

APPENDIX F (1998)

STORMWATER MANAGEMENT

Issue

The PACD is concerned about the proper stewardship of urban and other water resources. The PACD recommends a two-pronged approach to preserve, protect and restore healthy watersheds. First, we encourages communities to prevent further degradation of watersheds through broad-based prevention activities such as land-use planning and careful siting and design of new development. Second, PACD encourages local jurisdictions to implement Stormwater management and erosion and sediment control programs to protect water resources and other natural resources before, during , and after construction.

Stormwater management programs must be developed on a watershed basis and need to consider watershed and receiving stream conditions as well as goals and targets for the overall watershed . Implementation of these programs requires local resources and local commitment to establish Stormwater, erosion and sediment control design standards; enforce those standards; and provide for on-going operation and maintenance of structural controls. It may even call for the retrofitting of existing systems and the restoration of natural areas to correct the effects of past actions based on new and improved information and technology.

Background

Healthy watersheds provide a variety of values to communities. They provide clean water for drinking, recreational use, and for fish and other aquatic species. Vegetation along streambanks (the riparian area) provides wildlife habitat. Shade from riparian trees and other vegetation reduces temperatures in-stream as well as in the watershed. Healthy watersheds provide other values such as the tranquil sound of running water and vital green space. Continued degradation of watersheds constitutes a significant loss in community livability. Without intervention, watersheds will continue to deteriorate, will be perceived as community liabilities, and will be unable to support basic ecological and societal functions.

Changes in land use and in land management practices have affected the health of watersheds. Large areas of watersheds have been converted from forest and agricultural land to areas paved for industrial, commercial, and residential uses. This conversion has increased surface runoff, diminished water quality in receiving water, encroached on riparian corridors, and, in some areas, turned waterways into polluted drainage ditches with limited natural resource values. In the worst cases, urban development so extensively alters watershed hydrology that frequent flooding plagues neighborhoods and businesses, causing repeat property damage and posing threats to health, safety, and economic stability.

Increased sedimentation in runoff resulting from urbanization may degrade or destroy aquatic habitat. Sediment degrades shellfish beds, buries coral reefs and sea grass beds, clogs fish gills, and smothers fish eggs, reducing spawning success. High turbidity levels reduce aquatic plant production, diminishing food sources for other aquatic species. Many contaminants enter waterways attached to sediment. Sedimentation also accelerates the loss for storage in lakes and reservoirs and may result in decreased navigability, higher dredging costs, and reduced hydroelectric production.

Land use changes can also modify overland flow characteristics. This may result in increased peak flows and subsequent flood potential. The increased frequency of high flow and higher flow volume can cause streambank erosion and changes in stream shape, steepness, and sinuosity. Changes in flow duration affect riparian conditions and fish habitat. Increased flows often carry pollutants such as bacteria, hydrocarbons, nutrients, and heavy metals associated with urban land uses.

As the application of Stormwater management measures has increased so has their scope and complexity. What started as measures primarily focused on water quantity control for flood and conveyance purposes has expanded to mitigate a host of impacts from urban and other land use practices. Practitioners have found that a more holistic strategy is necessary to effectively manage a watershed. An effective Stormwater management approach requires a clear understanding of the watershed and use of that understanding to set specific targets, criteria, and policies that meet the specific Stormwater conveyance and environmental needs of the watershed and the community.

Position

The PACD advocates the following to minimize impacts and ensure effective protection of watersheds.

A. Watershed planning

Stormwater management should be conducted at the watershed level since all residents of a watershed, both rural and urban, contribute to watershed health and can control its future. Local watershed organizations are in the best position to balance ecological, economic and social concerns. CCCD encourages local jurisdictions, conservation districts, environmental groups and local residents to join together to form local watershed management groups.

A number of land use management techniques can be implemented to minimize negative watershed impacts from new development. Additionally, redevelopment of existing urban areas can be used to preserve undeveloped land and reduce costs, to economic, environmental and social acceptance. PACD recommends that government agencies:

- support Act 167 SWM;
- promote the use of PA [BMP](#) Handbook for Developing Areas.
- target federal, provincial, and state funds to help local jurisdictions form watershed management groups;
- use state, provincial, and local agency land use planning authorities (including zoning and comprehensive plans) to encourage and, where necessary, require prevention actions including protection of riparian areas and other natural features to promote sustainable development;
- encourage developers to use project designs that minimize land clearing activities and impervious surfaces and retain native vegetation for landscaping, such as conservation developments where 50% of the land area remains in open space and homes are clustered;
- designs should duplicate existing flow regime and volume conditions as closely as possible in a manner that recognizes groundwater flows and protects water quality.

- consider the carrying capacity of the watershed in designing a storm water management system;
- target new construction activities to already developed areas or "redevelopment" areas;
- limit land disturbance to allow people to walk or bike, reducing pollutants associated with car use;
- protect riparian areas and wetlands by requiring building setbacks, buffer zones or clustering and/or requiring that vegetation be protected;
- use tax breaks and development credits as financial incentives to direct growth to areas that help protect sensitive resource areas; institute a development rights program that will preserve entire ecosystems on a landscape scale while setting aside other area for relatively unrestricted development.

B. Stormwater management systems

As part of a watershed program that includes pro-active land use management, local jurisdictions need to implement programs for erosion and sediment control and Stormwater management. Stormwater management is one tool to protect and conserve watersheds. Stormwater management plans should be developed on a watershed basis to identify specific targets to be met, including both water quantity and quality, PACD encourages state and local governments to require Stormwater management system designs that do the following:

- provide for Stormwater flow, volume and velocity control to replicate pre-development conditions or to meet identified watershed needs;
- consider water quality issues such as nutrient, sediment, and heavy metals loading and the impact of Stormwater discharges on aquatic species;
- consider impacts of Stormwater system design on surface water and groundwater, wetlands and other areas of natural value;
- reflect the full flow regime (base, bankfull, riparian, and flood flows) to avoid stream impacts;
- result in economically sound Stormwater facilities;
- include maintenance programs to ensure continued effectiveness of Stormwater facilities;

C. Sediment and erosion control programs

Erosion and sediment control remains largely a state and local issue best handled and managed at those levels. PACD encourages state, provincial and local governments to implement erosion and sediment control programs that:

- promote erosion control as a more effective means of reducing impairments related to sedimentation. Redirect program emphasis from less effective sediment control practices;
- establish watershed-based sediment loading standards for water quality purposes;
- set standards for sediment removal efficiencies expected for silt traps and include monitoring requirements;
- combine voluntary implementation of best management practices with the use of regulatory and enforcement tools, if necessary;
- result in economically sound best management practices;
- identify on-going operation and maintenance requirements and financially responsible parties;

- implement and enforce program objectiveness consistently;
- link governmental requirements, water quality, and other watershed management goals;
- recognize and promote professional certification programs like CPESC (Certified Professional in Erosion and Sediment Control) and NICET Programs that identify professionals in the field who are qualified in planning, design, and implementation of Stormwater management measures.

D. Program design

PACD encourages state and local governments to develop Stormwater management policies on a watershed basis to reflect local resource and environmental conditions. Stormwater management programs should be based on specific targets to meet watershed needs as identified by the local people. Other watershed needs which may seem unrelated to soil or water do have an impact on watershed management strategies.

We recommend several general conditions for implementing both Stormwater management and erosion and sediment control programs:

- develop and enforce a site plan for each project that considers other activities in the watershed;
- where structural best management practices are required, implement and install site-specific best management practices that meet design specifications;
- inspect and maintain practices regularly;
- identify and monitor on-going operation and maintenance needs and the financially responsible parties;
- develop a contingency plan in case parties abrogate their financial responsibilities;
- conduct additional research to ensure that Stormwater management and erosion and sediment control practices are economically cost effective and designed for the proper storm event for the local situation;
- design standards need to be developed to meet government policies and local watershed needs;
- institute a monitoring program to ensure that claimed environmental results are achieved in practice and that modifications are made where design standards appear to be inappropriate;
- consider the expected lifetime and life-cycle cost of specific practices in the design of Stormwater management systems.

E. Funding and economics

PACD recognizes on-going institutional and financial support as a necessary ingredient to ensure strong watershed management programs. As a companion, all planning efforts need to include a vehicle by which implementation of planned actions can occur. Watershed plans must consider three key factors: environment, social conditions, and economic conditions. The development of Stormwater management policies must reflect local economic conditions to ensure that the approach is affordable, effective, and can be implemented. We recommends that state and local governments:

- identify and take the necessary steps to ensure funding for implementation and continuing operation, maintenance, and replacement;
- encourage innovative ways for funding the implementation of Stormwater management practices and the operation, maintenance, or enhancement of systems. These might include instituting user fees, re-designating funds, and initiating special taxation;
- offset the costs of Stormwater management systems by identifying and utilizing ecological and social beneficial values;
- consider the capability of land users and local entities to manage and maintain the system;
- utilize site specific engineering, in lieu of standard designs, too consider local economic, ecological and social situations as well as the capability of local watershed mangers to manage the system.

F. Education

New Stormwater management and erosion and sediment control techniques and structures are being developed and tested. Design standards and criteria are evolving as water resource professionals gain a better understanding of the hydrology and ecology of watersheds. PACD recognizes that professional and public education is essential to build support for watershed activities including Stormwater management and erosion and sediment control. We recommends that state, provincial, and local governments; watershed groups; and others to do the following:

- educate elected officials, planning department staffs, building and excavation contractors, and the general public about the relationship of Stormwater management and erosion and sediment control programs to healthy watersheds;
- continue and expand research on 'cutting edge' technology for Stormwater management and sediment and erosion control;
- develop a disciplined environmental management approach to assure that the latest techniques in Stormwater management are adopted;
- develop Stormwater management programs for individual landowners to implement in their own backyards;
- develop Stormwater management programs fort land developers top consider that enhance economic, ecological and social values of property;
- stress an adaptive environmental management approach to Stormwater management.