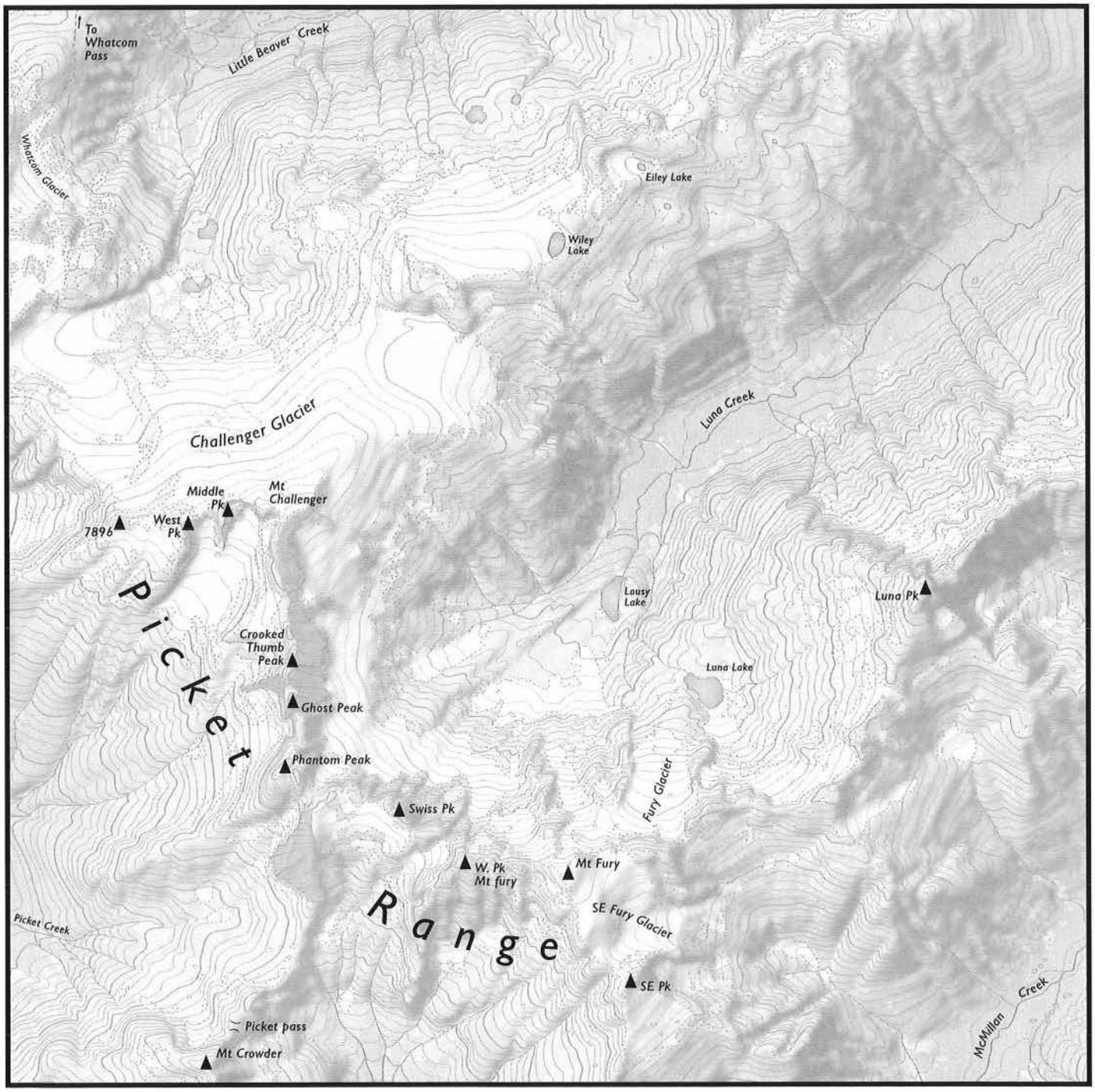
Cartouche

Newsletter of the Canadian Cartographic Association
Bulletin de l'Association canadienne de cartographie

Number 50, Summer, 2003
Numéro 50, été, 2003



Cartouche is published quarterly by the Canadian Cartographic Association. Members are welcome to submit articles for publication. Articles and notices submitted for publication are subject to editorial approval. Please address your submissions to the editor. All other articles will appear in the language of submission. While every effort is made to ensure accuracy of content, the editor cannot be responsible for errors in compilation, or loss of any item submitted. Opinions expressed in the editorials, submitted articles and letters are not necessarily those of the Canadian Cartographic Association. The Canadian Cartographic Association gratefully acknowledges the financial support given by the Social Sciences and Humanities Research Council of Canada.

Cartouche est publié trimestriellement par l'association canadienne de cartographie. Tous les membres peuvent soumettre des articles à l'éditeur du bulletin (voir coordonnées ci-dessous). Les articles et annonces soumis sont sujets à l'approbation de la rédaction. L'éditeur du bulletin ne peut être tenu responsable pour des erreurs de compilation ou la perte d'article. Des efforts particuliers sont déployés pour éviter de tels problèmes. Les opinions exprimées dans le cadre des éditoriaux, des articles et des lettres publiés dans le bulletin, ne reflètent pas nécessairement celles de l'Association canadienne de cartographie. L'Association canadienne de cartographie remercie particulièrement le Conseil de recherches en sciences humaines du Canada pour son apport financier.

Editor / *éditor:*
Gary E. McManus,
101-1550 W. 11th Avenue
Vancouver, BC CANADA V6J 2B6
Tel / *tél:* (604) 738-9296

Deadline for the next issue
October 15 octobre, 2003
La date tombée pour la prochaine publication

ISSN 1183-2045

E-mail / courr.élect:
gmcmanus@cartodesign.com

About the cover

The map on the cover which is centred on the Challenger and Fury Glaciers in the Picket Range in the North Cascades National Park acts as an introduction to the special feature on mountain cartography. Three short articles by Martin Gamache, Tom Patterson and Roger Wheate briefly cover the various aspects of this topic which they discussed in a session at the 2003 Conference in Victoria. See page 5 for the details. The map image is a copy of a prototype map sheet produced from USGS National Parks Service Data courtesy of Martin Gamache of the Alpine Mapping Guild.

Résultats des élections au comité exécutif 2003
Election Results

The following candidates were elected or appointed at the annual meeting in Victoria, 2003. *Les membres suivants de l'ACC ont été élu à l'exécutif en Victoria, 2003.*

Vice-President / *vice-Président*
Christine Earl
Carlton University

Cartographic Education /
Éducation cartographique
Paul Heersink
Ontario Ministry of Natural Resources

Map Production Technology/
Technologie de production cartographique
Jean MacKendry
University of Idaho

Inside this issue / *Sommaire....*

Welcome New Members

Ian Blandford ..... Vancouver, BC
Ainsley Bristowe ..... Ottawa, ON
Rebecca Fu ..... North York, ON
Laura Mcleod ..... Ompah, ON
Dir. Topographie & Cartographie ..... Belgium
Nancy Tavares ..... Toronto, ON
Pan Van Bakel ..... Calgary, AB
Jamie Whitters ..... Sydney, NS
Renate Wieshofer ..... Berlin, Germany

Clarie Gosson
Geomatics Canada

Mot du Président/
President's Message

President's Message

I hope that everyone had a great summer! This year's conference 'On the Edge' at the University of Victoria was a tremendous success. Congratulations to Peter Keller, the Team that put this all together and the University of Victoria for hosting this conference. There were many requests from members of all three organizations, the CCA, CAG and ACMLA, to repeat this type of conference in a few years.

I would also like to thank Patricia (Chalk) Connor, our Past-President for all that she has done for the Association over the past four-years. Patricia was always there to provide and guidance and this is very much appreciated. Also, Congratulation on your marriage this summer!

Congratulations to this year's winners of the President's Prize for 2003. The list of winning entries appears in this issue of Cartouche. I would also like at this time to encourage all cartography teachers and their students to submit a map for this 2004 President's prize. The specifications will remain the same as last year and can be found by visiting our new web site at http://www.cca-acc.org . Congratulations are also in order for the recipients of this year's Student Paper Award, Brian Mercer from Memorial University and John Fowler from the University of Victoria.

By this time, we should of all have the latest edition of *Cartographica,* Volume 38, Numbers 1 & 2, a special issue on Mountain Cartography. I would also like to take this opportunity to announce that Brian Klinkenberg, the editor of *Cartographica* would like to pass on the editorship of *Cartographica* in the near future. Brian has done an excellent work on *Cartographica* but at this time, needs to move on to other projects. We will be establishing a committee of CCA members to find a replacement for Brian. If you are interested in becoming editor, please do not hesitate to contact me.

I also invite you at this time to think about serving as a member of the executive of the Canadian Cartographic Association. A call for nominations appears in this issue of *Cartouche*. As well, mark your calendar to attend the next CCA conference that will take place at the Geomatics Institute, Sir Sandford Fleming College in the spring of 2004.

Ute Dymon
Kent State University

Mot du Président-sortant/
Past-President's Message

On the Edge - Victoria 2003

Blue skies, sunshine and the open sea, snow capped mountains and springtime greeted us in Victoria. How could the conference be anything but exceptional with great weather and a terrific environment? My own thought was, how can I arrange my life to live here?

Happily, not only the pleasant environment but also a well organized and an informative conference was waiting for us. Peter Keller and Dan Smith with their staff organized a very fine conference that included four professional associations (ACMLA-ACACC, CAG-ACG, CCA-ACC, CRSA-ACSR) with their different needs and requests. Thank you both for a job well done.

Richard Ruggles (left) and Henry Castner. (photo: A. Wood)

The program had something for everyone including a number of interesting workshops. Topics included: Understanding Common GIS Formats, Internet Cartography, Digital Elevation Modeling and Mobile GIS.

There was a special session organized by Roger Wheate on Mountain Cartography. Here the audience could learn about the Ice and Climate Project Atlas, Edouard Imhof's landscape and mountain mapping, the modern DEM and 3D terrain visualization techniques used by the US National Park Service and depiction of relief in the western Canadian Cordillera.

Other sessions informed the audience about the Westcoast Mapping Projects. We learned about the Salish Sea community mapping project, common ground community

mapping and how GIS was used to support First Nations mapping projects. In addition, some of the GIS sessions dealt with spatial data and data quality and analysis. Several interesting case studies at national, regional and local scales were presented. All presentations provoked questions from the audience, and many of the sessions were of interest to members of all four associations.

CCA, ACMLA, CAG and CRSA banquet goers hammer it out. (photo: W. Hiebert)

The CCA sponsored several sessions on atlases. Also included were several sessions organized by Claire Gosson of Natural Resources of Canada. These presentations provided insights and approaches to atlas making. Atlas planning, content and presentation of maps and visuals including the latest technologies used to communicate with atlas users were part of it. The audience got to view ongoing atlas projects, including the National Atlas of Canada. Lively discussions sparked these sessions.

More general cartographic sessions provided a glimpse into topics such as the Landscape of Memories, Maps Presented in Futuristic Movies and Charles Schultz's cartography. Cartographic design dealt with a series of topics, including mapping for the visually impaired and various design issues that have been plaguing cartographers for years.

A final session was on the History of Cartography with a number of provocative papers on topics such as the Literary Surveyor to Captain Dick's Creek, which concluded the sessions.

Three CCA past-presidents take coffee during a break between sessions. (L-R: Janet Mersey, Clifford Wood and Patricia Connors. photo: A. Wood)

Besides excellent presentations during the sessions, we had an opportunity to listen to Nick Christman's "Tales from the Technoscientific Edge: How maps provide evidence of the construction of the world." Here we learned that just because they are printed, maps are not useful for all purposes.

In addition to an excellent conference program, we also had the opportunity to have some fun. The opening reception on the University of Victoria campus, gave us an opportunity to mix with old friends and make new ones. Later, a reception at the Maritime Museum downtown gave us time to stroll around in the downtown area and allowed for some shopping and dinner afterwards. Our conference banquet was in a less formal setting. After the awards ceremony and our annual meeting, we took buses to the Sooke Logging Village where several loggers demonstrated how fast they can axe a tree down. Watching the difference between human muscle power and chain saws we saw a stump fall fastest by human power. Rooting for the human muscle power, which turned out to be the winners, we also learned how skillful these loggers are with the chain saw as one demonstrated how to make a small chair out of a stump of wood in several minutes. After watching all this hard work, we were ready for dinner, freshly prepared smoked salmon. For me, living in the Midwest, this was a real treat. During the banquet, the presidents of all four associations promised to make an effort to have another joint conference within the next few years. While I was on the edge about the Conference in Victoria, the Conference clearly went over the edge with a very fine program, something for everyone.

Mountain Cartography Session at the 2003 AGM

This session contained four talks, inspired by the ICA mountain cartography workshop organised in May 2002 by Tom Patterson, at Timberline Lodge, Mt. Hood, Oregon, where three of the speakers met and presented. Martin Gamache of the Alpine Mapping Guild opened the session with a description of current project to create an atlas utilising a library of over 100,000 photographs of North America's glacier areas. Harry Steward (Clark U.) followed with a concise evaluation of Eduard Imhof's masterworks and their relevance to today's cartographers. Tom Patterson (US Parks service) then demonstrated some of his masterworks in manipulating DEMs top create Imhof and Berann-like panoramas and Roger Wheate (UNBC) closed the session with a review of topographic maps of the western cordilleras. Following are brief summaries of three of the presentations submitted by the authors.

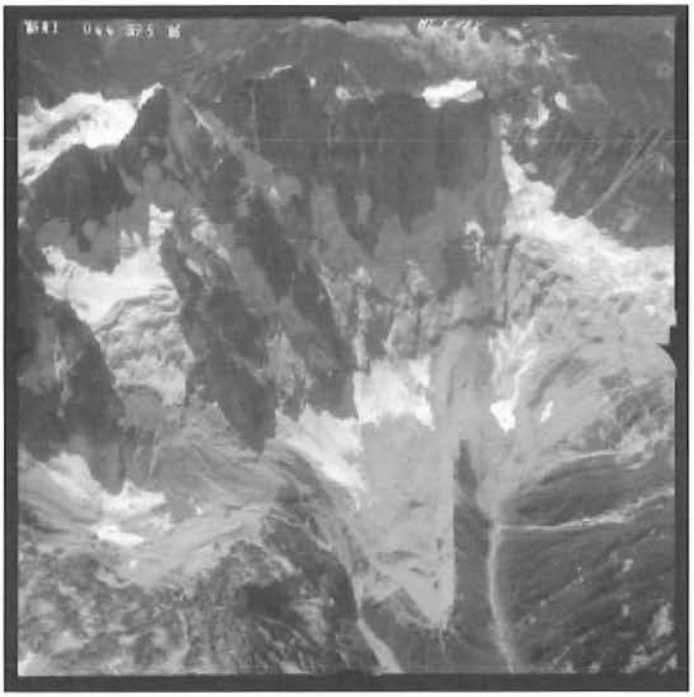
Roger Wheate

The Ice and Climate Project Atlas, Four Decades of Glacier Photography

Martin Gamache, Alpine Mapping Guild

The **Alpine Mapping Guild** seeks to document in an atlas the breadth and geographic scope of approximately 100,000 b/w oblique and vertical aerial photographs from 1960 to the present. The USGS Ice and Climate Project's collection was initiated by Austin Post who in 1958, while doing field work in Alaska with W.O. Field realized "...that grants for such things as scientific studies could be had! Might some of this treasure be diverted to my dream to photograph all the glacierized mountains of western America?"[1] It turns out that money was available and what began as a hobby for Post turned into a full time position with the USGS and a collection documenting glaciated mountains from Chile to Greenland. Now in its fifth decade the collection resides in Fairbank at the University of Alaska and continues to grow yearly. Little known outside the academic glaciology community this body of work constitutes a remarkable resource that could be further popularized in a large format atlas.

Challenger Glacier 1966 USGS Ice and Climate Project.



Mt. Fury 1986 USGS Ice and Climate Project, GeoData.

There are many models for this sort of project; numerous national mapping agencies have published landform atlases, Canada published its 52 plate *Glacier Atlas of Canada* in 1969 and the USGS is now in the process of compiling its 12 volume *Satellite Image Atlas of Glaciers of the World*. In the recently published North American volume Ommaney points out that

"Glacier-mapping activity in Canada is limited to a few small projects where the product is unlikely to be published or distributed widely and this trend will likely continue. Scientists and lay people alike may well regret the loss of this valuable aid."[2]

The ICP Atlas project seeks to redress this situation. We hope to document the geographical coverage of the collection and provide a visual record of the flights made by Post, Larry Mayo and Robert Krimmel. This series of maps would provide a useful tool for exploring the collection and determining whether it may be useful in one's research.

In addition to documenting the collection of aerial photographs, our project seeks to provide an outlet for cartographers to publish quality maps of alpine areas. Advances in digital methods and access to data mean that the opportunities for innovation are abundant. Further more as we have begun to learn more about climate change it has become clear that glaciated environments have been changing drastically in the last century. The ICP collection chronicles that change. The atlas may well provide a framework for illustrating it and presenting it to a wider audience. We believe that the resulting manuscript will be a valuable visual resource for its pedagogical, aesthetic and scientific value.

[1] Post, A. (1995) Annual Aerial Photography of Glaciers in Northwest North America: How it all Began and its Golden Age. *Physical Geography* 16 (*1*) pp. 15-26.

[2] Ommaney, C.S.L. (1988) Mapping Canada's Glaciers. *Satellite Image Atlas of Glaciers of North America* USGS PP1386-J Eds. Williams Jr. R.S. and Ferrigno, J.G., pp J83-J110.

DEM Manipulation and 3D Terrain Visualization: Techniques Used by the U.S. National Park Service

Tom Patterson, U.S. National Park Service

Over the past five years, the U.S. National Park Service (NPS) has relied increasingly on portraying geographic information through 3-D visualizations of the landscape. Our products include animations, geologic block diagrams, panoramas, and virtual reality scenes. Despite the importance of DEMs, cartographers generally hesitate to manipulate DEMs for enhancing 3-D visualizations-in contrast to their willingness to modify vector data routinely to enhance 2-D maps. This is mostly a matter of unfamiliarity with the tools and techniques needed to perform DEM manipulations. The NPS uses the familiar image editing tools in Adobe Photoshop for the manipulation of raster DEMs, like virtual modeling clay. Final rendering of 3D landscape visualizations occurs in Corel Bryce.

DEM manipulation techniques used by the NPS include topographic substitution, a method for reverse engineering present-day landscapes into the past or projecting them into the future. Topographic substitution permits the depiction of complex landscapes over time as comprehensible image sequences (see the Crater Lake illustration). Selective vertical exaggeration brings emphasis to localized topography on DEMs, a technique useful for creating panoramic views of ski areas. Resolution bumping is a generalization technique developed specifically for improving the legibility of high-mountain landscapes (see the Alps illustration below). Finally, borrowing an idea from the traditional masters of landscape depiction, warping the projection plane of DEMs permits the creation of 3D scenes that emulate the panoramas of Heinrich Berann and the spherical over-the-horizon views of Richard Edes Harrison.

Relief Depiction in the Western Canadian Cordillera on Twentieth Century Maps

Roger Wheate,
University of Northern British Columbia

Systematic topographic mapping has been in place for barely a century in Canada, and yet there is a rich tradition of mountain cartography in the Rockies, Coastal mountains and interior

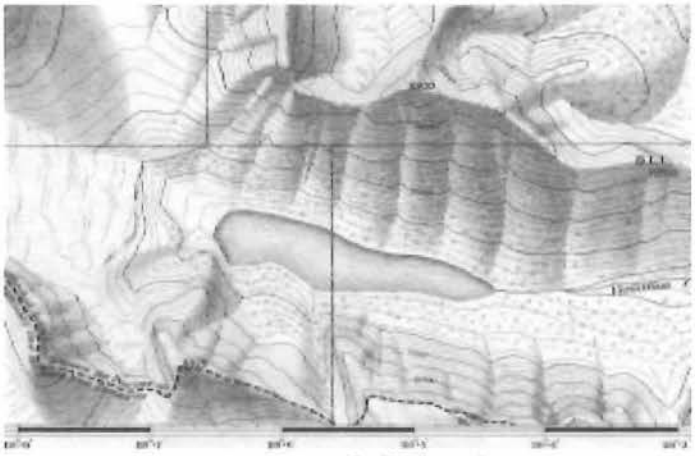


Figure 1: Eldon sheet, 1:40,000 series, 1892, contour interval: 100'

Selkirks and Purcells. These include Canada's first topographic series which generated contours and thence hill-shading from oblique photographs, taken from mountain peaks some 50 years before aerial photography became standard (figure 1).

Relief depiction on these early sheets is comparable with later examples of contouring and hill-shading during the 'glory days' of the NTS (1950-75), when the two current series (1:50,000 and 1:250,000) were completed for the west and all Canada respectively.

In between, there were many fine examples of specialized glacier and mountain park maps, at a variety of scales from 1:10,000 to 1:1,000,000 (figure 2). These represented the pinnacle of topographic mapping in Canada encapsulating some of our finest mountain scenery, and facilitated by provincial and federal

Figure 2: Columbia Icefield, 1:50,000, contour interval 20 metres (100 metres on bedrock), 1980.

funding. Since 1990, both agencies have focused on managing digital databases, and assisting some private ventures. The only series that enjoys regular updating in western Canada is the 1:500,000 aeronautical charts, where 51 sheets cover the country. A few companies generate map products for recreation in higher use mountain areas, such as the southern Rockies and Coastal mountains near the lower mainland (Vancouver). Greater use of federal and digital data for mountain cartography in western Canada is dependent on entrepreneurial desire and data access agreements.

More information about these authors and this topic may be found at these websites:

- Mt. Hood proceedings: www.karto.ethz.ch/ica-cmc/mt_hood/proceedings.html
- Martin Gamache: www.alpinemapguild.com
- Eduard Imhof: http://www.maps.ethz.ch/imhof_engl.html
- Tom Patterson: www.nacis.org/cp/cp28/resources.html
- Roger Wheate: www.gis.unbc.ca/resources
  also see "Relief depiction on Canadian topographic map series in the twentieth century", *Geomatica*, 57 (2), pp165-175.

Congratulations
President Prize Winners 2003

Communicating Canadian Issues (Undergraduate)
Map Title: Park Distribution, Population and Income in the Municipalities of the Capital Regional District.
Cartographer: **Suzanne Caskenette**, University of Victoria

Communicating Canadian Issues (College)
Map Title: Population Density
Cartographer: **Morgan Lown**, Sir Sandford Fleming College

Visualization Project (Undergraduate)
Map Title: Olympics Distribution 1896-2008
Cartographer: **Aby Cyrille Medard de Chardon**, University of Victoria

Map Title: Population Density and Distribution of 7/11 Stores in Japan
Cartographer: **Ran Kato**, University of British Columbia

Visualization Project (Graduate)
Map Title: Victoria - Swartz Bay, British Columbia Topographical
Cartogra

pher: **Tara Gwynnyth Gay**, Universty of Victoria

Map Title: Tsunami - The Marine Marauder
Cartographer: **Kyle D. Doane**

Special Category - Animated Mapping Project (College)
Title of CD: Last of the White Pine Loggers
Designer: **Mathew Pietryszyn**, Sir Sandford Fleming College

Student Paper Awards

Paper: Visual stability of horizontal vs. vertical line patterns: Extending the knowledge base of the map designer.
Author: **David J. Mercer**, Memorial University of Newfoundland

Paper: Developing a web-based multimedia atlas of British Columbia
Author: **John Fowler**, University of Victoria

Student's Corner

An opportunity to showcase student projects and research initiatives in the fields of Cartography and Geomatics.

Mapping Coral Reefs: Data collection options

Pauline Devine, University of Waterloo*

Introduction

Coral reefs are the most diverse of all marine ecosystems. They contain at least 4,000 species of fish and 800 species of reef building coral (Dahdouh-Guebas 2002). Modern coral reefs have been present in the world's oceans since the Mesozoic era some 250 million years ago (Souter and Linden 2000). Their high productivity level has prompted the World Conservation Strategy to recognize coral reefs as essential global life support systems that are necessary for food production, health and other aspects of human survival. Corals are a valued resource and a tourist attraction. They provide coastal protection, contribute to medicine production, biotechnology, and are second only to tropical rainforests as the most diverse ecosystem in the world (Souter and Linden 2000). Unfortunately, the rate of degradation of reef environments is increasing on a global scale. As much as 10% have been destroyed and some estimates suggest that at the present rate of devastation another 60% could be destroyed in 20-40 years (Knight *et al.* 1997).

It is for these very reasons that corals require mapping, and close monitoring. Precise locations and rates of damage are vital to implementing effective policies for coral reef protection. Sensors can provide data on reef features that can be mapped in a fraction of the time that it would take if collected by boat or airplane. Additionally, remote sensing imagery allows for objective and quantitative analysis of the extent of damage (Holden and LeDrew 1999). Reef maps can provide a quick assessment of large areas, as well as assist in reef policy formation, scientific research and development, and conservation activities (Liceage-Correa *et al.* 2002). Although remote sensing of corals offers several advantages researchers agree that there are numerous challenges and continue today to overcome the various complex issues associated with work in marine environments (Green *et al.* 2000).

Challenges To The Remote Sensing Of Coral Reefs

There are several limitations to remote sensing in marine environments; many are associated with the depth of the water affecting the detection capabilities of the sensor instruments. When light penetrates water the intensity decreases exponentially with increasing depth, this is a process called attenuation. Attenuation differs with the wavelength of electromagnetic radiation and spectral radiance is dependent on the substrata and the water depth (Green *et al.* 2000). The exponential decay of light intensity with increasing depth results from light absorption and scattering.

There are several models that researchers apply to correct for the attenuation. Unfortunately, there can be problems with utilizing such models if they assume that water gets darker with depth. In shallow reef environments water can become brighter creating error in the application of these models (per. com. Newman 2003). This creates confusion when analyzing imagery for classification and mapping of habitats. Holden and LeDrew (2002) conducted research to evaluate the effects of the water column on the identification and classification of bottom types. They found that it was difficult to identify substrate types due to water depth, water quality, variability of tides, surface roughness, benthic cover, as well as slope and aspect of the benthic topography.

Not only does the water column create confusion, but also several challenges arise from atmospheric and water properties. In tropical climates there is a great amount of cloud cover, which reduces the number of suitable images that are available. Water properties will also create confusion in coral identification. Mumby *et al.* (1997) state that where corals exist in turbid water, such as in Hong Kong, the effects of turbidity become a complex issue to resolve.

Technological Options For Coral Reef Data Collection

The application of remote sensing to reef environments includes mapping of reef geomorphology and reef habitats. Remote sensing provides important information that relates to reef management. Mapping corals involves distinguishing different reefs zones such as reef flat, reef crest, spur and groove zone (Green *et al.* 2000). While maps of reefs exist, detailed identification of their ecological components is difficult using satellite imagery because most corals are still smaller than contemporary $1m^2$ data. Researchers have studied the capabilities of satellite, aerial photography and digital airborne remote sensing (Holden and LeDrew 1999). There are advantages to each of these data sources; however, several instruments are notable as far as their capability to detect detail in submerged coral ecosystems.

Overall, sensors with higher resolution will offer greater detail. Satellite mounted sensors (such as Landsat and SPOT) provide general information about the reef

* Ms Devine is a 3rd year Geography student and was advised by Andrew Millward Instructor, Remote Sensing Project (GEOG-471), Department of Geography University of Waterloo.

features; however, more accurate means of mapping reefs involves the use airborne multispectral instruments such as the Compact Airborne Spectral Imager (CASI)(Green *et al.* 2000). Landsat MSS and TM have 80m and 30m spatial resolutions and are incapable of identifying reef features at sub-pixel scales (Mumby *et al.*, 1997), while sensors with 20m and 10m spatial resolutions such as SPOT XS and SPOT Panchromatic have fewer spectral bands, inhibiting their ability to separate spectral signatures (Mumby *et al.*, 1997). Holden and LeDrew (1999) state that most satellite imagery is limited for coral mapping if the spectral and the spatial resolution is too coarse to detect small differences in spectral reflectance. Green *et al.*, (2000) also state, "satellite sensors seem to be capable of identifying the geomorphology of coral reefs but poor at mapping ecological habitats including assemblages of reef-dwelling species and macro algal beds".

Mumby *et al.* (1997) evaluate the capability of satellite imagery for mapping Caribbean coral reefs. They determined that the most widely used satellites are Landsat MSS, Landsat TM, SPOT XS and SPOT Pan. In this study the capabilities of the sensors were evaluated, and compared to aerial photography and CASI. They found that for mapping coarse descriptive resolution, Landsat TM was more accurate than most sensors, while CASI imagery provided more accurate results than both satellite sensors and aerial photography. Most 'medium spatial resolution' instruments such as Landsat TM/ ETM+ and SPOT provide limited descriptive resolution (Holden and LeDrew 1998). Landsat TM was incapable of distinguishing thirteen coral habitats in the Caribbean (Mumby *et al.* 1997). These satellite sensors are unable to discriminate spectra due to their limited number of water penetrating bands. In a study designed to map nine reef categories using TM and CASI data, CASI's thematic accuracy was determined to be 81% as compared to Landsat TM at 31 % (Mumby *et al.* 2002). It should be noted also that with the launch of IKONOS in 1999, there has been recent advancement in the use of satellite remote sensing for coral reef mapping.

Low altitude aerial photography is also a successful method for acquiring remotely sensed data in reef environments. Green *et al.* (2000) conclude that aerial photography has a large penetration of water and is acceptable for habitat mapping; an optimal plane altitude has been suggested to be 3000 feet. While Landsat TM and SPOT sensors provide similar accuracies to aerial photography, there are many reasons to choose satellite images over aerial photography: the creation of a geocoded map is easier when based on a satellite image as opposed to mosaicing air photos together, and it is far more difficult to visually interpret and digitize aerial photography.

Mapping coral reefs with digital hyperspectral airborne sensors (e.g., CASI) has some distinct advantageous over satellite sensors: a larger number of spectral bands, increased temporal versatility, and high spatial resolution (Mumby *et al.*, 1997). Airborne digital remote sensing combines properties of satellite imagery and aerial photography (digital data in discrete spectral bands and higher spatial resolution). A sensor such as CASI offers adequate spatial and spectral resolution for mapping reefs. In addition to receiving map accuracies of greater than 80%, CASI can record data for objects underwater to a depth of 18m (Green *et al.* 2000). It is believed that the role of CASI as a coral monitoring tool will increase over the next decade. Overall, there are many different remote-sensing methods that can detect corals, each unique in its ability to detect fine detail and/or general levels of discrimination.

Cost effectiveness is an important consideration when deciding on a method of data collection. For example, although researchers have stated that CASI has advantages over other remote sensing methods, the cost of collecting these data are much greater than with other platforms. Careful consideration must be given to mapping objectives, required accuracy, area of study, as well as climate and availability of equipment. Mumby *et al.* (1997) compare cost effectiveness for several satellite sensors. They suggest that for areas >60km, Landsat TM is the most cost effective option. They also point out that a merged TM/SPOT is not cost effective, and offers little improvement to accuracy. Further, SPOT XS is found to be more accurate and cost effective then SPOT PAN.

Discussion and Conclusions

Remote sensing provides a practical and informative approach to mapping underwater habitats. There are various sensors that can be used to detect submerged features. Researchers have evaluated the capability of satellite remote sensing, low altitude aerial photography and digital airborne remote sensing systems. This review demonstrates that all three types of sensors are appropriate to map coral reefs depending upon the objective of the mapping effort, size of area and budget. The only way to monitor the growth and/or decline of coral reefs is to frequently map their locations and constantly compare these to previously recorded data. This requirement for frequent mapping makes the use of satellites attractive, and while they may not have high enough spatial and spectral resolution to detect precise species of coral, they are accurate enough to detect the existence of coral.

Detailed mapping can be performed accurately with digital hyperspectral airborne remote sensing methods. This review has shown that CASI provides the most accurate results over other sensors, and offers more flexibility to the user regarding collection options. CASI can map a range of benthic habitats with exceptionally high accuracy at fine levels of detail. Present coral mapping research is examining newer hyperspectral technologies (e.g., Hyperion) and high spatial resolution multispectral data (e.g., IKONOS/QuickBird) in conjunction with *in situ* measurements. The application of these new technologies to coral research will permit future scientific efforts to collect the necessary data to map and monitor corals with greater accuracy and precision.

References

Dahdouh-Guebas F. (2002) The Use of Remote Sensing and GIS in the Sustainable Management of Tropical Coastal Ecosystems. *Environment, Development and Sustainability*. 4, 92-112.

Green P.E., Mumby P.J., Edwards A.J., Clark C.D. (2000) *Remote Sensing Handbook For Tropical Coastal Management*. UNESCO. http://www.unesco.org/csi/pub/source/rs.htm (Extracts).

Holden H., LeDrew E. (1999) Hyperspectral Identification of Coral Reef Features. *International Journal of Remote Sensing*. 20, 2545-2563.

Holden H., LeDrew E. (1998) The Scientific Issues Surrounding Remote Detection of Submerged Coral Ecosystems. *Progress in Physical Geography*. 22, 190-221.

Holden H., LeDrew E. (2002) Measuring and Modeling Water Column Effects on Hyperspectral Reflectance in a Coral Reef Environment. *Remote Sensing of Environment*. 81, 300-308.

Knight D., LeDrew E., Holden H. (1997) Mapping Submerged Corals in Figi From Remote Sensing and in situ measurements: Applications for integrated Coastal Management. *Ocean and Coastal Management*. 34, 153-170.

Liceaga-Correa M.A., Avila-Euan J.I. (2002) Assessment of Coral Reef Bathymetric Mapping Using Visible Landsat Thematic Mapper Data. *International Journal of Remote Sensing*. 23, 3-14.

Mumby P.J., Green E.P., Edwards A.J., Clark C.D. (1997). Coral Reef Habitat Mapping: How Much Detail Can Remote Sensing Provide? *Marine Biology*. 130, 193-202.

Mumby, P.J., Edwards, A.J. (2002) Mapping Marine Environments with IKONOS Imagery:

Enhanced Spatial Resolution Can Deliver Greater Thematic Accuracy. *Remote Sensing of Environment*. 82, 248-257.

Souter D.W., Linden O. (2000) The Health and Future of Coral Reefs. *Ocean and Coastal Management*. 43:pp. 657-688.

Attention!

The CCA now has its own domain name.
The site has also be upgraded and redesigned by Anita Muller-Baingo.
Check it out.

www.cca-acc.org

L'ACC a un nouveau internet addresse. Le site Web de CCA a été également remodelé par Anita Muller-Baingo.

Svp visite.

Some Thoughts on Digital Archiving

Christine Earl and Tracey P. Lauriault

As creators of cartographic data and maps, cartographers are in the business of producing a specialized historical record for future generations, a record of our environment for our period in history, a record of our society's values, and a record of our technical achievements. It is a record which is worth preserving for future generations, generations which will have different technologies, methodologies and knowledge assets to assist them in uncovering social and environmental phenomena we can not uncover today, and who may wish to study our data. It is also something we would surely like to be able to look back on in our own lifetime to see where we've come from and how we got here.

But consider the range of physical forms of this record over the last thirty years. How enduring will these forms prove to be? Paper has its limitations as a storage medium but nevertheless, paper documents have survived many hundreds of years. What of electronic media? What will happen to today's representations which, in many cases, exist only as digital files coded in proprietary formats and requiring currently existing hardware and software to interpret them? What about the ephemeral representations of interactive Internet mapping? Will researchers in 2033 really be able to access our data and look at them in light of new ideas?

These issues have only recently begun to be addressed and, so far, it is safe to say that they have been dealt with in scattered and ad hoc ways and not in terms of any comprehensive set of policies, standards and strategies (Brown, 2003). Many CCA members will remember the Canada Land Inventory, an initiative which motivated the development of the first GIS – these data on land use, a valuable historical record, have been rescued from oblivion only through a massive and costly joint restoration project conducted by four federal ministries in Ottawa (Bleakly, 2002).

There are now the beginnings of a groundswell of research and interest in the issues of preservation of digital geospatial data. The social science data and library communities are actively discussing them and now some early Canadian geospatial data archiving policy and research initiatives are gaining momentum. The Ad Hoc Committee on Archiving and Preserving of Geospatial Data under the Policy Advisory Node of GeoConnections is investigating an information management infrastructure that will enhance the Canadian Geospatial Data Infrastructure and as well, the International Research on Permanent Authentic Records Electronic Systems II (InterPARES II), a collaborative research project funded by the Social Sciences and Humanities Research Council (SSHRC), has under its Scientific Focus, two case studies investigating archival issues related to geospatial data; they are archaeological GIS records and the Cybercartographic Atlas of Antarctica. Research into and interest in the preservation of digital geospatial data is beginning to increase and as creators of these data, cartographers and geographers ought to pay attention to these initiatives and think about what best practices we can evolve to enhance the durability of our work.

Preservation Issues

Among the issues which relate to the preservation of digital data, technological obsolescence is paramount and several strategies have been proposed for its mitigation. These are a) the deliberate maintenance of old hardware and software; b) the incorporation of the capacity to

emulate old technology in the development of new; and c) periodic migration of information or data from one storage medium or format to another (see http://www.nla.gov.au/padi/topics/18.html for a good summary of preservation topics).

No less essential than the data themselves is information about them in the form of complete metadata, including information about the archival history of the data and a measure of data accuracy to accompany archival authenticity. The metadata can be stored with the data themselves, or separately but linked to them, and must always be migrated or refreshed with the stored data. The metadata should provide contextual information for the data archive so that the circumstances of its creation and use may be correctly understood. This is to ensure future users will have due regard for the original data context. To date there are some excellent (albeit not universally adhered to) geospatial metadata standards, and some emerging standards for information objects such as video, animation, and photographs, although these need to be extended for scientific uses. However, there are yet no standards for multimedia information objects such as sonification, visualizations, scent, real time webcams, heightened reality, flight simulations, etc. The emergence of new forms of digital media being georeferenced and hyperlinked to internet maps and atlases and the growth of distributed Internet mapping systems are presenting significant archival challenges.

The costs of establishing and maintaining good and useful archives of digital geospatial data will be considerable, especially in the initial stages while policies and strategies are hammered out, but if our work is to have any long-term value, such costs will need to be borne. In future, perhaps archival and information management practices will be included routinely in project estimates and become standard practice.

While there is obviously no single, simple solution to the problem of preservation, it is encouraging that social scientists, librarians and archivists are already giving some thought to geospatial data. These data have unique value. Are those of us in the cartographic field thinking about the problems of their preservation? We invite you to consider the issues raised in this essay and to send your comments to the Editor for inclusion in a future issue of *Cartouche*. Please tell us what you do and what you think should be done. All contributions will be welcomed.

References

Bleakly, Denise R. (2002), "Long-term Spatial Data Preservation and Archiving: What Are the Issues?", Sandia National Laboratories (SAND) Report 2002-0107, Albuquerque, New Mexico.

Brown, David L., Welch, Grace and Cullingworth, Christine (2003), "Management and Preservation of Geospatial Data" (Draft), Ad-Hoc Committee on Archiving and Preserving Geospatial Data, Policy Advisory Network Node, GeoConnections, Ottawa.

Calendar/ *calendrier*

October 8 -12 octobre, 2003
NACIS XXIII
Jacksonville, Flordia
For information/*pour renseignements:* www.nacis.org

October 16 - 18 octobre, 2003
96th Annual CIG Geomatic Conference
Calgary, AB
For information/*pour renseignements:* *www.cig2003.org*

March 14 - 19 mars, 2004
100th AAG Annual Meeting
Philadelphia, PA
For information/*pour renseignements:* www.aag.org

March 28 - 31 March 2004
The GeoTec Event - Pathways to Intergration
Tortonto, ON
For information / *pour renseignements:* *EventInfo@GeoTecEvent.com or phone Matt Ball @ 303-544-0594*

GIS Day across Canada
November 19 novembre 2003

GIS Day is a global event that is part of the National Geographic Society's Geography Awareness Week, which focuses on promoting awareness about geography education.

« GIS Day » est un événement planétaire faisant partie de "National Geographic Society's Geography Awareness Week"; lequel met l'emphase de promouvoir la sensibilisation à la géographie.

For more information /
Pour plus d'informations
www.gisday.com

Orienteering at Royal Roads

CCA/CAG/ACMLA/CRSA Conference

May 29th, 2003

The 7th Nearly-Annual CCA AGM Orienteering event took place at Royal Roads University, near Victoria, on the week's most glorious evening, with a backdrop of the Juan de Fuca Strait and the Olympics Mountains in Washington State beyond.

A total of 45 took part, including 36 conference attendees. Of these, 16 were declared members of CCA, and 7 of CAG. Thanks go to cartographer and course setter Alan Philip, and other members of the VictOrienteers Club, who set up the event for us.

There were 30 controls to be found, an impossible task in the 60 minutes allotted. Individual awards for a variety of notable exploits, were handed out, at the Habitat pub handily located right on the map. The Challenge Certificate, for which we challenged the CAG, was eventually and correctly presented to Roger Wheate, at the conference banquet. The CAG had the highest individual score, but we had a much higher average!

Individual Awards

Chris Piller ..... Overall winner
Glenna Harris ..... Top woman
Roger MacLeod ..... Most shredded map *and* legs (also second overall)
Weldon Hiebert ..... Most easily distracted (chasing crabs on the beach)
Gary McManus ..... Most improvement since St. John's
Pam van Bakel ..... Most likely to improve next year
Kelvin Broad ..... Muddiest
Erin Richmond and fiancé Gerry Sebastian ..... Most fashionable couple
Courtney Campbell ..... Best swimmer
Matthew Baddock ..... Furthest traveller (from England)
Harry Doran ..... Pimp Award (for collecting no less than 3 female companions en route)
Peter Keller ..... Misplaced tenacity

Royal Roads University site of the 2003 CCA Orienteering event.

Thanks for continuing to support this fun event, everybody. I hope the memories will sustain you till the next time.

Diana Hocking

RESULTS: CCA O-Event 2003

Score	Participant	Affiliation or Team
1050	Chris Piller	U Vic
930	Roger MacLeod	VOC
800	Ian Steele	VOC
770	Ian Barclay	VOC
720	Matthew Baddock	unknown
720	Andrew Stegemann	CAG
690	John Barron	VOC
640	Scott Emmons	CCA
580	Roger Wheate	CCA

560	Gord Hawkes	VOC
550	Kelvin Broad	CCA
510	Rick Gray	CCA
510	Brian McGregor	CCA
480	Martin Gamache	AMG
450	Weldon Hiebert	CCA
430	Alex Clapp	CAG
430	Lyn Daniel	VOC
420	Glenna Harris	CAG
390	Gary McManus	CCA
350	Len Cook	VOC
340	Peter Keller	CCA
330	Jennifer Harvey	VIHA
320	Leanne Blackwood	UVic
310	Karl Siemonsen	NRC
300	Chui-Ling Tam	CAG
300	Erin Richmond	CCA
300	Gerry Sebastian	Erin
280	Marc Lemay	Stats. Canada
280	David Mercer	CCA
280	Courtney Campbell	UVic
280	Lorna Stirling	VOC
260	Sally Hermansen	CCA
260	Nicole Horspool	UVic
260	Don Kendal	CAG
250	Christine Earl	CCA
250	Nadine Schwager	VOC
190	Harold Doran	CAG
190	Lana Phillips	CAG
190	Kelly Sexsmith	unknown
180	Patricia Connor	CCA
130	Kluane Buser-Rivet	VOC
90	Pam van Bakel	unkown
20	Tim Wykes	CCA
?	Tom Patterson	CCA

VOC= VictOrienteers Club, VIHA = Vancouver Island Heath Authority, NRC = Natural Resources of Canada

The muddy and shredded assemble after the event with the Olympics Mountains as backdrop.

CALL FOR NOMINATIONS

Elections 2004

élections 2004

APPEL AUX CANDIDATURES

Nominations are sought for the following positions for election in 2004 / *Ces postes seront à combler, 2004:*

☆ **Vice-President / *vice-Président***

☆ **Interest Group Chair, Analytical Cartography and GIS (2 year term) / *Présidents du group d'Intérêt Cartographié analytique et SIG (mandat de 2 ans):***

☆ **Interest Group Chair, Map Use and Design (2 year term) / *Présidents du group d'Intérêt Conception et utilisation des cartes (mandat de 2 ans)***

☆ **Interest Group Chair, History of Cartography / *Présidents du group d'Intérêt Histoire de le cartographie (mandat de 2 ans)***

Please send suggestions or nominations to

Ute Dymon, Chair of the Nominations Committee:

udymon@kent.edu

Nous vous invitons à soumettre des candidatures pour les membres de l'exécutif au Ute Dymon, *Président du comité de candidature.*

Report from the Chair of the Canadian National Committee for Cartography and the CIG Technical Councillor for Cartography

Summer 2003 and Presented at the "On the Edge 2003" Conference (submitted to Cartouche July 15 2003)

Quite a few things have happened since I wrote last.

2003 On the Edge Conference: A lot of my recent time has been taken up co-directing the "On the Edge 2003" conference. By the time you receive this report the conference will be well on its way or over. It has been fun putting the conference and its scientific program together, and it has been enjoyable to be part of a fantastic team that worked very hard to bring together four professional associations in one place. I am pleased to report that cartography found a prominent place in the program. I hope that you enjoy the conference and that this will be the first of many meetings where these four associations gather together. Given these associations' common interest in geographic information, it makes sense to me.

1999-2003 National Report: I am pleased to inform you that the 1999-2003 National Report to be published as a special issue of GEOMATICA is ready for printing, and that it should be published in time for distribution at the ICA 2003 Durban conference in August. I would like to express my thanks to everybody who contributed, but especially to Carol Railer from the CIG Office for an excellent job working on this initiative. You will learn in my introduction to the report that feature articles in the report focus on community mapping, historical mapping and map design. This was done deliberately to balance the excellent initiatives reported federally and provincially about advances in digital mapping and implementation of spatial data infrastructure. I hope that you will enjoy reading the National Report when it comes out.

Children's Map Competition: Erin Richmond's team has completed judging of the Children's Map competition. Close to 200 maps were received and it was not an easy time selecting the five best maps especially given the age range of submissions (from age 5 to age 15). A selection of the best maps will be on display at the "On the Edge 2003" conference. Thank you to Erin for organizing this competition for a third time in a row, and for once again doing an excellent job. I gather that Erin has decided to pass on this responsibility for 2005. Volunteers, please step forward. Thank you also to the FOCUS Corporation for sponsoring this year's competition.

National Map Exhibit: The National Map Exhibit prepared for the Durban meeting is all organized thanks to Diane Lacasse and Claire Gosson. A copy of the exhibit will be on display at the "On the Edge" conference. I look forward to viewing this exhibit and wish to thank Diane and Claire for all their hard work. Thanks also to our Federal Government for continuing to support this initiative. I understand that submissions to the national exhibit from industry and private cartographers have been declining over the years. Let's all make an effort to encourage industry and individual map makers to submit their work for the next round.

CIG and ICA Initiatives: A number of proposed or implemented initiatives undertaken by both, the CIG and the ICA are worthwhile reporting since they have the potential to change the role and responsibilities of the National Committee.

CIG: The CIG has opted to form closer alliance with the Canadian Land Surveyors (CLS) and the Geomatics Industry Association of Canada (GIAC). The three groups now share an office and have a joint Executive Officer. I do not think these moves imply that the CIG deliberately is considering abandoning academic interests, nor do I think this implies that the importance of cartography to the CIG is deliberately diminished. However, these changes give the CCA, ACMLA and CRSS additional reasons for maintaining a strong presence, and for seeking continued strong collaboration and liaison with the CIG. Having the Chair of the National Committee hold the dual role as the CIG Scientific Councillor for Cartography should ensure a continued voice for cartography inside the CIG.

ICA: The ICA's letterhead now informs that it is the International Society for Cartography and Geographical Information Sciences, and a proposal will be put forward in Durban to change ICA membership to include educational establishments and national and international private industry. Broadening its mandate to include all of what is contained under "Geographic Information Sciences" positions the ICA in a very different playing field and I personally will watch with some interest how other national and international organizations claiming interests in GIS will share this playing field. Opening membership categories implies that more than one body from a nation can join, and that corporate interests have the potential to gain a louder voice. Here in Canada, an issue in the past has been who holds membership in the ICA. The CIG has been our official member, and the structure of our National Committee reflects this. Assuming that the new ICA membership categories get approved, other associations in Canada with an interest in cartography or the geographic information sciences could take membership in the ICA. Such a move would have implications to the role and structure of Canada's National Committee to the ICA. Folks - change is in the air. I caution to proceed carefully and collaboratively in order to ensure that Canada continues to have a strong and unified voice in the ICA.

ICA 2003 Durban Meeting: The ICA will meet in Durban, South Africa August 10-16, 2003. I plan to attend despite the staggering costs associated with getting to this meeting from Canada. I will be your official delegate at the ICA's 12th General Assembly. Assuming that Jan Mersey will be able to attend the meeting, plans are for her to be Canada's deputy delegate. Please chat to Jan or myself about thoughts or issues you wish to see addressed

at the General Assembly. For more information about ICC2003 check out: *http://www.icc2003.gov.za/* .

ICA 2005 Coruña Meeting: For those of you planning way ahead, ICA 2005 is scheduled for Coruña, Spain. More information can be found at: *http://www.icc2005.org*.

Chair, CNC: After eight years as Chair of Canada's National Committee to the ICA, I will be stepping aside after the Durban meeting. I understand that a successor has been found and I look forward to working with this person to facilitate a smooth transition. I have been blessed with tremendous support from the National Committee in fulfilling my duties. Special mention must go to Alberta Wood and Carolyn Weiss. Thank you for your help, your patience and for always being there to offer support.

Have a great summer – don't forget the more maps you will be using this summer so more fun you will be having – and that cartographers rule the world.

Peter Keller

Mark Your Calendars, CCA Members!

The Geomatics Institute, at Sir Sandford Fleming College's Frost campus in Lindsay, Ontario, Canada, will be hosting the next Canadian Cartographic Association Conference during the **second week of June, 2004.** More information on the conference will be made available in the weeks and months ahead. Until then, please direct any preliminary enquiries to Tim Wykes at (705)324-9144 or *twykes@flemingc.on.ca.*

CCA AWARDS

The Canadian Cartographic Association presents several awards each year to deserving members of the cartographic community which it serves. These awards are meant to recognize and encourage the achievements of outstanding individuals in the field.

- **President's Prize Student Map Competition**
($100 prizes in several categories)

- **Norman Nicholson Memorial Scholarship in Cartography**
($500 scholarship)
To recognize and encourage exceptional student achievement and ability in any aspect of cartography.

- **Awards of Distinction** To acknowledge exceptional professional or scholarly contributions to the field of cartography or an exceptional contribution to the Association.

For information about eligibility and how to apply or nominate individuals for these awards see the CCA web site: *www.cca-acc.org* or contact any member of the executive.

Prix de l'ACC

L'Association canadienne de cartographie présente, à chaque année, plusieurs prix à ses menbres méritants. L'attribution de ces prix a pour but de reconnaître et d'encourager l'accomplissement exceptionnel d'individus dans le milieu cartographique.

- **Le prix du Président pour la compétition des étudiants** (Des prix de $100 pour différentes catégories.)

- **Bourse Norman Nicholson** (Bourse de $500) Bourse attribuée afin de reconnaître et d'encourager un étudiant pour son accomplissement exceptionnel et ses capacités dans tous les aspects de la cartographie.

- **Prix de distinction** Prix pour reconnaître les contributions professionelles ou académiques exceptionnelles dans le domaine de la cartographie ou pour une contribution exceptionnelle à l'Association.

Pour de plus amples renseignements concernant l'éligibilité, comment postuler ou proposer un candidat pour ces prix, s'il vous plaît, veuillez visitez le site web de l'ACC à l'adresse URL suivante : *www.cca-acc.org*, ou veuillez contacter un membre du comité exécutif.

The Canadian Cartographic Association
L'Association canadienne de cartographie

www.cca-acc.org

CCA Mailing Address / Adresse de correspondence de l'ACC:

Diane Lacasse
CCA Secretariate / Secrétariat de l'ACC
24, rue de l'Atmosphère
Gatineau (Québec) J9A 2W1 CANADA

CCA Executive/ Exécutif de l'ACC:

President / *Président:*
Claire Gosson,
Geomatics Canada, NRCan
650 - 615 Booth Street
Ottawa, ON K1A 0E9
Phone/Tél: (work) (613) 992-4134
Fax/Téléc: (613) 943-8282
E-mail:Claire.Gosson@CCRS.NRCan.gc.ca

Vice-President / *vice-Président:*
Christine Earl
Dept. of Geography & Environmental Studies
Carleton University
1125 Colonel By Drve
Ottawa, ON K1Z 8K9
cearl@ccs.carleton.ca

Past-President / *Président-sortant:*
Ute Dymon,
Department of Geography
Kent State University
Kent, OH, USA, 44242-0001
Phone/Tél: (work) (330) 672-3226 ;
Fax/Téléc: (330) 672-4304;
E-mail/Courriel: udymon@kent.edu

Secretary / *secrétaire:*
Diane Lacasse
Geomatics Canada, NRCan
650 - 615 Booth Street
Ottawa, ON K1A 0E9
Phone/Tél: (613) 992-4335;
Fax/Téléc: (613) 947-2410
E-mail: lacasse@nrcan.gc.ca

Treasurer / *sortant:*
Charles Conway
Department of Geography
Memorial University of Newfoundland
St. John's, NF A1B 3X9
Phone/Tél: (709) 737-7912
Fax/Téléc: (709) 737-3119
E-mail/Courriel:cconway@morgan.ucs.mun.ca

Interest Group Chairs and Appointees/ *Présidents des groups d'Intérêt:*

Analytical Cartography and GIS / *Cartographié analytique et SIG:*
David Broscoe
Architecture/Civil Department
1385 Woodroffe Avenue
Algonquin College, Ottawa, ON, K2G 1V8
Phone/Tél:(613) 727-4723 ext.3350
Fax/Téléc:(613) 598-3300
E-mail/Courriel:broscod@algonquincollege.on.ca

Cartographic Education / *Éducation cartographique:*
Paul Heersink
Ontario Ministry of Natual Resources
300 Wate Street, 5th Floor
Peterbourgh, ON K9J 8M5
E-mail/Courriel: paperglyphs@sympatico.ca

Map Use and Design / *Conception ed utilisation des cartes:*
Andrew Millward
Department of Geography,
University of Waterloo
200 University Ave., Waterloo ON N2L 3G1
Phone/Tél: (519) 885-1211 ext. 6755
E-mail/Courriel: aamillwa@fes.uwaterloo.ca

Map Production Technology/ Technologie de production cartographique:
Jean McKendry
CESU National Network Office
Main Interior Building
1849 C Street NW (3127)
Washington, DC 20240 USA
Email: jeanm@uidaho.edu

History of Cartography / *Histoire de la cartographie:*
Léa Selley
TELUS Geomatics
16A - 10020 - 100 Street
Edmonton, Alberta T5J 0N5
Phone/Tél: (780) 493-5252; Fax/Téléc: (780) 493-4569
E-mail: lea.selley@telus.com

Appointees/ *les personnes nommées*

Membership Cordinator / *Département des adhésions*
Clint Loveman
Environmental Systems Research Institute Inc.
380 New York Street,
Redlands, CA 92373-8100, USA.
Phone/Tél: 909-793-2853 (X 2562),
E-mail/Courriel: cloveman@esri.com

Cartographica Editor/ *Éditeur de Cartographica:*
Brian Klinkenberg
Department of Geography
University of British Columbia
Vancouver, BC, V6T 1Z2
Phone/Tél: (604) 822-2663
Fax/Téléc: (604) 822-6150
E-mail/Courriel: brian@geog.ubc.ca

CCA Representative on the CNC/ *Délégué de l'ACC au Comité national canadien:*
Carolyn Weiss
Statistics Canada, Geography Divison
Ottawa, ON, K1A 0T6
Phone/Tél: (613) 951-3921 ; Fax/Téléc: (613) 951-0569
E-mail/Courriel: weiscar@statcan.ca

Student Representative
John Fowler
Deptartment of Geography
University of Victoria
Victoria, BC, V8W 3P5
E-mail/Courriel: jfowler@uvic.ca

The CCA was founded in 1975 to promote interest and education in maps and cartographic data, and to provide for the exchange of ideas and information, at the regional, national, and international levels, via meetings and publications. Membership in the Canadian Cartographic Association is open to all individuals, and public and private institutions which have an interest in maps and the aims and objectives of the Association. Membership is available in the following categories at the annual rates listed below ($CND):

Regular	$80
Student	$40
Institutional	$100
Corporate	$200
Family	$95
Retired	$40
Associate	$40

To cover mailing costs US residents please add $5 CDN and Overseas residents please add $10 CND to the applicable membership category.

Members receive the quarterly journal *Cartographica*, published by the University of Toronto Press and endorsed as the journal of the CCA; four issues of *Cartouche*, the CCA newsletter and the International Cartographic Association Newsletter. The Association also provides an annual conference to promote discourse and access to a range of expertise through the interest groups and regional contacts.

For further information about membership qualifications and benefits contact the membership coordinator or any executive member or visit www.cca-acc.org

L'ACC a été créé en 1975 pour promouvoir les intérêts et l'enseignement des cartes et de la cartographie ainsi que pour permettre l'échange d'idées, d'informations tant sur les plans régionaux que nationaux et ce via des bulletins et des conférences. L'adhésion à l'association est ouverte à tous les individus et institutions (privées et publiques) qui sont intéresés par les cartes et par les buts et objectifs de l'association. Vous pouvez adhérer dans les catégories suivantes selon les taux indiqués (cdn$) dans la liste ci-dessous:

Régulier	$80
Étudiant	$40
Institutionnel	$100
Société	$200
Famille	$95
à la retraite	$40
Associé	$40

Un montant de 5$ (cdn$) est ajouté pour couvrir les frais postaux aux membres américains (É-U) et de 10$ (cdn$) pour les membres outremers.

Les membres recoivent la monographie trimestrielle Cartographica, publiée par le University Toronto Press; 4 numéros du bulletin de nouvelle Cartouche et le bulletin de nouvelle de l'Association cartographique internationale (ACI). L'Association organise également une rencontre annuelle avec des conférences qui donne accès à l'expertise issue des groupes d'intérêts et des diverses régions du pays.

Pour plus d'information concernant l'adhésion et les bénéfices de l'association, contactez le coordonnateur des adhésions ou l'un des membres de l'exécutif ou encore, visitez notre site Internet *www.cca-acc.org*