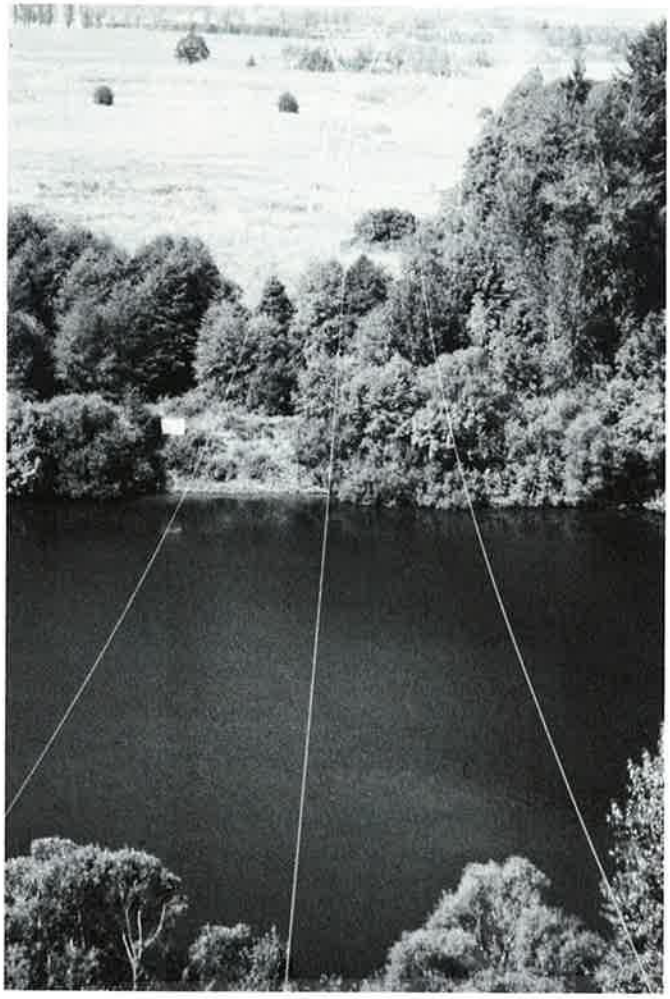
Use of Low-level Photography to Manage Transmission Line Rights-of-Way

by Joe A. Johnson



Joe Johnson has worked for the last ten years as Right-of-Way Management Specialist for the Bonneville Power Administration in Portland, Oregon. Johnson has a bachelor of science degree in forestry from the Stephen F. Austin State University in Texas.

He has developed an audio-visual presentation of the photographic methods described in this article. It has been presented at the following locations:

1. *The Third Symposium on Environmental Concerns in Rights-of-Way Management — Feb. 15-18, 1982 in San Diego, California.*
2. *Edison Electric Institute Fourth National Conference on Land Use, Recreation, and Resource Management — August 9-12, 1982 in Duluth, Minnesota.*
3. *Annual Educational Seminar of Chapter Three International Rights-of-Way Association — November 4-5, 1982, Wilsonville, Oregon.*

As early as 1973, BPA began to experiment with the use of aerial photography to identify maintenance problems on powerline rights-of-way. At that time, the commercially available aerial product was low-level color strip transparencies taken from a camera mounted horizontally in a fixed-wing aircraft. The resulting photography recorded what was behind the aircraft, rather than what was ahead. The photography was accompanied by a tape, narrating conditions on the rights-of-way.

Due to performance and contracting problems, BPA soon became interested in developing a more reliable system. Early efforts consisted of simply taking photographs of the right-of-way from a helicopter with a hand-held camera, then taping the rolls of exposed film together to form strip photography. Beginning with the purchase of a motorized camera in 1974, BPA has since developed a unique and sophisticated system which serves a variety of purposes resulting in significant dollar and manpower savings. Our present system produces continuous color strip photography of every powerline in the BPA system. The color transparency strips can be mounted on reels and conveniently

viewed in any office on a Dukane Model 27A25 viewer. The low-level photography displays the type of vegetation on the rights-of-way, as well as buildings, gardens, streams, or other bodies of water, gates, etc.

Originally, the low-level photography system was designed to identify areas beneath powerlines where brush control was needed. Typically, photography is used during the winter season to review the rights-of-way and select areas for contract brush control in the Spring. The low-level photography is used in conjunction with a Plan and Profile (P&P)* and high-altitude photography** to produce detailed instruction for the contractor. If necessary, the instructions produced with these aids can specify accurate locations and detailed prescriptions for very small tracts.

Although originally developed for use in the brush control program, low-level photography has become an integral part of many BPA planning processes and activities. In addition to its use in developing site specific vegetation management prescription, it is also used for work planning, (e.g., scheduling brush crews), and to identify access routes and appropriate equipment, to identify potential danger trees, to check the condition of access roads, including necessary erosion control measures or to forecast or modify road improvement contracts, to locate noxious weeds, or to verify office records for brush control or other right-of-way activities. Low-level photography has also demonstrated its utility in locating new lines or access roads, line revisions or line taps. Preliminary review of the low-level photography is helpful prior to field activities, such as timber cruising or land surveying. It can also be used to verify the type of structure presently on a right-of-way or the need for airway marker balls, airway lighting, or other installation details associated with various structures. In emergencies, such as unanticipated outages, low-level photography is helpful for planning the appropriate corrective actions. For those unfamiliar with an area, such as new foremen or contractors, the low-level photography provides essential background information. An unexpected use for low-level photography has been as a resource in responding to public or landowner complaints. Use of low-level photography to verify a complaint or check a description of a situation has enabled us to respond more promptly to problem situations. All of the uses described above have resulted in a savings of dollars, manpower, or travel expenses, and, in some cases, improved BPA's ability to respond to public or landowner concerns.

Low-level photography is used in conjunction with a computer based data storage and retrieval system (ROWDATA). Together, low-level photography and the computer based data system form the basis for site specific vegetation management prescriptions, and a historical record.

The present BPA photography system uses a Nikon F2AS camera with the following accessories:

-85MM F-2.0 Lens
-250 exposure back
-MD-2 motor drive
-52MM polarizing filter
-Control attachment DS-1
-EE aperature servo
-Pistol grip with electrical connecting cable

Additional accessories used with this system include:

-250 exposure film cassettes
-Bulk film cassette loader
-Bungi cords for hanging camera in helicopter
-Battery chargers for rechargable batteries
-35MM film splicer

The camera is mounted in a Bell 206 Jet Ranger. The only alteration to the aircraft is installation of a set of two small hooks placed on the passenger side where the fuselage connects with the windshield. Flights are made 25-50 feet above the conductor (approximately 100

* *A Plan and Profile (P&P) is a drawing illustrating topographic features, land use patterns, ownership, and major features of the existing electrical system.*

** *High altitude photography can be used to locate major features such as powerlines and access roads. In this example, it functions as a sort of photographic map.*