for yachts to sail and race easily, whatever the wind direction. The northern parts are too shallow for large yachts, and only smaller yachts pass beneath Commonwealth Bridge. The need for sailing boats to tack into the wind and avoid others means that they continually traverse the entire sailable area. The wooded surrounds, hills and buildings all interfere with wind flow so adjacent lake shores are avoided by sailors. The area suitable for yachts and racing covers ~1 km<sup>2</sup> (bounded by Lotus Bay - Lennox Gardens - Springbank Island - Black Mountain peninsula - Yarralumla Bays - Stirling Park) and coincides exactly with the area proposed for use by seaplanes. All sailing races and training sessions, regularly organised by the CYC, YMCA and other clubs are held within this part of West Lake. The West Lake is also frequently used by all other categories of user: it is the busiest and most diversely used part of the lake. Several rowing and sailing clubs, a boat ramp and school aquatic facilities are located in the Yarralumla Bays, all within 200 m of the proposed seaplane base, and within the manoeuvring area.
- The western **Taroola** and **Yaramundi reaches** are narrow, so they present limitations for sailing (especially with some wind directions) and are avoided by most yachts. However these long reaches are suitable for racing sculls, and several rowing clubs are located here. There are permanently buoyed courses for rowing races on Yaramundi reach.

### **Seaplanes and sailing in Sydney Harbour.**

Before airports were available, seaplanes (float planes) were able to utilise natural waterways, so they played a significant commercial and military role in the 1930s-1940s, including operations in Sydney Harbour. As airports were constructed, commercial aviation shifted to faster and safer wheeled aircraft, which were also less dependent on weather and wave conditions. In Australia seaplanes have continued to be used to access some remote islands but have primarily become a tourist activity. Most recent seaplane operations from Sydney Harbour are short scenic flights. Sydney Harbour has a total area of 55 km<sup>2</sup>, with extensive zones for recreational users, commercial shipping lanes and a small designated area ~1.6 km<sup>2</sup> for seaplanes at Rose Bay (Sydney Seaplanes, Sydney by Seaplane). Seaplane take-off and landing operations are largely within Rose Bay, which has an area ~2.4 km<sup>2</sup>. There is a ~300 m diameter seaplane 'manoeuvring zone' at each base from which other vessels are generally excluded. Depending upon wind direction, seaplane take-offs and landings (both into the wind) are within a designated 'strip' (~1.6 x 0.3 km) of Rose Bay (either outer east or west side with Southerly winds; central Rose Bay for northerly winds): leaving other parts of Rose Bay (~2 km<sup>2</sup>) accessible to other vessels. The

Bay is large enough that, with caution, both a seaplane and recreational vessels can operate in different zones at the same time. Both seaplane bases are near Woollahra Sailing Club, so it has been necessary to locate racing courses outside the zones where seaplane operations occur. Some junior courses and training are located in inner Rose Bay, away from seaplane operations. Most Woollahra Sailing Club yacht racing courses are outside Rose Bay, in greater Port Jackson. With the recent trend towards fast foiling (hydrofoil) sailing boats it has become necessary to designate additional courses in Port Jackson.

Sailors in Rose Bay are instructed to transit rapidly and safely if they must pass through a zone where seaplanes are possibly operating. Sailing boats are required to keep clear of seaplanes at all times, and *vice versa*. The rotating propellers on a seaplane are potentially very dangerous, even when a seaplane is stationary. A >60 m distance must be maintained from the front of a seaplane, and 30 m from the sides. The propeller thrust can create a fast back wind, especially when the seaplane is still nearly stationary or accelerating, that can interfere with (e.g. capsize) sailboats behind them. Colliding with a fast-moving seaplane is likely to cause severe damage, injury or death. The only recent fatalities (6 deaths in 2017) from a Sydney based seaplane involved a crash landing into the Hawkesbury River, probably caused by carbon monoxide poisoning when engine fumes leaked into the cabin.

### **Comparing the operation of seaplanes and sailing in Sydney Harbour and Lake Burley Griffin.**

A major difference between Rose Bay plus Port Jackson, and West Lake in Lake Burley Griffin is the area available for operating sailing boats and seaplanes. Rose Bay is large enough that, with caution, a seaplane can operate (load, taxi, land and take off) in one part while sailing and other vessels can operate elsewhere. Rose Bay opens onto the vast Port Jackson where sailing, especially yacht races, can proceed without any competition from seaplanes. In contrast, the area of West Lake suitable for yacht sailing, and the location of all sailing races, is small (~1 km<sup>2</sup>) and coincides with the area proposed for seaplane operations on Lake Burley Griffin. The total area suitable for sailing and racing on Lake Burley Griffin is smaller than the area designated for seaplane operations at Rose Bay. There is simply insufficient area with adequate depth and wind flow to safely accommodate both seaplanes and sailing yachts at the same time. Since each seaplane landing and take off might span 30-60 minutes, the operational area of the lake becomes virtually 'out of bounds' to other users for these chunks of time. Sydney Seaplanes is currently seeking permission for 3 flights daily between Sydney and Canberra: others may also apply. There is no mechanism to alert users if flight plans are changed – lake Burley Griffin is not an airport, there is no control tower, etc. Sailing dinghies generally do not carry communications equipment. The potential disruption to lake users is considerable.

### **Seaplane operations on lakes**

Seaplanes have different characteristics from other aircraft: at take-off and landing they act as a boat; in the air they are slowed by their floats. In particular, on take-off a rapid early acceleration (propeller thrust) is needed to bring the floats up from 'water displacement' to 'planing' over the surface (typically at ~27 knots: 50 km hr<sup>-1</sup>). Once planing, water resistance declines so it is easier to

accelerate to lift-off speed at ~55 Knots (100 km hr<sup>-1</sup>). Lakes create several difficulties for seaplanes, in addition to surrounding hills. Both take-off and landing is more difficult on still 'glassy' water: conditions that often occur on Lake Burley Griffin, especially in the morning. About 5% of seaplane accidents are caused by a misjudged landing on glassy water. The fatality rate from accidents when landing on water rather than land (by similar seaplanes) is nearly doubled. Take-off is also more difficult on glassy water: it is harder to transition from displacement to planing (small waves help). I have observed a loaded seaplane repeatedly failing to reach planing speed on a calm lake, and continuing the attempt for >1 km (eventually the passengers were left behind to lighten the plane).

A collision during take-off or landing is likely to cause substantial damage, injury or death to both occupants of the seaplane and any vessel or swimmer on the lake. A safe seaplane operation requires that all submerged or floating logs, vessels, swimmers, etc are absent from the landing and take-off path. Before landing, it is usual to firstly fly low to inspect the landing area (and warn vessels) before turning back into the final descent. Before take off, a seaplane pilot should first inspect, preferably by taxiing along the course, that there is no possible obstruction in the path of take-off, then commit to a straight 'charge' at high thrust. Since, on take off, seaplanes create strong gusts at lake level they pose an extra risk to sailing craft.

Essentially, it is unsafe for a lake user to be in the seaplane operation area for several minutes before each landing and takeoff. For sailboats that must repeatedly 'tack' at 30°-45° off the wind, 'reach' at greater angles, or 'run' downwind, their optimal course may be in virtually any direction. The wind continually gusts and shifts direction so the optimal course changes continually. A sailing boat cannot be expected to keep to on a currently safe course. In the hands of an inexperienced sailor (e.g. a child), a sailing boat may rapidly become uncontrolled, veering, stalling or capsizing. Whether sailing at will or competing in a race, sailboats spread across the lake. During a race ~100 boats may be sailing in all directions. To suggest that a seaplane can safely travel amongst sailing boats in a restricted channel at up to 60 knots (110 km hr<sup>-1</sup>) is clearly irresponsible. On Lake Burley Griffin there is no separate zone where a seaplane can safely operate.

## **Conclusions**

It was established many years ago that an appropriate maximum speed for a powerboat (including a seaplane) to proceed amongst sailing boats and other recreational users on the Lake Burley Griffin is ~12 knots (22 km hr<sup>-1</sup>). This legislation should be upheld, which requires excluding seaplanes. It is unreasonable to require the many recreational users of Lake Burley Griffin to limit their access to the lake so that a commercial Seaplane Operator may profit and entertain a few visitors. Fly over Canberra to see the view, but use the airport as a much safer place to operate.