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RESIDENTS' UTILIZATION OF COASTAL HAZARD ASSISTANCE PROGRAMS
THE LONG POINT AREA, LAKE ERIE

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ABSTRACT: This paper evaluates how adequately residents have utilized and benefitted from Ontario coastal-hazard assistance programs during the 1972 to 1976 Great Lakes high-water period. Four programs are described and their effectiveness in helping shore-dwellers in the Long Point Bay area of Lake Erie is examined. Data are obtained from a field survey measuring residents' attitudes toward coastal hazard responsibility and government financial aid, as well as their knowledge about, and utilization of, assistance programs. The study reveals that a majority of residents are: poorly informed about coastal ecological processes, misinformed about lake level fluctuations, and uninformed about assistance programs. As a result, they disregard adverse effects of structural adjustments, blame government for regulating Great Lakes levels, and fail to utilize hazard assistance programs. The programs, while benefitting some residents, encourage expensive structural devices, piecemeal shoreline protection, and stop-gap repair works. Suggestions to help overcome these deficiencies and general approaches to ensure wider and more effective utilization of assistance programs are recommended.

RESUME: L'auteur tente d'évaluer jusqu'à quel point les résidents se sont prévalus et ont bénéficié du programme Ontarien d'assistance contre les dommages côtiers au cours de la période des hautes eaux des Grands Lacs de 1972 à 1976. Il décrit quatre programmes

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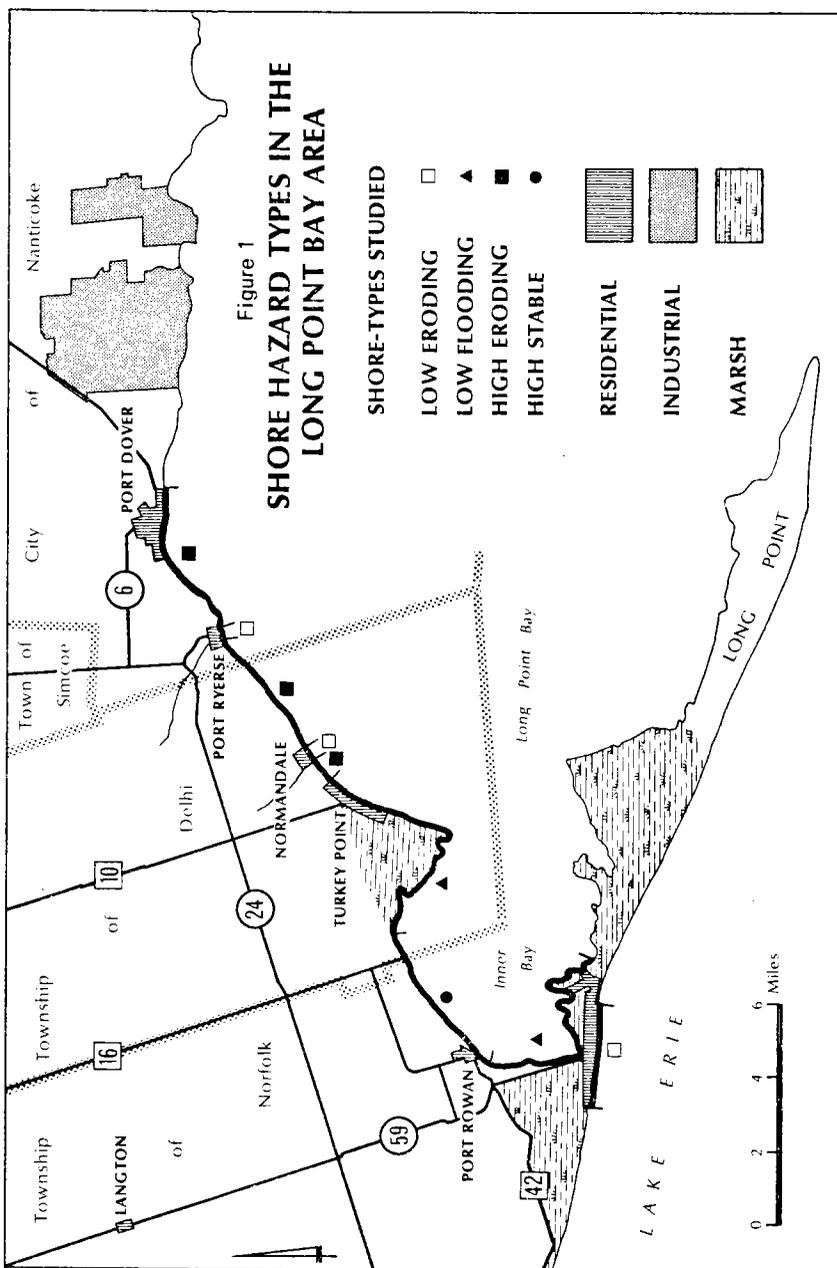
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et scrute leur efficacité à aider les riverains dans la région de Long Point Bay sur le lac Erié. Les données étudiées proviennent d'une enquête où l'on a tenté de connaître l'opinion des résidents à savoir qui est responsable des dommages côtiers, l'attitude des riverains vis-à-vis l'aide financière du gouvernement ainsi que le degré de connaissance et d'utilisation des programmes d'assistance. L'étude révèle qu'une majorité de riverains sont: peu connaissant des processus écologiques côtiers, mal informés des causes des fluctuations de niveau des lacs et pas du tout au courant des programmes d'assistance. En conséquence, ils ne tiennent pas compte des effets contraires que provoquent certains ouvrages de protection, blâment le gouvernement de la régularisation des Grands Lacs et n'utilisent pas les programmes d'assistance contre les dangers côtiers. Ces programmes, bien qu'utiles à certains riverains, n'encouragent la construction que d'ouvrages dispendieux, la protection de petites parcelles de rive seulement et les travaux de réparation d'urgence. Des suggestions sont faites, pour surmonter ces déficiences des programmes d'assistance et une approche plus générale est recommandée dans le but d'en assurer une utilisation accrue et plus efficace.

INTRODUCTION

This paper concerns the perception and utilization of government flood and erosion hazard assistance programs by Lake Erie coastal zone residents in the Long Point area. The study region consists of three hazardous shore types along a 30-mile segment of Lake Erie shoreline from Long Point to Port Dover, Ontario (Fig. 1). The low-eroding shore is located on the Lake Erie side of Long Point, a large complex spit, and on several creek valleys in the high bluff section. The low-flooding shore is situated on the Inner Bay side of Long Point and on Turkey Point, a second sand spit, with an extensive marsh-filled backshore. A third area, consisting of 30- to 85- foot glacial drift bluffs, erodes an average of one to seven feet per year and extends from Turkey Point to the developing Nanticoke industrial complex east of Port Dover (E. Grove, 1973). Settled areas containing permanent residents and cottagers are located in a number of hazardous shorefront positions: the narrow sand bars at the base of Long Point, the sand spit separating Turkey Point marsh from Long Point Bay, the creek valley mouths at Normandale and Port Ryerse, and the bluff top at Port Dover.

Such a vulnerable lakeshore land-use pattern offers great potential for flood and erosion damages when lake levels periodically rise due to natural hydrologic fluctuations. When such a rise occurred in Lake Erie during the 1972 to 1976 period, the Ontario government introduced a number of hazard assistance programs designed to help residents and their municipalities cope with high-water problems. Three of the four programs used in the study area were established in 1973, primarily to aid private



property owners in planning and financing their own hazard protection devices. The Shoreline Property Assistance Program (SPAP) enables municipalities to borrow funds from Ontario and make loans to residents for constructing protection works and repairing water-damaged buildings (M. D. Trewin, 1974). Loans are recovered as taxes by the municipality over 20 years at 8% interest. Operation Sandbag supplies residents with free sandbags for emergency protection of their properties (D. R. Fortner, 1975). An Extension Service Program provides residents with free advice on means to alleviate flood and erosion problems (D. R. Fortner, 1975). A fourth program, for Special Emergency Assistance, is designed to help municipalities by allowing them to obtain an 80% provincial subsidy for maintaining essential roads and services for which the municipality is directly responsible (M. D. Trewin, 1974). In addition, the Ontario Ministry of Transportation and Communications, as part of its maintenance program, protects provincial highways from water damages.

Two previous papers examined the process of adjustment in Ontario to high Lake Erie water levels. In the Rondeau and Pelee areas, Nelson et al. (1975) reported crisis-induced engineering solutions to solve high-water problems unsupported by assessments of associated economic, social, and biophysical costs and benefits. A companion study concerning the Rondeau coastal zone found gross discrimination in assistance available to shoreline residents, widespread ignorance of assistance programs available, and piecemeal protection of shoreline reaches (Day et al., N.D.).

The research reported here is a sequel investigation dealing with conditions in the Long Point area. To evaluate how adequately shore dwellers have utilized and benefitted from these programs, government officials and a stratified sample of 151 area residents were interviewed during the summer of 1976. Of sampled residents, only 9.5% were either too far inland or too high to be affected by recent high water. These 14 individuals are excluded from the major analyses except where general attitudes about coastal hazard problems are discussed.

SHORE HAZARD DAMAGES

The hazard magnitude is indicated by the fact that 76% of the respondents spontaneously mentioned flooding and erosion as the most serious problem in the area. Of the 137 affected respondents, only 10 were able to completely eliminate damages by taking preventive measures. Over 90% of the remainder had trees, lawns, sheds, and equipment destroyed; 32% had their house and its contents damaged; and 34% had other problems ranging from ruined septic systems to decreased property values (Table 1). The average water damage for the 28 interviewees who gave an estimate was \$1,284. However, even with these losses, only six

TABLE 1
Water Damages
(percentages)

	Low-shore (flood)	Low-shore (erode)	Bluff-shore	Total
No damage	8.6	5.7	6.3	7.3
Erosion	17.1	94.3	93.8	54.7
Yard	85.7	82.9	78.1	83.2
House	39.4	57.1	6.3	39.4
Other	40.0	51.4	3.1	34.3
Total Number	(70)	(35)	(32)	(137)

TABLE 2
Government Dams and Diversions are Responsible for Water Damages

	Low-shore %	Bluff-shore %	Total %
Strongly agree	31.3	9.4	26.5
Agree	36.1	9.4	30.5
Undecided	15.1	34.4	19.2
Disagree	15.1	37.5	19.9
Strongly disagree	2.5	9.4	4.0
Total Number	(119)	(32)	(151)
	Cramer's V=0.40	p < 0.0001	

TABLE 3
The Amount of Government Financial Assistance Should Be:

	Low-shore %	Bluff-shore %	Total %
100%	30.3	12.5	26.5
75%	15.1	6.3	13.2
50%	24.4	40.6	27.8
Loan	23.5	37.5	26.5
None	6.7	3.1	6.0
Total Number	(119)	(32)	(151)
	Cramer's V=0.25	p < .05	

residents said they were thinking of moving from their present location because of the hazard. Over 95% felt that the benefits of lakefront property ownership outweighed the losses incurred from flooding and erosion.

RESIDENTS' ATTITUDES CONCERNING HAZARD RESPONSIBILITY

The amount of assistance which residents felt government should give them to help cope with the flood and erosion hazard is largely determined by their experience and attitude concerning responsibility for the problem.

In low-shore areas where high lake levels are blamed for erosion and flooding, two-thirds of the respondents agreed with the statement: 'Government built dams and diversions are responsible for high Great Lakes levels and resulting flood and erosion damages' (Table 2). These residents felt government was raising lake levels to aid shipping, to increase hydro power, or even to flood shore-dwellers off their property. To substantiate this latter claim, many respondents referred to the Haldimand-Norfolk Lakeshore Report (Grove, 1973) which recommended removing cottages from Long Point and Turkey Point to provide more public recreation space for the anticipated crowds from the Nanticoke development. The residents' solution to the Great Lakes coastal hazard is, therefore, simply for government to open up "the dams and locks" and let the lakes recede to their normal levels. Many low-shore respondents regarded government assurances that lake levels are not being regulated as an attempt to avoid accepting responsibility for causing the hazard. These residents believed that the government is attempting to transfer to private land owners its obligation to compensate shore-dwellers for hazard damages. Thus, 45% of the low-shore respondents felt that government should provide individuals with at least 75% of the funding needed to alleviate flooding and erosion problems (Table 3).

Conversely, most bluff-shore residents believed that poor drainage conditions on the bluff top and resultant slumping, rather than high lake levels, is the primary hazard cause. Thus, they have no economically motivated reason to accuse government of controlling lake levels. Consequently, the majority have accepted public information stating that lake levels are not being regulated (Table 2). Only the 19% who felt that government was causing the problem through lake level regulation believed that government should pay at least 75% of the adjustment costs (Table 3).

RESIDENTS' KNOWLEDGE OF ASSISTANCE PROGRAMS

The issue of hazard responsibility also influences the amount of action residents have taken to obtain information about assistance programs. In low-shore areas, the majority of respondents assumed that since government was purposely raising lake

levels, it was not concerned with shore-dwellers' problems and therefore would not provide any meaningful assistance. Thus, only 14% bothered to contact a government authority to find out what assistance was available. In contrast, 44% of the respondents along the bluff-shore contacted an official. As a result, 75% of bluff-shore residents knew of the primary assistance available - the Shoreline Property Assistance Program (SPAP) - as compared to only 5% in low-shore areas (Table 4). This large discrepancy reflects not only the difference in the number of contacts made but also the difference in the amount of publicity given this program in the three study-area townships. In the City of Nanticoke, which covers the bluff-shore, local officials in the lakeside center of Port Dover have given the Shoreline Property Assistance Program (SPAP) extensive publicity in the local media. In Delhi and Norfolk Townships, however, which cover the low-shore, officials in the township centers of Langton and Delhi, 13 and 15 miles from the Lake, have given it much less publicity. In fact, to date the Delhi Council has not passed the necessary bylaw allowing residents to obtain a loan under SPAP. Additionally, the fact that all bluff-shore residents contacted their local government while over half of the low-shore residents contacted only provincial officials, who are less likely to mention the locally-administered SPAP program, further explains the vast difference in public awareness of this loan program.

Knowledge of other assistance programs was uniformly low. Only 4% of the respondents were aware of the other two potentially beneficial programs (Table 4). This is due to both the failure of residents to contact the provincial agencies administering these programs and the lack of publicity given the programs by these agencies. For example, only 15% of the respondents could name one of the four provincial agencies responsible for administering coastal hazard programs.

RESIDENTS' UTILIZATION OF ASSISTANCE PROGRAMS

Residents' utilization of the three programs is even less than the low level of public knowledge would suggest (Table 5). This is revealed by the fact that while most bluff-shore respondents knew of the Shoreline Property Assistance Program, only three have taken advantage of it. Most residents preferred to use their own funds to build less expensive protective devices than the steel breakwalls, timber pilings, concrete block "sand grabbers," and armor rock revetments commonly recommended by the consulting engineer as the primary measures covered by SPAP (F. K. Kent, 1976). For example, one individual whose protection plan was accredited to receive assistance under this program opted out when a steel price rise escalated the cost of his breakwall from \$5,000 to \$8,000. Several other residents stated they would have used such a loan to construct a steel breakwall if they could have persuaded neighbors to do likewise, a total effort which avoids the problem of protecting the flanks of their property from erosion. In addition, two respondents avoided

TABLE 4
Knowledge of Assistance Programs

	Low-shore %	Bluff-shore %	Total %
Shoreline Property	4.8	75.0	21.2
Operation Sandbag	2.9	0.0	2.2
Extension Service	1.0	6.3	2.2
No Knowledge	91.5	25.0	75.9
Total Number	(105)	(32)	(175)

TABLE 5
Utilization of Assistance Programs

	Low-shore %	Bluff-shore %	Total %
Shoreline Property	0.0	9.4	2.2
Operation Sandbag	1.9	0.0	1.5
Extension Service	0.0	3.1	0.7
Programs Not Used	98.1	87.5	95.6
Total Number	(105)	(32)	(137)

paying loan interest by constructing a steel breakwall with their own funds. For these reasons, only eight City of Nanticoke residents have used SPAP in the study area (F. K. Kent, 1976).

Although the Ministry of Transportation and Communications supplied no sandbags to the study area under Operation Sandbag in 1975-76, 7,985 and 1,945 bags were distributed during 1973 and 1974, respectively (E. Jephson, 1976). Over \$6,200 was spent by the Ministry in purchasing and distributing both empty and filled bags to three pick-up points for public and private use. Actions under this program in the study area were focussed along a 600-foot stretch of lakeside shoreline immediately east of a gabion breakwall constructed by the Ministry of Transportation and Communications in 1973 to protect Highway 59 from erosion. While the breakwall benefitted a number of respondents by protecting their property from erosion, it increased erosion in downdrift areas to such an extent that provincial authorities built a sandbag breakwall in 1974 to remedy the situation (L. Edwards, 1976). However, the sandbags were only a stop-gap measure as two interviewees built extensive protective works at their own expense as the erosion process induced by Highway 59 protection spread eastward down the Long Point Peninsula.

The Extension Service Program was used by only one of the three respondents who knew of its existence. This individual obtained beneficial technical advice in designing a steel breakwall. The other two felt that they knew more about the hazard problem at their particular site than any engineer and therefore they did not seek help in planning protective measures. In addition, several respondents who were unaware of this program stated that they would like to see this type of advisory assistance started since they had wasted considerable funds on ineffective protection works. Unfortunately, the provincial government terminated this program in 1975 as part of its austerity program (L. Edwards, 1976).

While only 4% of the respondents utilized the above three programs, 21% stated that they had benefitted from various government measures which prevented erosion and flooding of provincial and municipal roads. The Ministry of Transportation and Communications spent \$177,000 in the study area and the Ministry of Treasury, Economics, and Intergovernmental Affairs, under the Special Emergency Assistance Program (SEAP), provided over \$210,000 during the 1973-1976 period, mainly to two communities, Long Point and Turkey Point, to maintain roads and services.

The remaining three-quarters of the respondents did not benefit from any government program; this perhaps explains why 79% felt that government had done a poor to a very poor job in assisting residents with hazard problems.

COASTAL HAZARD AJUSTMENTS

As a result of shore-dwellers' reluctance to use the loan program, and their almost total ignorance of other assistance programs, 93% of those residents making adjustments have had to bear the substantial cost of designing and building flood and erosion protection works entirely by themselves. The average adjustment cost for the 127 respondents who gave an estimate was \$2,000; 12% made expenditures in excess of \$4,000 (Table 6). Protection measures adopted range from placing rip rap, fill, and breakwalls at the cliff base to retard bluff-shore undercutting, to raising houses and property to prevent flooding along the low-shore areas (Table 7).

POLICY IMPLICATIONS AND RECOMMENDATIONS

There appear to be two basic reasons why only 4% of affected residents used an assistance program.

First, there was a serious communication gap between residents and government officials which resulted in over three-quarters of the respondents being unaware of any program. A majority of respondents mistakenly believed that government dams and diversions were responsible for high lake levels and they therefore felt that government was unconcerned about shore-dwellers' problems. Consequently, they did not bother to find out if any assistance was available. For their part, government officials, with the exception of those in the City of Nanticoke, made little effort to inform residents of the programs available. Indeed, officials of the Townships of Delhi and Norfolk assert that since the public had not commonly asked for SPAP assistance, neither municipality had adopted the necessary bylaw to enable its use. Furthermore, since City of Nanticoke authorities promoted the SPAP while the other two townships did not, there is discrimination in the amount of government assistance available to study area residents. In part, this could reflect the fact that some municipalities are reluctant to implement or advertise this program for fear that the municipality might become responsible for a large number of loans should residents abandon their properties. For example, this fear of land abandonment prevails in Erieau, Ontario (Day et al.).

In addition, communication failure caused residents to disregard adverse effects attributable to structural adjustments and to underestimate the advantages of non-structural alternatives. For example, while 47% agreed that structural protection often aggravates erosion in adjacent areas, only 20% agreed that non-structural methods such as zoning regulations are better than protective devices, and less than 10% agreed that government should remove people from areas subject to serious flooding and erosion by purchasing properties at a fair market price. Only 13% mentioned non-structural measures such as hazard insurance, house relocation, and vegetation planting as worthy of government consideration. These findings are to be expected because study

TABLE 6
Adjustment Costs
(percentages)

	Low-shore (flood)	Low-shore (erode)	Bluff-shore	Total
No adjustments	10.6	0.0	0.0	5.5
<\$100	6.1	0.0	3.3	3.9
\$100-999	16.7	32.3	40.0	26.0
\$1,000-1,999	34.8	38.7	16.7	31.5
\$2,000-3,999	25.8	16.1	16.7	21.3
\$4,000-5,999	3.0	3.2	10.0	4.7
\$6,000-7,999	0.0	9.7	3.3	3.1
>\$8,000	3.0	0.0	10.0	3.9
Total Number	(66)	(31)	(30)	(127)
Total Costs	\$114,800	\$58,703	\$80,636	\$254,139
Average Costs	\$1,724	\$1,894	\$2,688	\$2,001

TABLE 7
Adjustments Types
(percentages)

	Low-shore (flood)	Low-shore (erode)	Bluff-shore	Total
No adjustments	10.0	0.0	0.0	5.1
Rip rap	4.3	54.3	68.8	32.1
Sandbags	0.0	5.7	0.0	1.5
Breakwall	12.9	82.9	46.9	38.7
Land fill	72.9	34.3	59.4	59.9
House raised	57.1	14.3	0.0	32.8
House moved	0.0	11.4	3.1	3.6
Total Number	(70)	(35)	(32)	(137)

area residents have commonly seen their governments adopt only structural means to control the Lake Erie flood and erosion hazard rather than a more balanced and sensitive use of structural and non-structural means of shoreline management.

Second, the limited nature of the programs resulted in low utilization among the one-quarter of respondents who were aware of a program. In the study area, loans under the Shoreline Property Assistance Program were only available for constructing expensive steel breakwalls and other kinds of structures. Such loans were only used by the few residents who felt they needed such elaborate protection but had insufficient funds to construct it themselves. Loans were unavailable to residents who wanted to adopt long-range, non-structural techniques such as house relocation and flood-proofing. Free sandbags were only given to residents adversely affected by government protection works at Long Point rather than to all shore-dwellers who needed them, as was done in other areas along Lake Erie (D. R. Fortner, 1975). The Extension Service, a program of great potential benefit to most area residents, was discontinued in 1975.

Finally, the two programs which provided stop-gap protection for roads and services, while benefitting some residents, encouraged piecemeal shoreline management in which public land protection often aggravates flooding and erosion problems on adjacent private property.

To ensure wider and more effective utilization of assistance programs, the following recommendations are offered:

1. There should be better liaison between shore-dwellers and government officials responsible for administering hazard programs so that all residents are aware of not only the programs available, but also causes of lake-level fluctuations, possible adverse effects of structural adjustments, and benefits of non-structural alternatives. To ensure that such an intensive public information program is uniformly applied in all Great Lakes municipalities it should be administered at the provincial level.
2. Existing programs should be broadened to encourage a wide range of structural and non-structural solutions to coastal hazards including flood-proofing, relocation, and other damage prevention methods. For example, under the Shoreline Property Assistance Program, individuals should receive loans for house relocation to minimize the need for structural protection which often has adverse environmental effects. Likewise, under the Special Emergency Assistance Program, municipalities should receive subsidies for road relocation to eliminate piecemeal protection which often aggravates hazard problems in adjacent areas.

3. Ontario should sponsor a demonstration program which exemplifies the full range of structural and non-structural measures in adjusting to high lake levels. In addition to the array of structures currently in use, the potential of complementary measures to reduce high water damages such as flood proofing, land zoning, land use changes, revised building codes, insurance, and public land ownership should be explored. Provincial inspectors need to be trained to formulate protection plans in such terms and public subsidy programs should attempt to limit the value of public improvements in shoreline areas which will repeatedly be exposed to potential damage by future high-water events.

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