Aviation Investigation Final Report

Location:	Lake Placid, Florida	**Accident Number:**	NYC08LA221
Date & Time:	June 20, 2008, 12:10 Local	**Registration:**	N988PC
Aircraft:	Piper PA-18-150	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Aerial observation		

Analysis

The pilot and a wildlife-research passenger departed in the pilot's airplane on a brief aerial observation flight with the purpose of locating a bear tracking collar. The airplane was observed by multiple witnesses in multiple locations to be flying at "very low" altitudes. Most of these observations occurred when the airplane flew over several lakes in the local area. The airplane returned to the origination airport for landing about 1/2 hour after its departure. Instead of flying a normal airport traffic pattern, the pilot flew along the runway in the direction opposite of his intended landing direction, at an altitude of approximately 100 feet above the ground. He then initiated a rapid pull-up and small radius turn to complete the landing. The airplane impacted airport property in a near-vertical attitude, approximately 900 feet from the approach threshold. Both occupants were fatally injured. With one exception, no evidence of any preimpact airframe mechanical failure or malfunction was found. The flap cable was found disconnected from the flap handle, but it could not be determined when or how this occurred. If the flaps were inoperative, the condition would not have resulted in any airplane control problems during normal flight operations, and a normal landing could have been accomplished. No evidence of any preimpact mechanical failure or malfunction was found that would have prevented the engine from developing power. Toxicological testing revealed that the pilot was taking a prescription antidepressant medication, but the medication would not have likely resulted in impairment. Several individuals stated that the non-standard landing maneuver was not unusual for the pilot. Digital images recovered from the passenger's camera revealed that during the accident flight the airplane was operated at low altitude above the surfaces of several lakes, and that on at least one occasion the airplane's tires were in contact with the surface of a lake.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's performance of a nonstandard abrupt maneuver at low altitude, which resulted in a loss of aircraft control.

Findings

Aircraft	(general) - Not attained/maintained
Personnel issues	Unnecessary action - Pilot
Personnel issues	Decision making/judgment - Pilot

Factual Information

History of Flight

Maneuvering-low-alt flying	Loss of control in flight (Defining event)

HISTORY OF FLIGHT

On June 20, 2008, about 1210 eastern daylight time, a Piper PA-18-150, N988PC, was substantially damaged when it impacted terrain at Placid Lakes Airport (09FA), Lake Placid, Florida. The certificated private pilot and the passenger were fatally injured. The aerial observation flight was operated under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed for the local flight, and no flight plan was filed.

The airplane was based at 09FA. The accident pilot began fueling the airplane shortly before 1100, but at some point the fuel nozzle broke, and fuel was spilled on the airplane. The husband of the airport manager reported that he was notified by his wife at 1100 that the nozzle was broken, and that he completed the repair by 1130. Witness reports indicated that the airplane departed on the accident flight shortly after being fueled, with the express purpose of locating a specific bear tracking collar, and that the accident flight was only about 1/2 hour in duration.

The husband of the airport manager was the only person to witness the return of the airplane to 09FA. He reported that he saw the airplane fly south along the north-south runway at a height which he variously estimated to be between 40 and 100 feet above the ground. When the airplane neared the south end of the runway, the witness heard the engine rpm increase, and saw the airplane conduct an abrupt pull up, followed by a turn to the left and a rapid descent. He described the maneuver as a "drastic left bank." At that point, the airplane disappeared from his view behind a treeline, and the witness heard a "thud." He subsequently drove to the south end of the runway, and saw that the airplane had impacted the ground. The pilot was seated in the front seat, and the passenger was seated in the rear seat.

PERSONNEL INFORMATION

Pilot

Examination of the pilot's logbook revealed that he had accumulated approximately 1,250 total hours of flight experience, including 700 hours in complex and/or high performance airplanes, and 420 hours in the accident airplane. The most recent entry in the logbook was dated April 7, 2008. His most recent flight review was accomplished on August 1, 2007, and his most recent third-class medical certificate was issued on July 16, 2007.

Passenger

The passenger was a University of Kentucky faculty member who was engaged in bear tracking studies. His research activity in Florida was associated with the Archbold Biological Station near Placid Lakes, and he regularly utilized aircraft to assist in his research. He was not a certificated pilot, and according to his wife, he had never obtained any flight instruction.

AIRCRAFT INFORMATION

The airplane was of a high wing, fixed-gear, tailwheel configuration, and the exterior surfaces were finished in a bright yellow color. According to Federal Aviation Administration (FAA) records, the airplane was manufactured in 1988, and changed ownership several times before being registered to a relative of the accident pilot in 2000. According to the FAA records, the airplane contained a significant number of post-delivery modifications. These modifications included additional antennae, as well as vortex generators and other aerodynamic alterations. Examination of the airplane's airworthiness documents that were maintained by the FAA revealed that the most recent documentation, dated February 1998, concerned the installation of a 180 horsepower engine and vortex generators on the wings.

According to the airplane manufacturer's documentation, the airplane was equipped with one trailing edge flap on each wing. The cockpit flap handle was located near the front left side of the pilot's seat. The flap handle was used to mechanically extend the flaps via cable, and springs and airloads provided the forces to retract the flaps. A pawl that was activated by a spring-loaded button in the top of the flap handle, and which contacted a plate with fixed detents, served as the positioning and locking mechanism for the flap handle and the flaps. The manufacturer's guidance specified that the flap cable was attached to the flap handle with a shackle that was secured by a bolt, castellated nut and cotter key. The flap cable was routed from the handle aft along the left cabin, to a point behind the passenger seat, then up to a cable juncture at the top of the fuselage. A separate cable segment was routed from the juncture to each of the two flaps.

The engine was a Lycoming IO-360-C4P, and had accumulated a total of 759.6 hours. The most recent annual inspection was completed on February 25, 2008, and at that time the maintenance records indicated a tachometer time of 1,160.1 hours. At the time of the accident, the tachometer registered 1,223.1 hours.

METEOROLOGICAL INFORMATION

The 1205 surface weather observation at an airport about 30 miles east of 09FA recorded winds from 320 degrees at 4 knots, scattered clouds at 3,900 feet, temperature 32 degrees C, dew point 22 degrees C, and an altimeter setting of 30.06 inches of mercury. The visibility was not included in this observation, but observations at the same airport 20 minutes prior to and after this observation indicated 10 miles visibility.

COMMUNICATIONS

No records of any communications between the accident airplane and any air traffic control facilities were located.

AIRPORT INFORMATION

09FA was situated at the western edge of the community of Placid Lakes. The single runway, 18/36, was asphalt, and measured 4,800 feet long by 50 feet wide. The elevation was 130 feet above mean sea level. The hangars and fueling ramp were located near the north end of the runway. There were no buildings along the southernmost thousand feet of the runway.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest in a grassy area approximately 940 feet north of the south end, and 130 feet east, of the runway. The fuselage was in a near-vertical, nose-down attitude, with the vertical stabilizer pointed southeast. The nose of the airplane was embedded approximately 16 inches into the ground. The forward fuselage exhibited significant crush damage in the aft direction, and the aft fuselage exhibited moderate twisting and bending. The cabin volume was significantly reduced by impact forces. All flight control surfaces were accounted for at the scene. The horizontal and vertical stabilizers, and their respective control surfaces, were intact. There was no fire.

According to the police report, the only hardware-type personal effect recovered from the airplane was a Nikon D-300 digital camera, which belonged to the passenger. Photographic and email evidence indicated that the passenger also carried a "Telonics TR-5" receiver, which was approximately the size of a 1-quart oil container, and which was found in its case.

The camera memory chip, and the engine and airframe were temporarily retained by the National Transportation Safety Board (NTSB) for further examination.

Airplane Examination

On June 26, 2008, FAA and Piper personnel examined the airplane in a hangar at 09FA. The left and right wings had been cut away and detached from the fuselage by recovery personnel. All flight controls were present, and were attached to their respective airfoils.

The cockpit and cabin area exhibited severe crush damage in the aft direction. Some fuselage structural tubes had been cut by recovery personnel. The aft fuselage was twisted and buckled downwards at a point approximately half-way between the cabin and empennage. The landing gear remained attached to the fuselage frame, and exhibited impact damage in the aft direction.

The leading edges of both wings were crumpled aft for the full span of each wing. The forward

and aft lift struts were attached to their respective wings, and bent at the jury strut attach areas. The flaps and ailerons remained attached to their respective wings, and both exhibited impact damage. The left and right fuel tanks were crushed and devoid of fuel. The left fuel cap was present, and the right tank fuel filler neck, with the cap attached, was separated from the tank.

The vertical fin and horizontal stabilizers remained attached to the fuselage. The fin, rudder, stabilizers and elevators were intact. Examination of photograph evidence revealed that the left elevator was intact subsequent to the accident, but after it was transported to the hangar, the inboard trailing edge was observed to be bent up approximately 15 degrees.

Flight control continuity was established for all primary flight controls, except for impact- and recovery-related separations. Control cable continuity for the flaps was established from the control surfaces to the cuts that were made by recovery personnel, and from the cuts to the cockpit region.

The flap handle exhibited impact damage, and its setting could not be determined. The flap control cable was not connected to the flap lever. The cable shackle and the corresponding attach point on the flap handle appeared undamaged. The hardware used to attach the shackle to the flap handle was not located. The investigation was unable to locate any recovery personnel who disconnected the cable from the flap handle, or who were aware of anyone else taking such an action.

When it was recovered, the engine remained attached to its mount, the mount remained partially attached to the fuselage frame, and the propeller remained attached to the engine.

Engine Examination

On July 9, 2008, FAA and Lycoming personnel examined the engine at the storage facility in Groveland, Florida. Both propeller blades exhibited chordwise scoring, and were bent aft and slightly twisted. The propeller was removed from the engine for examination purposes, and the engine was partially disassembled. The spark plugs, valve covers, and accessory components were removed. Borescope examination of the cylinders and valves revealed no anomalies. The combustion chambers and spark plugs exhibited a similar gray color consistent with normal operation. The engine crankshaft was rotated by hand, and continuity of the crankshaft, camshaft, valve train, and accessory drives was established. Each cylinder produced compression while the engine was rotated, and both magnetos produced sparks from all towers. The lubrication system components were properly attached and secured. The oil screen was free of contaminants. The carburetor appeared normal, with two exceptions; two of the bowl screws were under-torqued, and the float height measured 8/64 inches instead of the required 13/64 inches.

MEDICAL AND PATHOLOGICAL INFORMATION

Pilot

An autopsy was performed on the pilot by the Office of the District 10 Medical Examiner of Florida. The autopsy report listed the pilot's cause of death as multiple blunt force traumatic injuries, and autopsy findings included coronary artery stenoses. The autopsy examination of the heart noted that "the left anterior descending branch reveals focal areas of prominent stenotic narrowing at its bifurcation point with the obtuse marginal branch. This yellow atherosclerosis imparts a slightly larger than a pinpoint diameter stenosis to the luminal surface of the artery."

Toxicological testing of the pilot's tissue samples was conducted by the FAA Civil Aero Medical Institute (CAMI). The testing did not detect ethanol, but did detect Citalopram and its metabolites in the pilot's liver and urine.

Examination of the pilot’s most recent application for a third-class Airman Medical Certificate, which was dated July 16, 2007, revealed that the pilot responded "yes" to "Do You Currently Use Any Medication?," and that he indicated only the use of Tricor (fenofibrate) and Clarinex D (desloratadine/pseudoephedrine). The application also included "yes" responses to "hay fever or allergy," "other illness, disability, or surgery," and "admission to hospital." The pilot's entries included "basic allergies, tonsillectomy, wisdom teeth" and "appendectomy" in the "Explanations" portion of the application. The application indicated "no" to all other conditions under "Medical History," which specifically included line items for "Heart or Vascular Problems" and "Mental disorders of any sort; depression, anxiety, etc."

Passenger

An autopsy was performed on the passenger by the Office of the District 10 Medical Examiner of Florida. The autopsy report listed the passenger's cause of death as multiple blunt force traumatic injuries.

ADDITIONAL INFORMATION
Geographic Information

Placid Lakes Airport was situated near several lakes. Lake Placid measured approximately 2 miles in the east-west direction, 4 miles in the north-south direction, and was located approximately 2 miles east of 09FA. Lake June was approximately the same size as Lake Placid, and was located 2 miles north of 09FA. Lake Annie was approximately 1/2 mile in diameter, and was located approximately 5 miles southeast of 09FA.

Additional Witness Observations

According to one witness, about 1100 on the day of the accident, he observed the accident airplane being fueled by the accident pilot at the 09FA. The witness reported that at some point during the fueling, the fuel nozzle fractured at its swivel joint, and fuel spilled on the

airplane. The witness then observed the pilot "hose the airplane down" with water to clean the fuel off the exterior, and "wipe down" the interior of the airplane.

The husband of the manager of 09FA resided in a home adjacent to the airport, but he was not a pilot. He knew the pilot personally, and was familiar with the pilot's airplane, and some of his flying habits. His interview statements indicated that the pilot's low-altitude downwind pass, pull-up and course reversal near the end of the runway was not an unusual or abnormal maneuver for the pilot.

Two other individuals stated that it was not unusual for the pilot to perform the low-altitude downwind pass, pull-up and course reversal near the end of the runway when he landed at 09FA. They stated that they believed the maneuver was a means for the pilot to verify that the runway was clear of debris and animals, particularly "sand hill cranes." One witness stated that the pilot had been taught the maneuver by the pilot's father.

The airport manager stated that airport did not have a problem with birds, and that birds were rarely, if ever, seen on the runway.

Two individuals on a research boat on Lake Annie, who were working for the Archbold Biological Station, observed the accident airplane during the accident flight. One of the witnesses wrote that the airplane "came in out of the south, flying low, but not abnormally low, just typical for the bear work they do (maybe 200-400 ft?)." The witnesses recognized the pilot and airplane, and waved. The airplane then "came down and circled the boat, getting fairly low, at one point just above the water, then pulled up and headed back to the north."

Several persons on a pleasure boat on Lake Placid observed the accident airplane during the accident flight. According to the witnesses, they saw a yellow airplane flying from the direction of the community of Placid Lakes. The airplane attracted their attention due to its extremely low altitude, and it flew "over the top of the boat." The witnesses reported that the airplane was "very, very close" and that they could "clearly see the faces of the persons" on board the airplane. The witnesses reported that the doors and/or windows of the airplane "were open," and that the airplane passenger was taking photographs. The owner of the boat was on the shore during this period, and also observed the airplane. She stated that the airplane was "very low."

One witness who was working on the roof of a two-story house which overlooked Lake June observed the accident airplane during the accident flight. According to the witness, the airplane was "very low," and it "came down and followed...and passed a jet ski." The witness stated that the last time he observed the airplane flying over the lake, it was "definitely lower than the house." The witness saw photographs of the crashed airplane, recognized it as the same one he observed maneuvering over the lake, and contacted authorities to report his observations.

A family of four on a pleasure boat near the public dock on Lake June also observed the

accident airplane during the accident flight. They saw a "yellow plane" that "came down quite a bit," and at first they thought it might be attempting to land on the lake. They estimated that the airplane came within about "20 yards" of them at its closest approach.

About 1145 on the day of the accident, two persons in a truck approximately 16 miles north of 09FA observed a "bright yellow, low winged aircraft" initially approach from the south. They saw it flying "very low" and observed it cross a road several times, in a pattern they described as a "sideways figure 8." At one point they observed it fly perpendicular to, and then under, some electrical power lines. The airplane observed by the witnesses could not definitively be identified as, or discounted as, the accident airplane.

Digital Images from Passenger's Camera

A Nikon D300 digital camera that belonged to the passenger was recovered from the wreckage. The camera and its memory card were retained for examination, and the contents of the memory card were downloaded by NTSB Recorders Laboratory personnel. The memory card contained 99 digital image files, and each file was approximately 37 megabytes in size. Metadata information indicated that the first image file was named "DSC_0798," with a creation date and time of "6/17/2008 8:59 AM." The final image file was named "DSC_0896," with a creation date and time of "6/20/2008 12:10 PM." A correspondingly-named file was present for every consecutive number between 798 and 896. The first image from the day of the accident was "DSC_0822," which had a creation time of "11:44 AM." Every image with a creation date of June 20 was consistent with having been taken from the rear seat of the accident airplane while in flight.

Several images recovered from the memory card depicted views looking either down on or across calm bodies of water. The perspective and elevation angles of some of these images indicated that they were obtained at very low heights above the water. Some of the files contained images of boats. Nine images with creation times of "11:53 AM" or "11:54 AM" depicted a boat with two adult males on board. The boat and the two individuals were subsequently identified as two researchers from the Archbold Biological Station, who indicated that their boat was on Lake Annie.

Two images with creation times of "11:58 AM" depict a boat with several persons on board. The boat's registration number was used to identify the owner and occupants of the boat. These individuals provided some of the previous witness statements, and identified the body of water that they were on as Lake Placid.

Seven images with creation times between "12:06" and "12:08" depicted the yellow landing gear of an airplane in close proximity to a water surface. One file contained an image of a landing gear strut assembly and tire just above the surface of the water, and six files contained images of the tire contacting the water. Tire contact with the water was evidenced by the water spray pattern behind the tire, and the wet appearance of the tire. The geometry, placarding, and coloration of the landing gear strut assembly and tire were congruent with the right main

landing gear of the accident airplane. In addition, these images included the pants-clad leg of an individual; the color and pattern of the pants were congruent with those captured in post-accident photographs and documented in the passenger's autopsy report.

Pilot Information

Certificate:	Private	**Age:**	33,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	July 16, 2007
Occupational Pilot:		**Last Flight Review or Equivalent:**	August 1, 2007
Flight Time:	1246 hours (Total, all aircraft), 418 hours (Total, this make and model), 33 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N988PC
Model/Series:	PA-18-150	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1809010
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	February 25, 2008 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	63 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1223 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed	**Engine Model/Series:**	O-360-C4P
Registered Owner:	On file	**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	OBE	**Distance from Accident Site:**	30 Nautical Miles
Observation Time:	12:05 Local	**Direction from Accident Site:**	90°
Lowest Cloud Condition:	Scattered / 3900 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	320°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.05 inches Hg	**Temperature/Dew Point:**	32°C / 22°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lake Placid, FL (09FA)	**Type of Flight Plan Filed:**	None
Destination:	Lake Placid, FL (09FA)	**Type of Clearance:**	None
Departure Time:	11:45 Local	**Type of Airspace:**	

Airport Information

Airport:	Placid Lakes 09FA	**Runway Surface Type:**	Asphalt
Airport Elevation:	130 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	36	**IFR Approach:**	None
Runway Length/Width:	4800 ft / 50 ft	**VFR Approach/Landing:**	Full stop

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	27.245555,-81.413055(est)

Administrative Information

Investigator In Charge (IIC):	Huhn, Michael
Additional Participating Persons:	Marco Grillo; FAA/FSDO; Tampa, FL Hector Diaz; FAA/FSDO; Tampa, FL Edward Rogalski; Lycoming; Williamsport, PA Ron Maynard; Piper Aircraft; Vero Beach, FL
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