

# Manitoba from the Air

## A Geographical Interpretation

### INTRODUCTION

Over a period of 40 years the senior author has assembled a collection of remotely sensed images that depict the geography of Manitoba. About 550 of these have been selected for presentation in an e-book titled "Manitoba from the Air: A Geographical Interpretation." The "remoteness" of the sensing varies from a few tens of metres (from building tops) to hundreds of kilometres (from satellites). Included are panchromatic air photos, both verticals and obliques; colour air photos; colour infrared photos; radar images; and multispectral scanner images.

### BACKGROUND

The collection is intended as a companion to the book "The Geography of Manitoba: Its Land and Its People" and the topics are presented in the same order as in that book. Welsted's collection was the basis of the book but was supplemented by other images obtained specifically for the purpose. Whereas some aspects of the province's geography such as landforms, settlement patterns, and transport routes (past and present), are well displayed on remotely sensed images, others, such as climate and prehistoric settlements, are not. Also, we have included two chapters in the e-book that were not in the original book: transport is given separate treatment whereas it was subsumed under other headings in the book and there is a short section about legal issues.

### OBJECTIVES


When collection and interpretation were well underway Everitt had the idea for an e-book with the eventual title: "Manitoba from the Air: A Geographical Interpretation". A major advantage of an e-book is that it can be constantly edited and updated and is freely available to all. The aim was to use remotely sensed images to display and describe the geography of Manitoba: this would be made readily and freely available to all interested people.


### IMAGERY


The e-book contains over 550 images. Most images are panchromatic vertical air photographs. Images also included are colour and colour infrared verticals as well as oblique photographs (high, low, panchromatic, colour) as well as a few mosaics. Sequential images are used to show changes. Other types of image utilized in the e-book include: orthophotos, radar (airborne and space borne), multispectral scanner images as well as other space borne imaging systems. The scale of the imagery varies from 1:5,000,000 (a mosaic of the whole of Manitoba) to 1:5,000 (an area of palaeochannels near Portage la Prairie).


The main sources were the National Air Photo Library and the Manitoba Air Photo Library (including Manitoba Highways and Manitoba Hydro). Other sources of many images were Prairie Agri Photo and Manitoba Water Resources, Google Earth web site, NASA's web site, and individual photographs including some from former students.

### E-BOOK TOUR

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E-Book table of contents
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Expanded table of contents
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Chapter example
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Figures in chapter view
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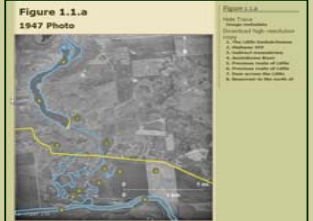
Figure with interactive reference points (trace hidden)
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Figure with reference points and tracings activated
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Figure with highlighted points of interest by selection

### INTERPRETATION PROCEDURE

Standard airphoto interpretation procedures were used employing the criteria: tone (colour), texture, pattern, shape (of objects and their shadows), size and location (or association). During the interpretation phase, the option of stereovision was sometimes employed. The interpretation was transferred to a transparent overlay with items identified on a written description. A line scale and a north arrow were added to each overlay.

### IMAGE PROCESSING

CorelDraw was used to digitise the physical and cultural features identified on each photo. Separate layers were created for both physical features (represented in blue), cultural features (represented in yellow), and annotation (N-arrow, scale bar, etc.). This information can be easily edited as updates and revisions occur.

In addition, the x, y location of feature labels and associated label text was recorded in an Excel spreadsheet. This data was then imported into a MySQL database, and used by a PHP/Javascript web application to generate dynamic labels on the photograph. There are currently over 12,000 features described in the database.

### LIMITATIONS/PROBLEMS

Throughout the development of the e-book, a few limitations and challenges were encountered. These include:

- Some of the photographs were old—this had both disadvantages and advantages—if a new image could be obtained for comparison.
- Good copies of old images that had been badly marked up were difficult to obtain.
- Obtaining permission to use some of the images was time consuming.
- Obtaining the meta data for the images.
- E-book presentation does not allow for stereovision.

### CONCLUSIONS

Over 550 descriptions have been written and transparent overlays drawn for each of these images. The final check of text against the web display is ongoing to ensure the written description and the display coincide.

Watch for the e-book in September 2008.

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