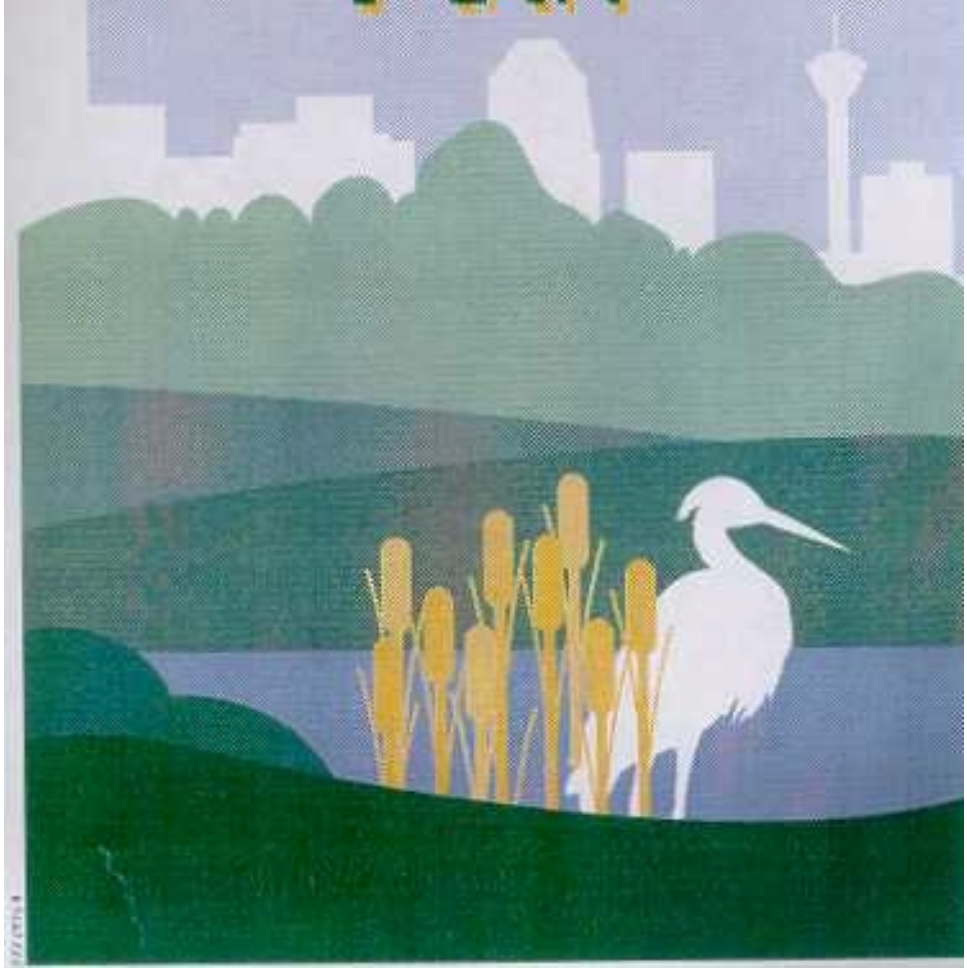
Calgary Parks & Recreation

Natural Area Management Plan



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EXECUTIVE SUMMARY

BACKGROUND AND APPROACH

Natural Areas in Calgary have been enjoyed and protected for many years. However, resource management techniques specific to these areas have not been established. The General Municipal Plan, the Calgary Parks and Recreation Policy and Priorities Plan 1988-1992, and the Calgary River Valleys Plan directed that Calgary Parks & Recreation develop natural area management strategy and policy. On May 30, 1991, a decision of council regarding The Parks Maintenance Program Review recommended that Administration bring forward a Master Plan for the preservation of natural areas and environmental reserves within the City of Calgary.

- This plan does establish natural area management techniques. A landscape ecology approach has been taken with the understanding that by protecting the viability of the resource (vegetation communities, topography, soils, and ecological associations) that those species that use it as wildlife habitat will remain.
- Associated operational costs are lower and the success of protection and conservation strategies improve in healthy functioning natural systems.
- The Natural Area Management Plan's primary roles are to ensure the long term viability and support appropriate public use of the City of Calgary's natural environments.

PROCESS AND PRODUCTS

The Plan was produced over the period of February 1992 through February 1994 in a joint effort between the Parks Division and Planning, Design and Marketing Division of Calgary Parks & Recreation. The Natural Parkland Management Coordinator will facilitate the implementation of this plan.

- Initially a two path approach was undertaken to identify specific natural area management requirements.
- These approaches were: Issue and Policy Identification, and a Land Based Natural Environment Inventory. This assessment provided enough information to create a

series of goals and objectives, a classification structure for natural environment parks and management guidelines of implementation. Training methods, staffing implications and suggested changes to the operation of Calgary Parks & Recreation will become part of the implementation program.

- Staff interviews, open houses, interest group meetings, forums and report review were all used for information gathering, program assessment and plan analysis.

ISSUES AND POLICY IDENTIFICATION

- Issues and policy identification involved interviews and reviews with numerous staff and interest groups. A literature review and summary of the issues was also produced which is available through the Natural Parkland Management Coordinator.
- Existing policy was summarized from provincial legislation, and municipal bylaw and policy. Existing policy was found to be sufficient to provide clear Council approved direction in the protection and management of natural environments on city-owned lands. However, the policy was scattered and poorly integrated.
- The major issues that impact natural environments have been categorized, summarized and the implications of not resolving those issues are identified. The categories are:
  - The perception, preferences and philosophy of natural environments.
  - Resources management.
  - Public use.
  - Planning.
  - Education, interpretation and marketing.

NATURAL ENVIRONMENT ASSESSMENT AND INVENTORY

- An inventory and basic assessment was conducted over a three year period to identify and record the existence and condition of the natural environment land base within the City of Calgary. The major projects that provided information included the Environmentally Sensitive Areas Inventory, the Nose Hill Biophysical and Land Use Inventory and Analysis, 1 :10,000 scale of the River Valley System and 1 :5000 bio-physical inventory and assessment of selected focus areas through the Urban Parks Program. A literature review was also completed for historic natural environment inventory information. All materials are on file with the Natural Parkland Management Coordinator.

MANAGEMENT RECOMMENDATIONS

Classification

- A classification for natural areas was developed within the Calgary Parks & Recreation Open Space system. The new park class is identified as "Natural Environment Park" and contains three park categories:
- Special Protection Natural Area (eg. Inglewood Bird Sanctuary, Weaselhead)
- Major Natural Area (eg. Edworthy Park, Nose Hill Park)
- Supporting Natural Area (eg. Edgemont Escarpment, Strathcona Ravines)
- Other park classes may include natural environments as well. (eg. Princes Island, Pearce Estate Park)
- A system of zones has also been recommended that would further break down the categories into management units. Two examples are:
  - Preservation Zone (eg. Douglas Fir Trail),
  - Active Recreation Zone (eg. playground, picnic).

Management Guidelines

- Guidelines for the management of natural environments have been developed and are presented in the report in one of three ways: Universal to all Natural Environment Parks, based on which category of Natural Environment Park and on habitat type. The management guidelines include recommendations on the following:

Natural Environment Parks

These include:

- Buffers
- Corridors
- Diversity
- Enhancement Structures
- Fire Management
- Fragmentation and Size
- Grazing
- Inventory
- Life-Cycling
- Problem Wildlife and Pest Control
- Signage and Amenities
- Snags and Deadfall

Category

These include:

- Community Participation
- Construction and Utilities
- Dog Use
- Pedestrian Off-Trail use
- General Parks Maintenance
- Problem Wildlife and Pest Control
- Planting and Reclamation
- Active Recreation
- Trails
- Weed Control

Habitat Type

These include:

- Buffers
- Fire Management
- Life Cycling
- Planting and Reclamation
- Trails

CONCLUSION AND RECOMMENDATIONS

- The report makes recommendation that emphasize the need for planning, resource management and education, interpretation and marketing.
- Planning includes the ongoing input into planning processes and design where natural environments are potentially impacted.
- Resource Management involves the allocation of staff to the day to day operation, maintenance and management of natural areas. Activities revolve around resource management techniques and basic maintenance strategies.
- Education, Interpretation and Marketing includes the presentation of information regarding natural areas and natural history in Calgary to the public and department staff. It is the primary method of communication regarding the protection, management and use of natural environment parks.
- Staffing implications include creating operational specialists within the current staff allocation with direct emphasis on management of Natural Environment Parks. This means a change in emphasis in some jobs. Major recommendations include:
  - staff training
  - change of existing positions into natural area foremen.
  - the Weed and Pest Working Circle is being recommended to be renamed and boradened in scope to look at all parks environmental issues.
  - a special research group be created.
- A number of unresolved issues have also been identified that were beyond the scope of this project.

INTRODUCTION

The citizens of Calgary have historically and consistently expressed a strong desire for the inclusion and management of natural areas in the municipal open space system. In this plan the concept of protection has been balanced by the desire of the public, to retain access and enjoy the passive recreation opportunities that these areas provide.

The desire to protect natural environments in Calgary is not a new concept. In 19114, the Mawson Plan identified riverbank protection as a priority for Calgarians. The Inglewood Bird Sanctuary, was established as a Federal Migratory Bird Sanctuary in 1929. Public opinion surveys in the 1940's identified the public desire to protect natural park environments within the municipality. In the 1960's – 70's, the Calgary Field Naturalists' Society, then the Calgary Bird Club, began to actively assess and advocate for formalized natural areas. They published "Five Natural Areas in the City of Calgary" which included Edworthy Park, Fish Creek, East Nose Hill, Glenmore and Pearce Estate and a later report in 1973 including Beaver Dam Flats, Beddington Creek, Cominco Lands, Bowmont Flats and West Nose Hill. The recognition of the importance of natural areas was increased. City policy reflected this in the first General Plan in 1971 which included the identification of natural areas.

Many of these "natural areas" were previously or are currently deemed either undevelopable due to engineering constraints or designated for future projects such as transportation routes. While unofficially considered "natural area parks" little or no management action has taken place in them for a number of reasons. Primary was the belief that natural environments needed little management.

A number of recent public opinion surveys indicate the strong desire by the public to have natural environments protected and managed. As the city expands, natural environments come into the city inventory through the subdivision process creating more areas that require specific management techniques.

In order to protect the long term viability of natural areas, and the passive recreational opportunities they provide, it is necessary to understand the management requirements of natural environment parks. The concept that the City must actively manage these natural areas at all, is the new direction being undertaken, not only in Calgary but in cities across North America.

The Natural Area Management Plan's primary goals are to establish and implement a management strategy for the protection, enhancement and public enjoyment of City-owned natural environments.

A landscape ecology approach has been selected in this plan, with the understanding that by protecting the viability of the resource (vegetation communities, topography, soils and ecological associations), wildlife species that use it will remain. Protection of relatively intact natural systems decreases overall operational costs and lessens chances of human/wildlife conflict such as deer/vehicle collisions. By retaining the complexity of habitat types and their associated ecological relationships, the opportunity for long term sustainability of natural environments is greatly increased. Unhealthy natural environment areas such as those with high populations of weeds and significant habitat deterioration normally require higher long term costs in maintenance, weed and pest control, and in restoration requirements.

The direction to establish a natural area management strategy and to implement that management has been approved within the Calgary General Municipal Plan, The Calgary Parks & Recreation Policy and Priorities Plan (1988 – 1992) and The Calgary River Valleys Plan.

- The Calgary General Municipal Plan states: "3.6.25. To provide a context for the implementation of the policies in this section, it is highly desirable that an overall policy for the city's natural areas be established."
- The 1988-1992 Policy and Priorities Plan states: "Goals and Objectives 0 2.e. Develop natural area management policy and site specific development management plans."
- The 1984 River Valley's Plan states: "C1.1.4.3 Management Techniques – i) That the decision to apply an specific management technique in a major natural area be made on the basis of a detailed study. C1.1.4.10 Supervisory Management – That the City of Calgary Parks and Recreation Department provide for the supervisory management of Natural Areas."

In accepting the report of the Audit committee dated 1991 May 8, regarding Parks Maintenance Program Review, City Council recommended the following:

3.0 NATURAL AREAS AND ENVIRONMENTAL RESERVES (AC 91-46)

- *3.0.2 "That the Administration be directed to bring forward a master plan for the protection of natural areas and environmental reserves within the City of Calgary which would protect and enhance wildlife habitat coordinated with future planning and development of the river valley system in Calgary."*
- *This report is to be brought to City Council for final approval.*

The natural environments identified for inclusion in this plan are City-owned lands and Provincial lands (such as portions of Lawrey Gardens and Pearce Estates) that are maintained by Calgary Parks & Recreation.

Major natural systems and habitat types have been identified based on a number of existing natural environment inventories. Habitats are groupings of vegetation communities. Major natural systems are a series of described habitat types with intact ecological associations (for example wildlife corridors

and important juxtaposed vegetation communities). The natural systems and habitats have been identified irrespective of ownership and inclusion on maps does NOT illustrate or assume existing or proposed park land. All areas within the city limits except Clearwater and Bearspaw park areas which are owned by the City and managed by Calgary Parks & Recreation.

This plan will evolve and will include, new techniques as more urban natural area research is completed. The City of Calgary is not unique in its emphasis on natural environment protection as most urban centres in Alberta and across North America are adapting to a changing public perception of open space.

The proposed Calgary Parks & Recreation Natural Area Management, by intent, is consistent with the Calgary Urban Park Master Plan and the Nose Hill Park Master Plan Review (1992).

PROCESS

Initially, there was two path approach to the creation of the Natural Area Management Plan. The first was a detailed collation and assessment of the issues that revolve around urban natural environments in Calgary. The second was an inventory of natural environments.

This first path identified significant issues and their impacts as well as what approved policies within municipal and provincial documents Calgary Parks & Recreation has, to manage its existing lands inventory. This information came from various Council approved documents and from specific master plans and updates. External references such as the Calgary Field Naturalists' Society's 1981 "Calgary Natural Areas" were also utilized. Staff and interest groups were interviewed for current operational and environmental insights. The issues were summarized, categorized and the implications of not dealing with each issue was identified. Overall goals for natural area management was created.

The natural environment inventory was undertaken with the aid of existing Calgary Field Naturalists' Society records; the Environmentally Sensitive Areas Inventory, the Urban Parks Program – 1:10,000 biophysical assessment, and other documents such as park specific Master Plans. These inventories (at varying scales and detail) were used in combination to develop an overview of the significance and variety of natural systems within the City Limits. A basic assessment of habitat types and condition was also created. Until an overall inventory was complete, the necessary understanding of the various natural systems was difficult to achieve.

Understanding the types, conditions and amounts of habitat that the City of Calgary is responsible for, allowed for creation of realistic resource management strategies.

Management guidelines have been recommended based on a review of current literature. These issue guidelines were broken into general natural environment guidelines, those based on natural environment category and those guidelines specifically centred on habitat types.

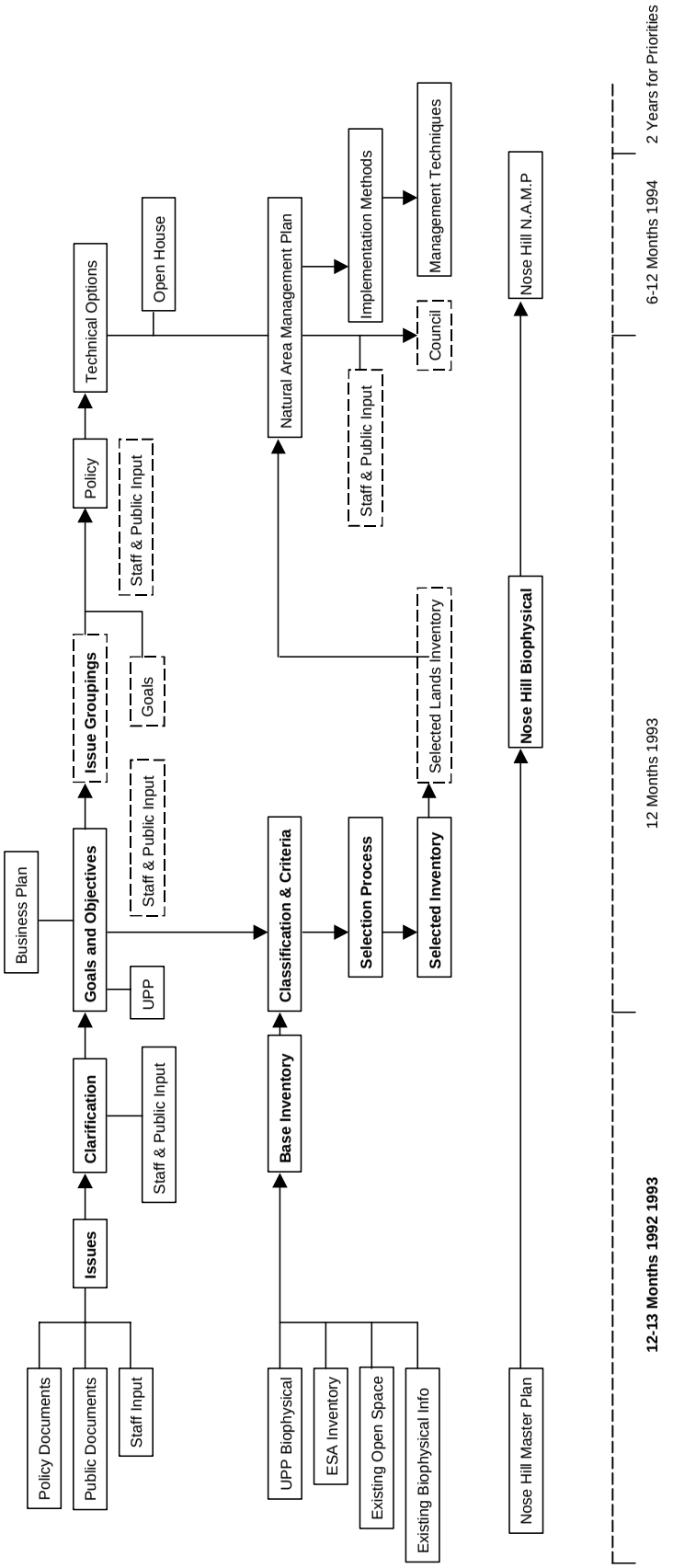
Existing Council approved policy provides sufficient direction to the Natural Area Management Plan. No new policies are required. Calgary Parks & Recreation is directed to protect significant natural environments in a number of documents. A brief synopsis of policy has been developed regarding specific issues of resource protection, character, public participation, education, stewardship, access and acquisition.

Implications on staff are identified and included in the report. Implementation and staff training begins after the transfer of the Natural Parkland Management Coordinator to Central Parks Services.

Currently a number of projects are being completed that will have significant bearing on the outcome of this plan, they include; the Urban Park Master Plan; the Nose Hill Biophysical and Management Plan; and the Calgary Parks & Recreation Business Plan.

As a part of the implementation of the Natural Management Plan, a training and technical manual is being produced. These documents will supply the detailed ecological background, guidelines for planting and reclamation, habitat information and natural environment design specifications (ie. trials, signage etc.).

The following graphics illustrated the initial work plan for the Natural Area Management Plan:


Policy Documents
Public Documents
Staff Input
Issues
Clarification
Staff & Public Input
Business Plan
Goals and Objectives
Staff & Public Input
UPP
Issue Groupings
Goals
Staff & Public Input
Policy
Technical Options
Open House
UPP Biophysical
ESA Inventory
Existing Open Space
Existing Biophysical Info
Base Inventory
Classification & Criteria
Selection Process
Selected Inventory
Selected Lands Inventory
Natural Area Management Plan
Staff & Public Input
Implementation Methods
Council
Management Techniques
Nose Hill Master Plan
Nose Hill Biophysical
Nose Hill N.A.M.P
12-13 Months 1992 1993
12 Months 1993
6-12 Months 1994
2 Years for Priorities

NATURAL AREAS – PUBLIC PREFERENCES AND PRIORITIES

OVERVIEW

Pulse on Parks:

In 1991, prior to the undertaking of the Urban Park Master Plan, Calgary Parks & Recreation initiated an urban park survey, entitled Pulse on Parks. The survey was undertaken to establish an objective baseline of information related to Calgarians park and open space needs, preferences and priorities.

Pulse on Parks provided an opportunity for public involvement in the identification of needs and issues to be addressed in the Urban Park Master Plan planning process. Existing park used patterns and trends were also sampled. This survey has provided significant information on the public desires regarding natural areas.

Pulse on Parks was conducted during the months of November and December 1991. The questionnaire was distributed by Canada Post to all residential dwellings located within the municipal boundaries. Of the 267,779 questionnaires sent out, 46,384 questionnaires were returned representing a return rate of 17.3%.

A series of reports have been prepared that detail the Pulse on Parks results and are available from Calgary Parks & Recreation. These reports include:

VOL. I: Section I: Technical Report & Summary of Results

Section II: Ward Analysis of Results

Section III: Detailed Report & Analysis of Results – Issues Related to the Heart of the Valley Urban Parks Project

VOL II: Section I: Detailed Report & Analysis of Results – Structured & Unstructured Sports

Section II: Detailed Report & Analysis of Results – Informal Play, Walking, & Jogging

Section III: Detailed Report & Analysis of Results – Festivals Cultural, & Nature Appreciation

Section IV: Detailed Report & Analysis of Results Relaxation & Nature Appreciation

Section V: Detailed Report & Analysis of Results – Parks & Open Space Allocation

Section VI: Detailed Report & Analysis of End Comments

Section VII: Summary Report

3.2 RESULTS AND ISSUES RELATED TO NATURAL AREA MANAGEMENT

The Pulse on Parks survey results indicate that Calgarians are appreciative and supportive of their parks and the river valley system. Analysis of the results also indicates that Calgarians support expansion of the river valley system (primarily via natural areas, pathways, and trails). This expansion must be environmentally sensitive, balanced and provide ease of access for all in order to address the concerns expressed by survey respondents.

In the survey questionnaire respondents were asked to review a series of issues related to the river valley system. The respondents were then to identify those issues which they felt should be addressed in the Urban park Master Plan. These issues were outlined and described in four main categories: (1) pathways, (2) protection and care of open spaces, (3) river valley facilities, and (4) interpretive facilities.

CARE & PROTECTION STRATEGIES FOR OPEN SPACE (Figure 1 – pg. 15)

In this section respondents were asked to identify the level of appropriateness that they placed on particular strategies for the protection and care of open space. The following issues were listed; (1) Acquisition of lands identified as environmentally sensitive. (2) Acquisition of lands to complete the river valley system, (3) Develop open space and allow controlled human use, (4) Preserve open space and prohibit human use, (5) Preserve open space for wildlife, (6) Increase public education programs.

Overall, respondents to the Pulse on Parks survey, identified the acquisition of river valley lands, and the acquisition of environmentally sensitive lands as the care and protection strategies which were most appropriate for inclusion in the Urban Park Master Plan. These issues were followed in descending order by; develop open space and control human use, increase public education programmes, preserve open space for wildlife, preserve open space and prohibit human use. The issue of preserve open space and prohibit human use was the least supported issue in the Pulse on Parks Survey.

Based upon these results, it would appear that Calgarians want access to their open space. The inclusion of nature trails, was the second most strongly supported issue. Nature trails must involve interaction with, not exclusion from natural areas. Clearly, respondents expect access to, and enjoyment of the river valley system.

Support for the issues of acquiring land to complete the river valley system and environmentally sensitive lands was broadly based among all respondents, both users and non park users. More than 72% of respondents supported these issues as being either very appropriate or appropriate for inclusion in the planning process.

RIVER VALLEY FACILITIES (Figure 2 – pg.16)

A series of potential river valley facilities were presented in the survey. Respondents were asked to indicate how necessary they thought each facility was. The option listed were; (1) Play Areas, (2) Rest Stops, (3) Picnic Areas, (4) Nature Trails, (5) View Points, (6) Beaches, and (7) Boat Launches. Overall respondents identified nature trails, and rest areas as the facilities that were most necessary. These were followed by picnic areas, play areas, and view points.

Nature trails was the most strongly supported facility in the Pulse on Parks Survey. Overall 80.5% of respondents identified nature trails as either a very necessary or necessary river valley facility. Support for this issue was broadly based among all categories of users with the greatest level of support among those whose main reason for visiting parks was nature appreciation.

Other facilities were divided into active or passive use categories. Rest areas, picnic areas, and viewpoints were considered passive use facilities. These are areas in which the level of activity would not be as intense as might be found in designated play areas, boat launches, or beach areas. Any combination of passive use areas could be expected to exist in close proximity to each other without causing disruption to each other.

INTERPRETIVE FACILITIES (Figure 3 – pg. 16)

As part of this section's review of the potential elements for the river valley system, respondents were asked to indicate whether they felt that an interpretive theme should be included in the Heart of the Valley-Urban Parks Project. City-wide, more than 71% of respondents indicated yes, and of these, 32.7% selected a self-guided program as the preferred interpretive theme option. The least supported options were, a single interpretive facility and a series of interpretive facilities. It is evident that in comparison to other options presented in the Pulse on Parks Survey that a self guided option is the preferred interpretive mode.

PRIORITIES FOR OPEN SPACE FUNDING (Figure 4,5 – pg. 17)

City-wide, 28.5 % of respondents indicated support for general use parks as their first open space funding priority, 27.7% supported the pathway and trail system as their first priority, and 14.7% indicated that their priority was for natural areas. The lowest levels of support were for formal and informal fields (less than 2% each) and for local playgrounds and walkways 9less than 5% each).

The more than 18% of Calgarians who used parks most frequently (11+ times per month) indicated that their first funding preference was for the pathway and trail system, second was for natural areas (out of eight). This is consistent with this groups well defined preferences for park use, that include commuting, and exercise.

More than 50% of those whose first funding priority was the pathway and trail system cited exercise, and sports as the main reasons for visiting parks. Nature appreciation was the third most common reason given. It is of significant interest that the 25-44 age group was the most supportive of the pathway and trail system.

Among those who supported general use parks as their first funding priority, the main reason for visiting parks was nature appreciation and the second most frequent reason was for relaxation. The third most common reason cited was for sports. Couples with children, females, and those that were mobility restricted were among the strongest supporters of general use parks.

The following graphs are taken from the Pulse in Parks 1991 Urban Parks Survey

Figure 1 **APPROPRIATENESS OF OPEN SPACE PROTECTION & CARE STRATEGIES**

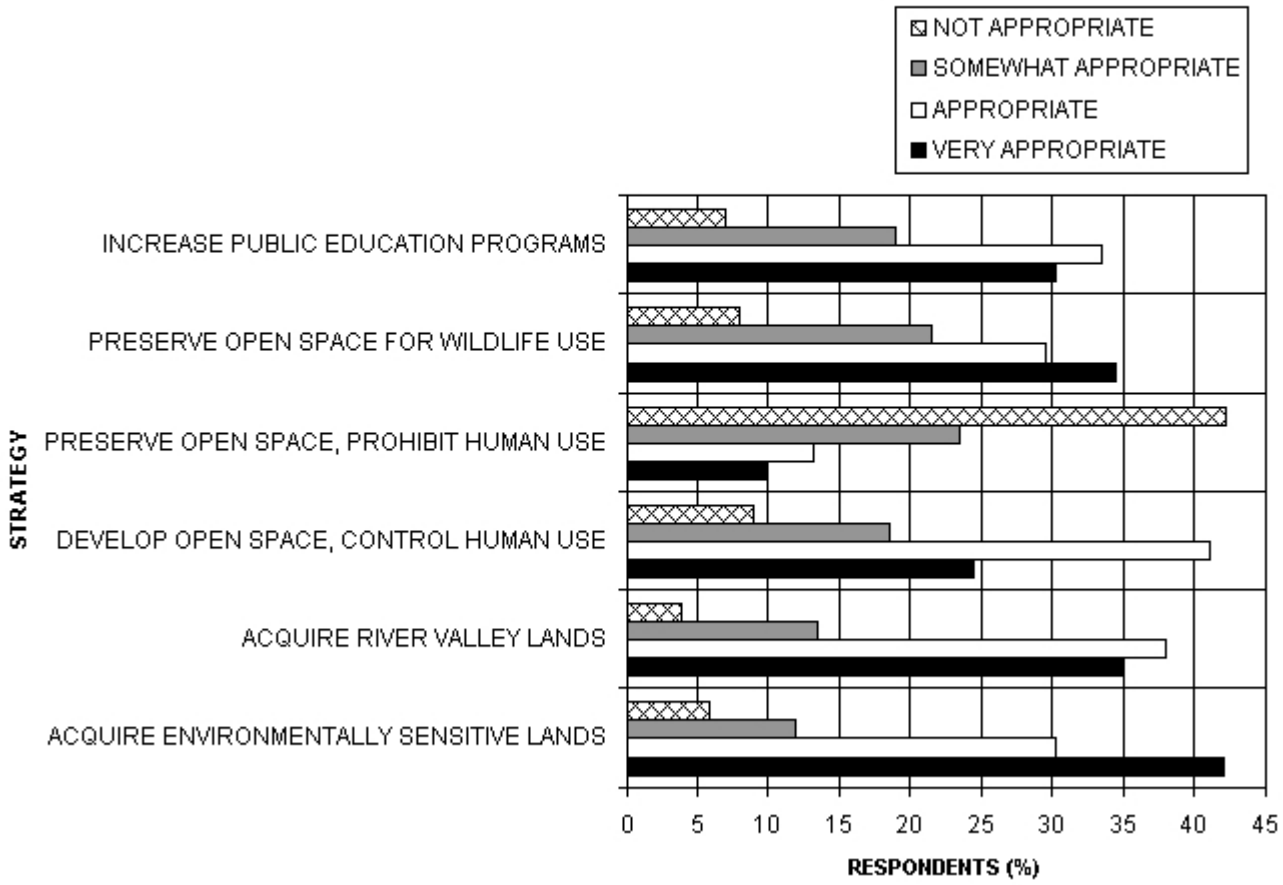


Figure 2 **NECESSITY OF POTENTIAL RIVER VALLEY FACILITIES**

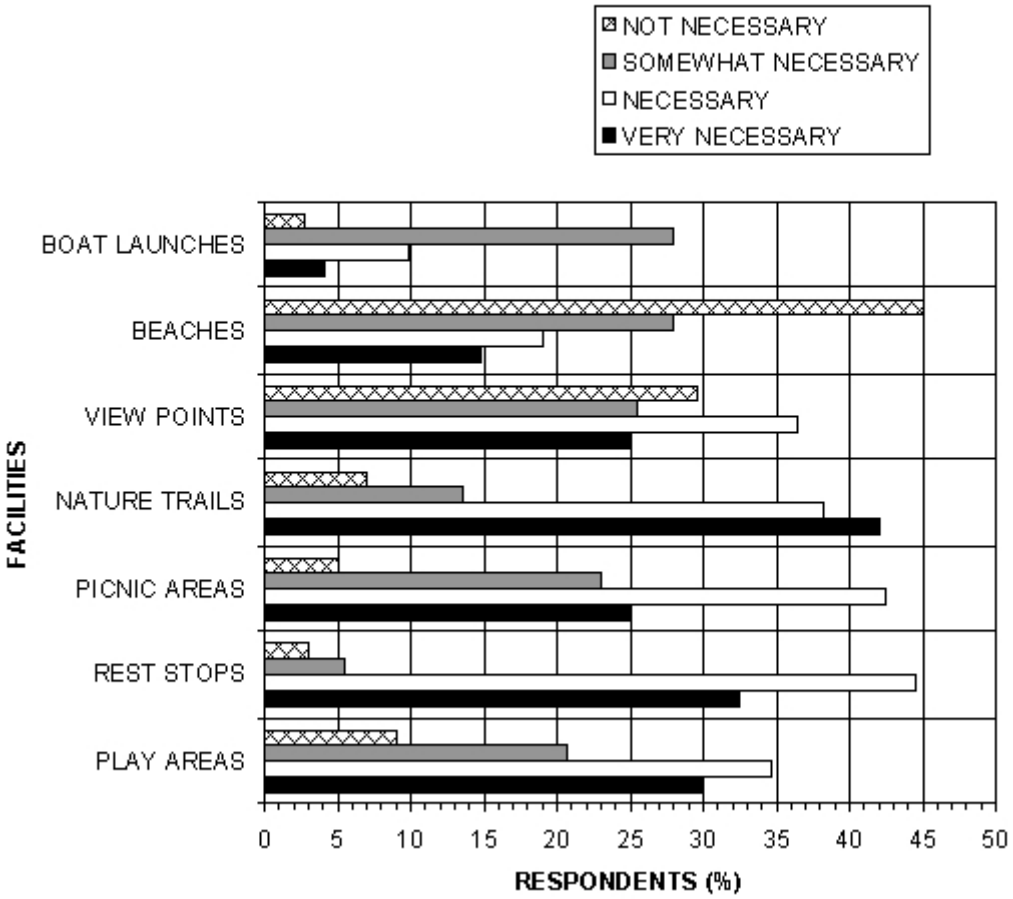
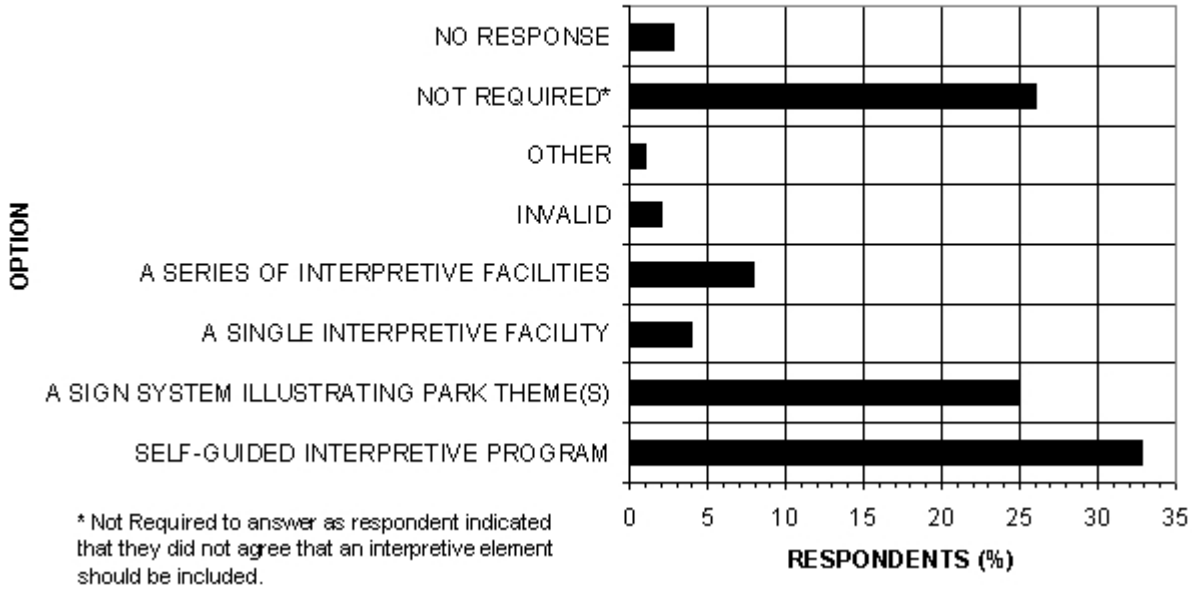
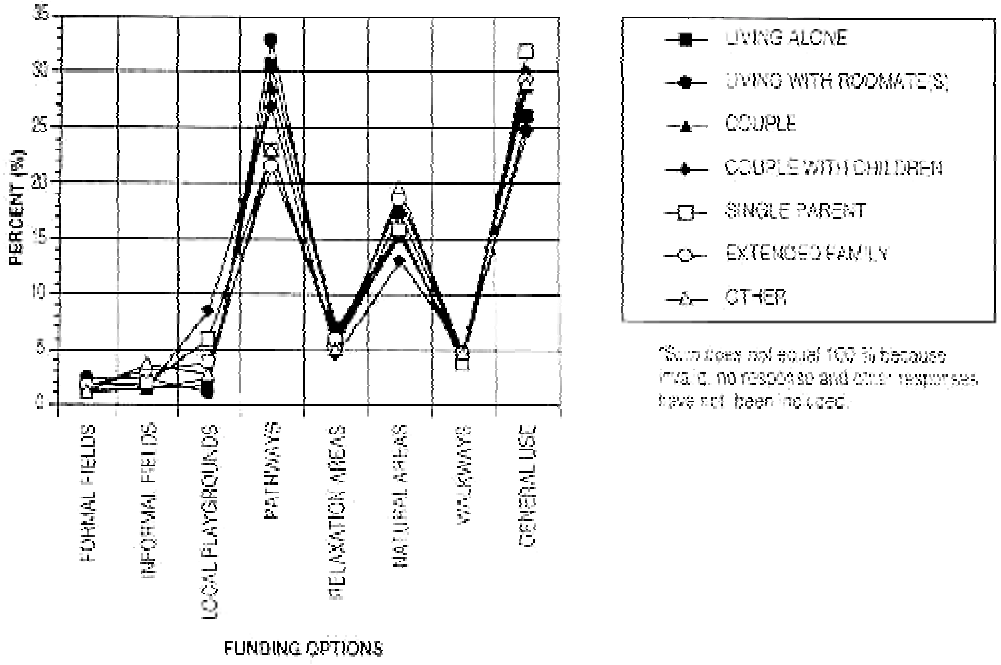


Figure 3 **PREFERRED INTERPRETIVE OPTION**



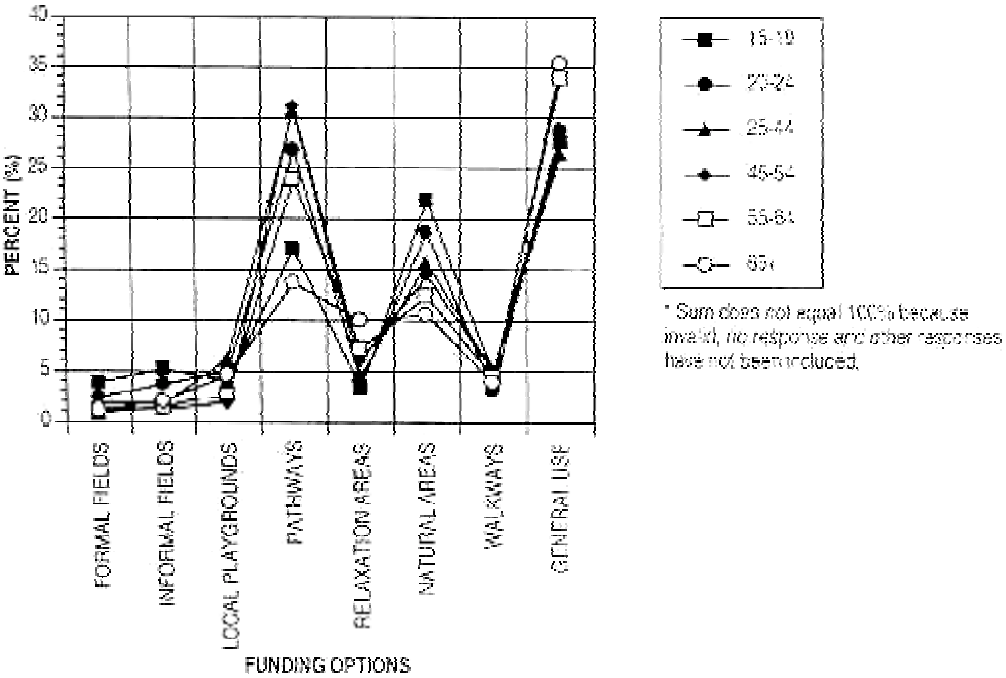
* Not Required to answer as respondent indicated that they did not agree that an interpretive element should be included.

Figure 4 **OPEN SPACE FUNDING PRIORITIES BY HOUSEHOLD DESCRIPTION**



*Sum does not equal 100 % because invalid, no response and other responses have not been included.

Figure 5 **OPEN SPACE FUNDING PRIORITIES BY AGE**



* Sum does not equal 100% because invalid, no response and other responses have not been included.

BENEFITS OF NATURAL ENVIRONMENTS IN URBAN CENTRES

There are several benefits to Calgarians regarding the protection of natural environments, each falling clearly under the traditional benefit categories. These are by no means exhaustive, nor extensive, but are presented to illustrate the variety of benefits that potentially occur.

ENVIRONMENTAL

Maintains Higher Biological Diversity

- Higher biological diversity reduces the risk to significant habitats. Protecting a diverse system lowers risk of a single event (fire, disease) significantly damaging an area. (4,5)

Ameliorate the Extremes of Climate

- Natural vegetation is known to reduce wind velocity, reduce evaporation of soil moisture and thus lower dust amounts. (4,6)

Erosion Control, Watershed Protection, Nose Abatement, Air Pollution Amelioration.

- Natural habitat management plays a significant role in all of the above. Protection of intact vegetation communities reduces significant risks from mass movement and plays a small role in filtering pollutants. (4,6,7)

Act as Environmental Indicators

- Natural environments and some species within them act as a litmus test for significant unseen environmental conditions. (ie. lichens and air pollution) (4)

ECONOMIC

Maintaining Ecological Functions

- By maintaining ecological functions of natural environments risks are lower of wildlife conflict and lower overall operational costs (reduced restoration etc.). There is reduced reliance on expertise and improved community perception. (4)

Protection from Hazard Areas

- The utilization of these areas as open space lowers the risk to development from hazards. Hazards that can be mitigated through conservation of open space include flooding, slope instability and fire. (7)

Increased Property Values Located Near of Adjacent to Open Spaces

- The increased value of properties next to open space is well documented and heavily promoted. (7,10)

SOCIAL

Public Interest

- Well documented through surveys such as the 1991 "Pulse on Parks" that there is a high public interest in the protection and management of significant natural environments. (1)

Voluntarism

- This is substantiated by the high amount of volunteer effort in reclaiming disturbed sites, participating in planning projects that involve natural environments and actively patrolling parks. (2,7)

Educative and Scientific Value

- A first step for many individuals in developing overall environmental responsibility is having access to natural environments and by fostering an understanding of these parks. Natural Environment parks currently play a large educative role in helping students to understand natural processes. Many field trips and class projects are conducted in these areas. Research possibilities are high especially in the field of reclamation. (4,7)

PERSONAL

Recreation and Relaxation

- Passive recreational activities such as cross country skiing, walking, bird watching and sitting are favorite past times in Calgary's Natural Areas. These activities are increasing in importance across North America. (3,7,9)

Aesthetic Amenities

- The idea of visual opportunities and other aesthetic qualities provided by natural areas are now being given new recognition. (7,8)

Sources:

1. *Pulse on Parks, 1991 Urban Parks Survey. Vol 1 & 2*
2. *Examples include the Inglewood Bird Sanctuary Stewardship Volunteer Program, Heritage Escarpment Society, Elbow Rier Conservancy, McHugh Bluffs Committee, Bowmont Natural Park Committee, Edworthy Park Heritage Society, Paskapoo Slopes Preservation Society, Friends of Nose Hill, Tom Campbell's Hill Committee, Weaselhead and Glenmore Preservation society.*
3. *1998 – 1999 Policy and Priorities Volume 2.*
4. *Wildlife Reserves and Corridors in the Urban Natural Environment. A Guide to Ecological Landscape Planning and Resource. National Institute for Urban Wildlife.*
5. *Nature in the Urban Landscape – A Study of City Ecosystems. Gill, D. and Bonnet, P. New York Press 1973.*
6. *Urban Ecology – Plants and Plant Communities in Urban Environments, Sukopp, H., Hejny, S. SPB Academic Publishing 1990.*
7. *The Benefits of Parks and Recreation – A Catalogue. Parks and Recreation Federation of Ontario. et al.*
8. *1990 Nose Hill Park Household Survey Report – February 1991.*
9. *1981 Calgary's Natural Areas – Calgary Field Naturalists' Society.*
10. *Calgary Herald. Advertisements (Valleyridge, Douglasdale) 1993*

NATURAL AREA ISSUE SUMMARY

The following natural area management issues were identified through a series of interviews with approximately 35 City of Calgary staff and a number of interest groups as well as from written material such as the 1981 Calgary Field Naturalists' Society "Calgary's Natural Areas". The issues reflect the participants perceptions at the time. The purpose of the issue identification was to identify a comprehensive base of concerns with which to work and fill in any potential gaps in background.

Issues were cateogorized and sent back to the groups to provide input as to their accuracy and priority. The following list is a summary breakdown of the information received. In some cases the issues may be contradictory.

Some issues, while identified in the text, have not been dealt with in the Natural Area Management Plan and are better dealt with elsewhere.

	MAJOR ISSUE	IMPACTS OF CURRENT SITUATION
1. PERCEPTION, PREFERENCES AND PHILOSOPHY OF NATURAL ENVIRONMENTS	The philosophical value behind the protection of natural environments is vague and inconsistent. Little consistent understanding or use of definitions	
• Preferences and Philosophy	There is currently a growing demand by the public to protect natural areas as well as the increased need to provide access for low intensity recreation. There is interest on the part of the public in actively participation in the management of these areas as well	There is a public perception that their interests are not being listened to or considered and yet there is increased public participation. Trying to adapt two goals (protection and use) can potentially conflict.
• Perception	There are a variety of perceptions (sometimes contradictory) about what constitutes a valuable natural environment. There is a perception by the public of little concern by the City of Calgary towards the protection of natural environments.	Confusion over different views of value resulting in ineffective use of areas, time and funs.
• Definition of Natural Area and Related Terms	Current definitions are relatively complete but are not known, accepted or used. There is also no common language used by all parties.	Lack of understanding of natural environments. Common communication errors regarding ideas and intent leading to different perceptions of interests.

	MAJOR ISSUE	IMPACTS OF CURRENT SITUATION
2. RESOURCE MANAGEMENT	Little emphasis has been placed on the understanding of the resource as a guiding principle in the management of natural environments. Previous management attempts have been largely user driven and horticulturally based.	
• Ecological Factors Affecting Natural Environments in an Urban Setting	Urbanization has had and does have major impacts on the functioning of ecological units. Adequate habitat size, diversity, connectivity and healthy condition must be maintained in order to conserve viable areas for future use for people and wildlife. There is little localized research regarding ecological factors.	Lowering of overall quality and effectiveness for wildlife and recreational uses. Loss of habitat diversity and an decrease in aesthetic values. Loss of ecological quality increases management costs (eg. weed control, fire control) and potential conflicts (eg. users, neighbouring uses and wildlife)
• Calgary Parks & Recreation Operational Perspective of Urban Natural Environment Parks	The Department is currently dominated by traditional horticulturally based expertise. Experience in natural resource management is not as well represented. It is very clear that the willingness to manage these sites is present within the department.	Credibility has been questioned and criticism has been directed at the department in regards to previous natural area management. The major impact has been to do minimal maintenance in natural environments resulting in little or no management activity. This has led to low assigned costs and low department emphasis as well as increased disturbance
• Management Controls Required in Urban Natural Environments	Introduced species have become a limiting factor in the health of natural environments in Calgary. At the same time there is an increasing concern over the traditional methods of control of both weeds and other pest species by the City of Calgary	Increased weed and pest species lower the diversity and therefore the health, as well as the viability and safety of these areas. Increased fire risk. Costs (dollar and controversy) of controls is expensive. Currently responding on a complaint basis. Lack of burning impacts some areas.

	MAJOR ISSUE	IMPACTS OF CURRENT SITUATION
• Classification and Zonation	Currently there is no formal system of classification or zonation within the city for managing natural areas	Because current management practices do not take into account the ecological landscape function, decisions generally are not made based on a resource perspective – resulting in losses of crucial habitat and its related function.
• Community and Corporate Interest in Participating in Natural Area Management	Currently there is little policy to guide Department Staff with the involvement of these groups. Different section of the department have become involved with various groups with little coordination between them.	Groups get little continuity of responses and therefore different levels of assistance.
• Reclamation and Planting	There is little defined policy, standards or intent regarding municipal natural environment reclamation. Currently there are few sources for planting stock, few guidelines on planting requirements and suitability, and few case studies of success or failure.	There is currently little coordination of what is considered to be reclamation. Unfounded assurances of reclamation with little follow up. Inappropriate plantings in sensitive locations occurs.

	MAJOR ISSUE	IMPACTS OF CURRENT SITUATION
3. PUBLIC USE ISSUES	The balance between the use by the public and the long term desire to protect natural environments.	
• Recreational Use	The wide and increasing use of natural environments for recreational purposes is threatening the long term viability of some natural environments. There is currently little policy or management strategy to control adverse effects of recreational use. There is a very positive result of passive recreational use of natural environments.	Continued deterioration of natural habitats. Poor public perception if deterioration continues. Increased maintenance and reclamation costs. Reduced opportunities for positive experiences.
• Non-Recreational Use	Encroachment and dumping onto public natural environments is increasing. The impact of public safety and liability in natural environments is largely unexplored in Calgary.	Loss of important habitat types. Encouragement of alternate and conflicting use of important natural environments. Confusion over requirements and liability.

	MAJOR ISSUE	IMPACTS OF CURRENT SITUATION
4. PLANNING	Planning done on a site by site basis with little systematic approach	
• Environmental Reserve	Protection of natural environments through Environmental Reserve dedication under the Planning Act refers mainly to areas that are undeveloped due to engineering constraints and not based on environmental quality.	This causes difficulty in perception by the public but also results in the acquisitions of a variety of natural environments in various conditions.
• Acquisition of Significant Natural Environments	There are few options short of direct purchase to acquire environmentally significant lands. Sites are planned on an individual basis. Municipal Reserve has been used sparingly for protection of natural environments.	Important natural environments are being lost as open space because of a lack of funds and/ or not identified as priorities.
• Development and Planning for Surrounding Lands	There is little independent assessment of environmental systems located directly outside the city limits.	The long term viability of protected areas within the city may e jeopardized due to inappropriate connectivity. There is a requirement for cordinated, cooperative inter-jurisdictional planning.
• Development Industry	There is little effective formalized structure outlining the methods to protect significant natural environment areas.	Some important natural environments are not protected while other less significant ones are.

	MAJOR ISSUE	IMPACTS OF CURRENT SITUATION
• Other Departments of the City of Calgary	Other Departments do not necessarily have within their mandate protection of natural environments, nor recognize Calgary Parks & Recreations role in the same.	Different priorities can create conflict of use on a parcel of land involving significant natural environments

	MAJOR ISSUE	IMPACTS OF CURRENT SITUATION
5. EDUCATION, INTERPRETATION AND MARKETING	There is little consistent or coordinated education, interpretation or marketing plan or product regarding natural environments.	
• Public Interpretation and Education	Information distributed regarding the management of natural environment in Calgary is not consistent, effective, or coordinated. Provision of current programs based on recreational natural history experiences and not on Parks Division's goals of stewardship of our natural environments.	Few Departmental messages received by the user regarding the appropriate use and enjoyment of natural environments. Public perception of Department of not maintaining or emphasizing these areas
• Community Education and Interpretation	There are few formal educational opportunities for communities with little experience to understand the methods and principles needed to participate in the management of natural environments	Different levels of cooperation and participation as well as apparent contradictory messages received both in the communities and within the department.
• Staff Education	There is a lack of experience, comfort, direction and opportunity for staff to effectively manage natural areas.	Lack of involvement in natural areas creates low stewardship attitude in Parks Staff creating feelings of alienation towards these areas. Increased habitat deterioration.
• Marketing of Natural Environments	There is low public understanding about what initiatives are currently under way within Calgary Parks & Recreation for the protection of significant natural environments	Low perception of our involvement in natural area management increases competing pressure for use of these areas for other purposes.

EXISTING POLICY SUMMARY

This section summarizes Provincial legislation and Council approved policy as it relates to natural area management. The information is separated into five issues categories. The following initials indicate from which plant the policy originates: GMP – Calgary General Municipal Plan, CPRPP – Calgary Parks & Recreation Policy and Priorities Plan 1988 0 1992, CRVP – Calgary River Valleys Plan, PLA – The Planning Act 1991, MGA – Municipal Government Act.

PHILOSOPY, PREFERENCES AND PRIORITY

- A natural area management strategy and policy shall be developed. (GMP), CPRPP) Any specific management technique in a major natural area will be made on the basis of a detailed study (CRVP). These recommendations provide the policy background for the creation of the Natural Area Management Plan.
- The Calgary General Municipal Plan recognizes the increasing concern of the public in environmental matters and identifies the vital importance that should be placed on the environment (GMP).
- One of the major objectives of the Calgary River Valleys Plan is to maintain and enhance the distinctive characteristic of the riverine valley and to encourage harmonious and diverse uses adjacent to the rivers and their tributaries. It also recommends the "preservation of environmentally sensitive areas".(CRVP)
- Protection of our natural environments is important in balance with recreation and education. It is the role of Calgary Parks & Recreation to manage natural areas owned by the City and to protect and preserve ecologically sensitive areas. Calgary Parks & Recreation will expand and further develop the Parks system to respond to the following roles: outdoor recreation, outdoor education, environmental protection, urban design, landscape beautification, civic pride and identity.

PLANNING:

- The Planning Act does not provide protection for significant natural environments except where there is coincidental overlap between undevelopable land and natural habitat and where municipal reserve can be used.
- The planning Act defines "reserve land" into environmental reserve, municipal reserve, school reserve or municipal and school reserve. Environmental reserve and municipal reserve are the primary means of acquiring natural environment lands for park purposes in Calgary. (PLA)
- Environmental reserve (ER) is normally considered undevelopable land that may be required to be turned over to the municipality by the registered owner in the subdivision process. The land is considered undevelopable due to a number of reasons (see appendix A). While significant natural environments can be protected in this way (due to a natural habitats presence on undevelopable land), environmental reserve status is NOT related to the quality of natural environment. At the time of turnover a variety of natural conditions may be present in ER. (PLA)
- Municipal reserve (MR) may be used as a public park, school land or as public recreation areas. The required amount of MR/MSR/SR shall not exceed 10% credit reserve. Municipal reserve has been used as a source for natural area acquisition, however, normally only a small portion can be used. (PLA)
- The Calgary General Municipal Plan does not make specific policies regarding ecologically valuable areas, however, it does recommend that an environmental quality in the city. The results would provide major strategic decisions affecting the area as a whole.
- The Calgary General Municipal Plan directs that an environmental assessment will be an integral part of all policy reports produced by the City. Environmental impact guidelines will prescribe detailed ways in which existing environmental features should be protected and new ones created within new development areas. (GMP) These assessment guidelines provide direction for understanding the overall natural systems and natural environment condition within Calgary.
- The Calgary River Valleys Plan also requires that an environmental impact assessment be prepared by the proponent when a major natural area is affected by public utilities, roadways or any other development. Potential pathways locations in major natural areas require an environmental inventory and a statement of impacts on adjacent land uses as well. An areas inventory evaluation criteria should include size, diversity, naturalness, recorded history and the position in a ecological geographic unit. (CRVP)
- The Calgary General Municipal Plan includes policy that requires that the City retain and expand the existing major parks system, preserving ownership of all City land suitable for parks purposes, and acquire further suitable lands as opportunities arise. It also identifies the need to preserve and acquire important natural features which contribute to the value of the system(GMP). This provides direction for the interpretation of the role that natural features play in an overall natural system.
- Actual natural areas acquired and the availability of Capital Budget funds for the acquisition of natural areas are to be indicators that should be monitored with respect to the river valleys and other natural areas. (GMP)
- A detailed land use concept plan should be prepared for each area identified as a major natural area.(CRVP)

- The Calgary Parks & Recreation Policy and Priorities 1988-1992 identifies acquisition methods (CPRPP) (see Appendix A)

RESOURCE MANAGEMENT:

- The City has committed to manage natural areas to preserve existing species, habitats and special natural features. (CPRPP) This policy recognizes the specific management strategies required in natural areas.
- Through environmental management/protection the park system should provide recreation opportunities, outdoor education and ensure environmental protection/preservation. (CPRPP)
- The Calgary River Valleys Plan ensures Major Natural Areas will be preserved so as to safeguard existing species, communities and habitats.(CRVP) (see public use)
- The above policies which identify the need to manage natural environments provides for the flexibility of a resource management approach in natural environments.
- Where disturbed sties exist in public areas in parks, appropriate measures should be taken to rehabilitate these areas. (CRVP)
- The authority for City Council to protect natural environments is vested through section 160 of the Municipal Government Act.
- The Weed Control Act, Agricultural Chemical Act and the Agricultural Pests Act pass on to the municipality the authority and responsibility to enforce the City environmental control regulation. The Fish and Wildlife Act and the Alberta Environment Act retail regulatory responsibility for Fish and Wildlife and numerous environmental concerns.
- Utilities will be permitted through regional parkland or other open space except in such cases where they adversely impact on the parks or open space or its use. (CPRPP) This policy indicates the need to assess and monitor any potential utility crossing for potential impact.

PUBLIC USE

- Park use will be encouraged. Every effort will be made to encourage recreation and education activities in the parks/open space system: Exceptions to accessibility enhancements are those areas whose management and preservation requires limited access. The department will limit recreational activities in certain locations if it is determined that significant impairment to natural environments will occur.(CPRPP)
- Major natural areas will be preserved so that existing species, communities and habitats are safeguarded. The City will encourage compatible recreational uses. In the event of a serious conflict between the two above sub-objectives the first assumes priority and appropriate management action should be take.(CRVP)
- Exceptions to the philosophy of providing as many functions as possible may be made in Natural areas. (CPRPP)
- The proceeding policies regarding public use identify the importance of public use to Calgary's Natural Areas. They also suggest, however, that use controls may e necessary in order to protect the resource.

EDUCATION, INTERPRETATION, AND MARKETING

- There is clear support to increase emphasis on parks visitor services (information, education programming and interpretation). Natural Areas will provide outdoor classrooms for increasing our understanding of nature and our interdependence with ecological systems. (CPRPP)
- An appropriate means shall be established to facilitate nature interpretation. Facilities such as the following may be provided: Self Guided trails, interpretive centres/points, and programs for outdoor nature activities.(CRVP)

NATURAL AREA MANAGEMENT POLICY

GOAL:

Calgary Parks & Recreation recognizes the value of natural habitat, relative to the healthy environmental and social functioning of the City of Calgary and will protect and maintain the areas for public enjoyment, understanding and visitation.

Through appropriate resource management techniques, Calgary Parks & Recreation will protect, maintain, and/or reclaim significant natural habitat types and their relevant ecological associations.

NATURAL ENVIRONMENT POLICIES:

1. Calgary Parks & Recreation will protect and maintain representative and viable natural habitat types as an integral component of the parks and open space system.
2. Calgary Parks & Recreation will manage designated natural park lands in a manner which will, by intent, maintain the natural character and integrity of these sites.
3. Calgary Parks & Recreation will encourage and welcome informed public, corporate and community participation, stweardship and partnerships in the acquisition, management, research and protection of appropriate natural environments.
4. Year round enjoyment and use by all Calgarians will be encouraged with appropriate sensitivity to environmental impact and safety. Where recreational use and the long term survival of significant habitats conflict, protection of the resource will take precedence. Recreational facilities will be designed and managed to minimize negative impact on natural areas.
5. The City of Calgary will work with adjacent municipalities to cooperatively protect contiguous natural habitat.

6. Natural Areas will be acquired by:
    - Developer dedication as Environmental Reserve
    - Developer dedication as credit or non-credit Municipal Reserve
    - Density transfer from land and subsequent dedication by the developer as Environmental Reserve
    - Required development setback standards
    - Donations and land exchange
    - Outright purchase

INVENTORY

A significantly large amount of information has been collected regarding the plants and animals that inhabit the natural areas in Calgary. Much of this information is included in "Calgary's Natural Areas" published in 1981 by the Calgary Field Naturalists' Society. Unfortunately, most of the information that was collected, while thorough, is not specific enough in location to be used effectively for management strategies. The basic habitat descriptions, however, provide valuable comparisons to present conditions.

Starting in 1991, a basic assessment of some components of natural environments within the City limits was undertaken. Initially, aerial photography was utilized to identify and locate major habitat types throughout the city. Upon determining those areas that had not been disturbed by development or cultivation, site visits were made to assess condition by a number of staff over three field seasons. A standard field assessment sheet was used so that all sites were evaluated consistently. A file containing information on condition, size, ownership, use by wildlife, landscape features, and aesthetics was developed. Air photos, species lists and habitat maps were also collected, each site was then mapped onto a city base map. The evaluations were subjective but consistent to established criteria. This inventory provides background to area structure plans and other planning documents. The inventory will eventually be included in the Geographical Information System being developed by the City of Calgary.

In 1992 and 1993, biophysical inventories were conducted in the Bow River and Elbow River Valleys as well as the West Nose Creek and Nose Creek Valleys, as part of the requirements for the Urban Park Master Plan. A scale of 1:10,000 was used for the whole study area and a scale of 1:5,000 was used for focus areas which include Bowmont Park, Bowness park, Edworthy Park, Prince's Island Park, Inglewood Bird Sanctuary, Beaver Dam Flats, Cominco

Area, Carburn Park, Stanley Park, Sandy Beach and the Weaselhead/South Glenmore Area. Assessments of ecosites and wildlife suitability were completed.

In 1993, a biophysical assessment of Nose Hill was completed as part of the commitment to the Nose Hill Park Master Plan Review (1992) recommendations. This inventory was undertaken at 1:2,500 providing greater overall detail in ecosite identification. Wildlife suitability was also assessed.

A combination of all four projects provides the base material required to determine the major habitat types and most of the vegetation community associations throughout the city. Understanding these, has allowed for the identification of major natural systems with the City of Calgary.

These habitat types and major systems simply identify ecological or natural function associations and do not identify intended or proposed park lands.

The ecosites identified in the Urban Parks and Nose Hill biophysical studies provide specific information and opportunities in locating critical wildlife areas. Hopefully with time, ecosite specific inventories can be created.

The following habitat descriptions have been simplified to a single dominant vegetation type but are broken into more complex units in the detailed evaluation. The maps presented in the Natural Area Management Plan are not detailed enough for site specific planning but rather give indications of relative unit size and location. For example, some of the identified aspen areas in the north west indicate aspen copses mixed with grazed grasslands, however scale did not allow for further detail.

The following chart provides some idea of the specific vegetation communities within each habitat type.

Each habitat type is described simply with specific resource information. Each natural vegetation community has an associated species planting list found within the Training and Technical Manual.

NAMP HABITAT TYPES

Habitat	Associated Vegetation Community
1. Aspen Forest	Aspen/ rose/ buckbrush
	Aspen/ balsam poplar/ dogwood.
	Aspen/ saskatoon/ rose
	Aspen/ willow
	Aspen/ white spruce
2. Balsam Poplar Forest	Balsam P./ water birch/ dogwood
	Balsam P./ dogwood
	Balsam P./ silverberry
	Balsam P./ brome (thistle)
	Balsam P. regeneration
	Balsam Poplar / white spruce / dogwood
3. White Spruce Forest	White Spruce/poplar
	White Spruce/dogwood/moss
	White Spruce/Douglas fir
	White Spruce/buckbrush
• Upland Tall Shrub	Sakatoon/chokecherry
	Willow
	Silverberry
• Riverine Tall Shrub	Willow
	Saskatoon
	Water birch
	Dogwood
	Silverberry
4. Upland Low Shrub	Buckbrush/Rose
	Shrubby Cinquefoil
5. Native Grassland	Rough Fescue
	Needle Grass (dominant)
	Mixed Native Grass (others)
6. Non-native Grassland	Brome0Thistle
	Crested Wheat Grass
	Clover-Thistle
	Other
7. Disturbed	Balsam P./manicured grass
	White Spruce/manicured grass
	Manicured grass
	Antroprogenic
8. Wetland	Cattail (Typha),
	Bulrush (Scirpus),
	Rush (Juncus)
	Sedge (Carex)
	Submergent (Chara)

ASPEN

Introduction:

Trembling aspen (often referred to as quaking aspen) is the most widely distributed tree in North America. Its success can be attributed to its ability to successfully establish in a broad range of site conditions, and prolific reproduction through asexual suckering. While abundant, aspen have a relatively short lifespan; in Calgary the average lifespan may be 65-80 years. On poor quality sites this existence may be reduced to 40 years or less.

Ecological Setting:

In the Calgary area, aspen may be found in both isolated stands or copses, and as a component of mixed woods. Aspen copses tend to form in well-drained, moist areas on open plains, and on the moist northern exposures of small hills and ravines. In a grassland setting, aspen stands from small "islands" of woodland, providing additional diversity and "edge" in the prairies and foothills. Several species of birds and mammals feed in the open grassland, but require the hiding, nesting, and thermal cover afforded by small tree stands.

Aspen typically reproduce b "suckering", where root tips sprout upon disturbance by such things as fire, clear cutting, or grazing. This species rarely reproduces by seed, as the site conditions and timing required are seldom met. Aspen clones thus have a very narrow genetic variation, with little or no variability between individuals of varying ages. Distinction of clones can be performed most easily during autumn as leaves will turn yellow at different times.

Large continuous aspen forests are found mainly along escarpments and in ravines. These same areas often act as wildlife corridors in addition to functioning as "home territory", through and around developed sites. In Calgary, large aspen forests are most common on marginal sites where the trees have a relatively fast turnover rate. Trees tend to reach maturity at a relatively young age, occasionally as young as thirty years in exposed, windy sites.

Structure:

In the Calgary area, aspen is found commonly in association with other tree species in mixed stands. Mixed deciduous forests of aspen and balsam poplar are found in riverine lowlands, moist depressions, or ravines. On moist, north-facing escarpments, aspen may be interspersed with white spruce. Typically, aspen ahs an understorey which may be composed of saskatoon, rose, chokecherry, red osier dogwood, willow, buckbrush, and Canada buffaloberry.

BALSAM POPLAR

Introduction:

The balsam poplar forest is the predominant habitat in most natural areas along rivers in Calgary. Riverine environments, in the Calgary context, offer vegetation that is not found in the grassland and aspen woodlands, and are among the most important habitats for wildlife, especially for migratory birds in North America.

Ecological Setting:

Riparian or riverine woodlands in Calgary typically exist on prominent point bars of the Bow and Elbow rivers. Balsam poplar (Populus balsamifera) is the dominant tree species in the riverine forest, establishing on gravelly river floodplain and terraces in moderately well-drained areas. This particular tree requires moist ground with cycles of drying in order to survive, and may suffer accordingly if water table regimes are altered. Historically, balsam poplar forests have established along the major rivers in Calgary in conjunction with natural flooding processes. Balsam poplar stands may also be found in upland areas, but are usually near a source of water – for example a seep, spring, or drainage course.

Structure:

Under ideal conditions, balsam poplar may be accompanied by an understorey of red-osier dogwood, willow, water birch, saskatoon, silverberry, or Canada buffaloberry. Occasionally, white spruce may establish in shady, moist areas but normally do not mature. Mature riparian forests that have been disturbed – through grazing, gravel extraction, or other natural and human processes – often have a rudimentary smooth brome thistle understorey.

In Calgary, balsam poplar trees establish and grow to maturity in the span of 80-100 years. Without suitable conditions for regeneration, the overstorey may become decadent, leading to a mature balsam poplar riverine forest with shrub or grass understorey and little regeneration. Depending on the disturbance regime, these forests may be very open underneath, with a dense, high canopy providing shade and cover for the ground below. In areas of open woodland with adequate moisture, understorey growth may be quite dense and tall. Competition for light and moisture are the major determinants of understorey development in this environment. Grazing and recreational uses are the normal reducers of understorey.

Comments:

The lack of balsam poplar regeneration in most areas of riverine forest within Calgary is a point of concern. Dams on the major rivers have mitigated flood events in the last few decades, and this may have affected the development of new tree stands along the river. Forests were established before flow controls are now becoming decadent, and are not being replaced by new growth. This tree species requires a specific set of environmental conditions before seedling establishment can occur. While Balsam Poplar forest are common along the river edge healthy stands are becoming rare.

WHITE SPRUCE

Introduction:

White spruce are shade tolerant and tend to co-exist with other tree species until they are able to dominate. One may notice mature aspen or balsam poplar stands with young spruce in the understorey, and other areas where the deciduous trees are being replaced by spruce trees. Despite their competitive qualities, white spruce stands may be found along the moist, shady, north-facing slopes of the Bow, Elbow, and Fish Creek valleys.

Ecological Setting:

White spruce are not drought tolerant, and therefore require shade and moisture for suitable growth. These conditions are provided by steep north and east facing escarpment faces along the river valleys in the city, and at scattered locations within the river floodplain itself.

Structure:

Spruce normally form very dense canopies which allows little in the way of understorey. This is due, in part, to modifications imposed on the site by the trees themselves. Their long-term presence influences the soil regime, as the decomposed spruce needles create a highly acidic substrate. This, in combination with shade provided by the trees, results in limited establishment and propagation of an understorey. Often, spruce forests have a homogenous moss carpet at ground level, and few other species. The lack of diversity on a large scale is compensated for by small openings which have a much greater variety of species. Wind throw, natural mortality of trees, or other disturbances will create gaps, allowing light-seeking plants to enter for a short period.

Within the city of Calgary, spruce exists generally in mixed stands with balsam poplar and/or aspen, or in a mixed coniferous forest in association with Douglas-fir. While mixed deciduous/coniferous stands are scattered throughout the city, the spruce/Douglas-fir community may be found only along the western Bow River escarpment. At the western edge of the city, the river escarpment is sufficiently steep to preclude most development, and portions of the coniferous forest remains. Feathermoss, Canada dogwood, and scant forbs may be all that occupies the lowest strata in these sites. However, it is much more common to find spruce associated with balsam and/or aspen poplar, with and understorey of mixed shrubs and forbs.

Comments:

These areas contain unique plants and animals, and they have a significant aesthetic appeal. At the western edge of the city along the Bow River, spruce exists in conjunction with Douglas-fir. Aside from three sites within Calgary, there is only one location to the east where Douglas-fir may be found along the Bow River another stand has been identified at Wyndham-Carseland Provincial Park). White spruce forest can be significantly impacted by uncontrolled recreational use.

SHRUBS

Introduction:

Shrub habitats in Calgary's natural areas have been separated into Riverine Tall Shrub, Upland Tall Shrub, and Low Shrub. These habitat types occur as isolated stands, as transition zones between grassland and woodland communities, or as an understorey component in a woodland association. Generally these three habitat groups are quite subjective and certainly share many of the same species motivating the decision to group them for this section.

Ecological setting:

The location of shrubs is regulated strongly by slope and aspect, as well as soil moisture, texture, and drainage. In ope upland areas, shrubs will be confined generally to areas of high moisture – such as depressions, shallow ravines, or west-, east- or north-facing slopes. South-facing slopes are usually too exposed and dry to support shrubs; in these areas grasses have a competitive advantage. Places where moisture collects on south-facing slopes, however, may permit the development of low shrub stands composed of buckbrush, silverberry, or rose. The overriding dependence on moisture availability leads to a widespread distribution of shrubs in suitable locations, wherever these may be found.

Structure:

Pure shrub communities commonly form dense thickets that present a formidable barrier to large mammals and humans. Riverine dogwood and tall willow communities are good examples of this growth habit. Low shrubs such as buckbrush, cinquefoil, or rose may form dense mats – effectively blocking out other competing grasses, forbs, and shrubs. Other species may be opportunists, seeking and colonizing disturbed areas. Sliverberry provides an illustration of this growth strategy: this shrub quickly moves into upland disturbed areas and colonizes newly formed river gravel bars.

The characteristics of the three major shrub communities are as follow:

Low Shrubs

Low shrub communities may consist of buckbrush, shrubby cinquefoil, rose spp., or silverberry. Canada buffaloberry and gooseberry may be present, although they forma minor component of these shrub habitat types. Low shrub communities may be found along the dry, upper portions of a slop or in well-drained, open floodplain areas.

Upland Tall Shrubs

Saskatoon and chokecherry, and sometimes willow and water birch can interact to form upland tall shrub communities. In some cases low shrub species may comprise a secondary layer as well. Saskatoon, chokecherry, birch, and willow usually grow on the lower, more moist portions of a slope, or in protected ravines. Once again, the distribution of these shrubs is largely dictated by moistrure availability.

Riverine Tall Shrubs

Riverine shrubs are found along the floodplain and lower slopes of the major river valleys in Calgary. These shrubs, which commonly include red-osier dogwood, water birch, and a variety of willows, can withstand periodic flooding and are adapted to growth in coarse unstable substrate. In general, riverine shrubland accompanies balsam poplar riverine woodlands, and marks the transition from lowland grassland or wetland into floodplain forest. This habitat is rare in large pure units and its highest concentration is at the Weaselhead. This area is particularly important to wildlife.

Comments

Shrub lands are a valuable habitat, as they provide cover for a variety of birds and mammals. The density of vegetation, along with the diversity of plant species usually found in these community types, makes the shrubland an active and highly productive wildlife area. Shrublands are often a vegetational transition zone, and represent valuable edge for grassland, shrubland, and woodland wildlife. The berries, leaves, and bark of various shrub species are sought after by birds and mammals alike. In addition to being a source of food and cover, shrubs also are attractive to nesting birds and for the protection of birthing mammals.

NATIVE GRASSLANDS

Introduction:

Native grasslands in the Calgary region have undergone many modifications over the years. Prior to the settlement of Southern Alberta, rough fescue likely was the dominant grassland type in this area. Early settlers brought livestock, and agricultural technology that subsequently changed the face of the prairies forever. Originally, native prairie was influenced mainly by bison and wildfire; this ecosystem was in equilibrium until the bison succumbed to market hunting exploitation. Settlement of the prairies resulted in a decline in fire frequency as newly established communities sought to suppress this threat. Vast, open grasslands became rangelands for cattle and horses, or cropland. The prairie has been transformed into a new panorama – where cultivation, livestock grazing, introduction of new species and overall human interference have left their mark.

Ecological Setting:

Most grasses grow in exposed areas where wind and sun prevail; more so than most other vegetation species can usually tolerate. Moisture tends to be limiting, especially in steeper hillside situations. In the Calgary area, grasslands are commonly found on south or southwest-facing slopes.

Structure:

In Calgary, grasses such as blue grama, June grass, wheat grasses, and needle grasses will grow in mixed communities on the drier hill slope habitats. Large patches of fescue grasslands while rare in Calgary still exist on Nose Hill and a few other locations. Rough fescue grass communities are often tall and tussocky and tend be found on rough terrain that were unsuitable for the plough. The tufted thick base protects the grass from fire and from winter grazing. The composition of these grasslands communities is largely dictated by moisture availablity. Certain species require a relatively moist, moderate slope,

while other grasses may tolerate steep, dry escarpments. Native grasslands also support a wide variety of forbs and herbs, including an abundance of wildflowers. Prairie crocus is a common spring flower, while golden bean, perennial lupine, and some species of geranium, fleabane, bedstraw, hedysarum, sage, goldenrod, and aster will follow into fall.

DISTURBED AND NON-NATIVE GRASSLANDS

Introduction:

While harbouring negative names these habitat types often play a significant role in active and passive recreation parks. Disturbance simply refers to areas where the majority of native species have been removed leaving either bare ground or manicured grasses or weeds that have been left to grow naturally. These areas are often mistakenly assumed to be native grasslands.

Ecological Setting:

These communities can be found in any area or ecological setting where disturbance is sufficiently high.

Structure:

The more disturbed a site is, the less structure biologically the area usually has and therefore the less likely it is to be utilized heavily by wildlife. A Balsam Poplar/manicured park will have higher wildlife use than manicured park. Restoration aims to restore the structure, native species, and ecological role to an area.

One of the most common non-native grasslands that is highly invasive and difficult to control is Smooth Brome/Thistle.

WETLANDS

Introduction:

The majority of wetlands in Calgary are found in the northeast and southeast quadrants of the city. Commonly situated in depressions along rolling or flat terrain, wetlands exist wherever the water table is in contact with the surface. They are either seasonal or permanent in nature; this can often be determined from the wetland's vegetational composition.

Ecological Setting:

Wetlands gather water from rain and spring meltwater, and occasionally from groundwater reserves. Although the exact definition is open to debate, wetlands are characterized by saturated ground on a semi-permanent basis, and associated water-loving vegetation.

Structure:

Although a variety of trees, shrubs, forbs, and grasses may be found in wetlands of the Calgary region, cattails, sedges, bulrushes, and rushes are generally identified as being the most dominant species. These particular vegetation types can be used as an indicator of wetland quality, with bulrushes and cattails reflecting highly productive sites.

Vegetation diversity may be very low in some wetland situations. Surrounding disturbance, the dominance of a few plant species, and other factors may result in a general lack of vegetation diversity in many wetlands. However this is more than compensated-for by an abundance of wildlife which frequent these areas.

Depending on the depth and permanence of water, wetlands may also boast a variety of submergent vegetation.

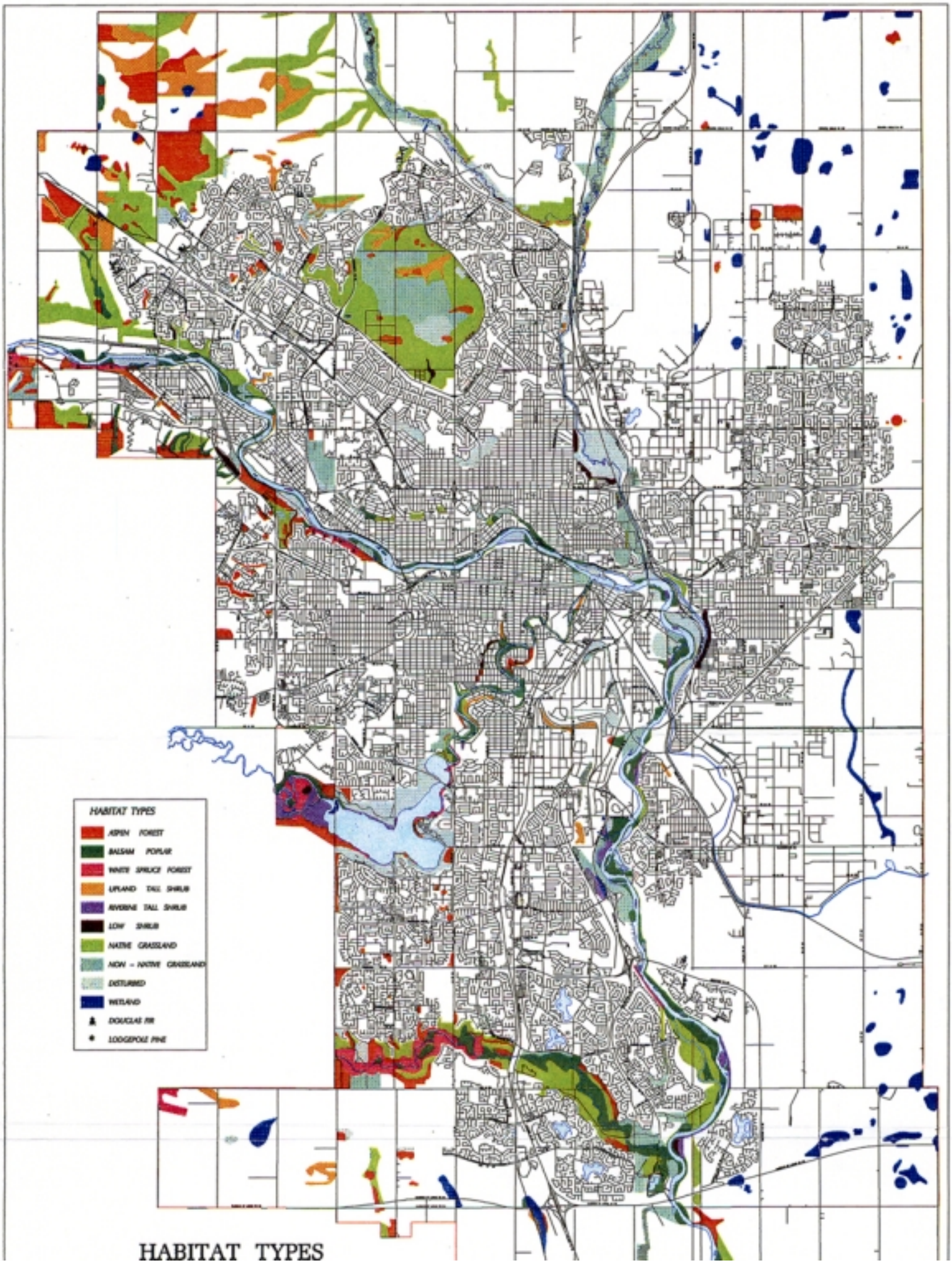
The two main types of wetlands in Calgary are as follows:

Seasonal Wetland: These are commonly found in shallow depressions or ditches, particularly in agricultural land. Some may have sedges around the margins, but do not often have permanent water. Dugouts may also flood beyond their capacity and flood the surrounding pasture or cropland. In all cases, agricultural disturbance may influence the integrity of the wetland. For example, dry years may see the cultivation of these "prairie potholes".

Permanent Wetland: These wetlands are generally much deeper than seasonal wetlands. They have a constant supply of water, provided by precipitation, ground water, or springs. Constant water availability results in the yield of more advanced submergent or emergent vegetation. In these areas, willow, balsam poplar, or aspen may form bordering communities and therby increase the habitat quality and diversity of the site.

Comments:

Wetlands are often associated into a series of individual sites that when evaluated alone are not perceived as valuable but when measured in a complex system, such as the Shepard Sloughs, their significance takes on an international importance. These wetland complexes provide breeding and stopover habitat for a wide variety of waterfowl and shorebirds



HABITAT TYPES

NATURAL AREA SYSTEMS

The approach taken in this section groups together lands that have an inherent diversity and relationship of habitat types. Grouping these natural systems will improved overall viability while accommodating use on public lands. Large diverse systems provide excellent opportunities for environmental education. A systems approach reduces the risk of habitat deterioration associated with small individual habitats and will help to reduce maintenance costs of natural areas. Cost reductions are realized by reducing the need for intervention practices including weed and pest control, restoration and fire management.

A natural system within this plan:

- includes juxtaposed vegetation communities (communities that require each other to maintain effective wildlife habitat),
- retains significant native character,
- Includes appropriate wildlife corridors,
- exhibits a moderate diversity of habitats, or is a rare intact habitat type where diversity in not moderate,
- has significant connectivity,
- is located within a dominant or group of landscape features,
- exhibits city wide ecological significance,
- may continue beyond city limits but is not illustrated in this plan.

Major natural systems include private lands and public lands. All the natural systems are located within the City of Calgary except Bearspaw Park and Clearwater Park.

The identification of these major natural systems does not represent all of the important natural environments within Calgary. The value of some of the excluded sites should not be overlooked, as a number of smaller habitats play an important role from a community parks perspective (ie Ranchlands, Tom Campbell's Hill).

These natural systems have been identified through a compiliation of the various inventories and assessments and are based on current condition. A list of natural systems follows:

GLENMORE RESEVOIR, WEASELHEAD, SOUTH GLENMORE, CLEARWATER

Parameter	Description
Location.....	Areas south and west of and including Glenmore Reservoir, and outside city limits at Clearwater Park.
Sites Included.....	South Glenmore, Western edge of reservoir, Weaselhead Natural Area, Clearwater.
Habitat Types.....	Riverine tall shrub, White Spruce Forest, Wetland, Balsam Poplar Forest, Aspen, Low Shrub
Ownership.....	City-owned land
Landscape Feature.....	Deltaic, Flood Plain, Escarpment, Reservoir
Significance.....	High importance for migratory birds, large mammals, one of most sensitive and significant areas in City.
General Comments.....	Generally undevelopable land. Recommended for preservation in Urban Park Master Plan and River Valley Plan, current Glenmore Park and Clearwater Master Plan. Little risk currently as areas well protected except for proposed Sarcee Trail Extension. Currently heavily impacted by recreational use.

NOSE HILL, EDGEMONT, HIDDEN VALLEY, WEST NOSE CREEK

Parameter	Description
Location	Nose Hill and escarpment west of Nose Hill, north to City limits along West Nose Creek.
Sites Included	Nose Hill Edgemont Escarpment and Ravine, R.O.W., West Nose Creek.
Habitat Types	Aspen, Low Shrub, Native and Non-native Grassland, Disturbed.
Ownership	City-owned land, Private
Landscape Feature	Escarpment, Plateau, Glacial Erratics, Archaeological Sites, Creek, Sandstone Outcrops
Significance	Large Fescue Grassland, with some breaks in terrain, only Sharp-tailed Grouse dancing ground in Calgary. High Bairds Sparrow (threatened species) population.
General Comments	Little risk currently as some areas are well protected in Nose Hill. Nose Hill Management Advisory Committee, Friends of Nose Hill, Nose Hill Park Communities Board, are active groups. West Nose Creek included in the River Valley's Plan and Urban Park Master Plan. Connectivity being reestablished along right of way

FISH CREEK PROVINCIAL PARK, DIAMOND COVE ESCARPMENT AND SOUTH BOW RIVER

Parameter	Description
Location.....	From Douglasdale to City Limits in SE corner of the city on East Side of river and entirety of Fish Creek Provincial Park. Includes tributary off Fish Creek at west end and Diamond Cove escarpment.
Sites Included.....	South Burnco Lands, MacKenzie Escarpment, Fish Creek Provincial Park and Diamond Cove Escarpment.
Habitat Type.....	White Spruce, Riverine Tall Shrubs, Low Shrub, Balsam Poplar woodland, Aspen Forest, native Grassland, Non-native Grassland, Disturbed Sites.
Ownership.....	Private, Provincial and City of Calgary
Landscape Feature.....	River Floodplain and Escarpment, Ravines Springs and Seeps, Lacustrine Bluffs, Glacial Fluvial Valley. Glacial Erratics
Significance.....	Fish Creek Provincial Park is considered provincially significant. South Bow important corridor into Fish Creek and Bow River Parks north. Large tracts of riverine forest. Only significant stand of White Spruce in SE Calgary. River has significant roosting sites for American white pelicans and in winter bald eagles.
General Comments.....	High amount of existing and proposed gravel extraction sites. Studied in Restricted Development Area study and recommended for preservation in Urban Park Master Plan and River Valley Plan. Provincial Parks protects Fish Creek Valley. High use by deer in area

INGLEWOOD BIRD SANCTUARY, PEARCE ESTATE AND INGLEWOOD GOLF COURSE, CARBURN PARK, BEAVERDAM FLATS, COMINCO, LYNNVIEW ESCARPMENT AND ACADIA ESCARPMENT

Parameter	Description
Location.....	Pearce estate Park to the crossing of the Bow River by Deerfoot Trail near Anderson Road.
Sites Included.....	Inglewood Bird Sanctuary, riverine community at Pearce Estate and Inlewood Golf Corse. Carburn Park, Beaverdam Flats, Lynnview Escarpment, Cominco (east of deerfoot), Acadia Escarpment, Southland Grasslands and forest Lafarge land.
Habitat Type.....	Wetland, mixed Native\Non-native Grassland, Riverine Tall Shrub, Disturbed, Balsam Poplar Forest, Low Shrub.
Ownership.....	Private, City of Calgary, Provincial
Landscape Feature.....	Floodplain, Floodway, Channel Islands and Cut-off Channels, Escarpment, Lagoons.
Significance.....	Largeley related with the Bow River. Only active great blue heron colony in Calgary. High waterfowl, bald eagle and deer usage as a complex. Inglewood is a Federal Migratory Bird Sanctuary. Riverine forest is highly significant as a migratory bird corridor.
General Comments.....	Large portion owned by City of Calgary as park. Cominco and Lafarge also protect significant lands.

BOWMONT PARK, WEST SCENIC ACRES ESCARPMENT, 12 MILE COULEE AND ROCKY RIDGE

Parameter	Description
Location.....	Area west of Home Road to City Limits, North to 112th Ave (North side of Bow River only).
Sites Included.....	Bowmont Park, West Scenic Acres Escarpment, 12 mile Coulee, and areas identified in ASP of Rocky Ridge as open space.
Habitat Type.....	Aspen Woodland, Balsam Poplar, Wetland, Upland Tall Shrub, Native Grassland, non-native Grassland, Disturbed
Ownership.....	Provincial, Private, City-owned
Landscape Feature.....	Knob and Kettle Terrain, River Escarpment, Ravine, Springs, Sandstone Outcrops, Wetland.
Significance.....	Largest Ravine in Calgary, Natural extension to Bowmont Park, Currently no knob and kettle terrain protected in Calgary. Low amount of Cattail wetland protected in City.
General Comments.....	Stoney Trail diverted away from 12 Mile Coulee, Rock Ridge Area Structure Plan in progress Proposed Sarcee Trail extension through Bowmont Park. Identified as Preservation Park in Urban Park Master Plan. Bowmont Natural Park Committee active.

EDWORTHY PARK, PASKAPOO SLOPES COMPLEX

Parameter	Description
Location	Western Edge of City, south of Highway #1 and the Bow River, including Edworthy Park, Douglas Fir Trail and Lowery Gardens.
Sites Included	Area west of Edworthy Park, Edworthy Park, Patterson Hills Ravines, Stonebridge, Calgary West, portions of MD of Rockyview, Canada Olympic Park, Transportation Utility Corridor.
Habitat Type	White Spruce Forest (with Douglas Fir), Aspen Woodland, Balsam Poplar Forest, Native Grassland, Non-native Grasslands, Upland Tall and Low Shrub, Wetland.
Ownership	Private, City of Calgary, Provincial.
Landscape Feature	Springs, Escarpments and Ravines, Glacial Erratics, Glacial Terraces, Riverine Point Bar and Archaeological Sites.
Significance	Major North Facing Escarpment, habitat Association and Wildlife Corridor between Edworthy Park and Paskapoo Slopes, only location where Balsam Poplar ravines establish onto Escarpment. One of three locations for Douglas Fir in Calgary. Rare Fescue grasslands present.
General Comments	Area planning in progress through Stonebridge and Calgary West Concept Plans, Area Structure Plans, urban Park Master Plan and East Springbank Joint General Municipal Plan. Edworthy Park Heritage Society and Paskapoo Slope Preservation Society currently active. Stoney Trail extension and Shaganappi Trail alignments proposed.

ELBOW RIVER

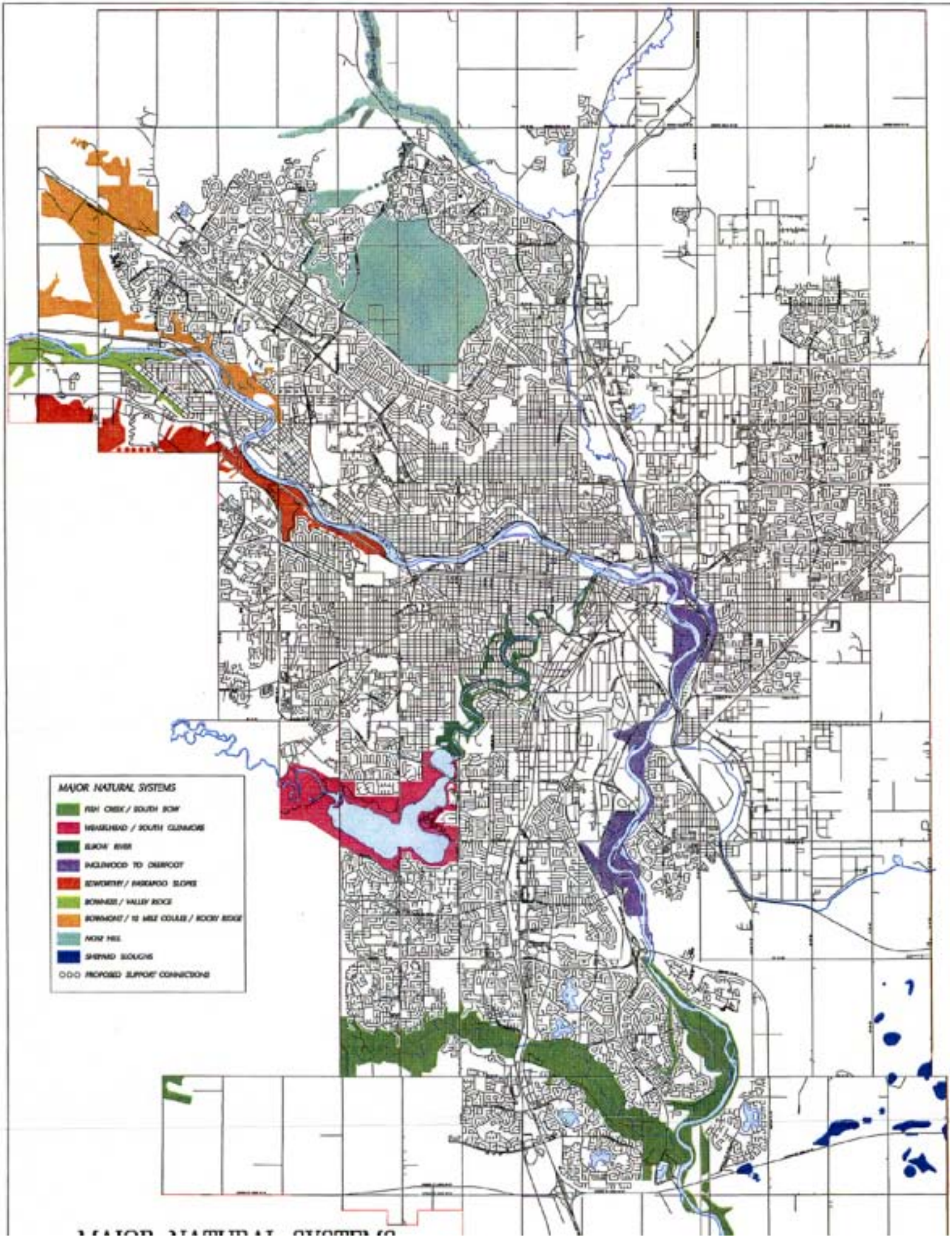
Parameter	Description
Location	Glenmore Dam to Fort Calgary
Sites Included	All natural environments in the valley (eg. Heritage Escarpment, Sandy Beach, Riveredge).
Habitat Type	Riverine Tall Shrub, White Spruce Forest, wetland, Balsam Poplar Forest, Low Shrub, Disturbed, Aspen Forest, Native and Non-Native Grassland.
Ownership	City-owned land, Private.
Landscape Feature	Flood Plain, Escarpment, Sandstone Outcrops
Significance	High importance for migratory birds, Fragmented but important system.
General Comments	Generally undevelopable land. Recommended for preservation in UPMP and RVP. Current Heritage Escarpment and Elbow River Conservancy involvement. Little risk currently as areas well protected. Proposed 50th Ave alignment.

BOWNESS/BEARSPAW PARK/VALLEY RIDGE ESCARPMENT AND RAVINE

Parameter	Description
Location	South Escarpment of Bowness Park to western edge of City Limit (including Bearspaw Park outside of City limits).
Sites Included	Douglas fir preserve, Greenbriar/Bowness escarpment, Valley Ridge escarpment and ravine, City-owned land in Bearspaw.
Habitat Type	White Spruce Forest (Douglas Fir), Aspen Forest, Tall Shrub, Non-native Grassland, Disturbed, Native Grassland, Balsam Poplar Forest
Ownership	Provincial, City of Calgary, Private
Landscape Feature	North facing escarpment, sandstone outcrops, ravines, springs, flooded inlets.
Significance	Contains two of three stands of mature Douglas fir in the city of Calgary, highly diverse variety of tree species.
General Comments	Area identified and priorized in Calgary River Valley Plan, Urban Park Master Plan and Bowness ARP. Bearspaw land referred in its own Master Plan and UPMP. Douglas Fir stands near Bowness Park and in Valley Ridge Ravine. Largely escarpment land. Approved Stoney Trail intersects Douglas fir preserve. Douglas Fir identified as Provincial Historic Site. Rare plants identified in Douglas fir preserve.

SHEPARD SLOUGH COMPLEX

Parameter	Description
Location	South of 114 Avenue SE, East of Deerfoot Trail and North of 174 Ave SE continuing outside of City.
Sites Included	Approximately 16 wetlands in city limits. Significant wetlands located outside city.
Habitat Type	Wetlands, Non-native Grassland, Disturbed.
Ownership	Provincial, Private.
Landscape Feature	Wetlands among cropland.
Significance	Three types of wetlands in large complex whose majority is outside of City. Provincially known for high use by waterfowl and shorebirds.
General Comments	Small portion of major wetland complex, disturbed sites between wetlands. A few wetlands are included in the Transportation Utility Corridor. Area included in S.E. drainage study.


MAJOR NATURAL SYSTEMS
FISH CREEK / SOUTH BOW
WEASELHEAD / SOUTH GLENMORE
ELBOW RIVER
INGLEWOOD TO DEERFOOT
EDWORTHY / PARKDALE SLOPES
BOWNESS / VALLEY RIDGE
BOWMONT / 10 MILE COULEE / ROCKY RIDGE
NOSE HILL
SHEPARD SLOUGHS
PROPOSED SUPPORT CONNECTIONS

OTHER NATURAL ENVIRONMENTS

This section refers to those natural environments that function independently, or are not likely related to a major natural system within City boundaries. Because of location, size or habitat type it does not fall into a major natural system. Due to the large number of these areas, they are not identified on a separate map but may be seen on the overall habitat map. Example include Nose Creek, portions of West Nose Creek, NW Grasslands, Research and Development Park, NE wetlands, Priddis Slough, McHugh Bluffs, Tom Campbell's Hill, and Strathcona Ravines.

Areas not described under major natural systems may play a significant role as habitat, support or in recreation. Inclusion in this section does not indicate low importance.

The City-owned lands that fall under this category are identified in the Natural Environment Park categories within this plan.

NATURAL ENVIRONMENT PARK CLASSIFICATION

A natural environment park classification with categories is require to:

a) provide recognition of the variation, conditions and management requirements of the habitats within natural areas.

b) Provide an objective method of assessing significance from a resource (ecological) perspective.

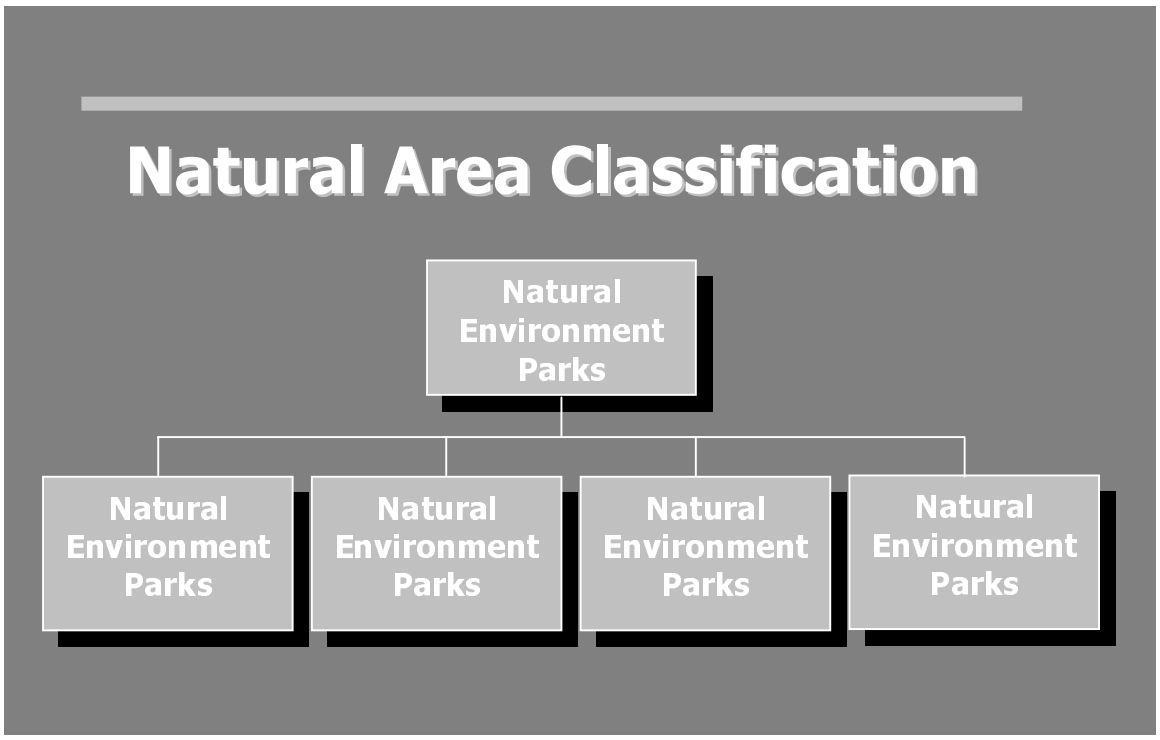
c) Assign specific management or operational guidelines for different habitat types.

GOALS AND OBJECTIVES OF A NATURAL AREA CLASSIFICATION SYSTEM

The overall goal of a classification system is to provide a systematic arrangement of parks in categories based on established criteria for a variety of management purposes.

The objectives of the natural area classification include:

1. The creation of a park class within the overall Calgary Parks & Recreation open space inventory, which represents natural environments and their roles.
2. A breakdown of the proposed Natural Environment Park class into functional categories throughout the City.
3. The creation of a zonation system that recognizes a variety of habitat types and public uses for operational and representative purposes.


Natural Area Classification
Natural Environment Parks
Natural Environment Parks
Natural Environment Parks
Natural Environment Parks
Natural Environment Parks

NATURAL ENVIRONMENT PARK CATEGORIES

The following chart reflects the three categories of Natural Environment Parks and the associated category for other classes of parks that have significant natural environments as a minor portion of their total area. These categories reflect varying management strategies and are not meant to portray levels of value.

NATURAL ENVIRONMENT CATEGORY GUIDELINES

The following criteria are guidelines for objectively allocating parks into one of the four categories. The criteria are subjective in that they are based on a comparison of park sites across the city.

	Special Protection Natural Area	Major Natural Area	Supporting Natural Area	Other Parks with NA Zones
Overall Environmental Sensitivity	High	High to Moderate	Low to Moderate	Varies
Resource Significance	Provincial/ Regional	City Wide	Local and/or Supportive	Varies
Wildlife Habitat	Highly Productive and Suitable	Varying Productivity	Mostly Lower due to size, condition etc.	Varies
Park Class	Natural Environment Park	Natural Environment Park	Natural Environment Park	Other
Primary Zones	Preservation	Natural Environment	Variable	Preservation, Natural Environment
Percentage of Natural Environment	>75%	> 50%	N/A	N/A
Natural Condition	Majority High	Majority High	Variable	Variable

Overall Environmental Sensitivity – Refers to the overall sensitivity to disturbance of the majority of habitat types found within the specific park area. May vary from high to low.

Resource Significance – Refers to the relative importance of the overall natural area within the province and municipality based on a simple assessment. May vary from provincial to local.

Wildlife Habitat – Refers to the average wildlife suitability of the mix of habitats based on existing detailed biophysical information.

Park Class – Classification to be applied

Primary Zones – Refers to the dominant management zone for the park area. (for example – 90% preservation, 10% active recreation)

Percentage Natural Environment – The % of land that contains natural environment.

Natural Condition – Refers to the average condition of the natural environment area.

PARKS ASSIGNMENTS TO CATEGORIES BASED ON CRITERIEA

- All lands listed by category below have portions in Calgary Parks & Recreation or Lands Department inventories, or are Provincially owned and maintained by Calgary Parks & Recreation.
- Fish Creek Provincial Park, while included in the assignment, would see no change under Provincial jurisdiction, but is included to indicate its status relative to other areas.
- Some of the park areas are considered right of way (R.O.W). These areas will be dealt with in other processes and inclusion in this report does NOT affect this status.
- No private owned lands are intentionally included in this assignment of categories.

	OWNERSHIP
SPECIAL PROTECTION NATURAL AREA – NATURAL ENVIRONMENT PARKS	
Inglewood Bird Sanctuary.....	City (Parks)
Weaselhead / South Glenmore (Natural Area).....	City (Parks)
MAJOR NATURAL AREA – NATURAL ENVIRONMENT PARKS	
Nose Hill Park.....	City (Parks)
Bowmont Park Natural Area (% of land that is private is excluded).....	City (Parks/Land), Prov., R.O.W
Edworthy Park, Lowery Gardens, Douglas Fir Trail.....	City (Parks), Prov., R.O.W
Elbow River Natural Area (% of land that is private is excluded).....	City (Parks/Land), Prov., R.O.W
Fish Creek Provincial Park.....	Provincial Parks
Carburn/Beaverdam Flats.....	City (Parks/Land), Prov.
Bearspaw Natural Area.....	City (Parks)
Clearwater Natural Area.....	City (Parks)
SUPPORTING NATURAL AREA – NATURAL ENVIRONMENT PARKS	
Acadia Escarpment (% of land that is private is excluded).....	City (Land)
Edgemont Ravines (% of land that is private is excluded).....	City
Edgemont Escarpment.....	City
Braeside Aspen.....	City
Briarhill Escarpment.....	City

	OWNERSHIP
Cedarbrae Aspen	City (Parks/Land)
Coach Hill Aspen (% of land that is private is excluded)	City (Parks/Land)
Deer Run Escarpment	City (Parks/Land)
Douglasdale Woodland	City (Parks)
Forest Lawn Creed and Retention Pond	City (Land)
Hawkwood ER. (% of land that is private is excluded)	City (Parks/Land)
Highfield Escarpments (% of land that is private is excluded)	City
McHugh Bluffs	City (Parks/Land)
Millican Park	City
Nose Creek (% of land that is private is excluded)	City, R.O.W
Northern Citadel	City (Land)
Parkdale Escarpment	City (Land)
Pumphill Aspen Stands	City
Ranchland's Hills	City (Parks/Land)
Richmond Aspen Woods	City (Parks)
Southland Grasslands	City (Land)
Southland Wetlands	City
Strathcona Ravines	City (Parks/Land)
Tom Campbell's Hill	City
Woodland/Woodbine Aspen Woods	City

OTHER PARKS – WITH NATURAL AREA ZONES ✸

Prince's Island	City (Parks), Prov.
Pearce Estate	City (Parks), Prov.
Confederation Park	City (Parks)
Bowness Park)% of land that is private is excluded)	City (Parks)
Glenmore Park	City (Parks)
Heritage Park	City (Lands)
City Owned Golf Cources and Cemeteries	City (Lands)

✸ *Ownership in this category refers to Natural Environment Area only and change of status is not planned*

PROPOSED MANAGEMENT ZONES

- While the following are suggested for Natural Environment Parks specifically, Management Zones should be assigned to all park classes.
- Specific zones are to be determined on a site by site basis.
- Zones may change based on condition

Management Zone	Description
Preservation	Protection zones for areas of high vegetation community sensitivity. On par with Special Protection Natural Area category. (eg. – Douglas Fir Trail in Edworthy Park).
Wildlife Refuge	Protection zone for specific wildlife species or function. May be closed to public access for specific periods or long term (eg. – south end Inglewood Bird Sanctuary).
Natural Parkland	Protection area for sites with less overall sensitivity to disturbance. (eg. – escarpments at Nose Hill)
Restoration	Areas where large scale operations to restore an area to its original state are currently being undertaken. (eg. – Tom Campbell's Hill)
Naturalized	Area where previously manicured or disturbed sites are left intentionally to grow with minimal care. (eg. – Centenary Park)
Developed/Access	Areas where buildings or other major development has occurred. (eg. – Regional Pathway through Weaselhead, Parking lots at Nose Hill).
Active Recreation / Sports/Manicured	Areas developed for active recreation (eg. – playgrounds at Edworthy Park).
Disturbed	Areas where previous disturbance has left either no plant cover or only introduced vegetation (eg. – Gravel Pits0. These area areas that may have priority as restoration zones.
Experimental	Areas where research is carried out on restoration and reclamation technologies. Many include several test plots, and may not restore site to natural condition.

MANAGEMENT GUIDELINES

BACKGROUND

The following guidelines represent the Natural Area Management Plan's recommendation on approaches to deal with significant resource management issues. The guidelines were formulated from information acquired through literature searches, other municipalities, and by the expertise of a number of staff.

The information is not extensive and represents an overall summary for reverence purposes. Detailed guidelines (eg. – planting requirements for specific vegetation communities or specific controlled burning specifications) are included in the training and technical manuals. This information will be updated as new information is received.

The management guidelines have been arranged into three categories. There is some overlap when a particular guideline needs to be addressed with in a couple of different perspectives.

A. Management guidelines referring to All Natural Environment Parks.

These include:

- Buffers
- Corridors
- Diversity
- Enhancement Structures
- Fire Management
- Fragmentation and Size
- Grazing
- Inventory
- Life-Cycling
- Problem Wildlife and Pest Control
- Signage and Amenities
- Snags and Deadfall

B. Management guidelines based on the category of Natural Environment Park.

(eg. – special Protection Natural Areas, Major Natural Area, Supporting Natural Area, Other Parks with Natural Area Zones)

These include:

- Community Participation
- Construction and Utilities
- Dog Use
- Pedestrian Off-Trail Use
- General Parks Maintenance
- Problem Wildlife and Pest Control
- Planting and Reclamation
- Active Recreation
- Trails
- Weed Control

C. Management guidelines based on habitat type.

These included management guidelines specific to various habitat types.

- Buffers
- Fire Management
- Life Cycling
- Planting and Reclamation
- Trails

NATURAL ENVIRONMENT PARKS

BUFFERS

Description:

- Area separating two or more incompatible uses.
- Two major kinds are found in natural areas:
  a) Natural Environment Boundary (Park – Urban interface)
  b) Zonal (Between incompatible zones)

Recommendation:

a) Boundary
   - Normally fenced directly between housing and natural habitat. Setback varied depending on surrounding land use.
   - Normally maintain 3 – 4 metre cut strip between natural environment and back of lot to act primarily as a fire break and for weed dispersal prevention.
   - Fire guard width dependent on size of area ad habitat type and other available options (ie roadway may allow no cut)

b) Zonal
   - Maintain buffer between incompatible uses to lessen effects of noise and other activities.

CORRIDORS:

Description:

- Urban natural environments normally are a collection of habitat islands. The viability of these islands as suitable wildlife habitat often depends on outside recruitment of plants and animals, which is directly affected by the spatial arrangement and the effectiveness of linkages between habitat.
- Corridors are defined as linear strips of habitat serving as interconnecting links between or among larger habitat areas.
- While narrow shelterbelts, hedgerows, and trail right-of-ways undoubted provide enough security to some species, species richness and diversity have been shown to increase significantly with increases in corridor width. Therefore an ecologically viable corridor would be a band of natural vegetation wide enough to accommodate the habitat needs of most wildlife species.

Recommendation:

- Corridor dimensions are based more on function than on specific boundaries where adjacent vegetation types interface.
- Corridor identification, requirement, and design methods:
  1. Identify purpose of corridor
     - Maintain wildlife richness
     - Maintain viable populations of species
     - Provide escape terrain

2. Select species and determine specific habitat needs:
    - Prepare species lists,
    - Determine habitat needs,
    - Determine special needs,
3. Delineate corridor boundaries.
    - All habitat types required included
    - Necessary connections
    - Protection of connected lands.
4. Establish buffers
5. Educate staff & public as to purpose.
6. Select appropriate acquisition options.
7. Address development issues regarding
    - Fragmentation
    - Obstructions to movement
8. Determine compatibility with various contiguous developments
9. Design habitat management practices
10. Evaluate success
    - Five years after project is completed

- Wildlife underpasses should be designed on a specific site basis regarding size, planting , fencing and other design factors

DIVERSITY:

Description:

- The process of urbanization results in greater habitat fragmentation and disturbance, and increases the isolation of islands from one another and from the surrounding rural landscape. This typically brings about a reduction in species richness.
- Habitat area (size) is the best predictor of the number of species of land vertebrates as a whole and of birds and amphibians separately. Species of mammals and reptiles correlate most closely with degree of habitat isolation. Independent variable determined most important in predicting total numbers of land vertebrate species (all classes combined) are: habitat area, degree of habitat isolation, and percentage of vegetative cover. These three variables account for 91% of the variation in species richness.

Recommendations:

- Maintain available natural environments in as large a parcel as possible to keep size requirements.
- Regularly update habitat and species inventory to predict levels of wildlife use which in turn identifies level of diversity.
- Develop simple database for each site. Encourage Calgary Field Naturalists' Society and Community Group involvement in ecosite/species relationships. Eventual tie in with Geographical Information Systems

ENHANCEMENT STRUCTURES

Description

- Enhancement structures include those features that augment natural terrain and provide nesting, roosting or escape sites for wildlife. They include wood piles, rock piles, nesting platforms, nest boxes and artificially created topographic features such as cut banks.

Recommendations

Enhancement of slope (ie cut banks)

- By increasing the structural diversity of a site wildlife diversity may improve.
- Cut bank topographic features provide shelter, escape corridors, visual barriers, nest and den sites, perch and roost sites and loafing sites for a number of species.

Method:

- Protect existing cut banks and provide warning for recreational uses where appropriate (ie Nose Hill Gravel Pit.).

Rock Piles

- Can be used to provide immediate cover for wildlife during the first years of reclamation when vegetation cover is sparse. They also provide den sites, shelters and hibernaculae.
- Rock pile height should be 1 to 4 metres and occupy an area of less the 10m sq.
- Rock piles are most useful to wildlife if the core of the pile is constructed of 1 to 3 large boulders, 1 to 4 metres in diameter, surrounded by smaller rocks 1m in diameter.
- Irregular edges increase attractiveness to wildlife.

Method:

- Do not remove potential valuable piles (ie. Larger than gravel rocks) unless assessed.
- In disturbed locations creation of some piles may be appropriate.

Brush Piles:

- Provide immediate cover for wildlife.

Method:

- Locate in areas where risk of fire is low
- Construct as mounds or hedgerows
- Combined with rocks to provide temporary cover.
- Construct on a bowl shaped depression where possible
- Use native material only to prevent introduced pest or disease importation.
- No larger than 5 cm twig diameter 1.2 metre lengths.

Downfalls and stumps:

- Important micro habitat sites and perching, nest and den sites
- Arthropod colonization and nutrient cycling
- Prey base for some species
- Useful for mycorizal colonization
- Nurse trees for seedlings.

Methods:

- Do not remove unless hazard.
- Place cut trees nearby in suitable locations.

Nest Boxes:

- Important as nest sites where natural sites not available.
- May cause many problems in natural environments unless monitored carefully and introduced species eliminated.

Methods:

- Discourage use in natural environment parks.
- In other areas, continuous monitoring required.

Wildlife Feeders:

- Generally not needed in wild situations and will attract pest species.
- Introduces weed seed source

Methods:

- Discourage use and remove existing feeders in natural areas.

FIRE MANAGEMENT

Description:

- Fire management involves two perspectives: Control of wildfire and prescribed habitat alteration. Due to the complexity

and specificity required of controlled burns they will be dealt within the technical document as they relate to grasslands and largely on an individual site basis.

- Control of wildfire is a requirement for safety of the user and nearby residents. However, level of risk needs to be objectively determined.

Recommendations:

Controlled Burns:

- Methods, locations, requirement and level of appropriateness to be determined by Natural Area Management Coordinator, Parks Superintendent, and individual Park Management Committee (if available). Permits to be acquired in normal fashion.
- Not generally recommended for woodlands, shrub lands, and some grasslands.

Control of Wildfire.

- Park specific fire strategies to be considered through individual park master and management plans.
- 3-4 meter buffer (mowed zone) provided where environmentally appropriate and public safety is threatened.
- Access for emergency crews to be provided where environmentally appropriate and where public safety is threatened.
- Natural Area Management Coordinator, Park Superintendent and Fire Department (if required) to meet and become aware of issues on individual site basis.

FRAGMENTATION AND SIZE

Description:

- Urban development fragments natural habitats into smaller and more isolated units. In the process, it destroys habitat of many species, modifies the habitats of others, and creats new habitats for some species.
- Island biogeography theory has emerged as the conceptual focal point in the design of habitat corridors and reserves for wildlife. In general, immigration rates are predicted to increase and extinction rates to decrease on larger, less isolated islands, resulting in a higher equilibrium number of species as compared to the number on smaller, more distant islands.
- In small areas the most effective factor increasing the species richness is dense vegetation in all layers. In large habitat islands, species number may be increased by an increased amount of habitat edge.
- Number of bird species increased rapidly as size of woodland is increased from 1 to 25 ha. At 25 ha, about 75% of the maximum number of expected species were represented.

Recommendations:

- When planning areas, size should be considered.
- Areas smaller than 2.5 ha require high density understories to be protected. Thus, planning and maintaining trails must consider impact on fragmentation. Planting strategies to consider these factors.
- Small natural areas are not to be cleared of understorey vegetation unless safety warrants change.

GRAZING

Description:

- Grazing has long been identified as an integral part of natural environments. However, grazing has both positive and negative effects on a variety of habitats. Overgrazing by cattle has been a major factor in the disturbance to grasslands, wetlands and woodlands in Calgary.
- Species diversity is affected by grazing as cattle selectively feed on several native species. Balsam poplar saplings,

streambank willow, and reed grasses are favoured by cattle and other browsers. This occurs to the point where poplar regeneration can be halted.

- Livestock and deer, etc. due to an abundance of succulent growth, cooler microclimate, and the innate need for water, tend to concentrate in riparian zones. Overuse of streamside vegetation by grazing animals contributes to the destruction of stream banks and vegetation, therby increasing erosion. Vegetation along stream banks directly effects stream ecology by contributing to food production and temperature control.
- Selective grazing, however, can play a role in maintaining natural conditions in grasslands.

Recommendations:

- Grazing by domesticated animals should be discouraged in parks near waterways unless specific controls are enforced.
- Grazing by domestic animals in others areas be site specific, controlled and based on habitat need.
- Further research is required to understand the roles and mechanics of artificially introducing grazing pressures.

INVENTORY

Description:

- In order to properly keep abreast of the long term changes in the natural environment updating of the overall site specific inventory must be continued. This includes the natural history database, weeds and pests, habitat condition and the significant computer mapping changes required. Updating of new management strategies are also required.

Recommendation:

- Creation of an easily used and simple database to reflect updated inventory.
- Encouragement of amateur naturalists and community groups to assist staff to monitor and collect specific information on an ecosite basis.
- Create a communications process for information exchange.

LIFE-CYCLING OF HABITATS

Description:

- Vegetation communities constantly change depending on environmental conditions. Grazing, burning and flooding are all natural processes that impact natural environments. In an urban centre these processes are usually controlled and thus unnatural vegetation communities can form (ie. rose/cinquefoil/wolf willow invasion in grasslands due to a lack of grazing or fire, or no new poplar growth in balsam poplar forests due to a lack of flooding.)

Recommendation:

- Natural parkland in Calgary should be in a variety of seral stages.
- Updates on new research regarding habitat management be maintained.
- Creation of a mixed administration, academic and community based research group to actively encourage and pursue projects that suggest methods of restoring natural processes (ie grazing, fire, scarring).
- Attempt test plots for management techniques such as sheep or other large mammal grazing, burning and scarring in a few non-sensitive places.

PROBLEM WILDLIFE AND PEST SPECIES

Description:

- The pests that actively affect natural environments generally fall into two categories. Those natural and native species that impact vegetation and wild-

life communities when the areas experience other stresses such as small size (Wildlife Problems) and those introduced species that impact natural areas (Pests).

Recommendations:

- Beaver – Generally should be controlled where overall impact is high which will be identified through inventory. Options such as wiring, removal and fencing shall be considered. Some areas need less control except as source areas. (ie Weaselhead.)
- Pest Bird Species – Primarily major control suggested is the discouragement of bird houses in natural environment.
- Richardson Ground Squirrel – Primary issue is the boundary areas between natural areas and developed areas. Control should centre in these boundary areas.
- Insect Pests – Develop understanding of the role of insects and that most infestations (except introduced varieties) are a result of stressors such as water loss, small size, fragmentation, etc.
- Grey Squirrel – Undertake information dispersal regarding harmful impacts of this introduced species. No release of Grey Squirrels in natural environments
- Wildlife Problems (other than beaver, ground squirrels) – To be undertaken by Provincial Authorities with assistance by Calgary Parks & Recreation Staff.

SIGNAGE AND AMENITIES

Description:

- Types of signage include Interpretive, Regulation and Directional.
- Primary education tool of regulations, rules and etiquette for users of natural environments. Amenities such as garbage receptacles and benches will be standardized where possible.

Recommendation:

- Signage will be standardized in form and design for all natural environment parks.
- Messages and themes spread throughout parks system.
- Signage to be reviewed by Natural Area Management Coordinator and Parks Superintendent and management advisory committees where appropriate.
- A concentration of information at visible or high use areas is favoured rather than widely spaced signage.
- Amenities design and placement is to be sensitive to aesthetic and environmental needs.

SNAGS AND DEADFALL

Description:

- Snags refer to dead or dying trees still standing.
- Deadfall refers to dead trees that have fallen.
- Snags are very important in all forested areas for providing nesting and perch sites for a variety of wildlife species including waterfowl, raptors and insect eating birds. Removal of significant snags can have a deleterious effect on the health of a woodland
- Deadfall plays a role in soil creation and habitat for insects and arthropods.

Recommendations:

- Appropriate snags for nesting are considered to be over six years old, more than 20 cm dbh (diameter at breast height) and with more than 40% bark cover.
- A variety of snags attract wildlife especially those trees greater than 5 metres in height.

- Other factors to consider include:
  - base firmly anchored (safety factor)
  - protect trees with nest holes
  - mixture of rotten and good quality snags.
  - Proximity to high use areas to be considered.
  - Clear dead fall as it relates to safety and travel on established trails.
- Felled trees and other brush may be left in non-conspicuous areas to facilitate nutrient recycling.

MANAGEMENT GUIDELINES BASED ON WHAT CATEGORY OF NATURAL ENVIRONMENT PARK

General Parks Upkeep/Maintenance (Garbage Collection, Hazard Removal Etc):

Category	Management Guideline
Special Protection Natural Area:	• Inventory of regular maintenance practices recorded. Minimum of a monthly assessment of specific maintenance requirements • Specific budget allocated to park. • Minimal heavy machinery use, except in disturbed sites (with specific sensitivity to wildlife seasonal use). • Any major projects to undergo impact assessment.
Major Natural Area:	• Preservation zones treated same as Special Protection Natural Area. • Inventory of regular maintenance kept for natural zones. Minimum of twice yearly assessment of maintenance requirements. • Natural environment zones allocated percentage of total park budget to ensure regular maintenance. • Minimal heavy machinery usage in natural zones (with specific sensitivity to wildlife seasonal use where appropriate).
Supporting Natural Area:	• Annual or twice yearly cutting of non-native grassland to reduce spread of weeds and lower fire risk. • Regularity of maintenance based on staff or public identification of requirements. • No site specific budget allocated. • Minimal heavy machinery usage in natural zones (with sensitivity to wildlife seasonal use).
Other Parks with Natural Area Zones:	• Portion(s) of specific park budge allocated on an as needed basis. • Annual or twice yearly cutting of non-native grassland to reduce spread of weeds and lower fire risk. • Regularity of maintenance based on specific staff or public identification. • Minimal heavy machinery usage in natural zones (with sensitivity to wildlife seasonal use).

Community Participation and Management

Category	Management Guidelines
Special Protection Natural Area:	• Management by Calgary Parks & Recreation with emphasis on volunteer commitment in stewardship. • Encourage investigation of societal status (eg. Gaetz Lake Sanctuary, Red Deer) and as per Inglewood Bird Sanctuary Master Plan
Major Natural Area:	• Management by Calgary Parks & Recreation with some invovement with volunteers and preservation societies. (ie. Edworthy Park Heritage Society, Bowmont Natural Park Committee, Hertage Escarpment Society, Elbow River Conserancy). • Master Plans to be approved through Council.
Supporting Natural Area:	• Areas can be adopted by communities with specific reclamation plans. • Project plans to be approved through Council. (eg. Tom Campbell's Hill, McHugh Bluffs)
Other Park With Natural Area Zones:	• Potential for Adopt-a-Park but generally maintained by Calgary Parks and Recreation.

Trails

Category	Management Guideline
Special Protection Natural Area:	• Informal trails discouraged (trails should be all planned and maintained). • No new pathways or trails created without impact assessment and public consultation. • Approved regional pathways considered as special recreation zones. • All pathway and trail surface types are potential (hardened, clay, shale, dirt, chip) depending on habitat requirement and public interest. • Minimal trail width possible, considering safe use. • Where possible construct barriers to discourage off-trail and off-pathway use in exceptionally sensitive areas. • Active restorative trail maintenance to encourage on-trail use. • Mobility impaired access where environmentally sound and physically realistic. • Seasonal closures of trails (but not regional linkages) may be considered for wildlife needs.
Major Natural Area:	• Discourage informal trails except in less sensitive grassland habitats. • No limitation to options of pathway and trail surfaces (ie. hardened, clay, shale, dirt, chip) depending on habitat requirement and public interest. • Locate pathway and trails, where possible, away from sensitive habitats and high wildlife use areas. • Optional barriers to be used in preservation zones, restoration zones, and areas with safety hazards • Mobility impaired access where environmentally sound and physically realistic.
Supporting Natural Area:	• Unless environmentally required or as a portion of regional or secondary trail system, no formal trails or pathways. • No limitation to types of pathway or trail surfaces (ie. hardened, clay, shale, dirt, chip) depending on habitat requirement and public interest.
Other Park With Natural Area Zones:	• Formal trails encouraged where high public traffic is in conflict with the viability of the resource.

Planting & Reclamation

Category	Management Guidelines
Special Protection Natural Area:	• All planting in natural environment zones to be strictly restorative or barrier in nature, with species that represent the associated vegetation community. • Site specific assessment and plan required in all restorative projects. Each project will be staff supervised. • No introduced species (to be used0 in preservation, restoration or natural environment zones. Developed zones excluded.
Major Natural Area:	• All planting in preservation, restoration or natural environment zones to be strictly restorative in nature with species used that represent the specific habitat. • An assessment and project plan required in all major projects in preservation zones and natural environment zones otherwise follow guideline species. • No introduced species (to be used) in natural environments. Developed zones excluded.
Supporting Natural Area:	• No introduced species in natural environments to be encouraged. • Use recommended species planting list for particular habitat present where possible and affordable.
Other Park With Natural Area Zones:	• All planting in preservation, or natural zones to be strictly restorative in nature with species used that represent the specific habitat. • As assessment and project plan required in all projects in preservation zones otherwise follow guideline species. • No introduced species (to be used) in natural environments. Developed zones excluded.

Weed Control

Category	Management Guidelines
Special Protection Natural Area:	• Monthly monitoring of weed problem. Inventory well documented. • Aggressive removal required to protect natural vegetation. • Priority, where possible, to use less chemical options. Spot spraying preferred in all natural areas.
Major Natural Area:	• Yearly inventory of weed problem. Inventory well documented. • Removal when problem threatens natural vegetation, manicured and residential areas. • Priority, where possible, to use less chemical options. Spot spraying preferred in all natural environments.
Supporting Natural Area:	• Removal when problems threaten natural vegetation, manicured and residential areas. • Respond on an as needed basis (complaints and identified problems). • Priority, where possible, to use less chemical usage. Spot spraying preferred in all natural areas.
Other Park With Natural Area Zones:	• Removal when problems threaten natural vegetation, other park areas and residential areas. • Respond to complaints. • Priority, where possible, to use less chemical usage. Spot spraying preferred in all natural areas.

Comment: Identified need to retain options regardless of classification. Differences based on classification regarding the aggressiveness of removal and inventory. Control depending on seriousness of problem. All areas require removal of restricted weeds.

Problem Wildlife and Animal Pest Control

Category	Management Guidelines
Special Protection Natural Area:	• Introduced species to be controlled based on impact, manpower and budget. • Richardson's Ground Squirrel, control only in developed areas for safety. Outside of area controlled to prevent invasion into nearby residential districts. • Selective beaver removal after wiring attempts, and severe habitat damage documented • All to be inventoried regularly.
Major Natural Area:	• Introduced species to be controlled based on impact, manpower and budget. • Richardson's Ground Squirrel control only in developed and recreational zones for safety. Buffer areas controlled to prevent invasion into residential districts. • Selective beaver removal when habitat damage documented and other options not successful. • Inventoried yearly for issues.
Supporting Natural Area:	• Introduced species may be controlled based on impact, manpower and budge. • Richardson's Ground Squirrel control in buffer zones only to prevent invasion into residential districts upon complaint. • Selective beaver removal when habitat damage documented and other options not successful.
Other Park With Natural Area Zones:	• Richardson's Ground Squirrel control in buffer zones only to prevent invasion into residential districts. • Selective beaver removal when habitat damage documented and other methods proven not successful.

Comment: Includes introduced species, Grey Squirrel, European Starling, House Sparrow. Native species includes Richardson's Ground Squirrel and Beaver.

Construction and Utility Usage

Category	Management Guideline
Special Protection Natural Area:	• Any future consideration for use as a utility corridor requires an impact assessment including public consultation. • Adverse environmental or aesthetic impacts without mitigation not to be considered, except where public safety is concerned. • Current approved projects at Council's discretion
Major Natural Area:	• Any future consideration for use as a utility corridor requires an impact assessment including public consultations. • Adverse environmental or aesthetic impacts to be minimal, except where public safety is concerned. Restoration to near natural condition and its normal habitat type required in damaged areas. • Current approved projects at Council's discretion.
Supporting Natural Area:	• Any future consideration for use as a utility corridor requires an internal impact assessment. • Attempts to be made to minimize adverse environmental or aesthetic impacts except where public safety is concerned. • Restoration would be strongly encouraged.
Other Park With Natural Area Zones:	• Requirements based on zonation of particular sites (ie. preservation zones and natural parkland zones would require similar consideration to Special Protection Natural Areas and Major Natural Area Status respectively.

Off-Trail and Off-Pathway Use

Category	Management Guideline
Special Protection Natural Area:	• Designated on-trail and pathway use only (posted).
Major Natural Area:	• Recommended on-trail and pathway use only (excepting identified grasslands and zones such as disturbed, recreation and access). • Education signage would be primary method of control
Supporting Natural Area:	• No restrictions (unless otherwise designated)
Other Park With Natural Area Zones:	• Designated on trail where available.

Dog Use

Category	Management Guideline
Special Protection Natural Area:	• Dogs prohibited except in special use zones where they must be leashed. (eg. Pathway at Weaselhead).
Major Natural Area:	• Dogs on leash, except in disturbed zones allocated for that used (ie upper Plateau at Edworthy Park, Top of Escarpment at Bowmont. Etc.). • As per Nose Hill Park MasterPlan Review (1992) and Management Plan recommendations • Excluded from wildlife refuge areas (eg. Sharp tailed grouse lek at Nose Hill).
Supporting Natural Area:	• Open to a variety of designations appropriate to site. In "off leash" areas, under control should be emphasized to minimize wildlife harassment.
Other Park With Natural Area Zones:	• As per overall park requirements.

Active Recreation

Category	Management Guideline
Special Protection Natural Area:	• Restricted to facilities constructed primarily for that activity. (eg. assigned pathway for Mountain Bikes). Facilities identified through other approved processes
Major Natural Area:	• Restricted to designated trails, (as defined by the Urban Park and other Master Plans) disturbed areas and recreation areas.
Supporting Natural Area:	• No restrictions unless otherwise identified.
Other Park With Natural Area Zones:	• As per overall park requirements.

MANAGEMENT GUIDELINES BASED ON THE HABITAT TYPE.

ASPEN HABITAT

Management Issue	Management Guideline
Buffer:	*DEVELOPMENT* – Where possible 2-3 meters grass cut between development and trees. Small areas of forest next to fencing acceptable. Generally buffer role is as fire barrier, however buffer may play function in travel route for users. *ZONAL* – Trees and shrubs play role as audio and visual barrier thus no major requirement. *HABITAT ASSOCIATION* – Planning should generally accommodate mix of native grassland habitat and/or low shrub community for wildlife needs.
Fire Management:	*CONTROLLED BURNS* – Not to be considered at present time. *FIRE CONTROL* – See buffer. High amount of weed build up increases risk.
Life Cycling of Habitats:	• Concerns lay mainly in the expansion of aspen woodlands into grassland habitats. • Clearing of understorey not recommended especially in small sites. • Regeneration can be encouraged by cutting.
Planting and Reclamation:	• Dense understorey requirement in smaller stands. Generally no replanting except where new suckers are absent. • No conifer planting recommended. • See vegetation community planting recommendations.
Trails:	• Aspen woodland trails tend to have less impact as regeneration is fast so few significant barriers are required. • Placement should consider impact of fragmentation and removal of important ecotones.

BALSAM POPLAR HABITAT

Management Issue	Management Guideline
Buffer:	*DEVELOPMENT* –
	Not normally a concern but in new developments maintenance of extensive grassland desirable. Where possible, fencing is appropriate to prevent uncontrolled access.
	ZONAL –
	Vegetational (tree or shrub) boundary between incompatible uses.
	HABITAT ASSOCIATION -
	Requirement for juxtaposition between native, naturalized grass lands and shrub communities. High percentage of wildlife require access to grasslands for feeding. High % species loss when grasslands and adjacent shrub communities removed from association.
Fire Management:	*CONTROLLED BURNS* –
	No controlled burns to be considered at this time.
	FIRE CONTROL –
	River access normally close by. Not generally high fire risk if healthy.
Life Cycling of Habitats:	• Major concern is the balsam poplar forests in Calgary, which apparently are unable to propagate effectively, and are gradually (almost imperceptibly on our time scale) being replaced by other species such as white spruce, water birch shrubland, or non-native grassland.
	• Research required into regeneration methods (ie scarring of ground surface, beaver, replanting).
	• Encourage priority protection for areas of regenerating of Balsam Poplar.
Planting and Reclamation:	• No conifer planting recommended
	• Research required into Brome grass remediation.
	• See vegetation community planting recommendations.
Trails:	• Balsam Poplar understorey tend to be highly impacted by recreational use. Any disturbance leads to introduced species proliferation.
	• Access/control trails required to lower new informal trail creation. Railing barriers effective for off-trail controls.

WHITE SPRUCE HABITAT

Management Issue	Management Guideline
Buffer:	*DEVELOPMENT* –
	Fencing or a wide buffer generally required to prevent increased erosion on sensitive slopes where spruce normally grow.
	ZONAL –
	Vegetation buffer where appropriate.
	HABITAT ASSOCIATION –
	Normally associated with balsam poplar, aspen woodlands and tall shrub communities.
Fire Management:	*CONTROLLED BURNS* –
	Not to be considered at this time.
	FIRE CONTROL –
	Due to moist microclimate conditions, fire is not a common occurrence. Weaselhead and Fish Creek sites higher risks than escarpments due to a large size. Access to be maintained along pathway and military road for emergency vehicles in the Weaselhead Area.
Life Cycling of Habitats:	• No serious concerns.
Planting and Reclamation:	• Regeneration to be carefully considered on an individual site basis due to the slow and difficult process of regrowth and the high chance of erosion in these areas. Major restoration efforts should be directed towards elimination of informal pathways.
	• See vegetation community planting recommendations.
Trails:	• Significant impacts by recreation activities causing serious erosion control problems.
	• Short cutting quickly becomes a permanent scar features.
	• Expense of rehabilitation is high.
	• Important locations for formal trail establishment including barriers for prevention of off-trail use.

RIVERINE TALL SHRUB, LOW SHRUB AND UPLAND TALL SHRUB HABITAT

Management Issue	Management Guideline
Buffer:	*DEVELOPMENT –* Small buffer required (1-2) meter with decreased need with fencing. *ZONAL –* 1 meter cut wide and 3 meter tall for major pathways. No standard for secondary or minor pathways. *HABITAT ASSOCIATION* Generally this habitat is associated with other vegetational communities, often as an intermediary.
Fire Management:	*CONTROLLED BURNS –* Not to be considered on established habitats, but rather as a potential control for expansion of invasive shrubs into significant natural grassland. *FIRE CONTROL –* Potential fire load may exist. Further research is required.
Life Cycling of Habitats:	*LOW SHRUBS* Play a role in the life cycling of native grasslands and often expand where grazing or fire has been eliminated and moisture levels are moderate. *UPLAND TALL SHRUB* Silverberry may spread with its role as a colonizer. Assessments to be made on an individual basis. *RIVERINE TALL SHRUB* Is an important component of may riverine communities and in some cases represent a gradual change between two vegetation communities.
Planting and Reclamation:	• See vegetation community planting recommendations.
Trails:	*LOW SHRUB* Trails should avoid edges and not fragment habitat type unless area is large. *UPLAND TALL SHRUBS* Trails should avoid edges and not fragment habitat type unless area is large. *RIVERINE TALL SHRUB* Recreational use needs to be controlled and informal trails closed where possible.

GRASSLAND HABITAT

Management Issue	Management Guideline
Buffer:	*DEVELOPMENT* –
	Mowed strip of 3-4 metres for fire break where no roadway exists.
	ZONAL –
	Due to low height of grasslands only mowed buffer may be required.
	HABITAT ASSOCIATION –
	Effectively supplies feeding areas for a variety of wildlife species of many vegetation community types.
Fire Management:	*CONTROLLED BURNS* –
	Fire is being used more commonly as a tool in grassland management. This measure may be used to remove invading annual grasses, weeds, and forbs, and is used also to "clean up" sites which have been sprayed with herbicides. However, because of the complexity and impact on forbs, a detailed plan is required for any proposed burn. Native prairie should not routinely be considered for burning without significant research to support such measures.
	FIRE CONTROL –
	Fire breaks, access and methodology should be created for each major grasslands site.
Life Cycling of Habitats:	• With the change in natural controls (burning and grazing) low shrub and silverberry have encroached into a variety of grassland habitat types.
	• Methods of control and optimal densities of plant types are being researched.
Planting and Reclamation:	• Attempts are being made currently to utilize native species in reseeding and rehabilitation projects. Introduced grass species, such as smooth brome, timothy, foxtail barley, and crested wheat grass are now seen as being "weed" grasses that tend to supplant other grasses and forbs. It is recommended that these types be removed from current seed mixtures associated with natural environments. No conifer planting recommended.
	• See vegetation community planting recommendations.
Trails:	• Grasslands are one of the most resilient habitats to a variety of impacts. However, if soil is exposed to significant impact, introduced and invasive species will occur.
	• Closure and rehabilitation of significantly damaged trails are to be determined on a site by site basis.

WETLAND HABITAT

Management Issue	Management Guideline
Buffer:	*DEVELOPMENT* –
	Adjacent housing has potentially significant detrimental impacts on native wetlands, including increased recreational pressure, changed water tables, elimination of upland nesting sites, reduced over land drainage and water quality. Wetlands also increase pest species such as mosquitoes as an impact to residential development. A greater buffer size is desirable to prevent conflict. Industrial sites under some circumstances may be more appropriate as neighbouring land uses.
	ZONAL –
	Nesting sites require seasonal separation from recreational uses this can be done through vegetation planting and trail routing.
	HABITAT ASSOCIATION –
	Upland vegetation is important to protect in association with the actual wetland areas to provide nesting and feeding areas.
Fire Management:	*CONTROLLED BURNS* –
	Not to be considered at this time.
	FIRE CONTROL
	Ver little risk in healthy habitat.
Life Cycling of Habitats:	• Surrounding agricultural uses and other impacts such as grazing to e avoided in dry seasons to maintain overall integrity.
Planting and Reclamation:	• See vegetation community planting recommendations.
Trails:	• Secure and controlling structures required to reduce high impacts in sensitive areas. Use of railing and/or boardwalks to provide safe and lower impact access.

RECOMMENDATIONS & CONCLUSIONS

The following recommendations have been provided after considering the issues, the recommended management guidelines and after discussions with Parks Division management. These recommendations include comments on required action, staff required, changes in working groups and finally issues needing resolution that are beyond the scope of this report.

The management areas that require ongoing natural environment expertise are Planning and Design, Resource Management and Education, Interpretation, and Marketing. While somewhat aligned with Calgary Parks & Recreation divisions, significant responsibility overlap requires increased communication between each division.

A) PLANNING REQUIREMENTS:

Involves the ongoing input into planning processes and design where natural environments are potentially impacted. Activities include regular reviews and input into Area Structure Plans, Area Redevelopment Plans, Master Plans, projects and policy documents.

Required Projects:

Environmentally Sensitive and Significant Areas:

- A regular updating of the Environmentally Sensitive Areas Inventory files.
- Accurate interpretation of Significant Environmentally Sensitive Areas for inclusion in Area Structure Plans and other development negotiations.
- Transfer of the material to a computer database (GIS).
- Annual biophysical review of some of the sites will be required.

Projects Related to Natural Area Management Plan:

- Implementation of individual park projects will require direction to comply with new natural area management guidelines. The Nose Hill Park Natural Area Management Plan, the Urban Park Master Plan implementation, and the Inglewood Bird Sanctuary Master Plan, are just a few of the projects currently under way requiring such involvement.
- As new master plans, management plans and other project proposals are developed, attention will need to be focused on the impacts of active recreation, and on the provision of buffers, corridors, protection of diversity and the reduction of fragmentation.
- Specific site plans will be required for trails, amenities and barriers.
- With and increased focus on environmental assessments as a requirement from new provincial legislation, direct staff support will be required in the form of impact assessments, research and consultant report reviews.
- Proposals for construction and utility placement in natural environments will undergo varying levels of assessment and mitigation.

Community Participation and Coordination:

- A one window approach is requried when dealing with the various community organizations involved with City natural environment lands.
- Continuous operational contact should be made available to the interest groups from planning and operations.

Assigning of Management Zones in Parks:

- Overall parks system requires zoning with particular emphasis on Natural Environment Parks.
- Each Park in the Open Space Classification System needs assignment into the park management zones system.

Research:

- Research is currently taking on increased importance, with the need for updated information on rehabilitation techniques, habitat life-cycling, fire management and other issues. With the increased numbers of student projects and consultants capable of undertaking such research, a method of assessing proposals and funding is required. Consideration shall be given to experimental research sites where the natural environment is not compromised.

Urban Edge/(Fringe):

- An increased coordination with the surrounding municipalities is required to address connections and other natural/open space system issues.
- A long term strategy of assessing surrounding natural environments is required.

Data Base:

- Creation of a public data base so that groups such as the Calgary Field Naturalists' Society, Elbow River Conservancy and Schools can update ecosite species lists.

Monitoring Results:

- Review and assess management guidelines. Review and assess protected lands and condition over long term.

B) RESOURCE MANAGEMENT REQUIREMENTS:

Involves the allocation of staff to the day to day operation, maintenance and management of natural areas. Activities revolve around resource management techniques and basic maintenance strategies. While not normally labour intensive, regular assessments and action is required. In order to adequately address and give priority to natural environment parks, specific trained staff with the responsibility for allocating appropriate staff resource, must be assigned on a permanent basis with natural environment parks as their primary responsibility. Knowledge required by the identified foreman includes staff supervision, project management, community relations, weed and pest control, light equipment, ecology and reclamation. It is hoped that with time, the expertise will be increased through training and a shift in hiring emphasis.

Required Projects:

Field Project Management:

- Field supervision of ongoing projects for natural environments, while not necessarily requiring direct project management from a Natural Parkland Management Coordinator, ongoing liaison is necessary from Parks Division field staff to answer day to day resource concerns.
- Some specific projects would be undertaken by the Natural Area Management Coordinator as necessary (ie. thse that require level of technical expertise).

Dog Use:

- New signage assigned and posted by Parks Division.
- Increased education information required, (eg. brochures, signage).

Fire Management, grazing, Life-cycling of Habitats, Wildlife Control and Pest Management, Enhancement Structures, Snags and Deadfall:

- Issues dealt with on a site by site basis following Natural Parkland Management Plan guidelines.
- Issues dealt with by area staff.
- Complex issues dealt with by Natural Parkland Management Coordinator/Parks Superintendent.
- Wildlife issues will be dealt with by Provincial Authorities as per the Wildlife Act in consultation with Natural Parkland Management Coordinator/Parks Superintendent.

General Natural Environment Parks Maintenance:

- Maintenance schedules set by area office on a park by park basis by Natural Area Foremen.
- Inventory of required and completed work to be conducted based on category of natural environment by Natural Parkland Management Coordinator.
- Assistance with community based cleanup operations.
- Ongoing evaluation of trail conditions and rehabilitation projects.

Planting and Reclamation

- Major Natural Areas, Preservation Zones and Special Protection Natural Areas to be monitored and evaluated by Natural Parkland Management Coordinator and Parks Superintendents.

- Disturbed and Supporting Natural Area Parks to be monitored and evaluated by area staff.

- Other park types with natural environments coordinated by area staff with contact as required from the Natural Parkland Management Coordinator.

- Identification of potential planting sites for a variety of trees that become available on an annual basis is required.

- All rehabilitation projects reviewed on an individual basis with a long term maintenance requirements identified.

Signage and Amenities

- A signage policy for Natural Environment Parks be created including themes, design, priority, budget and placement. To be developed by Design staff, Natural Parkland Management Coordinator and Parks Superintendent.

- Signage, (regulation, directional, or interpretive) needs to be standardized in message and in some cases format for natural environment parks.

- Interpretive messages related to resource management.

Weed Control:

- Natural Area Foremen with Natural Parkland Management Coordinator identify priority control sites and identify methods of control.

- Inventory and mapping required to identify infestations of weed problems.

- Development of a reporting system by Natural Parkland Management Coordinator and appropriate Working group.

C: Education, Interpretation and Marketing:

This section includes the presentation of information regarding natural areas and natural history in Calgary. It is the primary method of communication regarding the protection, management and use of natural environment parks. It includes staff training, community communication and training, public use and general natural history programming. Techniques are widely varied and include direct public programming and courses, displays, brochures, public service announcements and signage. Staff are no longer the only method of delivery as community groups, post secondary institutes, schools and volunteers are committing greater amounts of time and funds to this area.

Staff Training

- 3 day training session for all full time parks division staff (and others as deemed necessary) regarding natural area management techniques.

Community-based Training

- Creating a training package for Community groups involved in: reclamation, planting and other park stewardship roles.

- Training to include: planting standards, techniques, basic ecological principles and site specific training. To include basics in inventory and using an ecosite approach.

Training and Technical Manual

- Creation of a Natural Area Staff Training and Technical Manuals.

- Includes definitions, habitat information (types, locations, issues, photos, maps), key species (identification, location, issues), ecological issues, evaluation techniques, management techniques. Technical manual will include detail required for specific projects.

Update and Revise Training.

- Includes updating manuals and providing staff courses as required.

Public Education and Personal Interpretation

- Courses and Programs offered both from an educating role in general natural history subjects to direct programs in natural area specifics.

- Include programs currently offered plus an expansion of community based Natural Area programs and "wise use" type recreation programs (eg. Mountain Bike etiquette).

Community Assisted Programs

- Encouragement of community-based interpretive programs with such activities as leadership training, promotion and in some cases direct course delivery.

Non-Personal Interpretation and Marketing

- A coordinated program for the creation of brochures, public service announcements, horticultural announcements interpretive signage (general natural history) and displays is required to address priority needs and funding potential.

Volunteers

- Creation of stewardship volunteer program initially at Weaselhead with potential to spread to other major natural areas.

- Continuation of Inglewood Bird Sanctuary Volunteer Program

Education, Interpretation and Marketing Recommendations:

- Staff training (Manuals and Courses) and community based training to be designed by Natural Parkland Management Coordinator and Parks Division Staff Training Section. Proposed NA foremen to take significant role in direct training.

- Public Education and Personal Interpretation is the responsibility of Leisure Services Division. Communication to be established between different organizations offering Natural Area personal interpretation. Where natural area management is concerned Natural Parkland Management Coordinator/Parks Superintendents will be involved in the direction of themes of programming.

- Non-personal interpretation and marketing will be undertaken with a team of staff from Natural Parkland Management Coordinator, Parks Superintendent, Leisure Services Division, and Marketing and Design.

- An Education and Interpretive Plan for Calgary Parks & Recreation be developed using Natural Area Management Staff and Leisure Services Staff under the Planning, Design and Marketing Section. Preferably a brief 2-3 month secondment to coordinate the plan.

STAFFING REQUIRED

(NOT INCLUDING LEISURE SERVICES)

A. Existing and in place with little change of duties required:

- Natural Parkland Management Coordinator – Central Parks Services. Required in more complex natural environment issues. Project management of Natural Environment Parks activities.

- 2 Seasonal/On-call Research Assistants. – Central Parks Services. Largely involved in research and inventory.

- Development Review Planner – Planning Section. Reviews and formally inputs on ASP's and Development Permits.

B. Existing but with significant change of duties:

- Natural Area Foremen – Prime focus centred on site specific natural area maintenance strategies. Responsibilities include coordination of ongoing operation projects, assigning of seasonal staff and some ongoing inventory.
- Design specialist (development coordinator or landscape technician). Specialized training in rehabilitation, reclamation and restoration.

NATURAL AREA MANAGEMENT PLAN STAFFING CHART

I – Input DD – Direct Delivery	NAM Coord	Park Sup	Plann	NA Foreman	S/OC RA	Design	LSD
PLANNING REQUIREMENTS							
Environmentally Sensitive and Significant Areas	DD		DD		I		
Environment Assessments	I				DD		
Parks Projects Related to Natural Area Management Plan	DD	I	I	I		DD	
Community Participation and Coordination	I	I	DD	I		I	
Assigning of Zonation System in Environment Parks	DD	I	I				
Research	I		I		DD	I	
Urban Edge	DD		I		DD		
Data Base	DD		I		I		I
Assess Success	DD	DD		I			
RESOURCE MANAGEMENT							
Project Management	DD	I		DD			
Dog Use in Parks	I	I	I	DD			
Fire Management, Grazing, Life-cycling of Habitats, Wildlife Control and Pest Management, Enhancement Structures, Snags and Deadfall:	DD	I	I	DD	DD	DD	
General Natural Environment Parks Maintenance:	I	I		DD	I		
Planting and Reclamation	I	I		DD	DD	DD	
Signage and Amenities	DD	I		DD		DD	I
Weed Control	I	I		DD	I		

I – Input DD – Direct Delivery	NAM Coord	Park Sup	Plann	NA Foreman	S/OC RA	Design	LSD
EDUCATION, INTERPRETATION AND MARKETING							
Staff Training	DD			I	DD		I
Community-based Training	I			I	DD		I
Training Update	DD	I		I	I		
Training and Technical Manuals	D			I	I		
Public Education and Personal Interpretation	I	I			I		DD
Community Assisted Programs	I						DD
Non-Personal Interpretation and Marketing	I	I			DD	DD	I
Voluntarism	I				DD		DD

RECOMMENDED GROUPS:

1. Environment Working Circle

- Change Weed and Pest Working Circle into an Environmental Working Circle with representation of Weed and Pest Foreman, insect abatement specialist, Natural Parkland Management Coordinator, Planner, representative from Leisure Services, Natural Area Foremen, Parks Superintendent and Urban Parks Coordinator (as required).

Role:

– To address current parks related environmental issues.

2. Natural Area Management Research Committee

- A Research Committee be created with membership including department staff (Planning, Design and Marketing, Parks Division and Leisure Services Division, Parks Foundation Division), some interest groups such as the Calgary Field Naturalists' Society, and the University of Calgary faculty, etc. (Only those organizations without a perceived conflict of interest).

Role:

– Independent review and assessment of priority for unsolicited research proposals.
– Monitor and collection group for related research updates.
– Identify experimental locations.

UNRESOLVED ISSUES

Outstanding Issues (with no recommendation) to be further reviewed by Parks Division Management Staff

- Natural Parkland Management Coordinator role. Currently no formal status regarding supervision of staff or land base. Needs specific and effective format for involvement in operations.

- Source for Parks Foremen and labour force Currently all foremen assigned to other duties.

- Mapped Inventory of Parks Lands (with separate attention to other departments lands, provincial lands) Currently very difficult determining specific boundaries for parks inventory.

- Native Plant Nursery – Consideration for the creation of one somewhere to propagate regeneration materials (as per Urban Parks Master Plan).

- Protection of Resource - Options for park regulation enforcement.

Outstanding Issues (with no recommendation) to be further reviewed by Calgary Parks & Recreation Department Management Staff

- Needs consistent Parks Classification System that takes into account function.

- Parks Zonation System – Application of comprehensive zone system to all Parkland.

- Inglewood Bird Sanctuary land based management. – Issues surround the land based responsibility between divisions. Discrepancy between IBS having full time facility attendant and separate operational budget. (question – can facility attendant be used more effectively across a variety of park sites.)

- Management responsibility for Petro Canada Rotary Site – To be taken over in 1996 by Calgary Parks & Recreation Department. Needs clear direction as to which division will operate site and staffing needs.

- City-wide Role of Proposed Interpretive Centre at Inglewood Bird Sanctuary. Long term goals and purposes for interpretive centre unidentified.

GLOSSARY OF TERMS

This glossary of definitions was developed for the Natural Area Management Plan to provide a consistent source for terms used by people in the management of natural environments.

These terms have been collected from a number of sources and those sources have been identified where possible. The following abbreviations apply to the approved document source.

(PRPP) Parks ad Recreation Policy and Systems Plan (1988-1992)

(CRVP) Calgary River Valleys Plan

(CGMP) Calgary General Municipal Plan

(UPMP) Proposed Urban Parks Master Plan

(UPPB) Urban Parks Master Plan Biophysical

The glossary will be reviewed and amended as necessary.

ABIOTIC – *Not living.*

ARCHAEOLOGY – *The scientific study of material remains of past human occupation.*

AREA REDEVELOPMENT PLAN (PRPP) – *A plan establishing guidelines for future redevelopment of inner city communities; when adopted by City Council, the plan becomes a bylaw. The guidelines are formulated by considering the sequence of development, land use, transportation, demographics and open space.*

AREA STRUCTURE PLAN (PRPP) – *A plan establishing guidelines for development and subsequent subdivision of new communities; when adopted by City Council the plan becomes a bylaw. The guidelines are formulated by considering the sequence of development, transportation, population density and land use*

ASPECT – *The particular direction a slope faces.*

ASSESSMENT – *An analysis of an inventory or piece of land.*

BIOTIC – *Living.*

BIOTIC COMMUNITY (CRVP) – *An assemblage of populations living within a prescribed area. It is a loosely organized unit to the extent that it has characteristics additional to its individual and population components.*

BOLE – *The main body or trunk of a tree.*

BUFFER STRIP (PRPP) – *A strip of land intended to separate two incompatible land uses or zones.*

CANOPY – *The top layer of vegetation in a forest, in particular that which controls light levels in the understorey.*

CLIMAX – *The last seral stage in succession.*

COMMUNITY – *A group of populations of plants and animals in a given area.*

CONIFEROUS – Cone bearing

CONSERVATION (PRPP) – *A mandate for the Parks & Recreation Department which implies the controlled, wise use of the natural environment or the saving of an area for future use.*

COPSE – *A small grove of trees (aspen), usually originating mainly from shoots or root sucker.*

CORRIDOR/CONNECTION – *The land or water area which enables wildlife (Plans, Birds, Mammals, Insects, Herptiles etc.) to move freely between natural environments.*

D.B.H – *Diameter breast height (4.5 ft. above ground) measurement of a tree.*

DECADENT – *Market by decay or decline due to age*

DECIDUOUS – *Leaves not persistent. Falling at end of growing season.*

DEDICATED PARKLAND(CRVP) – *City-owned land set aside by City Council for parks and recreational purposes.*

DEVELOPMENT(CRVP) – *Means:*

i) An excavation or stockpile and the creation of either of them, or

ii) A building or an addition to, or replacement or repair of a building and the construction or placing in, on, over, under land of any of them, or

iii) A change of use of land or a building or an act done in relation to land or a building that results in a change in the use of the land or the building

iv) A change in the intensity of use of land or a building or an act done in relation to land or a building that results in or is likely to result in a change in intensity of use of the land or building.

The above definition is in accordance with The Planning Act and The Land Use Bylaw

DISTURBED AREA – *An area which has resulted from the use of all terrain vehicles, excavation and fill, snow dumping, agriculture and gravel extraction. It may also result from the negative effects of recreational use. Generally these areas are rich in introduced plant species or void of vegetation.*

DIVERSITY – *The variety of species, vegetation communities, habitats or landform in a given area.*

DOMINANT SPECIES – *The most prolific species in a vegetational strata that by size, number, or coverage, impacts the resources of other associated species.*

ECOLOGY – *The study of relationships between living things, with each other and with their environments.*

ECOREGION(UPPB) – *An area characterized by a distinctive regional climate and other factors as expressed by vegetation.*

ECOTONE – *The transition area between two vegetation communities.*

ECOSITE(UPPB) – *An area with a unique combination of vegetation, landform, soil and other environmental components.*

ECOSYSTEM – *A community of organisms and their physical environment.*

EDGE – *The boundary between two distinct vegetational communities.*

EDUCATION – *The knowledge and development arising from training.*

ENHANCE – *To add or contribute to ...*

ENVIRONMENTAL RESERVE – *An open space area, established in accordance with the Planning Act. Subject to section 97, a subdivision approving authority may require the registered owner of a parcel that is the subject of a proposed subdivision to provide part of that parcel as environmental reserve if it consists of*

a) a swamp, gully, ravine, coulee or natural drainage course,

b) land that is subject to flooding or is, in the opinion of the subdivision approving authority, unstable, or

c) repealed 1984 c33 s6,

d) a strip of land, not less than 6 metres in width, abutting the bed and shore of any lake, river, stream or other body of water for the purpose of

i) preventing pollution, or

ii) providing public access to and beside the bed and shore.

ENVIRONMENTALLY SENSITIVE AREA – *Any land and/or water area that has existing characteristics of a:*

- *natural/native plant or animal community.*
- *portions of a natural ecological and or geomorphic system. It retains or has reestablished a natural character although it need not be completely natural.*

SIGNIFICANT ENVIRONMENTALLY SENSITIVE AREA – *An ESA that has existing significant characteristics of a:*

- *natural/native plant or animal community.*
- *portions of a natural ecological and or geomorphic system.*

The significance will be determined by a combination of the following criteria:

1. *Quality of Biotic Community – Biotic communities are of high quality (minimal disturbance) and/or diversity for their specific habitat type.*
2. *Ecological Function 0 Human – Area appears to make a significant, if not unique, contribution to the healthy maintenance of human systems beyond its boundaries (includes aesthetic considerations, informal recreation space, diversity of urban form).*
3. *Ecological Function – Natural – Area is important to the healthy maintenance of a natural system beyond its boundaries.*
4. *Distinctive and/or Unusual Landform – Presence of distinctive and/or unusual landform (geological or geographic)/*
5. *Uniqueness – The habitat or ecosystem component has limited representation within the municipality and/or the area is representative habitat for wildlife of recognized importance.*

6. *Viability – Natural Environment in its present state is likely to retain significance, quality and ecological integrity. Adequate land and/or water area is available to afford existing species with sufficient living space.*

ESCARPMENT(CRVP) – *A term used loosely to describe a steep slope formed by erosive action of water and normally adjacent to a watercourse.*

EVERGREEN – *Foliage persistent, and remains green year round.*

EXOTIC – *A species which is not native and has been introduced by people to an area.*

FLOODPLAIN(CRVP) – *The land located immediately adjacent to the floodway which is not needed for the course or the conveyance of the designated flood but which is, nonetheless, subject to inundation.*

FLOODWAY(CRVP) – *The present channel, plus those portions of adjoining land which are needed to convey a 100 year designated flood of 69,600 cubic feet per second for the Bow River upstream of the confluence with the Elbow River and 94,300 cubic feet per second downstream of the confluence; and 26,800 cfs for the Elbow River downstream from Glenmore Reservoir Dam; and 2,850 cfs for the Nose and West Nose Creeks, without unreasonably raising the upstream water levels above the natural levels that would exist if the channel was well maintained.*

FORB – *Any herbs other than grasses or grasslike plants.*

FRAGMENTATION – *To separate or divide naturally occurring habitats or plant communities.*

GREEN BELT(PRPP) – *A strip of land surrounding an urban area. It may contain farms, golf courses, and scattered housing. It is intended to separate one urban area from another.*

HABITAT(CRVP) – *A place where an organism lives.*

HISTORICAL – *Related to written history.*

INTERPRETATION(UPMP) – *Translation and communication of natural historical information into meaningful and contemporary messages.*

INTRODUCED – *Species or habitat created or transported by people or their activities.*

INVENTORY – *A survey of selected natural resources not necessarily including an assessment.*

LAND ACQUISITION(UPMP) – *Lands to be purchased or leased normally on an opportunity basis, and lands that can be acquired through donation, credit reserve or any other manner.*

LINEAR PARK – *A narrow open space extending along riverbanks, escarpments, easements and other rights-of-way. They are often landscaped and usually contain trails and/or pathways.*

MAINTENANCE – *The keeping of parks, buildings, equipment and supplies in accordance with standards for effective operation.*

MAJOR NATURAL AREA – *A large natural area whose primary role is protection and passive recreation. These parks have moderate to high environmental sensitivity but may contain a variety of park zones. (ie Nose Hill, Edworthy Park)*

MANAGEMENT – *To direct to a degree, the outcome of a particular project or land area.*

MANAGEMENT PLAN – *A planning study and resulting document where the concern is to identify issues and create a management and implementation strategy.*

MANAGEMENT ZONE – *See Park Zone.*

MASTER PLAN(PRPP) – *A planning study and resulting document where the concern is to formulate and to clarify long term goals for decision making. The plan identifies issues and concerns, then translates these into a recommended course of action.*

NATIVE – *Species of animals or plants that have not been introduced by people or their direct activities.*

NATURAL – *Ecological processes that are relatively unchanged by humans.*

NATURALIZED – *A previously disturbed site that is left to natural processes.*

NATURAL AREA(CRVP) – *A parcel of land exhibiting all of the following characteristics.*

- *an area of open "Green Space" within the city.*
- *predominately covered with indigenous vegetation such as prairie grassland or riverine forest*
- *lacking substantial modification by man*
- *not in active arable or other farmland use*
- *contains indigenous fauna*

NATURAL AREA(PRPP) – *Open space containing unusual or representative biological, physical or historical components. It either retains or has had re-established a natural character, although it need not be completely undisturbed.*

NATURAL ENVIRONMENT PARK – *A natural area to be included in the Open Space Classification*

NATURAL ENVIRONMENT CATEGORY – *The division of natural environment park class into functional categories. These include Sanctuary Status, Major Natural Area, Supporting Natural Area and Other Park Type with Natural Environment.*

NICHE – *The role in which any species or community plays in an ecological system.*

OPEN SPACE (PRPP) – *All land and water areas, either publicly owned or offering public access that are not covered by structures.*

OPEN SPACE CLASSIFICATION(PRPP) – *A system used to designate certain areas for specific types of use. Classification and zoning combined ensure that resources are managed for their preservation, Open space is categorized as follows:*

- *City-wide parks*
- *Regional Parks*
- *Community parks*
- *Neighborhood parks*
- *Cemeteries*
- *Golf Courses*
- *Roadway boulevards*
- *Park reserve*
- *Linear Parks*

OTHER PARKS WITH NATURAL AREA – *Another class park with natural environment within them (ie. Pearce Estate, Princes Island)*

PARK (PRPP) – *A specific use open space area which is managed to provide opportunities for recreation, education, cultural or aesthetic use. The main type of parks are:*

1. *City-wide – a park, also refereed to a special interest park, that offers historical, zoological park, botanical, cultural and education opportunities for the residents of and visitors to the city (eg) zoo, planetarium, historic sites.*
2. *Regional recreational parks – a park, large and basic to the park system. It offers diverse or special activities to the entire city. These currently include athletic parks and natural environment parks.*
3. *Community Parks – a large park having facilities intended for local use. It includes school grounds, community athletic fields and natural environment parks.*

4. *Neighborhood Parks – a small passive park offering spontaneous recreation to the local resident. It can include tot lots and playground.*

PARK RESERVE (PRPP) – *An open space area, publicly owned, intended for use as a park.*

PARK (or PARKLAND) ZONE:(PRPP) – *A resource management technique involving distinguishing units for varied management objectives, within a specific park (eg) recreational experiences, preservation etc.*

PATHWAYS – *A route that provides designated access by a variety of compatible multiple or single travel modes (excluding automobiles). It is designated for the pursuit of outdoor recreational experience and activities. Pathways may be for bicycles, cross country skiing, pedestrian or equestrian use unless otherwise identified.*

PEST – *A species of animal that is undesirable. It may or may not be introduced.*

POPULATION – *A group of individuals of a single species.*

PRESERVATION(PRPP) – *A mandate of the Parks and Recreation Department which implies efforts to maintain the natural environment in its present condition or to save an area from damage and destruction.*

PROTECTION – *A management technique used to keep an area from harm. It can include many actions.*

PUBLIC ACCESS(CRVP) – *Access registered public right-of-way or easements through private property.*

RAPTOR – *Birds of prey (Hawks and Owls).*

RECREATION(PRPP) – *An activity oriented to the expression of human interests and needs seeking satisfaction during leisure. It is a positive force for individual growth and development. Recreation can be an end in itself – there need be no reward other than personal satisfaction during leisure. It is a positive force for individual growth and development. Recreation can be an end in itself – there need be no reward other than personal satisfaction derived directly from ones participation in recreation.*

RECREATION PARK (PRPP) – *A mixed-use park area. The park may include play fields, playgrounds, landscaped areas, natural environment areas, etc.*

RECLAMATION – *The efforts to improve a disturbed site's condition.*

RESERVE(PRPP) – *With regards to subdivisions...Reserve land is required by the subdivision approving authority. There are five types of reserve land: environmental, municipal, school, general, and municipal school.*

RESOURCE MANAGEMENT – *A management strategy that identifies the requirements of the resource or a component of the resource and undertakes specific actions to provide those fundamental needs. They may include protection, development, education, encouragement of use, research, monitoring etc..*

RESTORATION – *The efforts to restore a disturbed site to near its natural and native condition.*

RIPARIAN – *The waters edge or ecotone between the aquatic and upland ecosystem.*

RIVER CORRIDOR – *The band of vegetation along a river that differs from the surrounding environment.*

RIVER/CREEK VALLEY(CRVP) – *Sloping area abutting the river/creek channel.*

SERAL STAGE – *Once stage in the continual successional change of a vegetational community.*

SETBACK (PRPP) – *Required distance between a roadway, right of way, water body or–escarpment and either a property line or a development as defined in the land use bylaw.*

SNAG – *A standing dead or dying tree.*

SPECIAL PROTECTION NATURAL AREA – *A park whose overall environmental sensitivity and significance merits most of its park zones to be preservation. These generally are provincially or regionally significant to wildlife. (eg. Inglewood Bird Sanctuary, Weaselhead).*

SPECIES(CRVP) – *A genetically distinctive group of natural populations that share a common gene pool that are reproductively isolated from all other such groups.*

STRUCTURE – *The spatial distribution of vegetation and or animals within a community.*

SUCKER – *A form of vegetative reproduction by which a shoot is produced from the roots of a plant, producing a clone.*

SUPPORTING NATURAL AREA – *A natural area of varying size that provides necessary ecological function to a larger natural environment (ie, corridor, buffer) or a smaller, separate natural area. (eg. Edgemont Escarpment, Ranchlands Community Aspen Woods)*

TRAIL – *A non-paved surface route for non-vehicular traffic.*

WEED – *A species of plant that is undesirable.*

WILDLIFE – *Native plants and animals living under natural conditions.*

VIABLE – *Capable of surviving under addressed conditions.*

SUGGESTED READING BY SUBJECT

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APPENDIX A

PROVINCIAL LEGISLATION

i) The Planning Act – June 25, 1991.

Reserves

Under the Planning Act, "reserve land" means environmental reserve, municipal reserve or school reserve.

Environmental Reserve

- Under section 98:

Subject to 97, a subdivision approving authority may require the registered owner of a parcel that is subject or a proposed subdivision to provide part of the parcel as environmental reserve if it consists of

a) A swamp, gully, ravine, coulee or natural drainage course,
b) Land that is subject to flooding or is, in the opinion of the subdivision approving authority, unstable, or
c) Repealed 1984 c33 s6,
d) A strip of land, not less than 6 metres in width, abutting the bed and shore of any lake, river, stream or other body of water for the purpose of
   i) preventing pollution, or
   ii) providing public access to and beside the bed and shore.

- Under Section 99 (2):

The aggregate amount of land that may be required to be provided under subsection (1) shall not exceed 10% of the area of the parcel less the land required to be provided as environmental reserve.

- Under Section 111 (1)

Subject to section 177.1, environmental reserve may be used as a public park but if not used, it must be left in its natural state.

- Under Section 111 (2)

Municipal reserve or school reserve or municipal and school reserve may only be used by a council or a school authority or by them jointly for all or any of the following purposes

- a public park,
- a public recreation area,
- school purposes, or
- to separate areas of land that area used for different purposes.

- **ii)The Municipal Government Act**

ii) Acquisition and Disposal of Land

Under sectio126 of the Act a council may acquire land or any interest either inside or outside the municipality for any municipal purpose.

iii) Maintenance of City Land

Under Section 160 of the Act a council may pass bylaws regarding a large range of subjects, including the eradication of dandelions and noxious weeds or plants, the cutting of grass on public or private property, for the purposes of eliminating or mitigating the mosquito nuisance, animal insects or other pests and diseases likely to be destructive to property, ...

Under section 197, a council may provide for the planting and protection of trees, shrubs, grass or flowers on any highway or public place.

- **iii)Other Provincial Legislation:**

a. The Municipal Taxation Act

Section 149 (1) authorizes many different works to be undertaken as local improvement including:

-The acquisition of land for a park and the creation of a park and all expenses connected therewith.

b. Weed Control Act, Agricultural Chemical Act, Agricultural Pests Act, Fish and Wildlife Act, Alberta Environment Act.

The first three pass Acts in (B) onto the municipality authority and responsibility to enforce the City environmental controls regulation. The last two retain regulatory responsibility for Fish and Wildlife and certain environmental concerns.

MUNICIPAL BYLAWS AND POLICIES

CALGARY GENERAL MUNICIPAL PLAN 1979 TO 1981

CHAPTER 3.5 THE ENVIRONMENT

Introduction:

3.5.1

The planning and management of Calgary's environment is a matter of increasing concern. The result of paying insufficient regard to the environment in the past has limited choices in the present; If sufficient regard is paid to the environment in the present the future will be jeopardized...

It is therefore vital, that increased attention must be given to environmental matters. In recognition of this, various environmental objectives and policies have been adopted by Council and included in the Calgary Plan...

3.5.2

The term "environment" has been interpreted as relating to three things: Firstly, the environment in relation to the existing urban fabric – this is "the built environment". Secondly, environment in relation to open areas such as agricultural land and natural areas. This is termed "the non-built environment". Thirdly there is environmental pollution.

NON-BUILT ENVIRONMENT

3.5.19

There are four aspects of the non-built environment that are singled out in the Calgary Plan for attention.

1. City scape
2. Agricultural land
3. Land liable to flooding.
4. Open space and natural areas.

3.5.20

City Scape

The visual character of significantly large parts of the city and the visual interrelationship between different types of use within parts of the city.

3.5.21

A study of "urban design guidelines' will be undertaken to identify potential policies and proposals for inclusion in the Calgary Plan. The following is a preliminary list of factors that will be examined in this study.

i) protection of vistas and views.
ii) skylines- assessment of the importance of views to and from these features.
iii) building design and height control
iv) protection of the environment around:
   a) rehabilitation areas
   b) industrial areas
   c) nodes of high activity
v) vegetation – assessment of the importance of trees and natural landscaping the urban environment.
vi) the importance of establishing stronger control over the design and placement of general landscaping, special treatment and furnishings.

MONITORING

3.5.35

This section has only discussed two aspects of the non-built environment in detail. Other aspects, such as ecologically valuable areas, wooded areas and steeply sloping areas, have not been discussed as the Calgary Plan contains no specific policies in these areas. However, it is important to recognize that many individual factors combine to create environmentally pleasing areas. It is proposed, as part of the Calgary Plan monitoring processes to establish two mechanisms which will not only add to the Cities knowledge of the environment but will provide guidance on environmental matters, particularly in new development areas.

3.5.36

These two mechanisms are as follows:

i) An environmental assessment study which would analyze the environmental quality of an area of the city, especially where development in prospect. The results of such a study would be used to guide major strategic decisions affecting the area as a whole. A key aspect of environmental assessment studies will be adding to the City's inventory of environmental information. The environmental assessment study would not only be concerned with the non-built environment, though generally this will be the predominate concern; aspects of the built environment could be included as well. An environmental assessment study will be an integral part of all policy reports prepared by the city. The policy report would indicate where more detailed environmental studies would be required as part of an area structure/redevelopment plan. In situations where area structure/redevelopment plans are prepared without there being a policy report, then the area structure/redevelopment plan will contain an environmental assessment study. Where an area structure/redevelopment plan has already been approved for an area, but where large areas remain un-subdivided, then, providing the character of the land warrants it, an environmental assessment study will be required to accompany subsequent applications for subdivisions.

ii) Environmental impact guidelines would prescribe detailed ways in which existing environmental features should be protected and new ones created within new development areas. The need for, and character of, such guidelines will be set down in an environmental assessment study. Although certain guidelines might be used on a city wide scale, they should be flexible and tailored to the needs and character of particular areas.

CHATPER 6 PARKS AND RECREATION

3.6.6

The policies of this plan are divided into four groups.

i) general
ii) parkland (Acquisition, planning, and use of public owned land)
iii) facilities
iv) program

3.6.7

Factors that may have an effect on municipal involvement...

iii)the growing interest in nature oriented activities, as well as increased awareness of the need to protect natural areas and preserve public open space.

v)the need to provide parkland and other types of open space in areas that are underprovided.

vi)The impact of increasing land costs and limited public funds on the acquisition of park land and public open space.

GENERAL POLICIES RELATED TO PARKS AND RECREATION

- PARK LAND POLICIES
- PARKLAND IN GENERAL

Policies – 3.6.16

PR.5 retain and expand the existing major parks system, preserving ownership of all City land suitable for parks purposes, and acquire further suitable lands as opportunities arise.

PR.6 Obtain land needed for neighborhood recreation in new areas through dedication of reserves under The Planning Act, 1977 and other appropriate means.

PR.7 Dedicate all land intended for the exclusive use for parks and recreation activities as park land.

PR.8 Ensure that major physical feature making up the park land system are made accessible and usable for varied activities.

PR.9 Ensure that greater use is made of public open spaces. (eg. by increasing density of surrounding residential development and providing better access to public open spaces).

PR.10 when land purchased by the school boards for building is no longer required, the City be given first rights to negotiate for the purchase of the lands.

THE RIVER VALLEY SYSTEM AND OTHER NATURAL AREAS

Policies – 3.6.24

PR. 13 Develop the river valleys as parkland system which includes:

i) public walk/bikeways throughout the city.

ii) reduction of air, water, noise and visual pollution.

iii) preservation of important major natural features which contribute to the value of the system.

PR. 14 Provide, where possible, as a long term objective, continuous public access to all river and creek banks, subject to the following.

i) This policy will not be applied in the case of private lots, abutting the city's watercourses which are currently designated RR-1, R1-2. Residential Districts, and riverbank land used by private nonprofit organizations.

ii) In the event of redesignation initiated by property owners/developers of river bank lots

to other land uses other that RR-1, R-1 residential districts, the city will negotiate for the provision of public access to riverbanks.

PR. 15 Providing building setbacks from the edge of the Bow and Elbow Rivers and the Nose and West Nose Creeks in accordance with the Land Use By-law.

PR. 16 Acquire major open space and natural areas, as part of the development of a total park and recreation network, in association with the provincial government.

PR. 17 Preserve undeveloped major escarpments as natural open space features to enhance the environment.

PR. 18 Setback zones of 60 feet from the top of any escarpment be established in any new development or redevelopment area. (see part 4 – 4.1.10 - ...When a residential subdivision or any redevelopment abuts the top of an escarpment, a strip of land – with a minimum width of sixty feet, measured from the top of the escarpment to the nearest property line or curb line of a road – will be protected for use as public open space.)

PR. 19 Retain the natural character of Nose Hill, preserving the original topography, flora and fauna.

PR. 20 Continue the development of Nose Hill Park

PR. 21 Continue to cooperate with the Provincial Government in the development of Fish Creek Provincial Park.

IMPLEMENTATION:

3.6.25

To provide a context for the implementation of the policies in this section, it is highly desirable that an overall policy for the City's Natural Areas be established. Especially in relation to PR 13, 16, 17

3.6.28

As required by Policy PR.16 the natural area policy will establish priorities for the acquisition of natural areas.

3.6.29

Area structure plans/redevelopment plans will contain specific proposals related to the preservation of major escarpments. Where suitable, the undevelopable land provisions of the Planning Act, 1977 will be utilized to have such land dedicated to the City.

MONITORING

3.6.32

The following indicators should be monitored with respect to the river valley system and other natural areas.

iii) natural areas acquired as part of the open space system.

iv) funds available in the Capital Budget for the acquisition of natural areas.

4.1.6

ARP/ASP will translate the policy framework and guidance of the GMP regarding ...environmental matters pertaining to the areas they cover.

CALGARY PARKS & RECREATION POLICIES AND PRIORITIES PLAN 1988-92 VOLUME 1 AND 2

APPROVED JAN 1998

PART 1. PHILOSOPHY, ROLE AND MISSION

BASIC VALUES AND BELIEFS

- **The Potential of the environment...**
  -We know that we must respect and relate to the natural environment.

  -This means...

  - that we will advocate the importance of open space and parks as the city is planned and developed
  - that we will endeavor to preserve and protect ecologically sensitive areas.
  - that we will develop and maintain a parks system capable of hosting outdoor recreation/education activity as well as providing buffers as visual relief from the built environment.

ROLES OF THE ENVIRONMENT

- **Planner, Protector, Facilitator and Provider**
- Protector
  - To protect and preserve unique and sensitive ecological and historical resources for the benefit, use and enjoyment of current and future populations.
  - To respect the investment already committed to parks, facilities and leisure programs.

MISSION

- **To ensure the provision of Leisure Opportunities are accessible for all Calgarians**
- **To Protect and enhance the Environment, Both Natural and Manmade**

SERVICES PROVIDED

- Primary Services
  - the acquisition, development and maintenance of park land and open space

PART 2 PRIORITIES 1998-1992

Calgarians indicated they would like to see increased emphasis placed on the following activities:

- General park development
- Natural Areas, environmental protection and preservation
- The role or recreation
- Provision of recreation opportunities
- Keeping sites in good shape

SUMMARY

Emphasis for the next five years:

- effective operation and maintenance of existing parks and facilities
- protection and preseration of significant natural areas with an emphasis on waterways
- marketing of current parks/facilities/ services to ensure optimal utilization and to keep the cost as low as possible for individual users
- expansion and further development of parks system with emphasis on larger parks and the urban design and beautification functions.
- continued emphasis on facilitation and community development strategies...

In keeping with the above priorities, limited capital funds will be focused on:

- Keeping current parks etc. in good shape (81% support)
- Protection of Natural Areas (77% support)
- Developing new parks, improving existing parks (66% support)

GOALS AND OBJECTIVES (1988-1992)

1. To operate and maintain existing parks and facilities in an efficient and cost effective manner.

2. Protect and preserve significant natural environments with emphasis on waterways

   a. Acquire and initiate development of Bow River park locations recommended in the "Calgary River Valleys Plan". (eg. Bowmont, Douglasdale, Cominco)

   b. Develop action plan for protection (and development) of significant open space resources around the City with ephasis on expansion areas to north, south and south-east (Beddington Creek, North Nose Creek, MacDonald Lake, Shepard Slough, Priddis Slough, Lloyd Lake, Pine Creek and East Bow River)

   c. Increase emphasis on river bank protection and management.

   d. Increase emphasis on river recreation (non-power boating); prepare master plan for access and support facilities; assist canoe clubs to establish white water river training sites.

   e. Develop natural area management policy and site specific development management plans.

3. To market current parks/facilities/services to ensure optimal utilization and to keep the costs as low as possible for the individual user.

4. To expand and further develop the parks system to respond to all six roles (outdoor recreation, outdoor education, environmental protection, urban design, landscape beautification, civic pride and identity).

   a. Act on land acquisition plans and strategies to take advantage of a relatively depresses and accessible land market.

   c. Initiate development of Bearspaw and Clearwater Parks wit appropriate links.

   d. Complete acquisition and initiate development of Nose Hill Park.

   g. Land disposition – relinquish poor quality, non-functional, surplus parkland.

   h. Increase emphasis on park visitor services (information, education, programming, interpretation); actively encourage park use

   j. Fulfill the City's obligation to participate fully in the "greening of Calgary"

7. Continue present emphasis on facilitation and community development strategies.

   e. Continued development of volunteer and community leadership programs.

   f. Encourage non-profit groups to assume responsibility for capital projects assigned high priority by the City – projects that might otherwise have been constructed and managed by Calgary Parks and Recreation.

PART 3 LONG TERM GOALS

GOALS FOR THE YEAR 2000

1. Calgary Parks & Recreation strives towards the development and maintenance of a modern, accessible and functional open space. (Map 1)

- Key natural areas will be conserved, a balance of sensitive recreation/ educational use and preservation.

- The river valley systems will be full accessible with major park nodes located along land and water routes...

- Wherever possible the entire system will be linked by linear parks, trails and pathways.

2. In cooperation with surrounding authorities, Calgary will endeavor to create a regional system of parks and natural areas designed to respond to leisure interests and environmental needs of a growing regional population (Map 2)

- protecting floodplain, significant natural habitats and scenic views.
- Providing outdoor recreation and education opportunities for the residents of Calgary and region.
- Linked by trail and water corridor to Calgary and the foothills beyond.

6. The voluntary sector is expected to significantly increase it's role in the provision of leisure and park services, with assistance from the public sector if necessary during the expansion period.
   - citizens will become increasingly involved in the development, maintenance and stewardship of their park and open space system through Adopt-a-park and the programs of the parks foundation.
8. Calgarians will be encouraged to gradually shift their leisure interests and emphasis to less consumptive activities.

PART 4. PARKS/OPEN SPACE

PARKS DIVISION

MISSION

- To ensure the provision and integrity of a high quality and diverse Park and open space system for present and future residents and visitors.
- To ensure a safe, aesthetic and comfortable urban environment through environmental management/protection and landscape development quality control.

The system will:

- provide active and passive recreational opportunities.
- offer a setting for outdoor education (formal and informal).
- Ensure environmental protection/preservation (aquifers, floodplain, woodlot, habitats, "urban lungs")
- contribute to effective urban design

Services provided:

- Coordination of land acquisition for parks and recreation purposes.
- Park planning/design
- Park construction and maintenance
- Management of natural areas owned by the city.
- Production of plant materials
- Environmental control.

PRINCIPLES TO GUIDE PARK/OPEN SPACE DEVELOPMENT

P4 – COMMITMENT TO REGULAR REVIEW OF EFFECTIVENESS OF PARK OPEN SPACE SYSTEM

- Over the years, a hierarchal or system of park types has evolved that collectively responds to the identified functions.
- The department will regularly review the contribution that each site makes to the overall system with the intent of ensuring ongoing development and increased effectiveness for each site.
- Every five years review will take place to determine if system is responsive to current needs and preferences.
- Site master plans, including needs/preferences analysis, will be prepared prior to development of regional and city wide parks.

P5 - CITY PARKS WILL BE MULTI-PURPOSE, DIVERSIFIED AND FLEXIBLE

- Generally each site will be designed to respond to as many functions as possible Exceptions may exist in Natural areas, in floral areas and other specialty parks.

P6– PARKS WILL BE DESIGNED/ CONSTRUCTED WITH OPERATING EFFICIENCY IN MIND

- minimize ongoing operating costs and difficulties such as:
- control and supervision
- maintenance
- pollution and environmental impact
- Parks will be designed with the following in mind
- mix and balance
- diversity and variety
- visual intrusion and noise buffers
- attraction and function.

P8 – PARK USE WILL BE ENCOURAGED

- Every effort will be made to encourage recreation and education activities in the municipal parks/open space system:
- multi use design
- interpretive facilities and programs
- low or minimum fencing
- Parks will be made as physically accessible as possible
- linked to trails and pathways wherever possible.
- regional and city wide parks to be served by public transit.
- design consideration given to special needs of the physically disabled, including parking stalls and access ramps.
- Exceptions to accessibility enhancement are those areas whose management and preservation requires limited access.

P9 – SIGNIFICANCE OF THE RIVER SYSTEM

- The water ways of the Bow, Elbow and Fish Creek are the most significant 'natural resources' in Calgary. The City's creeks and streams also offer opportunities to develop corridors emhasizing a balance between environmental preservation and outdoor recreation.
- The City intends to:
  - develop a river park system with a number of major parks serving a variety of leisure interests connected by a linear and pathway system.

P10 - SIGNIFICANCE OF OTHER NATURAL AREAS

- Along with the river corridors areas with representative or outstanding natural elements will be preserved to:
  - maintain their future existence
  - provide places for park users to be isolated from the urban environment in a setting where "natural" features and qualities are dominant.
  - offer outdoor classrooms for increasing our understanding of nature and our interdependence with ecological systems.
- The City commits to:
  - preserving all natural areas remaining in Calgary and vicinity if those lands are unique or have a high value to Calgarians.
  - work towards preservation of all islands in the Bow and Elbow Rivers containing valuable natural features.
  - managing natural areas to preserve existing species, habitats and special natural features.
  - establish appropriate maintenance procedures and policies for natural areas.
  - providing suitable buffer zones between natural areas and adjacent incompatible land uses.
- Natural areas will be integrated into the City park and open space system wherever possible to ensure protection. The system will contain:

- natural environment parks
- natural environment zones within larger parks
- environmental reserve parcels

- Natural areas will be acquired by:
  - developer dedication as ER
  - developer dedication as credit or non-credit municipal reserve.
  - density transfer from land and subsequent dedication by the developer as ER
  - required development setback standards (table 1)
  - donations to the Parks Foundation
  - outright purchase

P11 – THE IMPORTANCE OF LINEAR PARKS, TRAILS AND PATHWAYS

- The city encourages the creation of linear parks in new subdivisions in order to both link together park nodes in a system and to provide opportunities for linear recreation....Priority is placed on the establishment of linear forms of ER and CR and the use of utility corridors.
- High priority:
- linear recreation...
- cycling as transportation...
- provide access to natural areas.
- The department will:
- continue to develop un-surfaced trails for nature study, hiking, X-country skiing and in some locations, horseback riding.
- ensure public access by providing easements along riverbanks and escarpments through development setbacks.
- public access by providing crossings of barriers such as highways, railways and rivers.

P12 – PARKS/OPEN SPACE IN NEW COMMUNITIES

- Planning Act 1980 provides for the dedication of land for municipal reserve which is traditionally used for schools, community parks and local parks...The aggregate amount of land which is required through developer dedication is 10% of the parcel to be subdivided after subtracting ER and land purchased for expressway and freeway rights-of-way.

P13 – PARKS/OPEN SPACE IN OLDER COMMUNITIES

- The city will attempt to ensure the provision of more adequate open space as these areas redevelop.
- The department will keep a up to date inventory of parks and new acquisition and will work with the Land Department to acquire lands on a priority basis.

P16 – THE DEPARTENT WILL WORK WITH GROUPS INTERESTED IN A PART OF THE PARK/OPEN SPACE SYSTEM

- Users and adjacent communities will be encouraged to participate and become involved in the development and operation of their component of the park/open space system
  - providing input at the planning stage
  - prepared and implementing development projects, possibly grant supported, that address the purposes and objectives of the site
  - volunteering to upgrade maintenance level.

P19 – MAINTENANCE STANDARDS

- Maintenance standards are being developed for each type of park and open

space contained in the system or hierarchy in table 1.

- These standards will be designed to:
  - ensure attractive and functional parks and open space.
  - ensure standards are compatible with each parks system.
  - protect the natural environment.
- Maintenance standards backed by proper budgets for non-traditional parks such as natural areas, riverbanks, trails and pathways will be developed.
- Standards will be reviewed regularly by the department.

P20 – ENVIRONMENTAL CONTROL

- Some parts of natural areas will be formally considered for omission from the spraying program.

P22 – TOWARDS A PHILOSOPHY OF STEWARDSHIP

- Parks are for people; the citizens of Calgary, park users and staff will be encouraged to adopt a philosophy of "parks stewardship"
- The integrity of current parks and open spaces will be protected by:
  - roads will not be located through regional parkland and or other open space only in such cases where they will adversely impact on the park or open space or its use.
  - mitigating action will be taken to minimze disturbance as a result of any development on or near a park/open space site.
  - encourage private development to provide, upgrade and maintain deficient open space on the understanding that the integrity of the public use of the open space is protected by property line demarcation etc.
- require upgrading of the open space as compensation for reductions or encroachments caused by roadway or utility installations or the reserve fund compensated accordingly.
- establish an excavation permit system for utility installation in all parks, natural areas and roadway greens.
- The department will limit recreational activities in certain locations if it is determined that they will result in a significant impairment of environmental quality, particularly if the damage would be permanent.

CHART D...CIVIC BEAUTIFICATION

4. WOODLOT AND TREE PRESERVATION

- preserve woodlot throughout built-up areas and in new subdivisions: particular attention should be paid to those species not frequently found in Calgary.
- maintain existing landscape and vegetation with less developed recreational spaces, i.e. large natural areas preserve natural beauty.
- protect trees in areas under development.
- do not remove deadfall and dead trees in natural areas.
- resist residents pressure to mow natural areas.
- work with developers to minimize grade and watercourse changes in ER in new subdivisions.
- protect parks and natural areas from encroachment and damage by adjacent residents.

PART 6 LEISURE SERVICES DIVISION

GENERAL

- Leisure Services provides advice and support for approximately 500 community groups and organizations.

MISSION

- Ensure a broad range of leisure services is accessible to all Calgarians
- Encourage full utilization of all available Leisure opportunities
- Encourage community participation in the provision of leisure opportunities

SERVICES PROVIDED

- Development of cosponsored programs (including outdoor)
- Provision of direct programs
- information and resource provision
- Lesiure education
- Advice and consultation to other departments.

PART 9 FINANCIAL IMPLICATIONS

Anticipated Expenditure Increases

- Improved management and interpretation of natural areas.

CALGARY RIVER VALLEYS PLAN

EXECUTIVE SUMMARY

Initiated in 1978, the plan contains a range of policies to establish a coordinated approach over a 20 year period to the development, use and conservation of Calgary's rivers/creeks and immediately adjacent lands.

Ultimate aim for the plan is to

- create an open space system in the river/creek valleys and provide diverse, year round recreational uses for the enjoyment and benefit of citizens now and in the future.
- provide for residential and compatible commerical/industrial/institutional development and
- reduce potential flood damage.

IMPLEMENTATION

- Reduce potential flood damage
  - only compatible land uses are allowed in the flood way.
- To avoid major environmental damage, major transportation corridors should be routed away from the river creek valleys wherever possible.
- Enhance the riverine environment
  - distinctive natural features (eg.islands, escarpments) and historical resources will be preserved.
- Ensured that the policy reports and plans initiated by the City affecting the river valleys comply with and reinforce the policies of this plan.

OVERALL PLAN OBJECTIVES

1. To maintain and enhance the distinctive characteristics of the riverine environment.
2. To encourage harmonious and diverse uses adjacent to the rivers and their tributaries.

3. To develop the rivers/creeks and alleys as a focal point of year round recreational activities and to promote awareness of the river system as related to the overall development of the city.

4. To minimize loss of life, threat of health and to reduce economic loss by flooding.

5. To minimize economic or social hardship upon any individual or community in realizing the plan objective.

C – RECOMMENDATIONS

C1.1.1

General

ii) That development along Calgary's watercourses ensure diverse and harmonious land uses such as regional parks, natural areas and adjacent residential and commercial/industrial/institutional uses to provide opportunities for living, work and recreation in the overall riverine environment.

v.) That when Major Natural Areas or other river/creek valley regional parks are affected by public utilities, roadways or any other development, an environmental impact assessment report be prepared by the proponent (public and/or private agency) in accordance with the terms the city may establish.

C1.1.2.

Regional Open Spaces (the plan identifies significant, specific components)

C1.1.2.4

Regional Open Space "Master Planning"

i) In preparing detailed land use concept plans for regional open space in the valleys the Parks/Recreation Department ensure that individual sites are not planned in isolation to the rest of the open space system and that adequate consideration be given to adjacent local community need and the nature conservation significance.

C1.1.3

Public Access

i) Where possible, as a long term objective, continuous public access to all river and creek banks be provided, subject to the following:

   a) Private

   b) negotiation

iii) That proposals for riverbank walkways/pathways include an environmental inventory and a statement of impacts on adjacent land uses.

iv) That safety considerations for the users be addressed in locating walkways/pathways along rivers creeks and that the environmental and social impacts be miminized.

xi) That if public access is not needed, the future bridge design allow, if economically feasible, for adequate space between the abutments and edges of the river/creeks to facilitate natural or cultivated landscaping to maintain the continuity of the rier/creek edge environment.

C1.1.4

NATURAL AREAS

.1 Major natural areas adjacent to the watercourses

- For purposes of report Natural Areas – are defined as "Green space 5 acre, 2ha) or more in size predominantly covered with indigenous vegetation such as prairie grassland or riverine forest, with indigenous fauna present, and lacking substantial modifications by man which includes active arable or other farmland uses.

.2 General Recommendations

ii) Major NA be preserved in a manner that will:

a) Safeguard existing species, communities and habitats.

b) Encourage compatible recreational uses for the enjoyment and benefit of all Calgarians.

- In the event of a serious conflict between the two sub-objectives, the first assumes priority and appropriate management action should be taken.

- This recommendation shall be mandatory and assumes precedence over the other recommendations pertaining to major natural areas.

.3 Management Techniques

i) That the decision to apply any specific management technique in a major natural area be made on the basis of a detailed study.

.4 On-site Study

i) That a detailed Land Use concept plan be prepared for each site identified as a major Natural area concurrent to the development in these natural areas.

ii) That the detailed land use concept plans affecting major natural areas take into consideration the evaluation and constraining criteria identified in Section B1.1.3.6 of the supporting information.

.5 Proposed Status

i) That any major natural area acquired through negotiations be redesignated as PE – Public Park School and Recreation District under the Land Use By-Law.

.6 Adjacent Land Uses

i) That as and when any development adjacent to major natural areas take place, these areas be protected to minimize adverse environmental impact.

ii) That areas adjacent to major natural areas be developed for compatible land uses and a suitable buffer be provided between these two land uses.

.7 The Acquisition of Major Natural Areas

i) That, notwithstanding, acquisition recommendations made in Section C1.1.4.11, if any Major natural Area identified:

a) is proposed for development;

b) undergoes deterioration in quality that is not the result of natural processes;

it be acquired, subject to budget approval by the City Council, for the purpose of preservation before significant qualitative changes occurs.

.8 Environmental Impact Assessment

i) That an environmental impact assessment report concerning Major Natural Areas include reference to:

a) the evaluation criteria; e.g. size, diversity, naturalness, recorded history, position in an ecological geographical unit, and the presence of natural physical features (refer to supporting info Section B1.1.3.6)

b) the best public interests now and in the future.

.9 Interpretive Potential

i) That appropriate means be established to facilitate nature interpretation of major natural areas.

.10 Supervisory Management

i) That the City of Calgary Parks and Recreation Department provide for the supervisory management of Natural Areas.

.11 Site Specific Recommendations were made for the Bow River, the Elbow River, West Nose Creek and Nose Creek.

4.12

Small fragmented, discontinuous and less significant natural areas.

i) That natural areas adjacent to construction sites be adequately protected to minimize adverse environmental impacts (fencing)

ii) That suitable means be established to promote public awareness of the existing and value of natural areas and major vegetation adjacent to the cities water courses.

iii) That portions of existing city riverside parks presently in a natural or near natural state be preserved in their present form where possible (eg. the portion of Bowness Park, east of 85 st nw and the northeasterly portion of Pearce Estate.

iv) That existing treed areas of Lindsay Park adjacent to the Elbow River be retained for public Open Space recreational uses.

4.12.1 – The Bow River

There are numerous natural areas in the vicinity of the Elbow River. For the most part, they are either small, isolated, fragmented or of limited nature conservation significance. These areas of Lindsay Park. the escarpment adjacent to the communities of Rideau/Roxboro, portions of Stanley Park and much of the river bank along the entire length of the river. These important local environmental resource features make a major contribution to the aesthetics and natural character of the lands in the vicinity of the Elbow River and they support a variety of species. It is desirable that they be preserved and general recommendations applicable to such sites are contained in the preceding sections.

i) That private riverbank lands southwest of Sandy Beach be acquired by the city of Calgary for park purposes and be integrated with the adjoining City parks, ie Sandy Beach and River Park.

4.13

Islands

i) That all islands in the Bow and Elbow Rivers not presently developed as parks be preserved as Sanctuaries for existing Flora and Fauna to permit natural processes to operate and no general public access be encouraged.

ii) That all the provincially owned islands in the Bow and Elbow Rivers be protected by the Province in consultation with the City Parks and Recreation Department.

iii) That any modification to islands and/or Gravel bars be permitted subject to the preparation of an environmental impact assessment report and public review, prior to the implementation of such works.

C1.2.1.3

Land use and development controls

A.Floodway

i) The following or similar land uses be allowed in the floodway

a) flora and fauna preservation areas

C1.3

Transportation corridors adjacent to water courses

i) that major transportation corridors, with two lanes or more in each direction, be routed away from the river/creek valleys, where possible.

ii) upgrading of existing roadways or those locations of new roadways adjacent to Calgary's watercourses be planned with respect to:

c) potential adverse environmental impacts on the existing riverside vegetation.

C3

Preservation and enhancement of the riverine environment

C3.1 AESTHETICS

i) That, where possible, the aesthetic value of the river/creek valleys be maintained and enhanced by:

c) preservation of environmentally sensitive areas.

f) avoidance of future riverside land uses that would have an adverse environmental impact on the landscape

C3.2

Natural features

i) that undeveloped escarpments existing in the river/creek valleys be preserved in their natural state, and in case of areas affected by public utilities the environmental damage be minimized (refer to Appendix VII)

ii) That the environmentally sensitive oxbow lakes (not isolated by subsequent development) and the glacial erratic existing in the Nose and West Nose Creek valleys be preserved and adequately protected.

C3.5

Disturbed areas

i) That where disturbed areas exist in public parks adjacent to the water courses, appropriate measures be taken to rehabilitate such areas.

D

Implementation: procedures, priorities and cost estimates

D2.1

Policy reports and plans affecting the river/creek valleys should comply with the policies and address issues contained in the Calgary River Valley Plan.

.3 It is recommended that City Council authorize the civic administration to request the Provincial government for financial assistance to facilitate the implementation of the following:

a) land acquisition for the regional parks and/or natural areas in the river/creek valleys.

b) removal of incompatible riverside land uses.

.6 Alternative location studies and/or impact statements may be required by Civic departments proposing public works which could disrupt the natural environment pursuant to the "Policy on disturbance of natural environment by Public Works" (Appendix VII) approved by city council in 1973.

.7 The privately owned areas currently used for gravel extraction be reclaimed by the land owners to the satisfaction of the City Engineer when these operations cease.

D5

City Parks & Recreation Department

1) Prepare "Master Plans" (detailed land use concept plans) for the regional parks and natural areas in the river/creek valleys, and ensure the following:

a) public input prior to the actual development of the regional parks and/or natural areas;

b) liaison with City Police and other Civic Departments affected;

c) assessments of social and environmental impact on surrounding land uses of future specific recreational facilities with in the regional parks and/or natural areas.

d) employment of 'Area Naturalists' whose role should include increasing public awareness of the value of

natural areas and other parks resources, particularly in relation to landowners with properties adjacent to the watercourses.

8) The disturbed sites in public parks and on escarpment slopes adjacent to the city water courses should be rehabilitated through the restoration of natural appearing contours and replanting of trees and shrubs on a high priority basis.

9) Trails should be provided in appropriate locations on the escarpments adjacent Queensland Downs to prevent further trampling of natural vegetation in the remaining parts of the slopes.

10) In order to facilitate the interpretation of natural areas, provide facilities such as the following:

    a) self-guided trails

    b) interpretive centres/points, and

    c) programs of outdoor nature education.

11) Existing natural features, such as "split Rock" adjacent to west nose creek and the glacial erratic and oxbow lakes in the nose creek valley should be fenced and signs aesthetically compatible with the environment be erected warning against damage to these features, when these areas are dedicated as Environmental Reserve resulting from subdivision.

12) The escarpment north of west nose creek should be protected by fencing when the adjacent land is developed.

13) Appropriate signs should be erected concerning archaeological sites of significance adjacent to the cities watercourses.

16) Allocate sufficient funds,..., for the general maintenance and improvement of the river/creek valley parks and facilities and for the acquisition of land required for parks in the river valleys in accordance with the Policy and Systems Plan.

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Calgary Field Naturalists' Society

Elbow River Conservancy

Calgary River Valley's Committee

Calgary Orienteering

Calgary Equestrian Advisory Council

Edworthy Park Heritage Society

Bowmont Natural Park Committee

Heritage escarpment Preservation society

Nose Hill Park Management Advisory Committee

Friends of Nose Hill

Nose Hill Park Communities Board

Paskapoo Slopes Preservation Society

Mayors Environment Committee

Inglewood Community Association

THE CITY OF CALGARY

ENVIRONMENTAL POLICY

The City of Calgary is committed to environmental leadership to conserve protect and improve the environment for the benefit of Calgarians and the regional and global community. The City of Calgary will integrate social, economic and environmental objectives into a coordinated decision making process to maintain high standards of living, social harmony and environmental quality.

The City of Calgary has a significant influence on the local and surrounding environment. It will demonstrate leadership by:

a) ensuring environmental considerations are part of all City of Calgary decisions respecting planning,

b) initiating and enforcing municipal by-laws and promoting legislative initiatives by other levels of government;

c) ensuring The City of Calgary's own operations comply with legislation;

d) encouraging and demonstrating conservation of resources;

e) communicating and consulting with its citizens and businesses and other governments regarding the various ways of setting The City of Calgary's environmental objectives;

f) creating and keeping current an environmental action plan to achieve The City of Calgary's environmental objectives.

Environmental stewardship is a shared responsibility requiring the commitment of all Calgarians.

The Natural Area Management Plan identifies habitat types and natural systems on public and private lands. It is acknowledged that some private lands identified as habitat types and natural systems will be developed for purposes other than open space. The legal rights of land owners shall be respected.