



Australian Government

Australian Transport Safety Bureau

Collision with water involving de Havilland Canada DHC-2 Beaver aircraft, VH-NOO, at Jerusalem Bay, Hawkesbury River, NSW on 31 December 2017

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Addendum

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Preliminary report

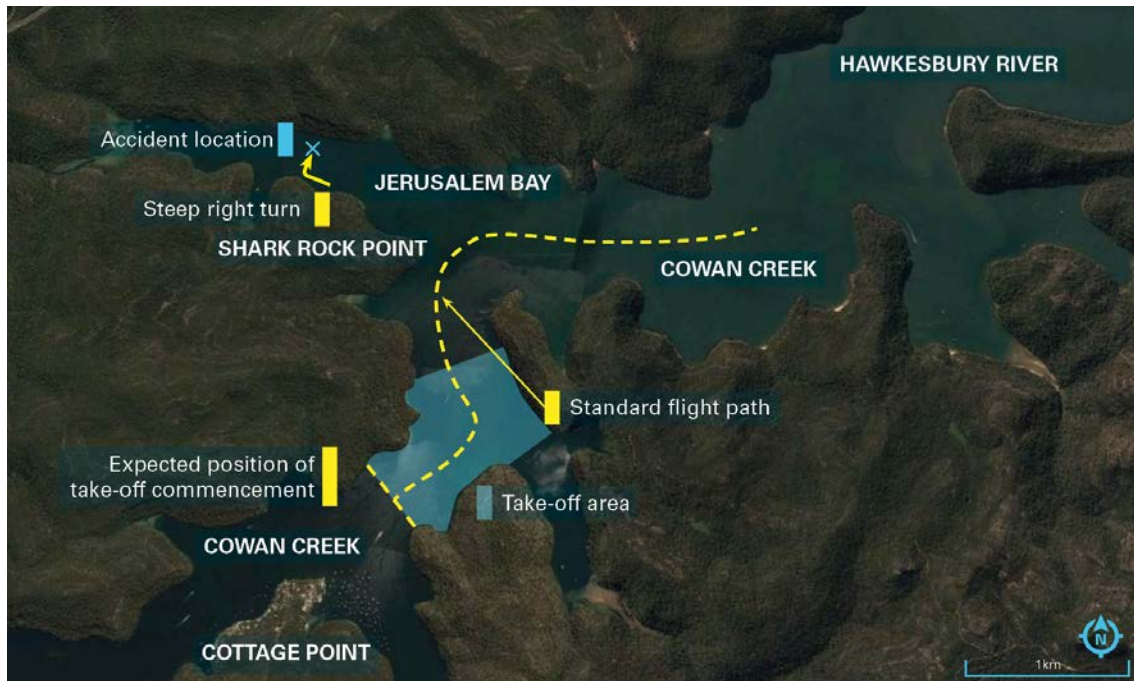
Sequence of events

On 31 December 2017, at about 1500¹ Eastern Daylight-saving Time,² the pilot and five passengers of a de Havilland Canada DHC-2 Beaver floatplane, registered VH-NOO and operated by Sydney Seaplanes, departed Cottage Point on a charter flight to Rose Bay, New South Wales.

The operator reported that the aircraft's expected and standard flight path³ after departing Cottage Point was to climb initially to the north then turn right along Cowan Creek toward the main body of the Hawkesbury River, until sufficient altitude was gained to fly above terrain and return to Rose Bay (Figure 1). While the exact take-off path from Cottage Point has yet to be established, the aircraft was observed by witnesses to enter Jerusalem Bay (Figure 1). The aircraft was observed to enter the bay at an altitude below the height of the surrounding terrain (Figure 2). Several witnesses also reported hearing the aircraft's engine and stated that the sound was constant and appeared normal.

Shortly after entering Jerusalem Bay, numerous witnesses reported seeing the aircraft suddenly enter a steep⁴ right turn and the aircraft's nose suddenly drop before the aircraft collided with the water in a near vertical position. The aircraft came to rest inverted and with the cabin submerged. Witnesses reported the entire tail section and parts of both floats were initially above the waterline. The aircraft took over 10 minutes to completely submerge. A quantity of fuel was also observed in the water. A number of witnesses who heard or observed the impact responded to render assistance. All six occupants received fatal injuries.

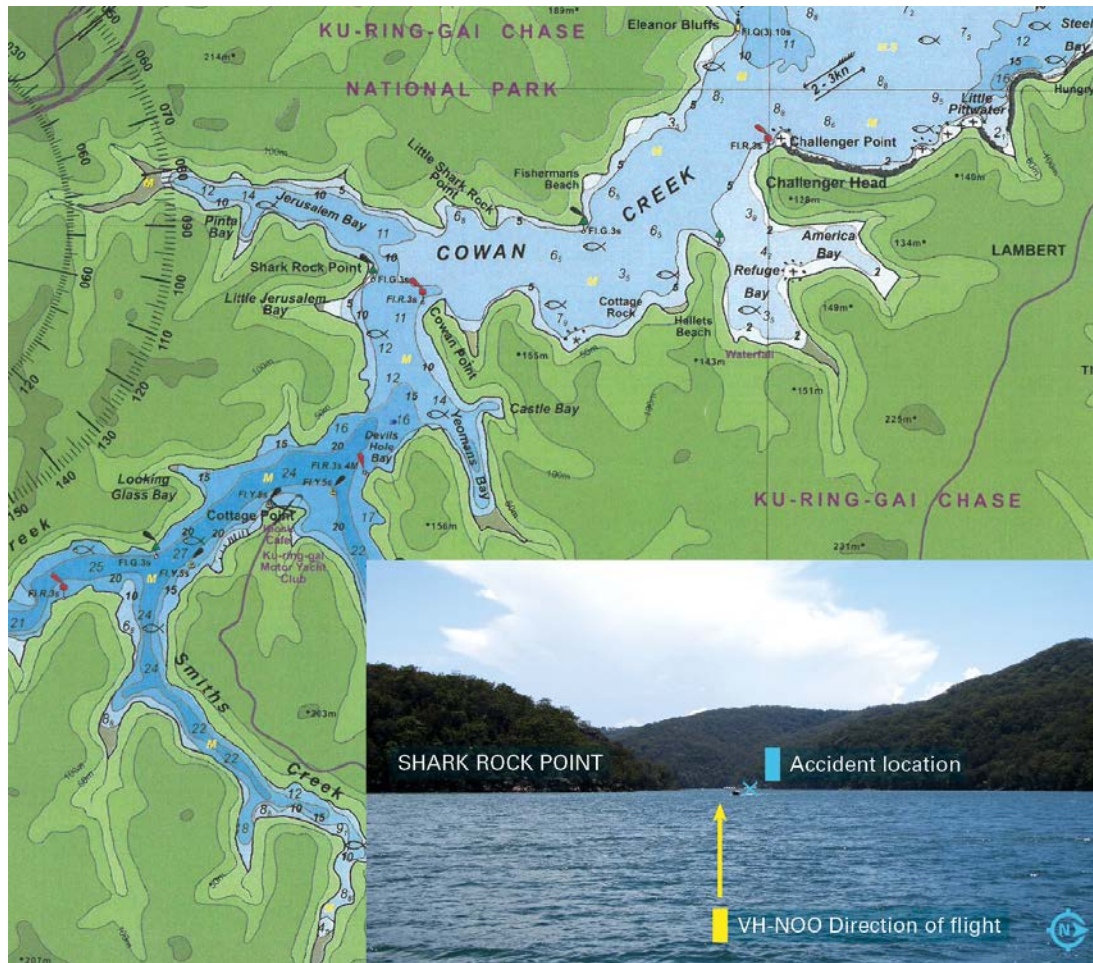
Figure 1: Cottage Point area, standard flight path and accident location



Source: Google earth, modified by the ATSB

¹ The operator indicated a scheduled departure time of 1500 from Cottage Point Inn. The exact timing of departure from Cottage Point has yet to be established and will be refined based on witness reports and other information.
² Eastern Daylight-saving Time (EDT): Coordinated Universal Time (UTC) + 11 hours.
³ Sydney Seaplanes Authorised Landing Area Register – Cottage Point.
⁴ Estimated by witnesses to be 80° - 90° bank angle.

Figure 2: Cottage Point area with Jerusalem Bay entry viewed from Cowan Creek



Source: Camtas International Pty Ltd

Pilot information

The pilot held a current Commercial Pilot (Aeroplane) Licence that was last reissued by the Civil Aviation Safety Authority (CASA) on 21 March 2017 following a flight review and proficiency check. He also held a Republic of Maldives Airline Transport Pilot Licence. The pilot held a Class 1 Aviation Medical Certificate valid until 6 March 2018 and he was reported to have a high standard of health.

A copy of the pilot's CASA licence provided by the operator indicated that he held single-engine and multi-engine aeroplane class ratings, and floatplane, manual propeller pitch control, and retractable undercarriage design feature endorsements.

The pilot's last ratings (flight review and proficiency check) were issued on 11 March 2017. The ratings comprised a multi-engine aircraft flight review and instrument proficiency check (valid until 31 March 2019 and 31 March 2018 respectively). The pilot's logbook also indicated that he had completed a gas turbine engine design feature endorsement on 16 June 2017 and conducted a single-engine aircraft flight review on 29 June 2017 (valid until 30 June 2019). Information provided by the operator indicated that the pilot had a total flying experience of more than 10,000 hours, of which about 9,000 hours were on floatplanes.

The pilot had been employed by Sydney Seaplanes from 2011 to 2014 and then relocated overseas. On return to Australia in May 2017, the operator's records indicated that the pilot had completed the following checks and training:

- pilot induction training
- a DHC-2 engineering, data and performance questionnaire
- a Cessna 208 Caravan (C-208) amphibian endorsement systems questionnaire
- an aircraft proficiency check on the DHC-2 and C-208
- a low-level manoeuvring check on the DHC-2 and C-208
- an authorised landing area check flight in the DHC-2 and C-208, which included Cottage Point
- Civil Aviation Order 20.11 emergency procedures training on the DHC-2 and C-208
- a flight crew dangerous goods and non-dangerous goods acceptance course
- CASA alcohol and other drugs 'managing risk' training module
- non-technical skills training in communication, situational awareness, decision making and workload management as part of the operator's safety management system
- fuel barge training
- a C-208 compressor/turbine water wash course.

Aircraft information

The float-equipped DHC-2 Beaver is a predominately all-metal high-wing aircraft designed to carry one pilot and seven passengers. VH-NOO was manufactured in 1963 and first registered in Australia in 1964 (Figure 3). Viking Air (Canada) has been the type certificate holder since 2006. The aircraft was powered by a Pratt & Whitney 'Wasp Junior' R-985 nine-cylinder, single-row, air-cooled radial engine, which drove a Hartzell HC-B3R30-4B three-blade propeller. The aircraft was operated in the charter category.

A periodic inspection of the aircraft was completed on 6 November 2017 and a new maintenance release was issued. A scheduled engine change was also carried out at this time. The installed engine had recently been inspected and test run by a maintenance organisation in the United States and had about 95 hours' time-in-service at fitment.

Figure 3: de Havilland Canada DHC-2 Beaver floatplane, registered VH-NOO



Source: Sydney Seaplanes

Previous accident

The ATSB investigated a fatal accident involving the same aircraft, then configured for aerial agriculture operations including a fixed undercarriage, which occurred on 15 November 1996, resulting in the fatality of the sole occupant. The aircraft was subsequently repaired, issued with a Certificate of Airworthiness and re-entered service, registered as VH-NOO, in 2000. Sydney Seaplanes acquired the aircraft in 2006.

Environmental information

The nearest Bureau of Meteorology automatic weather station (AWS) was located at Terrey Hills, about 11 km south-south-east of Jerusalem Bay. Another AWS was located at Gosford about 22 km north-north-east of Jerusalem Bay. At 1500 on the day of the accident, the Terrey Hills AWS recorded the wind at 13 km/h (about 7 kt) from the north-east. The Gosford station recorded the wind at 20 km/h (about 11 kt) from the east-north-east. Witnesses positioned in Jerusalem Bay generally indicated that the wind was directly into the bay at various strengths,⁵ which would have resulted in the aircraft experiencing a tailwind at the time the aircraft entered Jerusalem Bay.

The water depth at the wreckage location was 14.5 m. Bureau of Meteorology tidal recordings at the Ku-ring-gai Yacht Club (near Cottage Point), stated that it was low tide at 1400 indicating that the tide was in-coming at the time of the accident.

Wreckage recovery and examination

On 4 January 2018, the aircraft was recovered from the water, where it was established that both wings and floats had become separated from the fuselage (Figure 4). The aircraft was retrieved during three 'secure and lift' operations undertaken by the New South Wales Police Force Diving Unit and a barge operated crane crew. These were:

- the main sections of both aircraft floats and the right wing
- the main fuselage including the engine, propeller and tail section
- the left wing.

The Police conducted further diving operations to retrieve the remaining aircraft debris and items on-board at the time of impact.

The aircraft was transported to secure facilities for further examination. Initial examination of the aircraft wreckage indicated:

- all major sections of the aircraft structures were recovered
- no evidence of a birdstrike or collision with an object prior to take-off or in-flight
- no evidence of an in-flight break-up or pre-impact structural damage
- the front of the aircraft and float tips had been significantly damaged
- both the wings and floats had separated from the fuselage during the impact sequence
- damage to wings was consistent with the aircraft being banked to the right at the time of impact
- flight control continuity throughout, indicating no evidence of flight control issues⁶
- the flaps were in the 'climb' position of 15 ± 1 degrees
- there was no cockpit voice or flight data recorder (nor was there a regulatory requirement for an aircraft this size to be fitted with one)
- there was no commercial video recording equipment fitted to the aircraft.

The engine, propeller and a number of aircraft components have been retained by the ATSB for further examination.

⁵ The strength of the wind in Jerusalem Bay will be reviewed based on witness reports and information.

⁶ Flight controls inside the aircraft were connected to flight control surfaces on the aircraft structure.

Figure 4: VH-NOO recovery from Jerusalem Bay



Source: ATSB

Fuel testing

Fuel samples were collected by the New South Wales Police Force from the operator's refuelling point at Rose Bay. The fuel was tested by the ATSB for the presence of water, with nil indications found. A visual inspection did not identify any particle matter in the fuel. In addition, there were no reports of fuel quality concerns with the operator's other DHC-2 aircraft utilising the same fuel source. The remainder of the fuel samples have been retained by the ATSB for further testing if required.

Sydney Seaplanes safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action taken by Sydney Seaplanes in response to this accident.

- Immediately following the accident, Sydney Seaplanes suspended operations. They resumed operations in their C-208 amphibious aircraft on 15 January 2018, with an interim provision of having two crew on board.
- The maintenance status of all aircraft has been reviewed, with all maintenance actions found to have been carried out as required.
- All pilots and operations personnel completed threat and error management training.
- All pilots completed ground training on low-level flying and wind shear.
- Prior to commencing charter flights, all pilots will be re-checked in accordance with the operator's proficiency standards. This will include additional low-level and stall training.

Ongoing investigation

The ATSB investigation is continuing and will include consideration of the following:

- engine, propeller and aircraft component examinations
- flight and engine control positions
- aircraft maintenance history
- obtaining and evaluating witness information
- pilot qualifications, experience and medical information
- impact sequence
- survivability
- aircraft performance and handling characteristics
- aircraft weight and balance
- operator policies and procedures
- stall warning systems
- nature of seaplane operations
- environmental influences
- sources of recorded information
- similar occurrences in Australia and internationally.

The ATSB will continue to consult the engine and airframe type certificate holders, and utilise the expertise of the Seaplane Pilots Association of Australia. Accredited representatives from the Transportation Safety Board (TSB) of Canada and the United States National Transportation Safety Board (NTSB) have been appointed to participate in the investigation. A representative from the United Kingdom (UK) Air Accident Investigation Branch (AAIB) has been appointed as an expert to the investigation team under the same provisions. The AAIB will provide liaison with the passenger's next-of-kin, citizen's in the UK.

Acknowledgements

The ATSB acknowledges the support of the New South Wales (NSW) Police Force, Marine Area Command and Police Diving Unit; NSW Fire and Rescue, specialised operations and firefighting units from Metropolitan East 2; NSW National Parks and Wildlife Service; Sydney Metro Airports and those involved with the recovery of VH-NOO.

The information contained in this preliminary report is released in accordance with section 25 of the Transport Safety Investigation Act 2003 and is derived from the initial investigation of the occurrence. Readers are cautioned that new evidence will become available as the investigation progresses that will enhance the ATSB's understanding of the accident as outlined in this report. As such, no analysis or findings are included in this update.