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AN INTEGRATED APPROACH TO THE PLANNING AND MANAGEMENT OF URBAN WETLANDS: THE CASE OF BECHTEL PARK WETLAND, WATERLOO, ONTARIO

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Abstract

The Bechtel Park Wetland in Waterloo, Ontario was examined in an attempt to provide an integrated approach to the planning and management of wetlands in urban environments. The Wetland is the result of urban development activity and is of recent origin. A chronology detailing the development stages of the Wetland over the previous thirty years is presented. Evaluation, functional assessment and public consultation processes were carried out to understand the Wetland's ecological functions and establish its values. The results of the investigations raised four issues of concern: 1) urban runoff entering the Wetland is impairing water quality; 2) invasive plant species are threatening biodiversity; 3) beavers are cutting down trees and; 4) the lack of a delineated trail system is reducing the amenity value of the Wetland and leading to loss of vegetation. Options to address these concerns are discussed and the formation of a 'Friends of Bechtel Park' volunteer group is suggested. The paper concludes with a recommendation that pro-active planning of urban wetlands is essential if the functions and values of these ecosystems are to be sustained.

Résumé

Le marécage du parc Bechtel à Waterloo, en Ontario, fut examiné pour tenter d'en dégager une démarche intégrée de planification et de gestion des terres humides en milieu urbain. Le marécage résulte des activités d'urbanisation et est d'origine récente. Une chronologie faisant état de ses stades de développement au cours des trente dernières années est présentée. Des processus d'évaluation, d'étude fonctionnelle et de consultation du public furent menés à bonne fin dans le but de saisir les fonctions écologiques du marécage et d'établir ses valeurs. Les résultats des études ont soulevé quatre sujets de préoccupation : (1) l'écoulement urbain qui pénètre les terres humides porte atteinte à la qualité de l'eau; (2) des espèces de plantes envahissantes menacent la biodiversité; les castors rongent les arbres et les font tomber et (4) l'absence d'un réseau de pistes et sentiers délimités fait perdre de sa valeur à l'environnement du marécage et entraîne une perte de végétation. Diverses possibilités pour répondre à ces préoccupations sont envisagées et on a suggéré la formation d'un groupe de volontaires «Les amis de Bechtel Park». Le document se termine par une recommandation voulant que l'aménagement proactif des zones humides en milieu urbain est essentiel pour qui souhaite maintenir les fonctions et les valeurs de ces écosystèmes.

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Introduction

In the past, wetlands were considered as wastelands and were frequently drained for agriculture and urbanisation. However, in recent years, an increasing awareness has developed of the socio-ecological functions and values provided by wetlands. Urban wetlands are particularly valued due to their location within environments where some of these functions are most needed. Unfortunately, land-use changes have led to a significant loss of wetland ecosystems and it is estimated that only 0.2% of wetlands in Canada are found within 40 km of the 23 largest metropolitan areas (Rubec, 1980). Those wetlands that are located within urban and urbanising areas are often in a degraded state and, therefore, it is imperative that management strategies are developed to maintain and improve their functional values.

The wetland chosen for this case study (now on referred to as the 'Wetland') is located within Bechtel Park on the outskirts of the City of Waterloo in Southern Ontario, and provides a unique natural environment in an urban setting. The Wetland covers 7.25 hectares of the Laurel Creek floodplain and is near the confluence of Laurel Creek with the Grand River. The area has been traversed by an outfall from the Waterloo sewage treatment plant. Prior to the construction of Highway 86, the outfall sewer line was in poor repair, and there were frequent discharges of partially treated sewage into the creek (Bauer, personal communication, 1996). The parkland also contains a sports field, a cemetery and a woodlot. The upland plant communities within the park have been recognised as a significant natural feature of local value and much of the natural area has been designated as an Environmentally Sensitive Policy Area (ESPA) by the City. Housing developments dominate the surrounding area and Highway 86 is located west of the floodplain.

Various studies of Bechtel Park have been conducted. Tyler *et al.* (1990) investigated management options for the Park and also documented a few environmental issues related to the Wetland. A water resources study of Bechtel Park pointed out the degraded state of the Wetland and a need for restorative/rehabilitative measures (Mulamoottil *et al.*, 1991). Also the City of Waterloo commissioned an investigation into erosion problems in the channel of Laurel Creek adjacent to the Wetland (Braun Consulting *et al.*, 1992). However, the functions provided by the Wetland and the processes which may negatively impact the ecology and amenity value of the site have not been adequately researched. In addition, there seems to be no documentation available to guide assessments of urban wetland functions and values for an integrated approach to the planning and management of urban wetlands. The objectives of the study are:

1. to document the ecological development of the Wetland;
2. to evaluate and assess the functions and values of the Wetland;
3. to identify concerns held by stakeholders over the Wetland and its future; and
4. to explore management options which may enhance the values of the Wetland.

Methods

The integrated approach to the study was to conduct several concurrent investigations, all of which derived information from a variety of sources. The ecological development of the Wetland was investigated primarily using aerial photographs and sediment core analysis. Images were obtained for the years 1947, 1966, 1969, 1971, 1975, 1992 and 1995, and significant visible changes noted. A development chronology was established and sequential maps developed using the image data and supplementary information sources such as maps, engineering site plans and previous reports. Two sediment cores were taken from the Wetland for pollen analysis and an assessment of the

physical characteristics of bulk density, dry weight, organic and inorganic content.

A wetland evaluation was carried out in the fall of 1995 using the most recent version of the Ontario Ministry of Natural Resources Wetland Evaluation Manual (OMNR, 1993). A prior evaluation of the Wetland, conducted in 1990 (Mulamoottil *et al.*, 1991), was used as a source of reference. Most of the required data were collected on site or from topographical maps. However, liaison with a number of organisations was also necessary to evaluate some of the social values and interests in the Wetland. Those contacted include: the Six Nations Aboriginal Band, various local community groups, the Grand River Conservation Authority (GRCA), Ontario Ministry of Natural Resources (OMNR), the Waterloo Board of Education, the City of Waterloo, and the City of Kitchener.

An assessment of Wetland functions was carried out following the guidelines set down in the "Functional Assessment of Freshwater Wetlands: A Manual and Training Outline" (Larson *et al.*, 1989). Much of the information gathered in the ecological development study and the OMNR evaluation were also used in the assessment. However, this procedure enables a more qualitative review of wetland functionality than is permitted in the evaluation system. Two piezometers were installed near the centre of the Wetland to investigate infiltration potential of the site. Water quality data were obtained from previous studies (Tyler *et al.*, 1990, Mulamoottil *et al.*, 1991 and Braun Engineering *et al.*, 1992). Five broad functions are identified in the USEPA manual; groundwater discharge and recharge, flood control, water quality improvement, habitat for fish and wildlife, and biomass production and export (Larson *et al.*, 1989). Due to the urban location of the study site, it was appropriate to investigate the amenity value of the Wetland to the local population. Thus, a sixth component of 'values to society' was added.

Following the completion of the ecological development study and the OMNR evaluation, a public consultation was held to identify stakeholder concerns regarding the current state and use of the Wetland. The public meeting was widely advertised in local newspapers and through radio announcements. Over 4,500 information leaflets were distributed to households within approximately 1.5 km of the Wetland, and all interest groups and official bodies with any connection with the Wetland were mailed a copy. Information boards and a twenty minute presentation were used to present preliminary findings of the investigation. Following the presentation, small group discussions were held to identify issues of concern among stakeholders. A questionnaire was distributed to all participants and interest groups, so that further information regarding issues related to the Wetland could be generated.

Ecological Development of Bechtel Park Wetland

Downstream of the current Wetland location, Laurel Creek was dammed for a mill pond around 1829 (Leibbrandt, 1980). The resulting alteration of the flow regime, coupled with nearby road construction, may have had some impact on the ecological balance of the site (Bloomfield, 1995). Agriculture was the dominant land-use of the surrounding area prior to the 1950s. More recently, however, an increasing level of development activity in and around the study site has led to some significant changes in the flood-plain of Laurel Creek. Some of the more prominent transformations are discernible on aerial imagery. A summary of the Wetland development chronology is presented in Figure 1. Listed below are the years when aerial photographs record major changes within and around the study site.

1947. Three small streams drain into Laurel Creek from the south-west, with the northernmost of the three flowing into a meander bend.

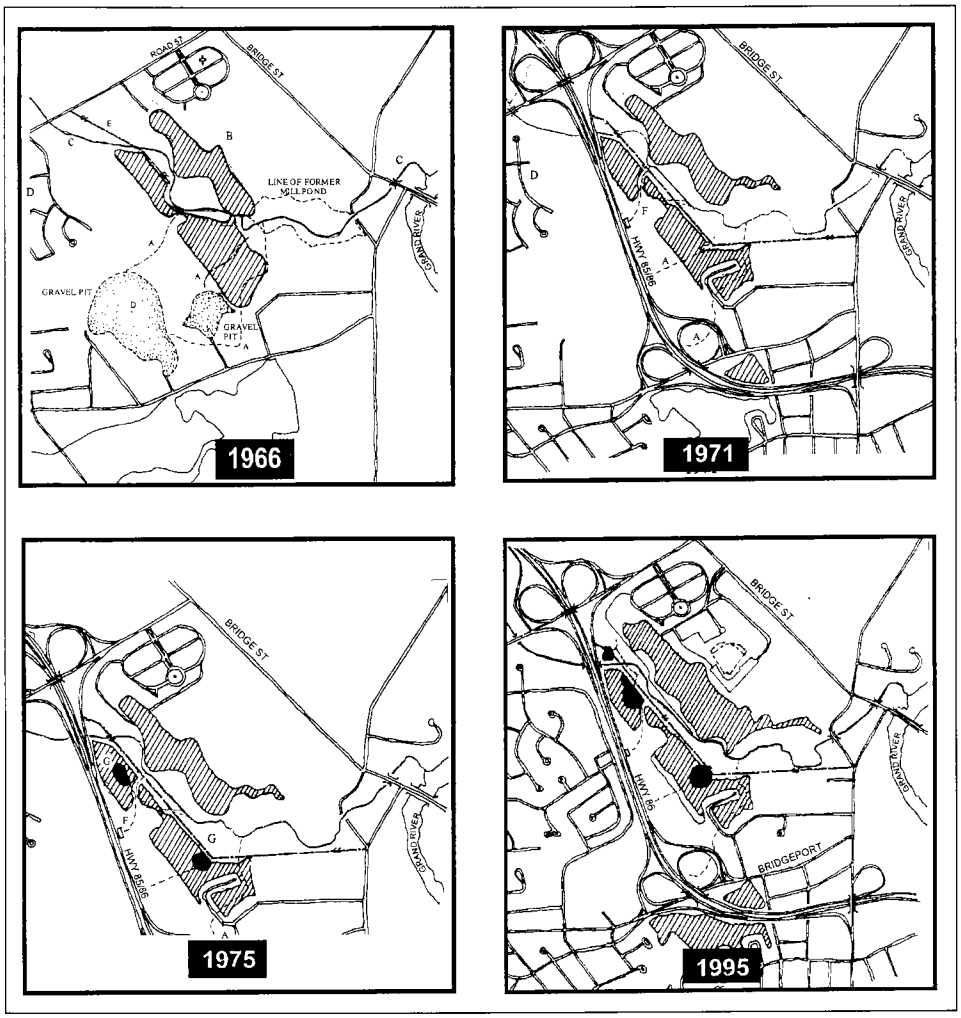

Figure 1: Sequential Map of Changes Impacting on Wetland Development A=stream input, B=woodland, C=Laurel Creek, D=Bluevale sub-division, E=sewer-line, F=stormwater culvert, G=open water

1966. The early construction stage of Bluevale sub-division is apparent west of the Creek flood-plain. Another land-use change adjacent to the Creek is visible on the north-west side of the meander bend. This is due to the use of the site for a sanitary landfill between 1957 and 1964 (Tyler *et al.*, 1990).

1969. Conestoga Parkway (Highway 86), between Bluevale and Laurel Creek, is under construction at this time and the northernmost stream entering the study site is acting as a stormwater drain for the sub-division. The meander bend has disappeared due to a straightening of the Creek. This channelization enabled the installation of a sewer-line to convey treated wastewater from the Waterloo Water Pollution Control Plant to the Grand River (Braun Consulting *et al.*, 1992).

1971. The construction of Conestoga Parkway is complete in the area adjacent to the Wetland.

1975. A wetland and small pond are discernible in the location of the previous meander bend.

1992. The open water body, now known as the 'Beaver Pond' has noticeably increased in size and the nearby Creek channel appears to have migrated slightly towards the Wetland. The observed lateral shift in Creek alignment acted to expose landfill materials and the sewer-line (Mulamoottil *et al.*, 1991). Channel reinforcement measures, using bio-engineering techniques, were undertaken to prevent further bank erosion (Braun Consulting *et al*, 1992)

1995. There are no significant changes discernible between the 1992 and 1995 images.

Additional evidence, indicative of changing land uses within the area and supporting the recent creation of the Wetland, was obtained from sediment core analysis. The core extracted south of the Beaver Pond displayed a low percentage of organics (3-6% excluding the surface layer), with the remainder consisting of alluvial silts and clays characteristic of a floodplain. A change in stratigraphy, found near the top of the core, may be a result of depositional changes caused by land clearance and the removal of aggregate near the three feeder streams. A reconstruction of past vegetation through pollen analysis was not possible due to low concentrations of pollen in the cores.

Wetland Evaluation

A total score of 546 affords the Wetland a class 5 status according to the OMNR 1-7 classification system. This is an increase from the previous class 6 status (Mulamoottil *et al.*, 1991). Changes in the scoring criteria within the evaluation manual used in 1995 are the main reason for the rise in status. The Wetland scores highly in the hydrological component due to flood attenuation and water quality improvement functions. The evaluation also recognizes the value of the Wetland in terms of rarity and distinctiveness as a natural area within an urbanized landscape. A low score was obtained for biodiversity and the provision of habitat for rare and significant species, due mainly to the small size and developmental stage of the Wetland. The scoring process of the evaluation assisted with the functional assessment by providing a quantitative summary of wetland values. The scores are presented in Table 1.

Functional Assessment

Groundwater Recharge and Discharge

There is some evidence to suggest that the Wetland is an area of groundwater recharge, since it is palustrine and located on a creek floodplain. Therefore, stormwater entering the site is detained and there is opportunity for infiltration. The general locality is considered to be a 'potential recharge' site by the Grand River Conservation Authority (1993). Piezometers located at the south end of the Beaver Pond provided confirmation of infiltration potential. However, recharge may be limited, overall, by the low permeability of alluvial sediments within the old meander bend and also the clay capping layers that cover the previous landfill site (Tyler *et al.*, 1990).

Well log data of the water table in the vicinity of Bechtel Park indicate depths greater than 100 m (MOE, 1976) and the Wetland is not expected to receive any groundwater input. A spring has been located in the woodlot upstream of the Wetland, the result of sub-surface seepage at the boundary between upper organic layers and underlying glacial tills.

Flood Control

Numerous site visits to the Wetland prior to and following major storm events during the fall of 1995 and the spring of 1996 indicated that the water level in the Beaver Pond fluctuated by approximately half a metre. Thus, the storage capacity of the wetland/floodplain is high, considering the small catchment size. Large spring melt events lead to

Table 1: Results of Wetland Evaluation Conducted in 1996

Biological component	Score	Out of	Hydrological component	Score	Out of
Productivity	34	50	Flood attenuation	88	100
Biodiversity	55	150	Water quality improvement	60	70
Size	7	50	Carbon sink	0	5
Total	**96**	**250**	Shoreline erosion control	0	15
			Groundwater recharge	57	60
			Total	**205**	**250**
Social Component			**Special Features Component**		
Economic products	14	50	Rarity	100	160
Recreational activities	20	50	Significant features/habitat	20	65
Landscape aesthetics	5	10	Ecosystem age	2	25
Proximity to settlement	40	40	**Total**	**122**	**250**
Education & public awareness	27	40		**Total**	**546**
Ownership	8	10			
Aboriginal & cultural values	0	30			
Size	9	20			
Total	**123**	**250**			

over bank flooding of the wetland area from Laurel Creek. The subsequent slow release of water from the Wetland alleviates the impact of further flooding downstream. However, this function is thought to be of limited value since there is no development in the downstream floodplain.

Water Quality

Urban runoff from the Conestoga Parkway and Bluevale sub-division is the dominant hydrological input to the Wetland. Analysis of water samples from the stormwater culvert indicates that copper, iron, zinc, and total phosphorus levels significantly exceed MOE limits (Braun Consulting *et al.*, 1992). Chlorides, calcium and nitrogen concentrations are also found to be high (Tyler *et al.*, 1990, Mulamoottil *et al.*, 1991). Although heavy metals are attenuated and sediment loads reduced, discharge out of the Wetland negatively impacts the water quality of Laurel Creek (Braun Consulting *et al.*, 1992).

Habitat for Fish and Wildlife

Based on the OMNR evaluation criteria, the biodiversity of Bechtel Park Wetland is found to be quite low. There are two wetland types, swamp and marsh (Figure 2), and a total of ten vegetational communities. These communities are typical of southwestern Ontario, with swamp areas containing willow, cedar, black ash, aspen and dogwood species. Marshes consist mainly of cattails, sedges, submergent vegetation and a significant presence of purple loosestrife. This low species diversity is probably a reflection of the Wetland's relatively small size, recent origin, poor water quality and lack of connectivity with other areas of rich natural habitats. However,

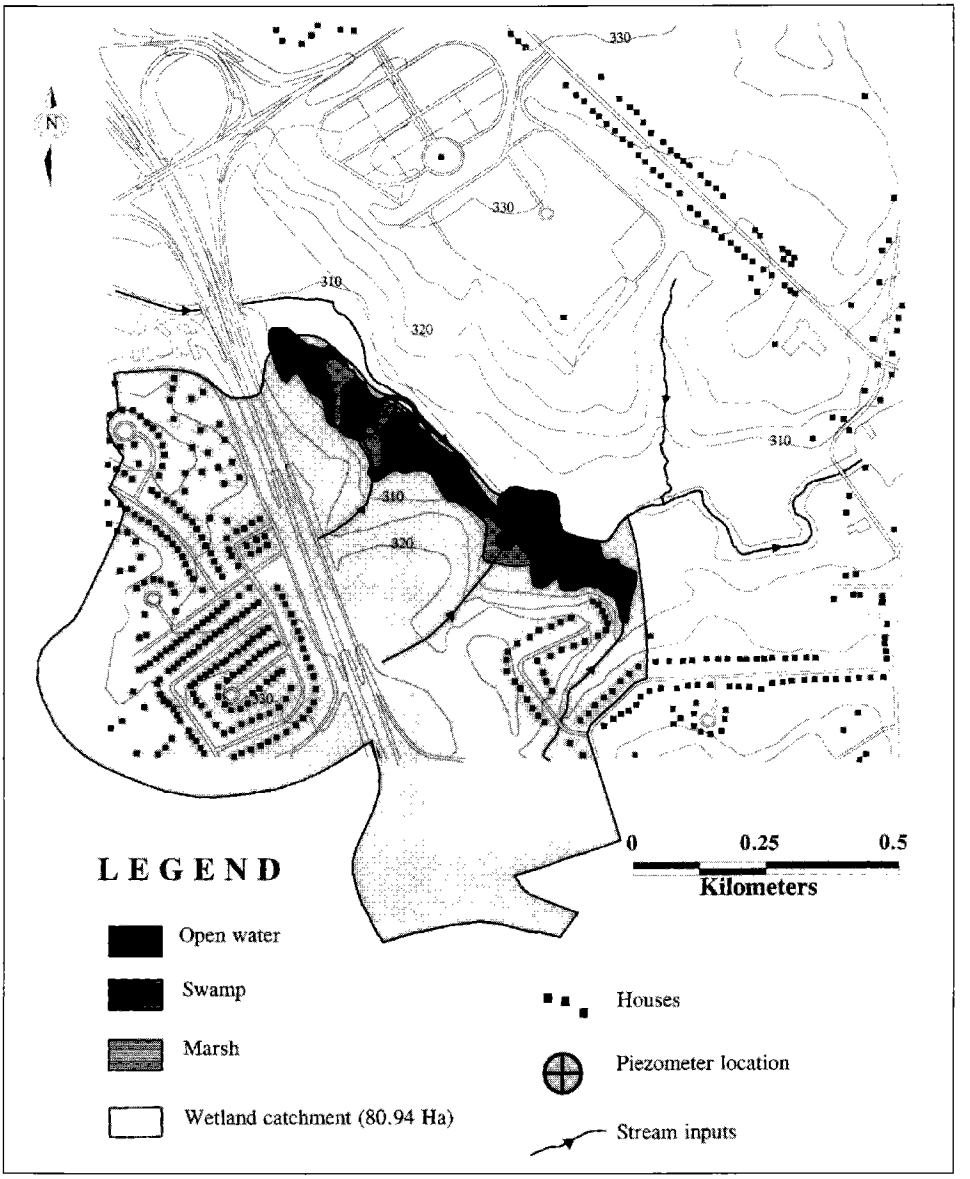

Figure 2: Bechtel Park Wetland; showing hydrological inputs and wetland cover types

given the surrounding urban environment, the Wetland provides an important and locally unique habitat for wildlife.

Two species of colonial waterbirds, the Green Heron *Butorides virescens* and the Great Blue Heron *Andrea herodias* have been known to use the Wetland for feeding, if not for breeding. The Wetland also provides a minimal waterfowl habitat. One animal species that is apparently successful in Bechtel Park Wetland is the beaver. Data regarding fish species and numbers are not available. It appears that the Wetland does not support a fish population.

Biomass Production and Export

Potentially harvestable products, such as a variety of fur-bearers, snapping turtles and bull frogs are found in and around the Wetland. In addition, fish spawning could take place in the marsh areas during spring flooding. However, although the potential for biomass production and export has been identified, there is no evidence to suggest that it is a valued function.

Values to Society

Although there is no delineated trail system within or around the Wetland, the area is very popular with casual strollers. The obvious recreational and aesthetic appeal of a seemingly natural amenity within an urban setting afford the Wetland a high functional value to the local population. Bechtel Park Wetland is also known to be used by school and university groups for education and research (Bresnahan, 1995, personal communication).

The Public Consultation Process

The public consultation revealed several major concerns of the attending participants. Pollution from stormwater inputs and possible landfill leachate contamination was generally regarded as detrimental to the Wetland ecosystem. Access was considered an important area of concern for two reasons: the main route through the site between the Beaver Pond and the Creek is frequently flooded or iced over from fall to spring, thus inhibiting access; and the lack of a delineated trail system has led to a significant loss of vegetation due to Wetland visitors opening up trails of their own to avoid difficult ground conditions and further explore the site. The participants also expressed concern over the possibility of future local development in the area intensifying the problems already identified.

Boardwalks were seen as beneficial to improve and control access, as well as to increase educational opportunities. Participants also recognised that maintenance of biodiversity in the Wetland would require control of invasive and disruptive elements such as purple loosestrife, European buckthorn as well as beaver. Several participants expressed a willingness to take a hands-on approach to this problem, and exchanged names and phone numbers in an effort to initiate a Friends of Bechtel Park advocacy group, modelled on public interest groups elsewhere.

Of 24 questionnaires distributed at the meeting and through the mail, 17 were returned; a response rate of 71%. Many reasons were given for visiting the Wetland. All identified walking as a purpose for their visits, with 15 pointing out that they had also gone simply to view the Wetland. Birding, nature study and photography were other popular reasons for visiting the site. Respondents agreed on the most important functions and values of the Wetland: opportunities for recreation and nature study, the provision of natural habitat, and water quality improvement. The issues identified as important by the respondents corroborated those expressed in the public meeting. They were also comparable to issues raised in previous public meetings investigating management options for Bechtel Park. However, there appears to be a slight shift in public opinion regarding access. Previously, local inhabitants expressed a desire to maintain the natural state of the Wetland and did not wish access to be controlled or improved. Table 2 lists the issues raised at earlier public meetings, as well as at the consultation held for the present study.

Discussion

It has been shown that Bechtel Park Wetland is a recent and fortuitous outcome of increasing anthropogenic forces within its surrounding area. However, intensifying pressures, largely as a consequence of nearby urban development, are acting to degrade the Wetland ecosystem and, reduce its functional value to both local inhabitants and the biotic environment. The results of site investigations and the public consultation process have pointed out four main areas of concern: storm water quality

Table 2: Results of Public Consultations Regarding Issues Relating to Bechtel Park Wetland

Date	Initiators	Purpose and format	Main issues raised at meeting
November 1989	Bechtel Park Master Plan Committee (Roth, 1991)	Open house and public meeting; to determine public opinion on future direction of park	1. Potential for vandalism if access to open pond was increased by use of boardwalks 2. Regular use by school groups, and potential for damage to natural areas 3. Potential contamination from former landfill 4. Desire to maintain 'wild,' inaccessible character of Wetland area 5. Maintenance and operation of skating pond
March 1990	Bechtel Park Master Plan Committee (Tyler *et al.* 1990)	Public workshop, coupled with walking tours, interpretation of natural processes and discussion of all natural areas within Bechtel Park.	1. "whether or not the Beaver Pond will continue to exist at all." (Tyler *et al.,* 1990)
August 1990	Bechtel Park Master Plan Committee (Roth, 1991)	Public meeting; opportunity for residents to express concerns about the Park	1. Location and extent of observation deck and boardwalks 2. Stream bank erosion 3. Future sub-division development on adjacent lands
January 1996	present study	Short presentation and small-group workshops; focus on concerns and ideas for future of the Bechtel Park Wetland	1. Pollution of water from stormwater and runoff 2. Management of beaver population 3. Boardwalks to control and limit access, yet permit educational and interpretive visits 4. Volunteerism and advocacy; formation of "Friends of Bechtel Park Wetland" group 5. Control of non-native, invasive species
January 1996	present study	Questionnaires distributed to participants and mailed to specific interest groups	1. Water quality; contamination and pollution from stormwater and runoff 2. Control over human access to wetland 3. Control of invasive species such as European Buckthorn and Purple Loosestrife

entering the Wetland, reduction of biodiversity by invasive species, reduction of habitat through beaver activity and lack of a delineated trail system.

Stormwater runoff from Bluevale and Conestoga Parkway is increasing the pollutant loading to the Beaver Pond, and discharge from the Wetland to Laurel Creek is of poor water quality. The apparent low nutrient retention and transformation capability of the Wetland may be due to the low level of organics in the substrate. It is likely, therefore, that the accumulation of pollutants will continue and is expected to have

a negative impact on plant and animal species diversity.

At present the Wetland is not officially recognised as a stormwater treatment facility, even though it is acting as such. Therefore, there is no management plan in place to monitor water quality and maintain wetland functions. Such a recognition and the adoption of a management plan would address the water quality issue more successfully if appropriate steps are implemented to reduce pollution inputs to the Wetland. Construction of an artificial wetland at the outflow of the Bluevale storm drain would reduce pollutant and sediment levels entering Bechtel Park Wetland. Once the soils within the constructed wetland are saturated with pollutants and unable to retain nutrients, the substrate could be removed through dredging, and replaced with new material.

Plant and animal diversity within created and somewhat isolated wetlands is expected to be lower than for those that are naturally occurring and of comparable size (Confer and Niering, 1992; Forman and Godron, 1986). This would largely explain the low species numbers found in Bechtel Park Wetland. However, the current level of biodiversity within the Wetland may diminish even more due to the significant presence of purple loosestrife and European buckthorn. Further proliferation of these pest species could increase competition with native vegetation and ultimately lead to a loss of habitat and food supply (Harker *et al.*, 1993).

Participants at the public consultation expressed a desire for action to address the problems of reducing biodiversity, and volunteerism was one suggestion put forward. Monitoring of the Wetland and implementation of restorative measures such as the cutting, hand pulling and removal of invasive plant species could be co-ordinated by the Friends of Bechtel Park Wetland. Temporary control of purple loosestrife by herbicide application has been recently demonstrated (Gabor *et al.*, 1996). However, it is prudent for the City of Waterloo to consider implementing an integrated pest management strategy using biological controls with a minimum of herbicide applications. Further simple measures could be taken to enhance species and habitat diversity within the Wetland. For example, seed dispersal and planting of native species and the provision of nesting boxes for birds, ducks and other appropriate animals are some options (Harker *et al.*, 1993).

The beaver colony at the Wetland is also having an adverse effect upon biodiversity. Site visits have revealed that the beavers are actively cutting down trees, particularly around the Beaver Pond. Their apparent selectivity for Aspens and Manitoba maple trees, common around the wetland, is leading to an uneven reduction in habitat. Another concern regarding beaver activity, brought up at the public consultation, is the damming and creation of channels. The beavers are impacting the hydrological flow regime of the Wetland and the flooding of trails has been a recurring problem. Although the beavers are a highly valued feature of the Wetland, it is felt that action is needed to minimise the negative impacts they have on certain components of the ecosystem. D'Eon *et al.*, (1995) recommend several methods for dealing with beaver problems. To discourage browsing of individual trees heavy wire mesh or tar paper can be wrapped around the trunks. Although these methods are inexpensive for a few trees, they can be impractical if large numbers are to be protected. In Bechtel Park Wetland, such measures could be implemented with the assistance of volunteers and/or the suggested Friends of Bechtel Park Wetland. Beaver-induced problems could also be reduced by annual trapping and selective removal to maintain the population at a sustainable level.

The flooding of trails adjacent to the Wetland is not solely the result of beaver activity; it is a natural process within wetland areas and must be accepted. However, the use of the Wetland as a natural amenity by local residents means

there is a significant level of pedestrian traffic. In times of high water levels and icy conditions, therefore, visitors to the site are forced to open new trails. The resulting soil erosion and trampling of vegetation is further exacerbated by minor vandalism and the roam-at-will perception, instilled in visitors due to the lack of a delineated trail system. Residents generally agreed that boardwalks could serve the dual purpose of improving and controlling access. Previous studies, however, have discounted boardwalks in and around the Wetland for various reasons. The Environmental Management Report (Tyler *et al.*, 1990) expressed concern over the possible impact of boardwalk construction on the landfill site which underlies part of the area. This is a minor problem, since the landfill only occupies a narrow strip running along the eastern edge of the Wetland and could be avoided. The same report also suggested that boardwalks would negatively impact wildlife movement by disrupting the spatial configuration of the Laurel Creek – Grand River corridor and increase the level of disturbance caused by people and dogs. From our study, it appears that the implementation of boardwalks would cause no more disruption to the ecosystem than is already taking place as a result of unconfined access. A further objection was raised based on the cost of establishing boardwalks (Roth, 1991). However, the responses from local residents indicate that this expense would be a wise investment.

Access to the area around the Wetland is clearly a sensitive issue and there are strong arguments for a 'do nothing' policy. However, it is also clear that the lack of a strategy to address access problems will reduce the amenity value of the Wetland to the public and further negatively impact the vegetation cover and habitat.

Conclusion

Over a 30 year period, Bechtel Park Wetland has come into being and developed into a locally-unique place of natural beauty, valued for its recreational opportunities and wildlife habitat within a dominantly urban environment. The Wetland is also valuable as a storm water management facility. It is now apparent that increasing urban pressures have led to the creation of the Wetland. The same processes are acting to degrade the Wetland and its surrounding areas through pollution and human trampling. In addition, natural factors are reducing habitat and biodiversity due to the success of disruptive and invasive species. Without the adoption of rehabilitative measures and renewed management strategies to address these threats, the functions and values of the Wetland to the ecology of the area and as a recreational and educational resource to local citizens, will diminish. The case study of Bechtel Park Wetland indicates that proactive planning is essential if the functions and values of urban wetlands are to be sustained.

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