stream and watershed information to support recovery and enhancement efforts. In response, the California Department of Fish and Game (DFG) video graphed the mainstem of the Eel River and mainstems of its major tributaries during the summer of 1993. The goal was to record aerial reconnaissance of fish habitat in main stems and to estimate erosion hazards and other watershed disturbance in minor tributaries. The two overall objectives of this project were first, to obtain and record a first-hand impression of current conditions for anadromous fish spawning and migration in the major sub basins of the Eel system, and second, to develop methods of capturing expert observations in a way that would enable their cataloging, mapping, and dissemination with more efficiency than person-to-person and/or conventional text reports.

The project was accomplished with a DFG Patenavia (P68) and a crew consisting of a pilot, two observers, and a camcorder operator. The aircraft was flown at 1,500 to 3,500 feet above ground level. The camcorder recorded near-vertical terrain imagery and the observer’s narrative, including stream names and codes, fish habitat descriptions, locations of landslides, etc. Verbal time announcements on the tape were correlated to UTC time and GPS position records to estimate the location of selected imagery and narrative sequences. The project encompassed over 640 miles of stream channel, and over five hours of narrative during the course of four flights. Video image sharp-
BROKEN WING AWARD
If It Weren’t For Bad Luck …
By Dave Younkin, President

On June 10th one of Colorado Division of Wildlife Cessna185s was involved in the following incident: Whitly Wanamacher was conducting a telemetry search for one of Colorado’s newly transplanted lynxes. At about mid-day he and an observer landed at Farmington, New Mexico for fuel and lunch. Upon departure at about 1:00 in the afternoon, at an altitude of approximately 700 feet agl, and about three miles from the airport, the engine lost power to the extent that it could only maintain a high idle. Whitly immediately attempted to return to Farmington and realized he could not. So he selected an open Mesa, and effected a successful emergency landing in a very small area.

Mechanics from Farmington were sent to the area by the tower (since he had been in continuous contact with them). They determined that the bolt that holds the throttle arm to the throttle body was missing. It was replaced, and the aircraft checked out normally. This bolt normally is held in place by a castellated nut and secured by a cotter pin.

After a careful inspection of the area a take-off was made. Just at the point of lift-off the left main gear contacted a small berm, and separated it from the aircraft. The flight was continued to the Farmington airport where a successful one-gear, one wing tip, landing was made. Damage to the aircraft will run around $20,000. In order to inspect the separated linkage a person would have to undo the aircraft, which was not expected of the pilot. The conclusion is that either there was a catastrophic failure of the bolt or the retaining key, or last but not least, that the pin was improperly placed.

We extend this caution to the membership: We all fly in hostile areas where such a problem might be catastrophic. Let us not be complacent about flying any lower or slower than necessary to accomplish our mission, even when ferrying to a job site. Let us not become complacent about reminding our maintenance facilities that our well being depends upon their skill and dedication. A lot of the flying we do becomes routine and even boring, but we must not become complacent. We must remember that those people in the air with us are counting on us not to be careless, sloppy, or complacent, but instead to be vigilant. Whitly displayed an excellent job of airmanship, and should be commended for it.

SAFETY CORNER
Down and Out...
Dennis E. Dura, D.P.E.

In the event of an engine failure a Natural Resource Pilot needs to know how far the aircraft will glide, and in some cases, how long the aircraft can stay aloft. For an airplane or helicopter, the L/D ratio determines glide distance. Gross weight affects the amount of time an aircraft glides, and the maximum-glide-distance airspeed for an airplane and helicopter. Any configuration change that increases drag, such as flaps on an airplane or external stores on a helicopter or airplane, will adversely affect the L/D ratio. The maximum-glide-distance airspeed is usually only published for the maximum gross weight of an aircraft. As an aircraft gets lighter, that airspeed decreases. A rule of thumb is that airspeed decreases 5% for every 10% decrease in gross weight. It is important to maintain that airspeed in order to glide at the minimum glide angle. A pilot can not stretch the gliding distance, and the maximum glide angle is published for all airplanes.

For an airplane, a little educated guess work is needed. If one looks at a graph of “rate of descent” versus “airspeed” for an airplane in powered off flight, the minimum rate of descent airspeed falls between the power off stall speed and the maximum glide airspeed. It is probably some where between 5 to 10 knots above stall speed. But to be more accurate, you might consider taking your airplane out some day and do a little experimenting to determine what the minimum rate of descent airspeed actually is for your airplane in a glide.

Natural Resource Pilots are involved in many flights over inhospitable terrain, and it would be wise to be aware of all our options if the engine quits.

(EEL RIVER BASIN Continued from page 1)

The voice recording was also the medium through which aircraft position, aircraft altitude, and camcorder zoom lens, and shutter speed settings were recorded. To mark an approximate position in the course of a flight recording, the front observer would read aloud the time on his wristwatch to be recorded on the videotape. During tape playback, any such “spoken time” would be correlated with GPS time included with each GPS position, thus locating (within a few seconds in time and a few hundred meters in space) any particular video imagery and/or observer comments. Flight altitude was read aloud by the front observer directly from the aircraft’s altimeter, while camcorder settings and status were relayed by the operator through the aircraft intercom. Additional location references were voiced onto the videotape in the form of place names, numbered waypoints (noted concurrently by the second observer operating a LORAN receiver), and stream name codes.

High terrain in close proximity to the subject streams necessitated the flying of a continuous, meandering flight path to follow stream channels. The camcorder, positioned over a factory-installed camera port, mounted on a simple gimbals, was panned by hand from side to side to keep the stream channel centered in an external monitor. While image blurring and distortion were introduced by this technique, the minor losses of image quality were exchanged for greatly increased rates of coverage. An additional advantage of the camera panning was the ability to track an image fore-to-aft, greatly reducing image forward-motion in effect “freezing” an image for several seconds.

GPS positions were collected at the rate of one position per second and were differentially corrected after the flight with base station files downloaded from the U.S. Forest Service’s Remote Sensing Lab in Sacramento. The precision of aircraft positions, estimated at 2 to 5 meters after correction, was more than adequate given the variable camcorder zoom lens settings and pointing direction.

Aerial video data, when integrated with UTC time code, GPS positioning, and expert narrative, can be a valuable supplementary information source for DFG field biologists, OSPR operations, fish habitat restoration managers, special-status species consultants, and other Department co-operators. Video imagery of streams and other natural resources, even at marginal levels of technical quality, can yield significant rates of information delivery in support of management decisions. Videography in general appears to have needed qualities of large capacity, archival storage, available, affordable technology, media integration, and user acceptability that can drive improved expert information cataloging, mapping, and dissemination.

Details of this project have been posted to the IANRP web page in the Operations Forum Chapter.

In the event of an engine failure a Natural Resource Pilot needs to know how far the aircraft will glide, and in some cases, how long the aircraft can stay aloft. For an airplane or helicopter, the L/D ratio determines glide distance. Gross weight affects the amount of time an aircraft glides, and the maximum-glide-distance airspeed for an airplane and helicopter. Any configuration change that increases drag, such as flaps on an airplane or external stores on a helicopter or airplane, will adversely affect the L/D ratio. The maximum-glide-distance airspeed is usually only published for the maximum gross weight of an aircraft. As an aircraft gets lighter, that airspeed decreases. A rule of thumb is that airspeed decreases 5% for every 10% decrease in gross weight. It is important to maintain that airspeed in order to glide at the minimum glide angle. A pilot can not stretch the gliding distance, and the angle of attack is increased. This increase in angle of attack will increase lift, but induced drag will also increase and the airspeed will decrease, resulting in less gliding distance.

Raising the nose of a helicopter will change the angle of airflow through the main rotor, increasing drag and reducing airspeed. Usually the maximum glide distance for a helicopter is achieved in the lower portion of the rotor rpm operating range. This is due to the decrease in induced drag affecting the main rotor at lower rpm settings. Remember that a head wind will decrease the gliding distance, and a tail wind will increase it. Sometimes a pilot may need to stay aloft as long as possible and would like to obtain the minimum sink rate airspeed. The minimum rate of descent airspeed in autorotation is published for all helicopters.

For an airplane, a little educated guess work is needed. If one looks at a graph of “rate of descent” versus “airspeed” for an airplane in powered off flight, the minimum rate of descent airspeed falls between the power off stall speed and the maximum glide airspeed. It is probably some where between 5 to 10 knots above stall speed. But to be more accurate, you might consider taking your airplane out some day and do a little experimenting to determine what the minimum rate of descent airspeed actually is for your airplane in a glide.

We need your help!
We need articles about your flying program. We also need articles about specific activities you may undertake, such as the Eel River Basin Project. We also need information about upcoming events. If you have any information you would like to see published, please send it to the newsletter editor. Include photographs and text (about one typed page).
The original FBA-2C was designed and manufactured by Found Brothers Aviation Limited in Toronto, to operate on wheels, skis, and floats in undeveloped regions, such as Canadian bush country. The aircraft was certified to FAA CAR 3 regulations in Canada and the United States, to operate on retractable wheel skis and wheel floats. The prototype flew successfully in 1959 with a tricycle configuration, but the -2C incorporated the optional tail down configuration. Twenty seven were sold and nine are still registered.

In 35 years of operation the FBA-2C has become a legend with its owners. It has earned the reputation of being a durable and reliable aircraft, with excellent take-off and climb capability, along with stable flight characteristics and exceptional handling qualities in high-wind, rough-water conditions.

One FBA-2C is owned by Tudhope Airways Limited in Hudson in Northern Ontario. Operating on skis and floats in the harsh conditions encountered in those remote regions, it has accumulated, safely and economically, over 13,000 hours and over 58,000 flight cycles (take-off / landing) without any sign of airframe deterioration or requirement for a major overhaul. Many more years of operation are planned.

The aircraft is preferred by Tudhope customers, and it continually returns high profits due to the bulky loads it carries in the 42” wide, 120 cubic-foot cabin, and the low operating costs which are approximately 55% of a comparable aircraft. Cabin access through four large doors facilitates loading such items as forty five imperial gallon fuel drums, automatic washers-dryers, ten-foot lumber, or a stretcher with patient.

The “Bush Hawk” is an improved version of the Found FBA-2C, and is being produced in response to compelling requests to place the FBA-2C back into production. The original Type Certificate of the FBA-2C in Canada and the United States has been reinstated. This has saved several million dollars in costs which would have been needed to certify a new aircraft.

The “Bush Hawk” carries approximately 70% of a Beaver load and incorporates several modifications, including: larger rear doors for easier access to the rear cabin, increased gross weight from 3,000 to 3,200 lbs, increased disposable load to 1200 lbs on Edo 2960 floats, increased power with a fuel injected engine, reduced drag, increased ASI and rate of climb, fail-safe design of critical components, and an increased fuel capacity (83 Imp gal/100 US gal).

The “Bush Hawk” is being built by Found Aircraft Canada Inc, near Toronto, Canada. The first production model, which will be available early 1999, will utilize a tail-down undercarriage configuration. A tricycle version will be available on subsequent models. For more information contact Found Aircraft Canada Inc, 300 Jones Road, Gravenhurst, Ontario, P1P 1A1. Telephone (705) 687-6167.

### PERFORMANCE

| Engine | Left Impulse Magneto | 260 HP Lycoming IO-540-D4A5 | Total Cabin Volume | 120 Cubic Feet |
| Propeller | Hartzell Three Blade | Diameter 84 Inches | Rear Cabin Volume | 87 Cubic Feet |
| Wing Span | 36 Feet | Fuel Capacity | 83 Imperial/100 US Gallons |
| Wing Area | 180 Square Feet | Main Wheel Size | 8.00 X 6 |
| Length | 25.5 Feet | | |

| Option | Description | Model # | Disposable Load | Gross Weight |
| Wheels | | | | |
| Floats | EDO Straight | #2960 | 1450 lbs | 3200 lbs |
| | EDO Amphibian | #2790 | 1200 lbs | 3200 lbs |
| Skis | Federal Retractable | C-3200 | 900 lbs | 3100 lbs |
| | | | 1335 lbs | 3200 lbs |

| Horsepower | Wheel Version | 260 HP | 3200 lbs |
| Gross Weight | Float Version | 260 HP | 3290 lbs |
| Sea Level ISA @ Max Continuous Power | Maximum Speed | 139 knots | 121 knots |
| Rate of Climb | 931 fpm | 750 fpm |
| 5000 IAS @ 75% Power | Cruise | 132 knots | 112 knots |
| Fuel Flow Imperial Gallons/US Gallons | 11.9/14.3 gph | 11.9/14.3 gph |
| Specific Range | N.A.M. Per Fuel Pound | 1.5 miles | 1.4 miles |
| 5000 IAS @ 60% Power | Cruise | 119 knots | 106 knots |
| Fuel Flow Imperial Gallons/US Gallons | 9.6/11.5 gph | 9.6/11.5 gph |
| Specific Range | N.A.M. Per Fuel Pound | 1.6 miles | 1.5 miles |

Con Aero Newsletter page 3
2000 IANRP WORKSHOP
Cajun Convention!
Forwarded by Tom Monterestelli, OAS

The IANRP 2000 Workshop will be held in New Orleans, Louisiana at the Le Pavillion Hotel from January 31 through February 4, 2000. A precise agenda is yet to be established, and we are looking for IANRP members who could and would make a contribution in the way of a talk or slide presentation, or movie or comedy act or anything else of passing interest. For those members who have access to the internet, updated information can be found on the www.oas.gov.au symposium.

CLASSIFIED ADVERTISEMENTS

POSITION WANTED: PILOT/BIOLOGIST
Stephen D. Earsom
Licenses/ratings: Com'l and Instrument AS/MEL, CFI for ASE. Experience: 600+TT, 500+PIC, 200+ as CFI with a majority of experience obtained in mountains and deserts of New Mexico and Colorado. Will be receiving MS in Biology this fall from University of New Mexico. Read/write/speak Spanish. Contact:
Dept. of Biology
167 Castetter Hall
University of New Mexico
Albuquerque, NM 87131
(505)277-5130; Fax 277-0304

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