Geographic Factors as a Core Element of Sustainable Transport Best Practices in Metropolitan Regions in Canada

Dr. Barry Wellar
Distinguished Research Fellow
Transport 2000 Canada
wellarb@uottawa.ca
http://wellarconsulting.com/

2007 Annual Meeting
Association of American Geographers
San Francisco, CA, April 17-21

Fleming Lecture - Organized by the University of Washington

Geographic Factors as a Core Element of Sustainable Transport Best Practices in Metropolitan Regions in Canada

Synopsis (1)

Factors of physical and human geography directly and significantly affect the structures, functions, and performance characteristics of all modes of transport:

- walk, cycle, transit (bus, subway, LRT)
- private motor vehicle (car, truck, minivan, SUV, etc.)
- pipeline, water (passenger, freight)
- heavy rail (passenger, freight)
- air (passenger, freight)

It follows on *prima facie* grounds, therefore, that geographic factors warrant primary consideration as potentially essential features in the conceptualization, design, and implementation of best practices promoted or adopted in the name of sustainable transport.

Synopsis (2)

The 2007 Fleming Lecture begins with a brief review of Canada's progress in achieving core element standing for geographic factors in sustainable transport best practices.

This part of the paper grounds sustainable transport in metropolitan regions, and then establishes the essential role of geographic factors in the sustainability of transport systems in Canada, and particularly in its metropolitan transportation systems.

Synopsis (3)

With that foundation in place, the paper then presents findings that reveal the extremely limited implementation of nine sustainable transport best practices in Canada's metropolitan regions, and the consequent lack of regard for geographic factors in matters related to achieving sustainable transport practices.

Synopsis (4)

In the spirit of the Fleming Lecture, it is not sufficient to merely identify shortcomings and ‘curse the darkness’.

Instead, it is appropriate to contribute to the solution, which in this case means suggesting how geographic factors could be pertinent to the design, implementation, and evaluation of sustainable transport best practices.

Synopsis (5)

As a contribution towards that objective, 100 terms are presented to illustrate the various ways that geographic factors are germane to decisions and actions involving the walk, cycle, transit, and/or private vehicle modes in metropolitan regions.

The section is concluded by a preliminary indication of the geographic factors that are pertinent to each of the nine sustainable transport best practices.

Finally, the issue of how to accelerate the process of achieving core element standing for geographic factors in the body of best practices associated with sustainable transport best practices is examined.

Synopsis (6)

Taking into account the failures of governments, big media, corporations, and adults over the past decades, it is argued that children and community newspapers represent the best hope for achieving sustainable transport practices in metropolitan regions in Canada within the next 10-15 years, and for incorporating geographic factors in those practices.

Introduction (1)

Previous Fleming Lecturers are a challenge and an inspiration because they raise the bar for this Fleming Lecture in a very constructive way.

Their combined works set a high standard for presenting sustainable transport practice ideas that are new and different, as well as achievable, repeatable, practical, and appealing.

Introduction (2)

As for newcomers to sustainable transport, they need to appreciate that we have a large quantity of sustainable transport principles, and a high frequency of public and published references to those principles.

However, relatively little has been achieved in <u>implementing sustainable transport practices</u>, and this is where earnest newcomers have a key role to play: Moving sustainable transport beyond the “same old, same old” of promise and principle into performance and practice.

Introduction (3)

One of the most important tasks before geographers and the field of transport geography in particular may be summarized as follows:

To broaden and deepen the body of theoretical and empirical knowledge of why and how geography affects the need for and achievement of best practices in sustainable transport in metropolitan regions.

Background (1)

My interest in sustainable transport principles and practices began while I was a graduate student at Northwestern University in the 1960s, and continued when I joined the University of Kansas in 1969.

In 1972, I was invited to return to Canada and join the Ministry of State for Urban Affairs, Government of Canada, as a senior research officer. My entrance into the sustainable transport field at the practices level came to be quickly informed by exposure to both the ‘top-down’ and ‘bottom-up’ perspectives, respectively.

Background (2)

My duties at Urban Affairs included providing all manner of subject matter advice on a variety of policy, program, and plan issues and initiatives affecting the economic, social, environmental, and geographical development of urban centers, urban systems, and urban regions across the country

Background (3)

Regarding the bottom-up (or grassroots) perspective, upon arriving in Ottawa I quickly became involved in numerous contentious community-based issues. These issues frequently involved objections to what was being prescribed for neighbourhoods by those with 'top-down' authority.

One of the common links between the top-down and bottom-up perspectives was the land use-transportation connection. Or, more accurately, the land use-transportation system disconnection.

Background (4)

From ***Housing for the Future*** (Wellar, 1975)

"Will urban land uses, including housing, be so distributed that we profligately consume scarce or non-renewable resources while traveling millions of journey-to-work person-miles every day, that walking school children are put in competition for space with driving adults, that city residence-to-recreation site distances are routinely separated on a greater-than-walking distance basis?"

"Change the input numbers to 20,000,000 trip-makers each driving 20 miles per day at 20 miles per gallon, and our consumption numbers change to 20,000,000 gallons per day, and 7,300,000,000 per year."

Background (5)

As might be surmised, it seemed clear to me in 1975 that Canada had a serious transportation-land use disconnect, compounded by a fossil fuel consumption habit of disturbing proportions.

From ***Taking steps towards the end of the automobile era*** (Wellar, 1975)

"…a senior professional at the Department of Urban Affairs and a former professor of urban transport."

Background (6)

From ***Taking steps towards the end of the automobile era*** (Wellar, 1975)

"Selected streets should have buses-only sections and lanes during the morning and evening peak hours. Buses should be equipped with devices for changing light signals upon approach. Buses in cities should have legal and acknowledged right-of-way for turns at intersections and into traffic, regardless of street signals and markings."

There are nine other fundamental change recommendations in the column. All of them are being put forward today in the name of sustainable transport, or in the related fields of sustainable development, smart growth, energy conservation, etc., some **30 years after they appeared in print.**

Geographic Factors as a Core Element of Sustainable Transport Best Practices in Metropolitan Regions in Canada

Current Regard for Geographic Factors in Sustainable Transport Best Practices (1)

Two questions were used to direct the research undertaken for the country report.

- What sustainable transport practices have been achieved by Canadian governments, corporations and citizens?
- What are the tangible, measurable results that have been realized from the sustainable transport practices implemented by governments, corporations and citizens?

Promise -> **Perform!**
Talk -> **Act!**
Will Do -> **Done!**
In The Mail -> **Done!**
On The Way -> **Done!**
In Process -> **Done!**
Under Consideration -> **Done!**

Current Regard for Geographic Factors in Sustainable Transport Best Practices (2)

The following definition was used to explain how the term “best practice” was employed in the White Paper: (Wellar, 2006)

The term ‘best practice’ refers to initiatives and activities that most effectively contribute to making sustainable transport practices a reality.

Promise –> **Perform!**
Talk –> **Act!**
Will Do –> **Done!**
In The Mail –> **Done!**
On The Way –> **Done!**
In Process –> **Done!**
Under Consideration –> **Done!**

Current Regard for Geographic Factors in Sustainable Transport Best Practices (3)

Table 1.
Initial List of Sustainable Transport Best Practices
Used to Assess Canada's Record of Achievement

1. Sustainable Transport Test.
2. Integrated Land Use and Transportation System Planning and Development.
3. Smart Growth/New Urbanism.
4. Development and Adoption of a Pedestrian Charter.
5. Incorporating Time as a Criterion for Defining Sustainable Transport.
6. Incorporating the Geo-Factor in Sustainable Transport Measures.
7. Using Indexes for Decision Support.
8. Defining Road/Highway "Improvements" in Sustainable Transport Terms.
9. Implementing Measures to Simultaneously Increase Walk, Cycle, and Transit/Train Trips While Decreasing Trips by Private Motor Vehicle.

Current Regard for Geographic Factors in Sustainable Transport Best Practices (4)

No evidence was found to demonstrate that any best practice has been achieved to a significant degree. Moreover, after a second search it is my impression that there is not sufficient material in the extant literature to write even one informative paper on achieved sustainable transport best practices in Canada's metropolitan regions.

Questions: Is it unreasonable to expect Canadians to achieve sustainable transport best practices, and due to the fragility of our national psyche should the bar be lowered? **Answers:** No, and No.

Current Regard for Geographic Factors in Sustainable Transport Best Practices (5)

In early March 2007, the Big City Mayors Caucus of the Federation of Canadian Municipalities apparently endorsed the Integrated Land Use and Transportation System Planning and Development best practice in a proposal to the federal government about transit funding. However, the mayors' proposal for "…better land use and transportation planning …" merely confirms Table 1. More talk, no action.

Promise –> **Perform!** *In The Mail* –> **Done!**

Talk –> **Act!** *On The Way* –> **Done!**

Will Do –> **Done!** *In Process* –> **Done!**

Under Consideration –> **Done!**

Current Regard for Geographic Factors in Sustainable Transport Best Practices (6)

A very practical question:

"Why bother examining regard shown for geographic factors if there is only minimal progress in achieving best practices in the first place?"

A very practical answer:

The Intergovernmental Panel on Climate Change (IPCC) released Part 1 of its Fourth Assessment Report on February 2, 2007. Two weeks before I had made a presentation on ***The Doomsday Map*** to the Canadian Meteorological and Oceanographic Society. For me, it was "game on"!

Action agenda for geographers

There is an urgent need for geographers to act in two respects.

First, we need to establish the geographic factors that are pertinent to defining, specifying, implementing, evaluating, and modifying sustainable transport best practices.

Second, we need to figure out how to accelerate the process of achieving core element standing for geographic factors in the body of best practices in Canada and, I suggest, in most other countries of the world.

Current Regard for Geographic Factors in Sustainable Transport Best Practices (8)

Table 2.

A Selection of Terms that Indicate the Potential for Incorporating Geographic Factors in Designing, Implementing and Evaluating Sustainable Transport Best Practices in Metropolitan Areas

Accessibility	Distribution	Location	Scale
Adjacency	District	Lot	Segregation
Area	Edge	Margin	Shape
Block	Elevation	Migration	Site
Border	Encroachment	Morphology	Situation
Boundary	Environs	Movement	Slope
Buffer	Far	Near	Space
Center	Flow	Neighbourhood	Spatial
Centrality	Fringe	Network	Sphere
Circle	Function	NIMBY	Sprawl
Closeness	Geometry	Node	Spread
Cluster	Grid	Orientation	Strip
Commutershed	Gridlock	Origin	Structure
Compactness	Habitat	Parcel	Surface
Concentration	Hinterland	Partition	System
Concentric	Integration	Path	Territory
Congestion	Intensification	Pattern	Topography
Connectivity	Interaction	Pedshed	Topology
Contiguity	Intersection	Perimeter	Walkway
Core	Island	Periphery	Walkshed
Crossing	Isolation	Place	Ward
Density	Land	Proximity	Where
Destination	Landscape	Quadrant	YIMBY
Diffusion	Lane	Region	Zone
Dispersion	Line	Right-of-way	
Distance	Link	Route	

Connections between sustainable transport best practices and pertinent geographic factors are posited in Table 3.

At this stage my objective is to indicate the connections between geographical factors and sustainable transport best practices.

While many of the connections have general applicability, the relative importance of geographical factors will vary by metropolitan area and zones or neighbourhoods within the area.

Table 3.
Connecting Sustainable Transport Best Practices and Geographical Factors

1. Sustainable Transport Test

Sustainable transport best practices occur “on the ground”, that is, the effects of a practice being implemented can be evaluated by examining functional, structural, and output or outcome changes in the affected transportation mode(s).

As a result, an assessment of whether a purported sustainable transport best practice has improved, enhanced, or beneficially modified a situation or process would include an examination of such geographic factors as *accessibility, compactness, connectivity, gridlock, integration, interaction,* and *segregation.*

Table 3.
Connecting Sustainable Transport Best Practices and Geographical Factors

2. Integrated Land Use and Transportation System Planning and Development

Land uses and transportation systems are <u>of</u> and <u>in</u> the built environment, so the consequences of their being integrated (rather than segregated) must be measurable or expressible in geographic terms.

Pertinent concepts or constructs are represented by terms such as c*ommutershed, diffusion, dispersion, edge, hinterland, pedshed,* and *sprawl.*

Table 3.
Connecting Sustainable Transport Best Practices and Geographical Factors

3. Smart Growth/New Urbanism

Land uses and transportation systems are of and in the built environment, and always have been; the intended difference of this best practice is that the former emphasis on private motor vehicle-driven growth gives way to an emphasis on alternative transportation (walk, cycle, transit) and increased regard for land and space as limited resources.

Pertinent terms to use in designing or evaluating this best practice in terms of its regard for geographic factors include *adjacency, buffer, contiguity, interaction, neighbourhood, path,* and *walkshed.*

Table 3.
Connecting Sustainable Transport Best Practices and Geographical Factors

4. Development and Adoption of a Pedestrian Charter

Pedestrians are people who walk between a variety of places -- home, work, school, recreation, shopping, health, medical, entertainment, etc., -- and they frequently are required to use sidewalks as well as the transportation infrastructure that is also used by cyclists, transit riders, and private vehicle operators and their passengers. Terms in Table 2 that apply to his best practice include *buffer, crossing, distance, encroachment, intersection, lane, path, quadrant, segregation, and zone.*

Table 3.
Connecting Sustainable Transport Best Practices and Geographical Factors

5. Incorporating Time as a Criterion for Defining Sustainable Transport

Any of the process terms – *concentration, congestion, diffusion, dispersion, distribution, intensification,* etc., in Table 2, and any the terms that can be expressed as processes – for example, cluster and *clustering*, link and *linking*, spread and *spreading* – can be used with this best practice. All that is required is an appropriate timeframe, that is, from seconds, minutes and hours, to months and years and perhaps even decades to accommodate census data.

Table 3.
Connecting Sustainable Transport Best Practices and Geographical Factors

6. Incorporating the Geo-Factor in Sustainable Transport Measures

All of the terms in Table 2 have been incorporated in geographic information systems software applications, beginning in the 1970s for many of them, and there are a number of software applications that combine multiples of the terms contained in Table 2. In view of the arguments given above for the preceding best practices, as well as those that follow, it appears that every term contained in Table 2 could be a candidate for inclusion in one or more sustainable transport measures.

Table 3.
Connecting Sustainable Transport Best Practices and Geographical Factors

7. Using Indexes for Decision Support

With their capacity to rate and rank phenomena, indexes are a proven means to provide decision support information when relatively large quantities of an entity or entities are under consideration. As a case in point, one quickly runs out ways to track the relative performance of 850 signalized intersections, but an index can turn this kind of exercise into child's play. It is likely that indexes either exist for many of the terms in Table 2, and that existing research would enable the development of indexes for any of the other terms. An initial inspection suggests that *all the terms* in Table 2 appear to be candidates for inclusion in an index to assist in the design, development, or evaluation of a sustainable transport best practice.

My gut tells me

$$STI_F = \frac{\#\text{ of Alt Tran Trips}}{\#\text{ of Total Tran Trips}}$$

Table 3.
Connecting Sustainable Transport Best Practices and Geographical Factors

8. Defining Road/Highway "Improvements" in Sustainable Transport Terms

As noted above, the design and implementation of sustainable transport practices requires that projects are justified on the basis of sustainability criteria, however they are defined. This could mean, for example, that changes for the better (improvements) are made to structures, functions, behaviours, etc., and these changes affect the extent and rate that trip volumes and modal shares shift from private motor vehicles to the walk, cycle, and transit modes for people, and from trucks to trains for freight.

Terms that are pertinent for defining spatial relationships between causal changes and causal effects include *area, block, border, distribution, district, flow, grid, location, movement, neighbourhood, origin, parcel, place, region,, strip, territory, ward,* and *zone.*

Table 3.
Connecting Sustainable Transport Best Practices and Geographical Factors

9. Implementing Measures to Simultaneously Increase Walk, Cycle, and Transit/Train Trips while Decreasing Trips by Private Motor Vehicle

Increases and decreases in trips by mode is a topic that lends itself to numerous research scenarios, some of which are indicated by the terms in Table 2. By way of illustration, the following are among the terms that could be used in designing and executing a program to map, analyze and evaluate the spatial outcomes of this best practice: *area, block, border, boundary, buffer; center, centrality, cluster, commutershed, concentration, congestion, core, distance, distribution, district, flow, fringe, function, geometry, gridlock, integration, intensification, interaction, intersection, lane, location, movement, near, neighbourhood, network, NIMBY, node, path, pattern, pedshed, place, proximity, quadrant, region, right-of-way, route, site, situation, spatial, sphere, sprawl, spread, structure, surface, system, topology, walkshed, ward, where, YIMBY,* and *zone.*

Suggestions for Engaging Citizens and the Media (1)

As some of you may recall, H. L. Mencken opined,

"As for the great masses
They can be divided into two classes;
Those for whom thinking is painful
And those for whom it is impossible".

The message that I take from Mr. Mencken is crystal clear:

Find ways to ease the burden of thinking
in order to achieve the desired actions.

Examination of Tables 1, 2, and 3 suggests to me that two parts of the "ways strategy" have already been presented.

Suggestions for Engaging Citizens and the Media (2)

First, none of the best practices in Table 1 requires rocket science skills to understand. It is my impression that the vast majority of adults and teens can get a handle on the meaning and implications of each best practice.

Second, there is hardly anything brain-numbing about most of the terms in Table 2, and many of them are in the everyday vocabularies of ordinary citizens, including teens and children. In addition to their lack of perplexity, however, the terms in Table 2 give geography a “hook” which is shared with few other disciplines associated with sustainable transport.

Suggestions for Engaging Citizens and the Media (3)

Through the fact of daily living, people have the opportunity to experience more geographic factors than the factors of any other disciplines that claim a role in shaping sustainable transport practices. Members of the media may also experience geographic factors on a daily basis.

In the field of sustainable transport best practices, we are in **urgent** need of popular literature contributions (newspapers, radio, television, Internet), that discuss the geographic factors listed in Table 2.

Suggestions for Engaging Citizens and the Media (4)

The best practices to resolve sustainability issues involve local initiatives, the geographic factors of most import to the day-to-day lives of people are local, and the media of most utility in this domain are also local. These include community newspapers that publish on a weekly, bi-weekly or monthly basis, and television and radio stations that are primarily concerned with local coverage.

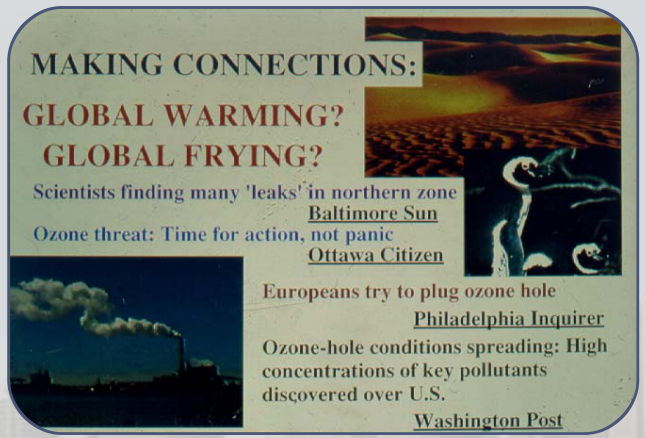
Suggestions for Engaging Citizens and the Media (5)

We are likely 10-15 years away from Canadian society taking widespread action on sustainable transport, largely because there is no market-based, health-based, fear-based, or other force to drive near-term change among the 'great masses' or even a large segment of the population. However, there appears to be a force for change coming over the horizon: **Children.**

Suggestions for Engaging Citizens and the Media (6)

In presentations to elementary and high school classes a number of children asked a pertinent question:

What can we do to stop the things that are going into *The Doomsday Map*?



Suggestions for Engaging Citizens and the Media (7)

The apparent ability of children to understand the headlines in ***The Doomsday Map*** presentation prompted a question for me:

> **If elementary school children can grasp the idea of a Doomsday Map, could they grasp the importance of achieving sustainable transport best practices?**

The answer, it appears, is **Yes.**

Suggestions for Engaging Citizens and the Media (8)

After weighing the evidence accumulated over the past 30 years, it is my finding that the younger generation, ages 8-14, is the **most significant player** in Canada's forthcoming struggle to achieve sustainable transport best practices.

In 10-15 years the current group will be 18-29 years of age, which makes these young people **a formidable force** on everything from voting to societal values and attitudes to media influence.

Conclusion (1)

After describing nine sustainable transport best practices in Table 1, about 100 terms representing geographic factors are listed in Table 2. Table 3 contains a selection of terms from Table 2 that could be incorporated in the design, specification, implementation, evaluation, etc., of the respective best practices.

Conclusion (2)

After more than 30 years as a researcher, civil servant, consultant and activist, and more than 1,000 media interviews, columns, events, letters to editors, etc., I am cautiously optimistic that the next decade could be the basis for **major movement** in the field of sustainable transport practices, and that geography will be appreciated as a core element.

I suggest that terms like those in Table 2 are central to our mission, that the greatest human force for change will be today's children ages 8-14, that the **best friends** we have in the media are community newspapers, local television and local radio stations, and that effective use of list serves and websites is critical.

Acknowledgements

In addition to the support of Transport 2000 Canada, I wish to acknowledge the contributions of several individuals to the presentation of the 2007 Fleming Lecture, ***Geographic Factors as a Core Element of Sustainable Transport Best Practices in Metropolitan Regions in Canada***. I wish to thank Dr. Richard Morrill, University of Washington, for organizing the Lecture; Dr. Susan Hanson, Clark University, for her contributions as the Discussant; and, the previous Fleming Lecturers who assisted with the references and pointed me towards some adjustments in the slides and the paper. Finally, I want to thank Prof. William Garrison, University of California at Berkeley, for his many sound "second opinions".

Assistance in preparing the PowerPoint presentation was provided by Sam Herold, Laboratory for Applied Geomatics and Geographic Information Systems Science, University of Ottawa, and it is gratefully acknowledged.

LAGGISS Laboratory for Applied Geomatics and GIS science
Laboratoire pour la géomatique appliquée et la science des SIG