



PROVINCE-WIDE AGRI-GIS IN CANADA

MANITOBA AGRICULTURAL SERVICES CORPORATION (MASC) ORTHOPHOTO DATASETS PLAY A SIGNIFICANT ROLE IN FULFILLING ITS MANDATE TO HELP FARMERS IN THE PROVINCE.

Manitoba, the easternmost of Canada's Prairie Provinces, is a rich land ideal for agriculture – fertile soils, clean flowing water, and warm growing seasons. For almost a thousand years the province's inhabitants have relied on its bounty. Historically, agriculture has been the keystone of Manitoba's economy – and will continue to be into the future. Today, Manitoba producers keep over 19 million acres in production, raise 2.9 million pigs and more than 1.6 million cattle, with gross agricultural receipts totalling in excess of \$4 billion.

Manitoba Agricultural Services Corporation (MASC) is a Crown Corporation of the Province of Manitoba, Canada, that provides agricultural insurance programs (agri-insurance), hail insurance, and lending programs to Manitoba farmers. Manitoba Agricultural Services Corporation (MASC) fully supports the province's producers and rural communities, through innovative and targeted risk management and financial programs. MASC is represented across Manitoba by 19 insurance offices and 16 lending offices, with corporate offices located in Portage la Prairie and Brandon. In 2008, MASC insured over 9 million acres—about 90 percent of the annually cropped land in Manitoba—under its agri-insurance program, with premiums of \$196 million and a total liability of \$2.1 billion.

GIS plays a significant role at MASC. Orthophotos, used as a georeferenced backdrop for vector data, provide the means to quickly and easily locate, measure, and understand the geospatial relationships of land features. In turn, this information supports one of MASC's

fundamental business functions (adjusting insurance claims) and serves as an effective tool for making informed decisions.

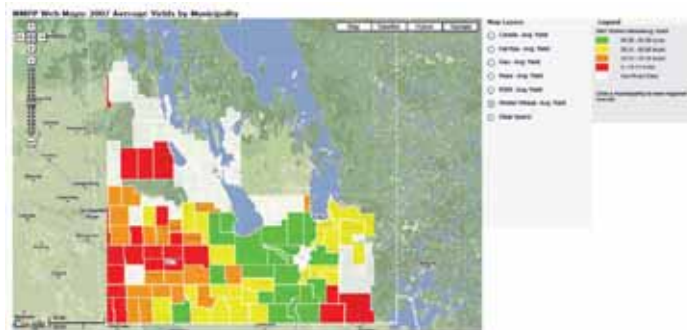
MASC crop insurance agents, agency clerks, team leaders, and adjusters all utilize orthophotos in various ways. Adjusters working on claims use orthophotos as an integral part of their inspection reports, helping them locate the appropriate fields and inspection areas. Team leaders use orthophotos when conducting excess moisture insurance claims, as well as for irrigation audits, where spatially locating objects in a field is important. Agency clerks and agents use orthophotos to confirm information on seeded acreage and harvested production reports, and hard copies of orthophotos are often placed in a producer's records for future reference.

Orthophotos also help MASC's customers accurately establish the size and location of natural features and attributes on their land such as sloughs, trees, or drainage ditches. Accounting for these attributes can be an important consideration when determining lease payments or total seeded acres for crop insurance documents.

Producers can optionally request orthophotos of their land for use as a crop production management tool. MASC can measure a producer's field using an orthophoto, summarize the acreage by legal description, and print the orthophoto along with the associated land information. Producers can then use this to plan fertilizer and spraying regimes and to accurately estimate and oversee chemical formulation and costs during their busy cropping season.

The size of MASC's orthophoto dataset has grown considerably since orthophotos first became available to it in the 1990s. Originally, the dataset was 60 GBs, which was compressed to just over 5 GBs, but in early 2000, new higher-quality orthophotos became available. While the increase in quality was desirable, the new orthophoto database would have grown to between 1 and 4 TBs. This raised serious concerns about how to provide MASC staff (spread out in offices across the province) with timely access to such an enormous database.

To address these issues, in 2007 MASC's GIS department created MASC Ortho Mapping Application, a Web-based application developed



Screenshot from the Manitoba Management Plus Program (MMPP) showing 2007 winter wheat average yields



Screenshot from the Manitoba Management Plus Program (MMPP) showing 2008 red spring wheat average yields

with Microsoft Visual Studio 2005 and ArcGIS Server Enterprise for Windows. All orthophotos products and other basemap data were loaded into the geodatabase, taking advantage of raster indexing and compression and allowing effective management of the large image files. This greatly reduced the amount of server storage space required; using a 50 percent JPEG compression, the original TIFF files (around 500 GB of data) now reside in the geodatabase as a 66 GB dataset.

MASC staff can now access the application and associated imagery from any computer connected to the province-wide network. Adjusters are able to measure any legal land description in the province, helping to provide more accurate claim assessments to producers. Reductions in driving time, mileage, and time spent in the field have resulted in significant cost savings, improved efficiencies, and better claim accuracies. "In the next couple of years, MASC expects to receive another 500–700 GB of orthophotos data, but we're not concerned," says Janos Boda, GIS analyst for MASC. "Once the data is loaded into the geodatabase, the size of our entire database will still not exceed 200 GB."

"Last year, adjusters printed 9,500 legal descriptions using the MASC Ortho Mapping Application. Since its inception, we estimate that, on average, it saves them about one hour per quarter section of land inspected," notes Boda. "The prints of river lots are especially useful when determining river lot boundaries. Many times the use of the orthophoto is critical to the accurate adjusting of a field or the revision of a claim."

Development of a new acreage measurement application is currently under way in the ArcGIS Server 9.3 environment, which will add more functionality to the current viewing application. The user will be able to digitize field boundaries and store field measurements in the geodatabase for future use, with these previously entered boundaries available for staff to view and/or edit at a later date.

MASC is committed to building a strong rural Manitoba. For more information about Manitoba Agricultural Services Corporation and its programs, visit www.masc.mb.ca/masc.nsf/index.html

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MASC Ortho Mapping Application can locate and print a producer's field using an orthophoto along with the associated land information.