PROJECT REPORT

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Assessing Recreation Values at Risk of Loss from Wildfires in Alberta: A Static Analysis

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SFMN Project: A Static and Dynamic Analysis of Forest Recreation Values

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ABSTRACT

This study examined some preliminary steps for including outdoor recreation values in forest fire management in Alberta. Rather than assume that existing recreation infrastructure reflects recreation values, we propose an alternative valuation framework based on understanding the spatial distribution of levels of recreation participation. The results indicate that recreation values are not necessarily tied to the availability of recreation infrastructure. The high value recreation sites in Alberta are located outside of national parks are located in southern areas of the province, particularly along the Mountain and the East Slopes Regions. Some implications of this spatial distribution of recreation activity on current fire management framework are analyzed and some management recommendations made.

Keywords: Forest recreation values, fire management, spatial modeling.

ACKNOWLEDGEMENTS

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RESARCH QUESTIONS AND OBJECTIVES

Fire management in the province of Alberta has been driven by the broadly stated goal of reducing the impact of wildfire on people, property and resources which are collectively termed values at risk. Recreation values currently are reflected through the presence of recreation capital infrastructure such as buildings and associated facilities in provincial parks, campgrounds and related areas. Figure 1 provides a map of the distribution of this infrastructure. The implicit assumption in preliminary models of values at risk is that the costs of replacing lost recreation infrastructure due to fire at recreation sites determine the economic values associated with recreation use. However, the efficacy of this assumption can be questioned on several fronts. First, recreation activity in forested areas may or may not be associated with the presence of recreation infrastructure. Second, the levels of visitation to all recreation areas are not likely to be similar. Third, unlike infrastructure, recreationists can be more spatially dispersed on the landscape including those areas that may not contain recreation infrastructure, such as camping "randomly" in public forested lands (called random camping by provincial recreation experts). These concerns suggest that recreation values at risk should be examined by including the economic values associated with participating in the activity, not the costs of replacing lost infrastructure. The importance of recreation participation is shown by the fact that it is one of the indicators of sustainable forest management reporting in Canada. Furthermore, recreation participation is also implicitly tied to the presence of human life which is considered the highest value at risk of loss from wildfire in Alberta.

Given the rising costs associated with fire suppression, the Government of Alberta has developed a preliminary map identifying the various values at risk. The goal is to use this map to more efficiently allocate fire suppression resources. Toward that effort, the objective of this research was to develop spatially explicit models and indicators of recreation participation to provide a better measure of the apatial distribution of recreation in Alberta.

KEY FINDINGS

1. It was possible to develop recreation participation models that can estimate the spatial distribution of recreation trips in Alberta. The models of the number of recreation trips in specified spatial units were estimated as a function of biophysical characteristics of the landscape (roads, recreation infrastructure, forest cover, water area, population density, etc).

2. These models suggest that recreation participation is not exclusively associated with recreation infrastructure. For example, northern Alberta, despite having infrastructure at a number of recreation areas hosts relatively few recreation trips (Figure 2). In contrast, southern Alberta, particularly those areas bordering the National Parks, hosted substantial recreation trips including many trips not associated with infrastructure (Figure 3). These finding have implications on the efficacy of the current fire management framework suggested by the existing values-at-risk map used by provincial fire managers.

3. Access into the landscape, as measured by road density, was one of the key biophysical attributes explaining recreation demand to a spatial unit.

4. Random camping is widespread and popular in the East Slopes Region, particularly in the southern areas and is driven primarily by opportunities for outdoor recreation such as off-highway vehicle use, lack of camping fees and accessibility of landscape due to the availability road networks associated with the forest industry.

5. Random camping trips account for over half (estimated 80%) of the trips taken to the East Slopes Region (see Figure 4 for select comparison). Therefore, these trips must be accounted for in fire management decisions for resource allocation. Recreationists who participate in random camping explicitly seek areas with no infrastructure.

6. There is an urgent need for updated, comprehensive, and systematic data collection efforts to improve the ability of fire managers to determine spatial distributions of recreation use in Alberta. These efforts should also be developed to allow the estimation of the economic values of recreation use. While large-scale data collection can be expensive, the study identified some approaches which can be accommodated within the existing recreation management framework. These include modifications to existing camping permiting systems at managed sites with infrastructure. Similarly, spatial recreation data could be collected for random camping use by administering standardized surveys of forest officers, guardians, and other experts who conduct periodic patrols on public forestlands.

KEY DELIVERABLES

There were two principle deliverables of this research. The first deliverable involved maps (see Figures 2-4) of the spatial distribution of recreation participation for the entire province. Specifically, recreation trips were assumed to occur within specified spatial units (either in 100 km2 cells provincially or 25 km2 cells for the Eastern Slopes Region) and the annual number of trips to these units was modeled as a function of the biophysical attributes of those units. The trips derived in the models were inflated to the provincial level to provide a spatial distribution of trips taken for outdoor recreation in Alberta. The second deliverable refined the spatially explicit indicators of recreation for Alberta by focusing on the East Slopes Region. This Region lies on the east slopes of the Rocky Mountains, straddling the Alberta-BC border, excluding the National Parks, and is highly sought after for recreational activities. The focus of this deliverable was to highlight the recreation values associated with random camping.

BENEFITS TO PROJECT PARTNERS AND OTHERS

The recreation models developed in this research are an improvement over the current recreation infrastructure framework for fire management since the spatial distribution of recreationists and recreation values were explicitly considered. This consideration can allow for the inclusion of some non-timber values in fire management which previously did not occur. This will allow fire

managers a more complete picture of the benefits in doing cost benefit analysis of fire suppression activity.

MANAGEMENT/POLICY IMPLICATIONS

An explicit consideration of the values of recreation participation is advantageous in that this value is closely linked to the presence of recreationists and, implicitly, human life which is considered the highest value at risk. Therefore, during fire events, directing suppression efforts and/or evacuation efforts to high value recreation areas can fulfill a fire management goal of protecting the highest values at risk (human life), as well as protecting areas with significant recreation values. This can help minimize the risk from fire to the high valued areas in addition to minimizing fire suppression expenditures. For example, the participation models suggest that suppression efforts may be better directed to southern Alberta, particularly outside the National Parks, than to northern Alberta.

While this research provided some noteworthy results, there are limitations which need to be addressed. The most significant was the availability of comprehensive and updated information on the levels of recreation use across the province. The only available data for the province as a whole stemmed from the 1996 National Survey on the Importance of Nature to Canadians (DuWors et al. 1999). While this dated data contained spatial referencing of some recreation trips, there were some significant methodological drawbacks and inaccuracies involved in this referencing which suggests caution in using the resulting findings. In addition, the underlying recreation data structure suggested the use of limited dependent and qualitative dependent spatial regression frameworks - unfortunately, advances in econometric spatial modelling have not yet occurred to incorporate such data issues.

This study should be repeated when more thorough information on the intensity and distribution of recreation use becomes available in Alberta.

SUGGESTIONS FOR FUTURE RESEARCH

The development of recreation information as conducted in this study connotes information that is typically viewed as static and rudimentary. For example, using the spatial information in assessing the effects of fire on recreation one might assume that in cases where a cell burns, the number of recreation trips to that cell become 0. Further, this suggests that the recreational value contained in that cell becomes $0. This may not be the case as previous research suggests that recreationists have varying preferences for burned landscapes. Some recreationists' activities may be affected by fires (e.g. fishing and hunting), or in some cases may be enhanced by it (e.g. wildflower gathering, mushroom picking). This suggests that fire may affect different recreational activities in various ways. In addition, if trips in one spatial unit disappear as a result of fire, recreationists may substitute to other unburnt recreation areas. Using the assumption of no substitution following a fire would result in an over-estimation of the reduction in recreation economic value caused by that fire.

Also, while fire is a natural disturbance in the forests of Alberta, forests recover from fire. This suggests that recreation values may not be "lost" due to fire, but recover in much the same way the forest does. This indicates a number of interesting dimensions researchers can pursue. One is the understanding of intertemporal recreational amenities in which recreation values change as the forest ages, burns and recovers, or grows back, following fire. Another is assessing the movements of recreationists across forested landscapes as portions of that landscape burn. In this sense recreation values are not lost, but are maintained through recreationists visiting other parts of the forest in response to a fire in their favourite areas.

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Publications, Posters, Presentations

Presentations

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Neupane, A., P.C. Boxall and R. Pelletier. 2004. Assessing the recreation values at risk from wildfire. Paper presented at the 2004 Annual Meeting of the Canadian Agricultural Economics Society, Halifax, NS, June 20-23.

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Posters

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Theses

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Manuscript submitted for publication

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FIGURES

Figure 1. The spatial distribution of outdoor recreation infrastructure in 100 km^2 cells in Alberta from the existing provincial values-at-risk map.

Source: Alberta Sustainable Resource Development

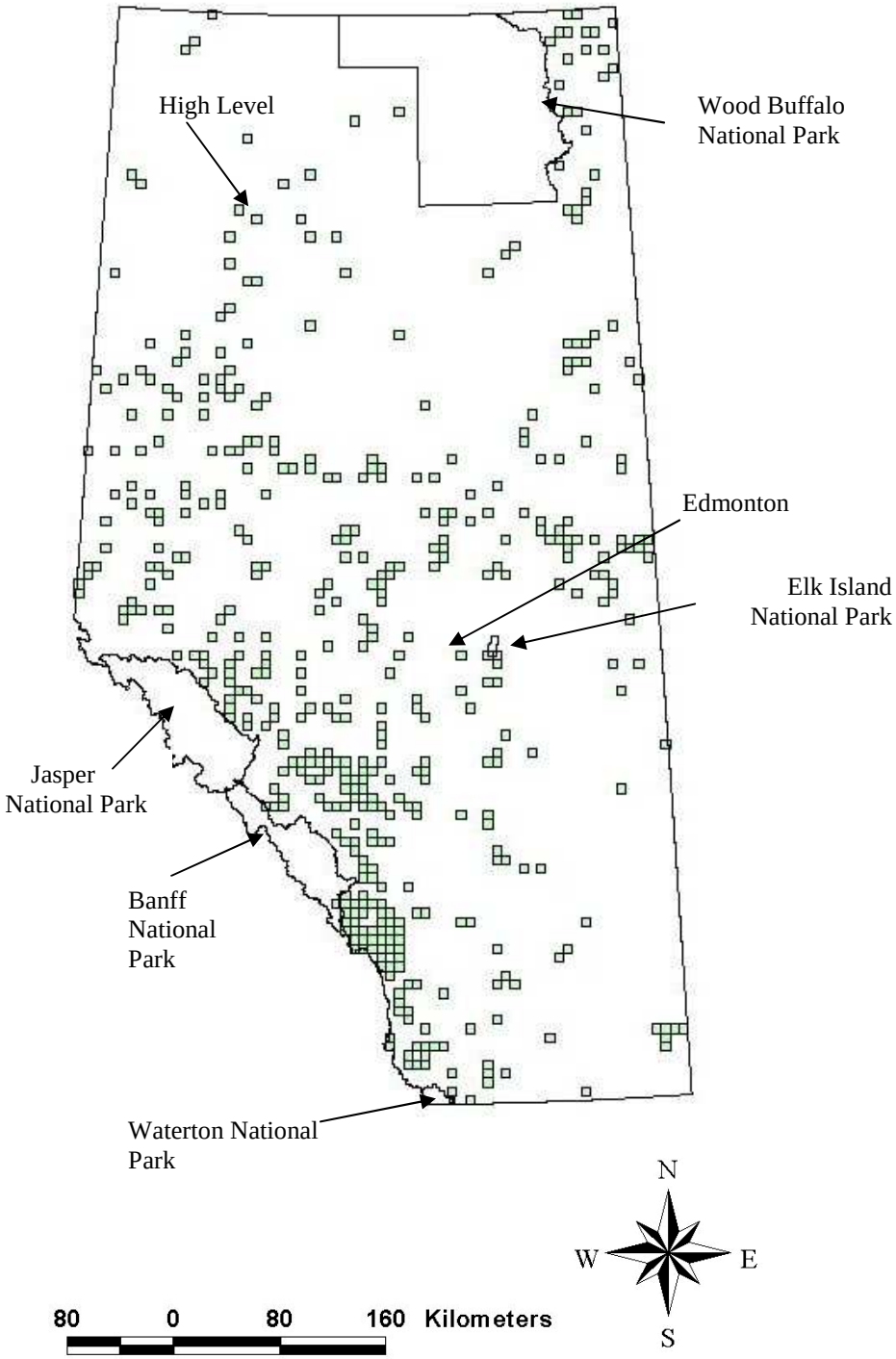

Figure 2. The predicted spatial distribution of trips for outdoor recreation activity inflated to the provincial level for northern Alberta using data from the 1996 National Survey on the Importance of Nature to Canadians.

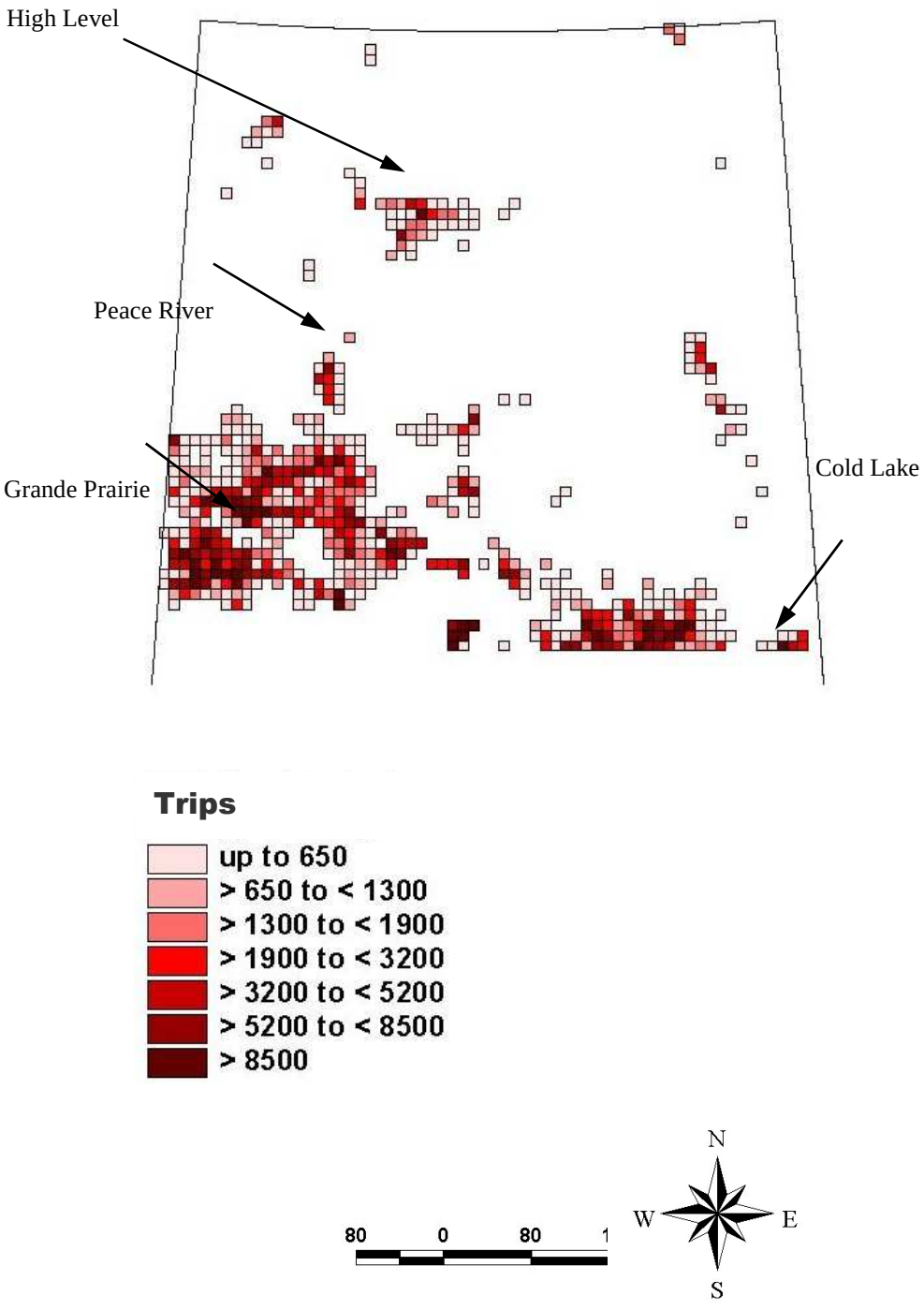

Figure 3. The predicted spatial distribution of trips for outdoor recreation activity inflated to the provincial level in the southern Alberta using data from the 1996 National Survey on the Importance of Nature to Canadians.

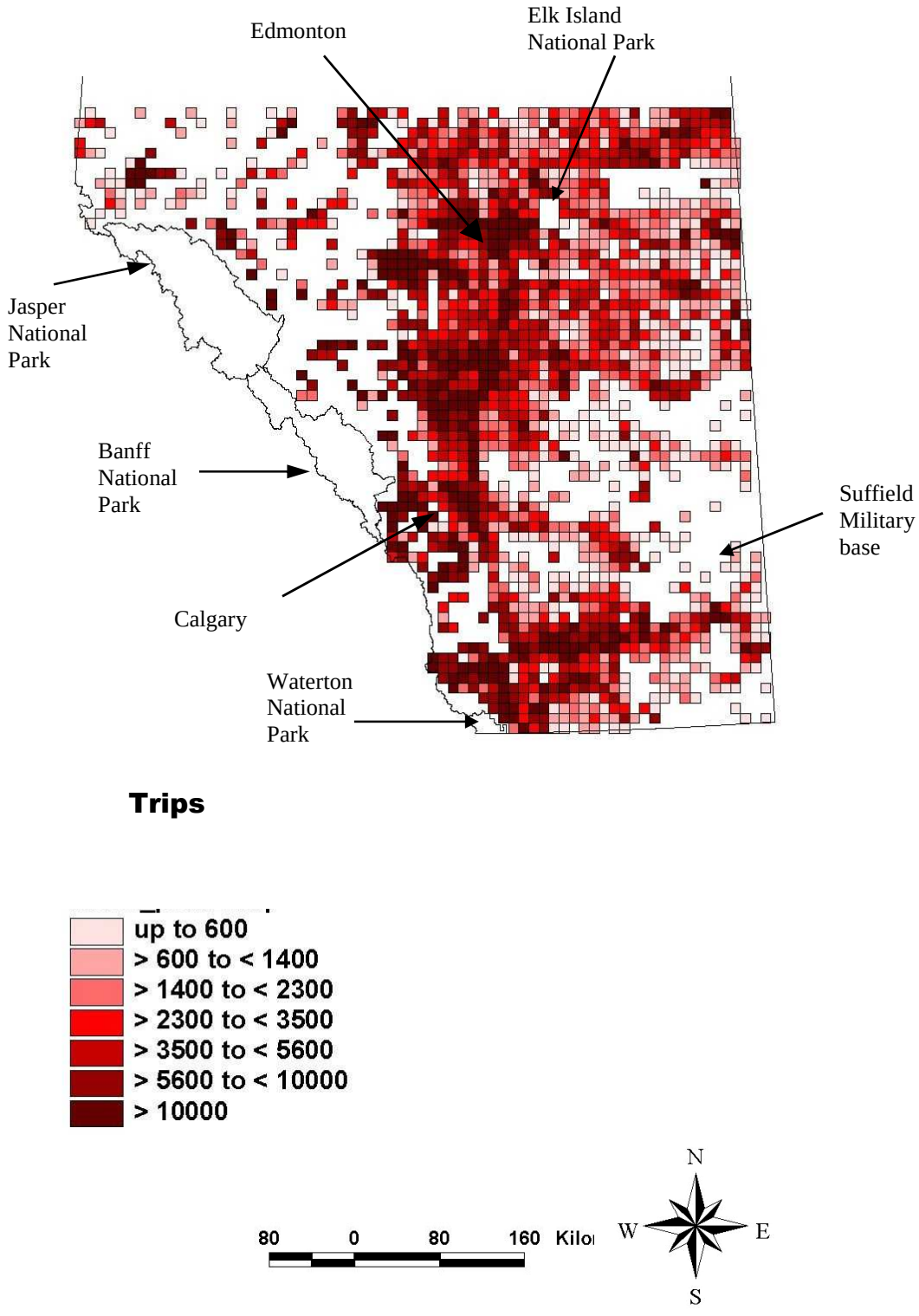

Figure 4. The predicted spatial distribution of trips taken to sites associated with infrastructure (managed trips) and random camping area displayed in 25 km^2 cells in the Rocky Mountain House area of the East Slopes Region of Alberta.