

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of the Petition
for Modification of Order No.
WQ 78-10, State Water Resources
Control Board, by Louisiana-
Pacific Corporation. Our Files
Nos. A-206(a) and A-206(b).

Order No. WQ 79-1

BY THE BOARD:

The Louisiana-Pacific Corporation (petitioner) has constructed access roads and conducted logging operations near Hoxie Crossing adjacent to the Middle Fork of the Eel River in Trinity County. These activities took place on land owned by Richard Wilson. The discharge of waste resulting from these activities is regulated by Order No. 76-174, Order No. 77-86, and Resolution No. 78-4, California Regional Water Quality Control Board, North Coast Region (Regional Board) as amended on May 18, 1978, by Order No. WQ 78-10, State Water Resources Control Board (State Board).

Order No. WQ 78-10 stated, in part:

"In reviewing the waste discharge requirements prescribed for this project we have had occasion to review the monitoring requirements prescribed by the Regional Board and find that they are inadequate in that for winter time sampling they permit the discharger, at its option, to either sample the Middle Fork of the Eel River or submit aerial stereo pairs of photographs of the area involved taken just after it is winterized, twice during the rainy season and once at the end of the rainy season. In our opinion, both photographic monitoring and water samples are necessary in the winter time when the major impacts of this project would normally be anticipated. We realize that access to the area may be difficult in the winter but we feel that every reasonable effort should be made by the company to determine the actual impact of this project on water quality. We, therefore, adopt as a part of this order a provision requiring the Regional Board Executive Officer to amend the monitoring requirements to provide that the discharger shall obtain water quality samples on a monthly basis. If access to the sampling points is not possible, the company should be required to submit a statement under penalty of perjury stating specifically what attempts were made to gain access to the sampling points and the reason why access could not be gained. Further, the discharger should be required to provide aerial stereo pairs during any month that water quality samples are not obtained. Finally, the monitoring program should require the discharger to submit 35mm aerial photos just after the area is winterized, twice during the rainy season and once at the end of the rainy season."

On August 29, 1978, the petitioner filed a petition for modification of Order No. WQ 78-10 and on September 8, 1978, a petition was filed on behalf of Richard Wilson (intervenor) opposing the petitioner's request.

I. CONTENTIONS

The petitioner alleges:

"On May 17, 1978, Board held a special workshop in regard to the above Order. At the time of hearing, petitioner advised the Board that aerial stereo pairs was exceedingly expensive, and suggested that ordinary 35mm photographs would suffice. Board agreed with this position. At the adjournment of the meeting, applicant asked if it was adviseable that it stay for the regular meeting the following day. Applicant was advised that it was not necessary to attend said meeting.

When an Order was finally issued, the provision for stereo pairs was retained in the Order.

Counsel of the Board advised counsel Louisiana-Pacific Corporation that the foregoing is not a clerical error, but was indeed a substantive change of position.

WHEREFORE, applicant prays that the provision for stereo pairs be eliminated, and that it be authorized to use 35mm aerial photographs in lieu thereof."

Making reference to the materials quoted, previously from Order No. WQ 78-10, the intervenor states:

"...it is apparent from the Order of the Board that the matter of water quality on the Middle Fork of the Eel River is paramount to cost consideration insofar as the discharger is concerned. For this reason there is absolutely no merit to Louisiana-Pacific Corporation's Petition for Modification of Monitoring Requirements."

II. ANALYSIS

At issue is whether the discharger should be required to provide aerial "stereo pairs". Because of the cost of stereo pairs, the petitioner seeks relaxation of this requirement and offers to take 35mm aerial photos in place of the stereo pairs. An unstated assumption in our reference to "stereo pairs" in Order No. WQ 78-10, was that the pictures would be taken by a firm or person expert in taking vertical stereo pairs. Such pictures seen through a viewer not only enable the user to obtain the effect of three dimensional imagery but permit the user to accurately scale and to make calculations of features in the pictures. For the purposes

of aerial monitoring of compliance with waste discharge requirements, the three dimensional imagery (as opposed to regular photographs) greatly enhances the users ability to perceive what changes are actually occurring on the ground.

Upon consideration, we believe there can be some relaxation from the vertical stereo pairs requirements without reducing the effectiveness of aerial surveillance. During those months when water quality samples are not obtained, the petitioner may fulfill its requirements for stereoscopic pictures via oblique stereo pairs.^{1/} Oblique stereo pairs may be obtained with a hand held 35mm camera using the procedure set forth in Appendix A (or other similiar procedure) at no greater cost than ordinary 35mm photographs.^{2/} By using this procedure, the petitioner can achieve desired cost savings without the Regional Board's loss of the benefits of three dimensional aerial photographs. However, the requirement for professional vertical stereo pairs after the area is winterized and after the rainy season is retained because we believe that stereoscopic pictures of that precision and taken at these times may provide a useful adjunct to any actions for violation of waste discharge requirements.

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1. These pictures, however, must be of a quality acceptable to the Regional Boards' Executive Officer. If satisfactory photographs usable for accurate monitoring are not obtained using this method, the Regional Board Executive Officer should again revise the monitoring requirements to be consistent with our original Order No. WQ 78-10, dated May 10, 1978.
 2. The paired stereo photos may be taken from any angle and at any elevation that provides pictorial resolution satisfactory to the Regional Board Executive Officer.

III. CONCLUSIONS

Based on the foregoing analysis, we find that the petitioner may take oblique stereo pairs during those months when water quality samples are not obtained.

IV. ORDER

IT IS HEREBY ORDERED that Order No. WQ 78-10 is amended as discussed under our foregoing analysis and the Executive Officer of the Regional Board, accordingly, is directed to amend the petitioner's monitoring requirements.

Dated: JAN 25 1979

ABSENT

John E. Bryson, Chairman

W. Don Maughan
W. Don Maughan, Vice Chairman

William J. Miller
William J. Miller, Member

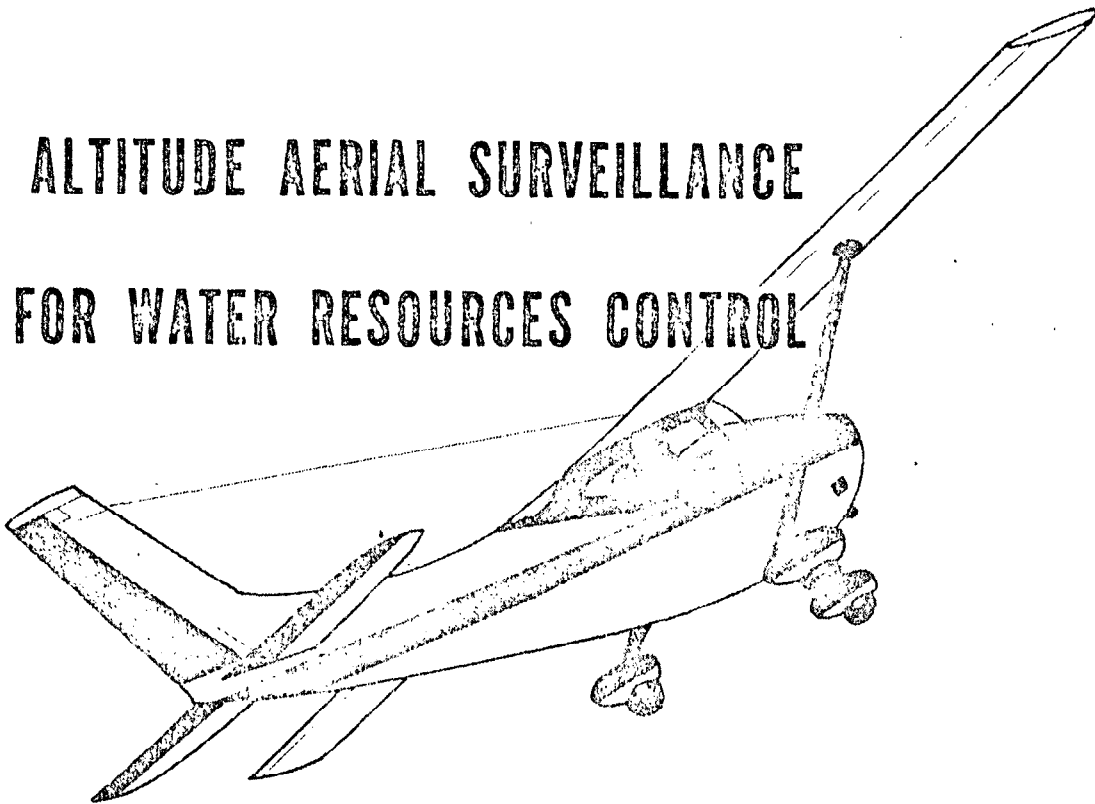
L. L. Mitchell
L. L. Mitchell, Member

APPENDIX A

MANUAL OF PRACTICE

A reference handbook and training supplement
for the statewide aerial surveillance program

LOW ALTITUDE AERIAL SURVEILLANCE FOR WATER RESOURCES CONTROL



JULY 1978

STATE WATER RESOURCES CONTROL BOARD

Division of Planning and Research

REMOTE SENSING APPLICATIONS IN WATER RESOURCES - A PLANNING MATRIX

SENSOR OPTIONS

WATER RESOURCES CONTROL SUBJECTS - APPLICATIONS	CONDUCTIVITY	HEAT INDEX	FLUORIDE	PHOSPHORUS	NITRATES	NITROGEN	PHOSPHORUS	SILICA	SODIUM	TEMPERATURE	MAGNETIC		LASER	LIDAR	RADIOISOTOPES	SPECTROSCOPY	THERMAL	ULTRASOUND	
											IN	OUT							
Adjudication-Compliance	0	X	X	X	Y	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Rights Permit Compliance	0	X	X	X	Y	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Depth	X	X	0	0	0	Y	0	0	0	0	0	Y	Y	0	0	0	0	0	0
Offshore Currents	0	X	X	0	0	Y	Y	0	0	0	0	Y	Y	Z	0	0	0	0	0
Swamp or Marshland Delineation	0	X	X	X	X	Y	0	0	0	0	0	0	0	0	Y	0	0	0	0
Stream Bed Analysis	0	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Watershed Analysis	0	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0
Lakes Inventory	X	X	X	X	X	Y	0	0	0	0	0	0	0	0	Z	0	0	0	0
ADSD Investigations	0	X	X	0	Y	Y	0	0	0	0	0	0	C	Z	0	0	0	0	0
Environmental Impact Analysis	0	X	X	0	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0
Point Source Enforcement	0	X	X	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
Nonpoint Source Inventory	0	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thermal, Geothermal Discharges	0	X	X	0	0	X	0	0	0	0	0	0	0	Z	0	0	0	0	0
Mining Wastes	0	X	X	Y	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agricultural Wastes-Return Waters	0	X	X	0	X	Y	0	0	0	0	0	0	0	Z	0	0	0	0	0
Logging-Effects on Water Quality	0	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erosion-Sedimentation	0	X	X	0	Y	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emergent Response Oil Spills-Pink Pills, Etc.	X	X	X	Y	X	Y	0	Y	Y	0	Y	Y	Y	Y	0	0	0	0	0
Archaeology-Historic	0	X	X	Y	0	Y	0	0	0	0	0	0	0	0	0	0	0	0	0

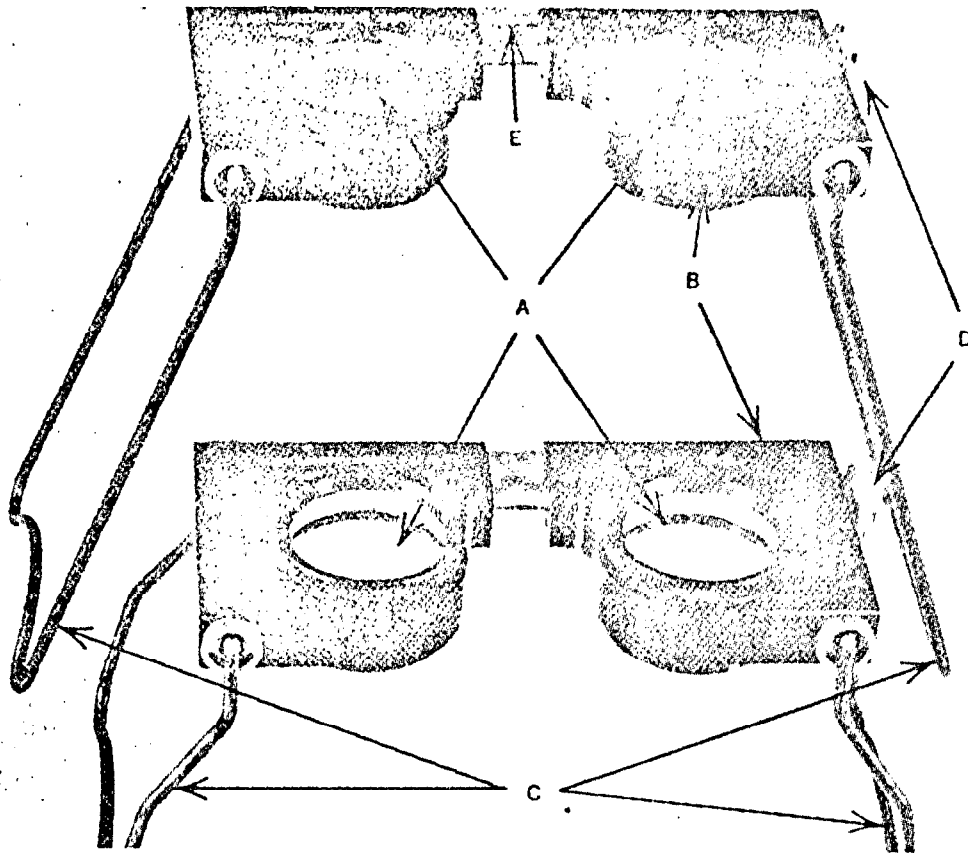
LEGEND:
 X - OFF-SHELF AVAILABILITY OF SENSOR SYSTEM - PROVEN EFFECTIVE.
 Y - A DEVICE OR SYSTEM IS IN DEVELOPMENTAL STAGE, BUT NEEDS FIELD TESTING.
 Z - NO DEVICE OR SYSTEM EXISTS, BUT IT IS NEEDED.
 0 - THERE IS NO LIKELY APPLICATION - OR THERE IS NO SYSTEMS NEED.

9.2 BASIC STEREOSCOPY

Special equipment is sometimes needed to aid and enhance the interpretation of aerial photography. Optical magnification, by either direct magnification or by projection, is almost a requirement. The 35 mm camera optics, for example, are superior in resolution to the unaided human vision, and most aerial photography even in large scale produces images which are often too small to be fully interpreted without magnification.

When terrain slope and elevation information are important, the technology of stereoscopy can be brought into play. Slightly offset photographs of a target are arranged as stereo-pairs or stereograms. The obvious advantage in working with stereograms is the "apparent" three-dimensional point of view.

Some basic steps for taking and viewing stereo-pairs are discussed below. The simplest piece of equipment for viewing stereo-pairs is a folding, pocket-type lens stereoscope, as



Folding stereoscopes are simple instruments designed to help users see the imagery pictured on properly positioned overlapping aerial photographs in three dimensions. The basic parts of folding stereoscopes are A, lenses, usually two "times" magnification; B, frame to hold lenses the correct distance apart; C, legs to hold the lenses the correct distance above photographs; D, vernier adjustment, for precise adjustment of distance between lenses (found only on first-quality instruments); E, lens separation scale for adjustment to user's eye-spacing.

shown above.

A number of optical firms, including Bausch and Lomb, manufacture a variety of portable stereoscopes, including the more sophisticated (and costly) stereomicroscopes. A stereomicroscope is available in the Division of Planning and Research for Board-wide use.

Cartographic and orthophoto applications most often require vertical photography and, very often, examples of stereo-pairs are photographed in the vertical. However, both pleasing and effective stereograms can be produced in the oblique.

About 30 degrees off the vertical toward the horizon is recommended.

Try the following sequence for producing oblique stereo-pairs:

1. Load a single-lens-reflex, 35 mm camera with color print-type film. The processed prints will be dimensionally ideal for use with a pocket stereoscope.
2. Set the camera to fully automatic metering, but be sure the shutter speed is from 1/500 to 1/1000 second.
3. Fly to an identifiable scene, such as a park or campus. Set up a flight altitude of about 1500 feet AGL (above ground).
4. Establish a flight line such that the field of view will be toward the north. Slow the airplane to about 20 percent over stall speed and extend 20 degrees of flaps. This will produce the best stability for photography.
5. Hold the camera vertically - or on end. The long dimension of the photographs will be vertical. This "trick" will greatly facilitate mounting the stereo-pairs for inspection.
6. The aircraft must pass by the subject on a straight heading. A slight turn to the right or left will distort the stereo product.
7. Aim the camera center spot at an identifiable object being sure the camera is not canted. Choose a fixed oblique angle and shoot the first picture, making sure wing struts and landing gear appendages are not in the scene.
8. Advance immediately to the next frame and shoot the second stereo-pair picture at the same reference point

exactly two seconds after the first exposure.

9. If you wish, experiment with a three-second interval. This might produce a more exaggerated three-dimensional effect.

After reviewing the processed print films, set up the imagery pairs as shown in the following example. The distance between the reference target on the pairs should be your "inter-ocular" distance, or the distance between your eyes. Set the span of the lenses on the pocket stereo-viewer to the same distance. If the print pairs are set up geometrically correct, following the general spatial geometry of the flight path, three-dimensional viewing will be realized.

Reverse the order of the photographs if trees and buildings appear recessed into the ground.

You will not be able to achieve the 3-D viewing by setting identical photographs side-by-side under the viewing scope. There must be a displacement from the first photographic instant to the next.

For further reading on the subject, try the Manual of Remote Sensing published by the American Society of Photogrammetry. Also, a number of color stereo-pairs are contained in the Manual of Color Photography, also by the ASP.

A few examples of stereo-pairs follow with which you can test your aptitude.