

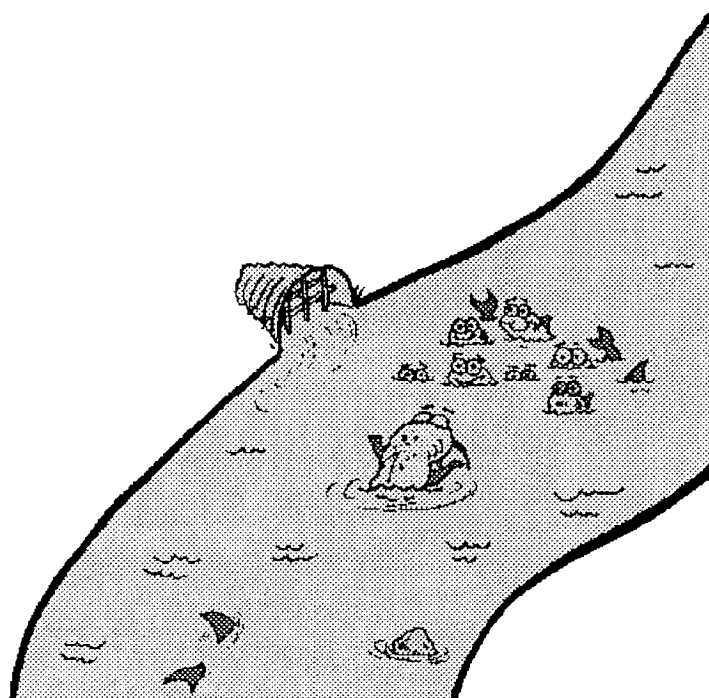


City of Winnipeg
Water and Waste Department

Combined Sewer Overflow Management Study

PHASE 3 Technical Memorandum No. 2

PUBLIC COMMUNICATIONS



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Internal Document by:

WARDROP
Engineering Inc.

and

TetrES
CONSULTANTS INC.

In Association With:

Gore & Storrie Limited and **EMA Services Inc.**

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Contributors to the TMs included:

Consultants:

Wardrop Engineering Inc./TetrES Consultants Inc.
In Association with CH2M Gore & Storrie Limited and EMA Services Limited

G. Rempel, Project Manager	M. Parente
R.J. Gladding, Assistant Project Manager	M. Yue
D. Morgan	R.G. Skrentner
N. Szoke	D. Weatherbe
G. Steiss	G. Zukovs
S. Quigley	S. Black
R. Rempel	L. Thompson
G. Mohr	C. Rowney
D. Dagg	
M. Sweet	

City of Winnipeg:

E.J. Sharp, Project Manager	D. Sacher
M.A. Shkolny	T.R. Pearson
A. Permut	D. McNeil
W.J. Borlase	E. Zaleski
P. Lagasse	B. Station
D. Wardrop	

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PREAMBLE

This Technical Memorandum (TM) is one of a series of TMs intended for internal discussion. It is not intended as a report representing the policy or direction of the City of Winnipeg.

The two TMs produced in Phase 3 are:

TM #1	Control Alternatives
TM #2	Public Communication

Each of the Phase 3 TMs draws on information developed in the prior Phase 1 and Phase 2 TMs.

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1. INTRODUCTION

Public participation in the CSO Management Study is warranted from the standpoint of City policy as well as through the direction of the Clean Environment Commission.

The City has established policy guidelines for citizen participation in public works projects. The policy outlines criteria for projects where public participation is warranted. These criteria include projects which have key strategic importance in the City's long-term plans, projects where the City is seeking public input, awareness and support for a project, a history of public involvement in the project, and projects where a requirement exists for *Environment Act* approvals.

The potential CSO program meets these criteria in that the potential costs involved in CSO control are massive, and the City will seek public support for such a control program as it has in its river quality protection programs in the past. There has also been a history of public involvement in river control projects and there will be requirements for endorsement of the CSO control program from Manitoba Environment.

The Clean Environment Commission (CEC), in delivering its report on the water quality objectives for the Red and Assiniboine rivers in June 1992, recommended that an advisory or steering committee should be established during implementation of the study and that members of the scientific community should be invited to collaborate in the study design. Thus, the CEC gave some specific direction in terms of consultation with certain publics.

The City policy guidelines provide direction in terms of the objectives of citizen participation. As applied to this study, the general objective is to obtain public support for a CSO control policy and a strategy for action. Public involvement is intended to accomplish the following:

- develop public awareness of how CSOs occur and their impact on river water quality;
- enable the public to have a better understanding of the CSO control planning process;
- help determine and define the public's judgements on issues and priorities;
- create understanding among the stakeholders of the trade-offs involved in CSO control options, and

- demonstrate to the CEC that the City has made reasonable efforts to inform the various publics and to obtain meaningful feedback from these publics.

This memorandum provides an overview of the public communication activities conducted during Phase 3 of the Study.

2. BACKGROUND PERSPECTIVE

In 1992, after holding public hearings on river water quality issues, the Clean Environment Commission (CEC) made a number of recommendations concerning Winnipeg's rivers including a recommendation for a study of the issues associated with wet weather events. As a result, the City of Winnipeg initiated the Combined Sewer Overflow Management Strategy Study. The Study is being done in four phases.

The Study Team is comprised of professionals from several disciplines, including engineers and scientists experienced in addressing pollution control and water quality issues. The Study Team has been technically evaluating CSOs to:

- define the effects of CSOs on river quality (Phase 1);
- determine the control options for controlling wet weather flows (Phase 2);
- determine costs and benefits of potential plans (Phase 3); and
- develop alternative implementation plans for evaluation (Phase 4).

The fundamental issue related to combined sewer overflows is the discharge of untreated sewage combined with storm runoff into the rivers. This is an environmental issue of potential interest to the public and river users, as well as to the environmental regulatory agencies as a matter of environmental policy. Aside from the issue of environmental policy, the water quality parameters of major concern are:

- microbiological quality in the river (i.e., fecal coliform contamination); and
- floating matter which is aesthetically displeasing.

Obtaining input from the public on such a complex study is difficult and will require an iterative, sustained process. The major challenge in obtaining meaningful feedback regarding the public's opinion is to gain the public's attention towards the major issues of the planning study. This public communication plan was created based on the tenet that the public must be informed with the facts prior to beginning their process of forming and providing their opinions. This public consultation process has emphasized improving public awareness towards the general CSO

issues. As the study progressed, the emphasis has changed to request feedback and opinions on choices. In Phases 1 and 2, the emphasis had been on public awareness of the existing conditions. For Phase 3, the focus was threefold:

- inform the public about possible alternative control strategies;
- explain the effects of alternative control strategies on different water quality goals; and
- obtain public opinion on choices available for improved CSO management.

The public communication program is being undertaken to help the City develop a position with respect to Combined Sewer Overflows (CSOs) and provide support to the City's position at upcoming CEC hearings. The program is a mechanism to understand the public's expectations and preferences regarding CSO management options. Public opinion and suggestions will then be considered in formulating recommendations.

During each phase of the Study, the findings of the Study Team members have been provided to the public in a format which attempted to be both objective and comprehensive.

2.1 PUBLIC COMMUNICATIONS PROGRAM

During Phase 1 of the Study, a communication program was developed by the Study Team to organize the various education, awareness and consultation activities so that the public communication program would be coherent and effective. The preliminary outline of activities proposed and the proposed timing for all 4 phases of the project were described in the Phase 1 Technical Memorandum. The public communication tasks proposed for Phase 3 were outlined more specifically within Section 6.0 of the Phase 2 Technical Memorandum No. 5 (Public Communication) completed in the summer of 1996.

Phase 3 included three primary tasks:

- 1) Continued consultation with a number of groups identified during Phase 1 and 2, including;
 - Advisory Committee
 - Special Interest Group

- River Use Groups
- Environmental Groups
- Scientific Community.

2) Public Education/Information Meetings

- The Study Team made a considerable effort in Phase 3 to provide the general public with useful information regarding the CSO Study. A key task in Phase 3 was finding appropriate venues to display information to the public. Of the venue locations considered, preference in venue selection was given to locations hosting organized, well-attended events with relevant linkage to CSO issues and/or river water quality. Instead of placing informational displays at shopping malls as conducted in Phase 2, public events in Phase 3 were held at venues more relevant to the public use of the rivers, including:
 - Mid-Canada Boat shows,
 - Home Expressions trade shows,
 - Earth Day Trade Shows, and
 - Family fish festivals.

3) Media Coverage

- The Study Team prepared a number of newspaper articles for publication in a variety of local papers (e.g., Real Estate News, Civic Pulse, etc.) and presented technical papers at various conferences throughout North America.

2.2 PHASE 3 EXTENSION

In November 1996 (refer to Progress Meeting No. 26), the City of Winnipeg opted to extend the term of the CSO Study, including Phase 3. The program extension was deemed necessary for the following reasons:

- 1) In Phase 3, several activities were initiated which were relevant to the assessment of Phase 3 control technologies. Conclusion of these activities was necessary for thorough assessment of Phase 3 control options. These activities included technical studies

(including the potential for pilot testing) of in-line storage, field sampling and CSO treatability tests, and floatables capture programs. A deferral of the completion of the study to accommodate these activities was considered acceptable by the City and Province.

- 2) The 1997 Red River Flood created substantial reallocation of study resources, including City of Winnipeg and private-sector personnel. Staffing considerations and the extended period of elevated water levels led to the largest impact on the schedule of the study program in 1997.

The City and Manitoba Environment considered these deferrals and also the anticipated scheduling of other related environmental approval issues, such as the ammonia toxicity study, and mutually agreed to address all these issues in one CEC hearing. It is now anticipated that the CSO Study will be completed by the end of 1999.

Once Phase 3 of the program was extended, the Study Team deemed it necessary to include a number of public events in the extended Phase 3 schedule. As these events were not originally contemplated in Phase 3 activities, they were not listed in the Phase 2 Public Communication Technical Memorandum.

In addition to Phase 3 tasks outlined in the Phase 2 Technical Memorandum and described in Section 2.1, the Study Team conducted a Health Risk Assessment to develop a site-specific perspective on health risks associated with recreation within the urban river system. The Study Team has also been drafting a brochure presenting the issues and choices involved in alternative control plans and accompanying survey for distribution to persons listed in the CSO database and also to portions of the general public. The survey will help to provide an opportunity for the general public and also persons who have expressed interest in the Study at past events to express their opinions about technical choices, value judgements, and issues regarding the cost for control measures. It is anticipated that the survey will be conducted prior to Phase 4 so that public opinions expressed in the survey can be incorporated into the proposed implementation plans.

The tasks outlined in Section 2.1 and 2.2 are discussed in more detail in the remainder of the memorandum.

3. PHASE 3 ACTIVITIES

3.1 ADVISORY COMMITTEE

As described in Phase 2, an external Advisory Committee was formed in the fall of 1994. The Committee's responsibilities include providing advice (from an external perspective) to the CSO Study Team as the study progresses, and reporting to the CEC upon completion of the study. Its members were selected to represent a cross-section of major stakeholders which the City would receive ongoing feedback from. The Committee meets regularly on approximately a quarterly basis. The current member list is provided below.

- Chris Leach, Manitoba Housing (Chair)
- Charles Conyette, Manitoba Environment
- Art Derksen, Natural Resources
- Sharon Gurney, Manitoba Environment
- Cheryl (Nielson) Heming, City of Winnipeg, Parks and Recreation Department
- Dr. Sande Harlos, City of Winnipeg, Department of Health
- Randy Borsa, Town of Selkirk
- Drew Bodaly, Fisheries and Oceans
- Dr. Jim Popplow, Manitoba Health (until February 1998)
- Dr. Margaret Fast, City of Winnipeg, Department of Health
- Darwin Donachuck, Natural Resources
- Gary Swanson, Natural Resources

A listing of the meetings held during Phase 3 is provided below.

An agenda was developed by the Study Team prior to each meeting and distributed through the Advisory Committee chair to the members. The common agenda items for each meeting included:

- technical progress on control alternatives;
- public communication updates; and

- overall schedule updates.

The main themes of discussion associated with each of the meetings are also provided below.

- Meeting No. 4, Wednesday, September 27, 1995
 - a demonstration of the Receiving Stream River model was conducted.
 - the purpose of the Committee was reviewed (e.g., to provide advice on purpose, scope, objectives, methods, and public involvement in the study and to improve the quality, comprehensiveness and credibility of the study). It was also noted that the committee will ultimately provide a report.
- Meeting No. 5, Wednesday, January 17, 1996
 - an overview of public program and activities contemplated for Phase 3 was discussed.
- Meeting No. 6, Wednesday May 15, 1996
 - technical progress was reviewed. Issues discussed included consideration of the use of the river for irrigation, ammonia levels in CSOs, rainfall patterns, etc.
 - it was noted that Dr. Fast of the City would be the City Health Department representative on the Advisory Committee.
 - following the meeting, a tour of the South End WPCC was provided.
- Meeting No. 7, September 6, 1996
 - the Study Team advised that initial estimates of available in-line storage were conservatively low and that more recent calculations indicated a greater volume of potential storage, making this control option even more attractive.
 - a field monitoring program involving a floating boom to capture floatables was initiated and preliminary results were discussed.
 - it was reported that members of the scientific community had been contacted for feedback to the study.
 - a tour of the WEWPCC followed the meeting.

- Meeting No. 8, Wednesday, December 4, 1996
 - in addition to presenting the technical progress made and public consultation programs conducted, the requirement for additional participation from health officials was discussed. Additional public health expertise was requested by the Committee to enable the group to respond responsibly on the issue of public health related to CSOs. Dr. Popplow (Province of Manitoba) and Dr. Harlos subsequently accepted invitations to become committee members. Interrelationships of the CSO study and the proposed ammonia study were also discussed.

- Meeting No. 9, Wednesday, April 9, 1997
 - The City of Winnipeg's E. Sharp reviewed the purpose of the Committee and requested the Committee to identify any areas or issues not being addressed in the study.
 - a presentation was given on the microbial quality of the Red and Assiniboine rivers and its relationship to human health risk arising from the use of the surface waters. The presentation was based on information presented at CEC hearings in 1991. A wide-ranging discussion took place which was useful input to the update of this health information.
 - The Committee recommended that an update of health risk information be done and also requested information on the status of the ammonia study planned by the City.
 - technical progress on in-line storage control options was presented.

- Meeting No. 10, Wednesday, July 16, 1997
 - The City of Winnipeg's E. Sharp reviewed the original and modified schedules for the CSO study and the proposed ammonia study. Manitoba Environment has agreed that the ammonia study completion can be deferred to the end of 2000 and that the results of both the CSO and ammonia studies will be reviewed at a subsequent common CEC hearing.
 - a preliminary update of health risk assessment information was provided based on extensive literature of research and guidelines.
 - technical progress on the range of control options from separation to in-line storage, was reviewed, including preliminary cost estimates.
 - E. Sharp requested the Advisory Committee to consider producing an Interim Report, which would give the City of Winnipeg feedback on the Committee's judgements with

respect to the comprehensiveness of the study, any outstanding issues, direction on additional work required, including public consultation or technical analyses. The Committee agreed to provide such a report based on activities up to and including Phase 3.

- Meeting No. 11, Tuesday, October 28, 1997
 - a further update of the health risk study was presented with much discussion following.
 - The City of Winnipeg's E. Sharp noted the team will develop a public brochure on the issues and choices on the CSO problem and plan to conduct a survey of the people in the public communication database and a random subset of the general public. The Advisory Committee will be asked for comments on the questionnaire.

3.2 PUBLIC COMMUNICATION

Phase 3 public communications consisted of:

- participation in trade shows (e.g., Mid-Canada Boat Show);
- participation in public events (e.g., Family Fish Festival);
- communications to the public through addressed mail and publications;
- correspondence with various scientific communities; and
- meetings with special interest groups with identified interests in the rivers.

The key tasks and outcomes of the activities are highlighted below.

3.2.1 Events

During Phase 3, a number of public information booth events were organized. The information booths consisted of a working hydraulic model of a combined sewer system and display panels with a series of storyboards (Appendix A). The storyboards were updated periodically to correspond with the current status of the study. One to two people staffed the display, using the model and the display panels to provide specific information to the public including:

- describing the combined sewer system;
- explaining how raw sewage overflows to the river during rainfall;
- explaining river water quality issues associated with CSOs;
- explaining how basements flood;
- discussing elements of the CSO Study;
- explaining what the CSO control options are;
- explaining why evaluating the cost and benefits of the control options is difficult; and
- detailing how the management study encourages public input and stressing how important public opinion is in the process of choosing CSO control plan(s) which are best suited for Winnipeg.

Brochures about the CSO study and related topics were made available and distributed to the public. The materials distributed are discussed in Section 3.2.2. A short survey form was provided, which the public could complete at the event or take home and complete as a mail-in form. The names collected from the survey forms were placed on the CSO database for subsequent follow-up (see Section 3.3).

The CSO display model has been the focal point for the display booth. As an educational tool, the hydraulic model was very powerful in explaining the behaviour of combined sewer systems during dry and wet weather events. The public has generally been interested in this physical model and often converged during public events to view the model in operation. A further description of these events follows.

3.2.1.1 Trade Shows

Mid-Canada Boat Show

The CSO Study Team participated in the Mid-Canada Boat Show during February 28-March 3, 1996, and again March 5-9, 1997. Both events were held at the Convention Centre. The display panels as well as the Combined Sewer Overflow Model (as described in Section 3.2.1) were utilized at the booth. A number of handouts were distributed at the events including the CSO Update brochure, and the "Floatables" brochure (Appendix B). Persons were encouraged

to leave their name and address by completing a short questionnaire. It was explained that persons leaving their address would be placed on a CSO database and that additional information regarding the project would follow by mail as it became available. A draw to win one of several water conservation kits was used to encourage people to participate in the project and fill in the questionnaire.

In 1996, event organizers estimated 28,000 people attended the boat show. As a result of the event, approximately 400 names were added to the CSO database. In 1997, event organizers estimated approximately 25,000 people attended the show and approximately 190 people filled in the questionnaire and were entered into the database.

During the Mid-Canada Boat Show, many people stopped at the model and indicated that the display was very interesting and informative. Others commented on the educational value of the display and suggested that the model be brought to schools or educational centres such as Fort Whyte Centre. Study Team members staffing the information booths in 1997 noted that some members of the public were familiar with the display material from previous visits to these trade shows.

Home Expressions

During Phase 3, the CSO Study Team set up the display booth at Home Expressions 1996 (March 6-10), Home Expressions 1997 (March 12-16), and Home Expressions 1998 (March 4-8), all held at the Convention Centre. The Study Team set up the display and model adjacent to the City of Winnipeg Basement Flooding information booth. The amalgamation of these information displays offered the public detailed information regarding CSOs and river water quality, and CSOs and basement flooding in one central location.

Similar to the Mid-Canada Boat Show, a draw to win a free sump pump was utilized in 1996 and 1997 to encourage people to fill out the questionnaire and participate in the CSO study. Event organizers estimated that approximately 28,000 people attended the trade show in 1996 and 1997. Approximately 500 people filled out the questionnaire in 1996, and 540 people completed the questionnaire in 1997. In 1998, approximately 32,000 people attended the

event. A free draw was not conducted to encourage people to fill out the questionnaire and 54 responses were received.

Similar to the Mid-Canada Boat show, the display booth was well received.

Earth Day Trade Show

In January 1996, the CSO Study Team was invited to attend the Earth Day Trade Show to be held on April 21, 1997 outdoors (under a tent) at The Forks. The Study Team accepted the invitation. The display booth and model were utilized for the exhibit.

Notwithstanding the poor weather conditions (cold, rainy and windy) on that day, the event was poorly organized. Electricity was not available to run the model until hours after the show start time and the venue was cramped, with the space allotment for the CSO Display being much smaller than requested. Because of the cramped venue, the attendees were unable to stop and look at the display or discuss the CSO Study with Team representatives. After the event it was decided that the Study Team would not use this venue in upcoming years for public communication.

3.2.1.2 Public Events

Family Fish Festival

In early spring 1996, the Study Team was asked to participate in the Family Fish Festival, with a similar display as supplied in the previous year's event held on June 24, 1995, and described in the Phase 2 Technical Memorandum. The Team accepted the invitation and participated in the second annual Family Fish Festival held outdoors at The Forks on June 15, 1996.

The display booth and model described in section 3.2.1 were exhibited under the main canopy located in the central area between the main structures at the Forks. The CSO information display was presented along with other exhibition materials (e.g., Coast Guard and Natural

Resources). During the event, the Study Team handed out a number of brochures including the CSO questionnaire.

Because the venue was outdoors and not conducive to completion of questionnaires, no questionnaire responses regarding the CSO study were obtained during the event. Following the event, no response cards were received by mail. Although no additional names were added to the database as a result of this event, the display was well attended and well received by the public and is considered a useful venue for CSO public education.

At the festival, Doug McNeil of the Water and Waste Department conducted an interview regarding Combined Sewers and the CSO Management Strategy Study to Winnipeg's Shaw Cable Company. The interview aired September 12, 1996 and was about 8-10 minutes in length. A Shaw Cable Representative estimated that approximately 1-2% of the cable subscribers may be viewing this channel at any one time. Therefore, it is possible that between 2,000 and 4,000 individuals would have seen this interview. The interview has been rebroadcast periodically on Shaw and Videon's public access television channels.

The City did not participate in the festival in 1997, primarily due to the dislocation caused by the 1997 Red River flood. Not only would representation at this event during the 1997 flood have been inappropriate, but also most members of the CSO Study Team were conducting flood-related duties at the time.

Photos taken during this 1996 event are shown in Appendix C.

3.2.2 Publications

3.2.2.1 Brochures/Handouts

A number of information brochures/handouts were made available during the public events. These brochures included:

- "You Can Help Keep Floating Debris Out Of Our Rivers";

- “Combined Sewer And River Quality”;
- “Fish Handling And Food Safety”;
- “Keeping Your Basement Dry”;
- “River Quality And Combined Sewer Overflows”;
 - Update, January 1996
 - Update, January 1997
 - Update, January 1998.

Copies of the brochures and handouts are provided in Appendix B.

In general, while the interest of those attending these events appears to be fairly high with respect to the CSO displays, the mail-back response is quite low.

3.2.2.2 Phase Reports

Upon completion of each phase of the Study, a compendium of the phase studies and results have been compiled into a reader-friendly public report. The Phase 1 Report was completed in September 1994. The Phase 2 Report was finalized for public distribution on July 9, 1996. Once finalized, the Phase 1 Report was placed as an appendix within the Phase 2 Report and distributed to members of the public who had requested information about the Study and to members of the various special interest groups (Environmental Groups, River Use Groups, Winnipeg Chamber of Commerce, etc.). An addressed letter describing the study, and mentioning their previous involvement in the study, accompanied each report. A copy of a letter is provided in Appendix D. A total of 992 reports were distributed to the various stakeholders via mail on August 13, 1996. The report was also made available through the City of Winnipeg and has been placed in the Centennial Public Library.

The Phase 2 Report outlined the range of control options being considered in the study for controlling CSOs. The report also introduced the issues for Phase 3 consideration.

Subsequent Phase Reports will be sent to individuals who comprise the CSO Database.

3.2.2.3 Newspaper/Newsletter Articles

The study team has completed several articles for community newsletters and other publications in Phase 3. Combined sewer overflow articles have been published in:

- Fisherman's Gazette, June 3, 1996
 - total circulation 7,000 (3,000 in Winnipeg and the remainder in rural areas).
- Real Estate News, September 6, 1996
 - distributed through 650 outlets in Manitoba from The Pas and southward. Total circulation 42,500.
- Civic Pulse, September 1996 Issue
 - total circulation 3,200
 - the Civic Pulse is distributed to City of Winnipeg employees, unions, MTS's corporate communication department, Manitoba Hydro, Workplace Safety and Health, hospitals, the Winnipeg Free Press, Winnipeg International Airport, Winnipeg's universities, and the Pan-Am Games Society.
- The International Coalition Summer Newsletter, October 1996
 - total circulation 660
 - the International Coalition newsletter is sent to individuals, businesses, agencies and various levels of government, including all Red River Basin municipalities.
- Western Canada Water and Wastewater Association's "The Bulletin", December 1996 Issue
 - total circulation 5,500.

The purpose of the written articles was to inform people in Winnipeg and the Red River Valley of CSO discharges associated with the City of Winnipeg sewer system and the City's initiatives to study the river quality impacts and evaluate possible control options. Each article provided the reader with the latest CSO study information and was written to interest the intended readership audience. The articles are located in Appendix E.

3.2.2.4 On-Line Publishing

The City of Winnipeg features a brochure regarding the City's CSO Study on their worldwide web home page (<http://www.mbnet.mb.ca/city/html/services/browwater/sewers.htm>). The CSO information is offered as a link on the Water and Waste Department portion of the City of Winnipeg Web Site.

3.2.3 Special Interest Groups

Urban Fishing Committee

The Urban Fishing Committee is comprised of members of the Mid-Canada Marine Dealers Association, Manitoba Wildlife Federation, Fish Futures, City of Winnipeg Parks and Recreation and Water and Waste Departments, Travel Manitoba, and Fisheries and Oceans. A presentation of the CSO Study was made to the Committee during one of their regularly scheduled monthly meetings on June 27, 1996. The meeting, held at the Department of Natural Resources, was sparsely attended, but the presentation was well received. Most in attendance were familiar with the Study through discussions with the Advisory Committee or their colleagues.

Rotary Club of Winnipeg

In January 1997, Mr. Jonasson, a member of the Speakers Committee of the Rotary Club of Winnipeg, (Club No. 35), invited the Study Team (Messrs. Ed Sharp and George Rempel) to speak on the Combined Sewer Overflow Management Study.

The Team accepted the invitation, however, due to flood forecasting, Ed Sharp was unable to attend the meeting. On April 23, 1997, George Rempel gave a 20-minute presentation to the meeting members. The meeting was followed by a question and answer period. The questions asked focussed on the life span of the existing combined sewer system and annual and capital costs associated with control options. The 1997 Update brochure was made available to the

Rotary members. Approximately 20 brochures were taken. A total of 112 members (and guests) attended this meeting.

3.2.3.1 River User Groups

On June 10, 1996, an afternoon meeting was held at the Franco-Manitobain Culturel Centre with various groups who utilize the river for recreational activities, e.g., yacht clubs. Table 1 shows the groups invited to the meeting, which groups confirmed and were scheduled to attend, and those groups that had representation at the meeting. In summary, a total of 14 organizations were contacted, 9 confirmed and were scheduled to attend, and 7 groups were represented at the meeting. The meeting lasted approximately 2 hours.

Ed Sharp, City of Winnipeg, and George Rempel, TetrES Consultants Inc., gave an overhead presentation, providing information on Phase 2 of the study, which took approximately one hour to complete. The presentation was followed by a question and answer period which also took approximately one hour.

The group representatives indicated that they would like to continue communication with the City regarding CSO issues. Upon completion of the Phase 2 Report in August 1996, copies were sent to all groups invited to the meeting.

3.2.3.2 Environmental Groups

On June 12, 1996, an afternoon meeting was held at the Franco-Manitobain Culturel Centre with various eco-network groups. Table 2 shows the groups invited to the meeting, which groups confirmed and were scheduled to attend, and those groups which had representation at the meetings. In summary, a total of 17 organizations were contacted, 13 confirmed and were scheduled to attend, and 9 groups were represented at the meeting.

TABLE 1
CONTACT LIST FOR RIVER USER GROUPS

ORGANIZATIONS CONTACTED	CONFIRMED TO ATTEND	ATTENDEES
Royal Manitoba Yacht Club	√	√ (1)
Kildonan Yacht Club		
Point Douglas Yacht Club		
Redboine Yacht Club	√	√ (1)
Winnipeg Rowing Club		
Winnipeg Canoe Club	√	
Winnipeg Power and Sail Squadron Rowing Club	√	√ (1)
Jet Sport Association Manitoba	√	√ (2)
Water-ski Manitoba	√	√ (1)
Triple Creek Water-ski Club		
Harbour Patrol	√	
Winnipeg Police Divers Unit	√	√ (2)
DFO Emergency Preparedness and Diving Team		
Fire Department Water Rescue Unit	√	√ (6)

(2) Indicates number of members participating in the meeting

TABLE 2
CONTACT LIST FOR ECO-NETWORK GROUPS

ENVIRONMENTAL GROUPS CONTACTED	CONFIRMED TO ATTEND	ATTENDEES
Friends of the La Salle	√	√(1) ¹
The International Coalition	√	√(1)
La Barriere Greenspace Group	√	√(1) ¹
Manitoba Naturalist Society		
North Tache River Group	√	
Assiniboine River Management Advisory Board	√	√
Coalition for a Canoeable Seine	√	√(1)
Friends of Bruce Park	√	
Omands Creek Wolseley Residents Association	√	√(1)
Save our Seine	√	√(1)
Sierra Club	√	
North St. Boniface Residents Association	√	√(1)
St. Boniface Riverbank Preservation Committee	√	√(1)
Sturgeon Creek Association		
Urban Green Team		
Wildlife Association		
Winnipeg Water Group	√	

(2) Indicates number of members participating in the meeting

(1)¹ Indicates an individual representing two different groups

Ed Sharp, City of Winnipeg, and George Rempel, TetrES Consultants Inc., gave an overhead presentation providing information on Phase 2 of the study. The material presented overlapped in content to that presented at the first eco-network meeting held May 10, 1995.

The presentation took approximately 2 hours to complete. In general, questions asked after the presentation focussed on issues associated with small creeks and streams more so than the CSO study and the two major rivers. Of particular note were comments made regarding the potential for better water quality in the tributary streams to contribute to improved water quality in the rivers.

3.2.3.2.1 TIC Conference

The City of Winnipeg was invited to present a brief overview of the CSO Study at the annual summit conference of The International Coalition (a group involved with water management issues associated with the Red River Basin) held November 13-15, 1996 in Winnipeg. The City of Winnipeg also reserved space at the conference to display the CSO exhibit and model. Brochures used in past public events were offered at the conference.

Approximately 200 people were in attendance during the presentation given by E. Sharp. Due to the format of the conference, there was no question and answer period at the end of the presentation and approximately 60 people from the conference stopped by the City's CSO display. Only three individuals were recorded as requiring additional information.

Although a limited number of the conference attendees were interested in the study, it is considered prudent by the Study Team members to maintain an active liaison with this organization.

3.2.4 Scientific Community

After completion of the Phase 2 reader-friendly report, a meeting was held to develop a list of individuals from the scientific and academic community that might be interested in receiving

such a document. Approximately 30 people, including those contacted in Phase 2, were suggested. Their areas of expertise included civil engineering, biology (plankton nutrient recycling, fish ecology, toxicology, riverine macro-invertebrates, and ecological microbiology), economic and community health.

In August 1996, the Study Team contacted these individuals by telephone, explaining the study, and requesting their review of the project. The Study Team also requested their assistance in obtaining additional names of persons that they thought may be interested in receiving information regarding the study.

In September 1996, Phase 2 reports were sent out to 22 scientific/academic contacts who agreed to review the project. A letter restating the Study Team's request for their contribution to the study was sent with the report.

Members of the scientific/academic community that received a report and a copy of the accompanying letter are provided in Appendix D.

In November 1996, the Study Team recontacted the scientific/academic representatives to determine if they had a chance to review the document, if they had any comments, and if they would like to meet with members of the team to further discuss the project. None of the persons contacted were interested in meeting. The following comments and suggestions were made by members of the scientific/academic community in response to the CSO Management Strategy Study Phase 1 and 2 Reports.

Valel (Val) Chacko, Environment Canada

Mr. Chacko indicated that he would contribute when and if federal financing became available for controlling combined sewer overflows.

Dr. H. Halverson, University of Manitoba Microbiology

Dr. Halverson indicated that he was leaving academic circles. It seemed to be his intention not to take part in this or any other study.

Professor T. Elefsinoitis, U of M Civil Engineering

Professor Elefsinoitis said that he did not have a chance to review the document but intended to in the near future. He indicated that he would call in early to mid-December to express his views.

Dr. J. Oleszkjewicz, University of Manitoba Civil Engineering

Dr. Oleszkjewicz had several comments he wished to make. As a citizen, he is most concerned with the aesthetics and point disinfection of the rivers. As an engineer, he had two areas of concern:

- he wishes to see a cost effectiveness analysis of control options in terms of risk with respect to ammonia and disinfection, and
- he would like to see some kind of time scale that illustrates how long the various control options would take to implement compared with the cost and benefits of the control option.

Professor Oleszkjewicz indicated that he has some limited experience with sewage issues in Poland.

Mr. Joe O'Connor, Natural Resources

Mr. O'Connor indicated that Natural Resources is addressing the CSO issue through representation in the Advisory Committee.

Dr. Jim Popplow, Manitoba Public Health Officer

Dr. Popplow indicated that Manitoba Health supports the document and the Study. However, he said he felt that a more immediate health concern is Winnipeg's lack of a potable water treatment plant. He would rather see money placed towards a water treatment plant than reducing CSOs.

Dr. Allan Ronald, U of M Faculty of Medicine

Dr. Ronald responded in a letter dated September 25, 1996. The letter is provided in Appendix D for your review. Observations made by Dr. Ronald in the letter include:

- the City should review the evidence that has led to the setting of the fecal coliform standards to determine if it continues to be valid;
- personally he does not feel that there is much evidence from existing data to suggest that human illness is resulting from the quality of the water in our rivers. From the data supplied he would not be enthusiastic about spending large incremental sums of money on waste water management;
- need additional media to allow as many people as possible to evaluate the options and understand the costs and benefits for the city.

John Shearer, Manitoba Naturalist Society

John Shearer responded in a letter dated December 2, 1996. Mr. Shearer focusses on his concerns regarding:

- other possible contaminants such as metals and organochlorines which may impact downstream users and ecosystems;
- lack of discussions regarding public education to encourage reductions of the amount and toxicity of waste entering the sewer system;
- concern regarding long-term environmental costs associated with the use of chlorine; and
- our ethical and moral obligations to ensure the water we take from rivers and lakes is returned in a condition comparable to that in which it is received.

The letter from Mr. Shearer is located in Appendix D.

Donald Cobb, Impact Assessment Biologist, Fisheries and Oceans

Mr. Cobb responded on behalf of Fisheries and Oceans in a letter dated November 26, 1996. The letter is located in Appendix D. A summary of the comments made is provided below:

- data presented in the report indicates that 1992 is a “normal flow year”. Work conducted by DFO indicates that flows in 1992 on the Assiniboine River was not a normal flow year;
- an explanation of the log scale used on several of the figures should be given to reduce the confusion felt by people who are not used to looking at graphs using this type of scale; and
- expensive options do not appear to improve wet weather control with respect to compliance.

The majority of persons who responded to the Phase 2 report indicated that they welcome the opportunity to participate again with a review of the Phase 3 report.

Since the contact made in 1996, Dr. Popplow has become a member of the Advisory Committee.

George Rempel and Ed Sharp of the CSO Study Team conducted a presentation in 1996 regarding CSO Phase 2 results. The presentation was held at the DFO facilities and was attended by approximately 60-70 people. The presentation began by introducing the CSO Study and general concepts, and continued with discussion of the technical aspects relating to Phase 2 of the study. The concluding portion of the presentation dealt with the Public Communications program.

The presentation to the audience at DFO was well received and audience members submitted several questions for the Study Team representatives. Questions dealt with issues such as organic matter loadings, BOD, the impact of snowmelt on CSOs, and disinfection options and implications. At the conclusion of the presentation, several people expressed interest in receiving follow-up information, and were added to the consultation database.

3.2.4.1 Presentations

A series of technical papers providing information regarding the City of Winnipeg CSO Study have been presented throughout North America. Phase 2 CSO-related papers presented include:

- Urban Effects on Water Quality in the Red River and Related Uses (authors: E Sharp, City of Winnipeg; G. Rempel, TetrES Consultants Inc.; N. Szoke, TetrES Consultants Inc.; and D. Morgan, TetrES Consultants Inc.)
 - presented at the Water Environment Federation (WEFTWC) Conference, Quebec City, PQ, June 15-19, 1996.

- The City of Winnipeg's Combined Sewer Management Study and the Partnering Process (authors: E. Sharp, City of Winnipeg; R. Gladding, Wardrop Engineering; W. Borlase, City of Winnipeg; N. Szoke, TetrES Consultants Inc.)
 - presented at the Water Environment Federation of Ontario (WEFO) Conference, Toronto, ON, April 1996, and
 - presented at the Western Canada Water and Wastewater Association Conference, Regina, SK, September 1996.

- Application of Linked Models to Develop Combined Sewer Overflow Control Plans (authors: E. Sharp, City of Winnipeg; G. Rempel, TetrES Consultants Inc.; D. Morgan, TetrES Consultants Inc.; and N. Szoke, TetrES Consultants Inc.)
 - presented at the Canadian Society for Hydrological Sciences, Winnipeg, MB, May 28, 1996
 - presented at the Water Environment Federation (WEFTEC) Conference, Dallas, TX, October 7-9, 1996.

- Preparing for Informed Decision-Making (authors: E.J. Sharp, City of Winnipeg; G. Rempel, TetrES Consultants Inc.)
 - presented at the Western Canada Water and Wastewater Association Conference, Winnipeg, MB, November 1997.

The feedback from these papers has been positive and indicates that "state-of-the-art" methods, technology, and analysis are being used in the Winnipeg CSO Study. The Winnipeg CSO Study was selected as one of a number of case studies to be given peer review by a Water Environment Federation Technical Committee.

3.3 DATABASE MANAGEMENT

As part of the public communication program, the database software "ACT" has been utilized for public contact management. The database has been used to schedule and record communications between CSO Team Members and interested residents, special interest groups, environmental groups, the scientific community, etc., and is used to aid in the distribution of CSO-related material to interested persons. Following a public event, or during a large-scale distribution to contacts, database management requires modest effort. Otherwise, database management requirements are minimal. At the end of Phase 2, 70 contacts were established and had been recorded on the database. Since this time, the database has grown to approximately 1,750.

For residential contacts, the results of two questions asked on the questionnaire distributed during public events have been recorded in the database. In July 1997, the Team was asked to query the database to determine the response to date of the questions asked. At this time, 1,472 resident contacts listed in the database had responded to the questionnaire. (Since this request, 36 additional public contacts have been made and incorporated into the database.) The responses to the two questions asked on the questionnaire, as of July 1997, are discussed below. The questions are as follows:

1. Which river use is most important to you? Please circle your choice.
 - a. use of the river for swimming/waterskiing;
 - b. the river's appearance;
 - c. protecting aquatic life; and
 - d. all of the above.

2. Currently, the average Winnipeg homeowner's sewer bill is \$180 per year. How much more are you willing to pay on your annual sewer bill to control combined sewer overflows? Please circle your choice.
 - a. \$0
 - b. \$1-25
 - c. \$26-50
 - d. \$51-100

- e. \$101-200
- f. more than \$200.

Following are the results of the database queries used to evaluate the resident responses to these questions.

- Total of 1,472 residents responded to the questionnaire by either leaving their name only or by answering at least one of the two questions.

- 989 residents responded to question number 1:

a. use of the river for swimming/waterskiing	16
b. the river's appearance	48
c. protecting aquatic life	106
d. all of the above	803

- 1,132 responded to question number 2:

a. \$0	219
b. \$1-25	265
c. \$26-50	404
d. \$51-100	102
e. \$101-200	105
f. more than \$200	37

- The various relationships between question 1 and 2 responses are as follows:

\$0 and use of the river for swimming/waterskiing	3
\$0 and the river's appearance	8
\$0 and protecting aquatic life	15
\$0 and all of the above	159
\$1-25 and use of the river for swimming/waterskiing	1
\$1-25 and the river's appearance	13
\$1-25 and protecting aquatic life	28

\$1-25 and all of the above	169
\$26-50 and use of the river for swimming/waterskiing	8
\$26-50 and the river's appearance	17
\$26-50 and protecting aquatic life	38
\$26-50 and all of the above	263
\$51-100 and use of the river for swimming/waterskiing	1
\$51-100 and the river's appearance	3
\$51-100 and protecting aquatic life	11
\$51-100 and all of the above	59
\$101-200 and use of the river for swimming/waterskiing	2
\$101-200 and the river's appearance	3
\$101-200 and protecting aquatic life	8
\$101-200 and all of the above	69
more than \$200 and use of the river for swimming/waterskiing	1
more than \$200 and the river's appearance	0
more than \$200 and protecting aquatic life	1
more than \$200 and all of the above	24

Statistical confidence analyses were not conducted, however, preliminary review of the responses received shows that the majority of the public (404 responses) is willing to pay more on their annual sewer bill to control combined sewer overflows. The largest response was in the \$26-\$50/year category. The next largest response was in the \$1-\$25/year category. Not surprisingly, the majority of people think that all river uses are important. Individually, only 16 respondents chose swimming/waterskiing as the most important river use and the majority of the 16 were will to pay an additional \$26-50 for this river use. Forty-eight people cited the river's appearance as the most important use and the majority of the 48 were will to pay either \$1-25 (13 responses) or \$26-50 (17) for this use. One hundred and six people cited aquatic life as the most important river use and the majority are willing to pay either \$1-25 (28) or \$26-50 (38) to protect this use.

3.4 HEALTH-RISK ASSESSMENT

In the context of this CSO study, the microbial quality of the urban reaches of the Red and Assiniboine rivers is a major issue. Public-attitude surveys and public consultation have shown that there is a perception of risk to public health from bacterial contamination of the river, from CSOs, land drainage, and effluent discharges. The Advisory Committee recommended an update of the literature on the origin of microbial guidelines and the available health risk assessment information.

The City therefore authorized a study to develop site-specific perspective on health risks associated with the beneficial uses of the urban reaches of the rivers, especially as these relate to CSOs, to promote:

- greater public understanding of the risks inherent in urban river recreation;
- greater public understanding of the benefits of CSO control; and
- informed decision-making on CSO control as it relates to public health risk.

The study has resulted in a number of observations and conclusions, which were presented in the categories of:

- regulation of pathogens in surface water;
- sources of pathogens;
- the estimated risk from recreational use of surface waters; and
- the implications for control of urban discharges, specifically, CSOs in Winnipeg.

The report was provided to the Advisory Committee for review and comment, and a public "reader-friendly" report may be produced at a later date.

3.5 HEALTH RISK REPORT FINDINGS

3.5.1 Water Quality Objectives and Guidelines

Most jurisdictions have objectives or guidelines for surface water quality parameters for the intent of protecting beneficial uses of the water. Manitoba Environment has defined an objective of 200 fecal coliforms/100 mL (200 fc/100 mL) for protecting primary recreation, consistent with most other jurisdictions.

It was confirmed that guidelines for protecting human health from recreational use of surface waters have a largely arbitrary origin. Their origin is based on protecting "natural" bathing beaches (not turbid rivers). The current standard of 200 fc/100 mL for protecting primary recreation has been rationalized by regulatory agencies:

- the criterion is relatively widely utilized and is considered "*adequate*", or "*practical*";
- current rationalizations of such use reflect the original U.S. Public Health Service (i.e., 1960) doctrine of "*attainability*";
- while some epidemiological studies support this numerical guideline, there is growing recognition of the weaknesses of such quality indicators and numerical values among regulators; and
- primary recreation in water meeting the fecal coliform objective does not imply a risk-free condition (the health risk at 200 fc/100 mL is estimated to be about 9 to 19 gastrointestinal illness [GI] cases for every 1,000 immersions, depending on the dose-response model used).

Like some other jurisdictions, Manitoba Environment has adopted an objective of 1,000 fc/100 mL for secondary recreation. There are no epidemiological studies that relate health risk to secondary recreational use.

Surface waters typically receive pathogens from a wide variety of sources, such as rural drainage, urban storm drainage, treated effluents from wastewater plants, CSOs, etc. These source urban discharges will typically increase concentrations of pathogens and indicator organisms in the surface waters. In the case of the Red and Assiniboine rivers, the wastewater

plant effluents are the largest sources of indicator bacteria to the rivers. With disinfection of the plant effluents, indicator bacteria will be reduced but the resistant parasites, such as *Cryptosporidium* and, possibly, *Yersinia*, will likely still be present in plant effluent. Upstream and zoonotic sources will continue to be important. Thus, urban-source control cannot preclude some residual degree of risk due to background levels from both rural and urban non-point sources.

3.5.2 Uses of Rivers in Winnipeg

The Red and Assiniboine rivers are very popular for passive enjoyment, active use of riverwalks, and secondary (non-contact) recreation (boating, fishing). The use of the shoreline and surface waters for primary recreation is limited and results in approximately 5,800 instances of immersion per year in Winnipeg. The limited participation in primary recreation is in part due to flow, clarity, and current constraints. Ingestion of river water during these activities is likely. Therefore, any associated risks from exposure have been implicitly accepted by individuals choosing to engage in primary recreation.

Secondary recreation (boating, fishing) is popular within the City and represents approximately 70,000 users per year¹. While direct contact is not intended in secondary recreation activities, it is estimated that accidental immersion while boating and fishing will result in approximately 2,900 immersion events per year. Both primary and secondary recreation activities are estimated to result in about 8,700 immersions per year.

3.5.3 Estimated Health Risk Associated With Current River Usage

For the Red and Assiniboine rivers, the estimated health-risk rates for current ("baseline") conditions are described below and shown on Figure 1:

¹ CSO Management Strategy Phase 2 Report, May 1996

Health Risk Along Red River using America EPA Equation (Dufour 1985) for Identified Pollution Control Options

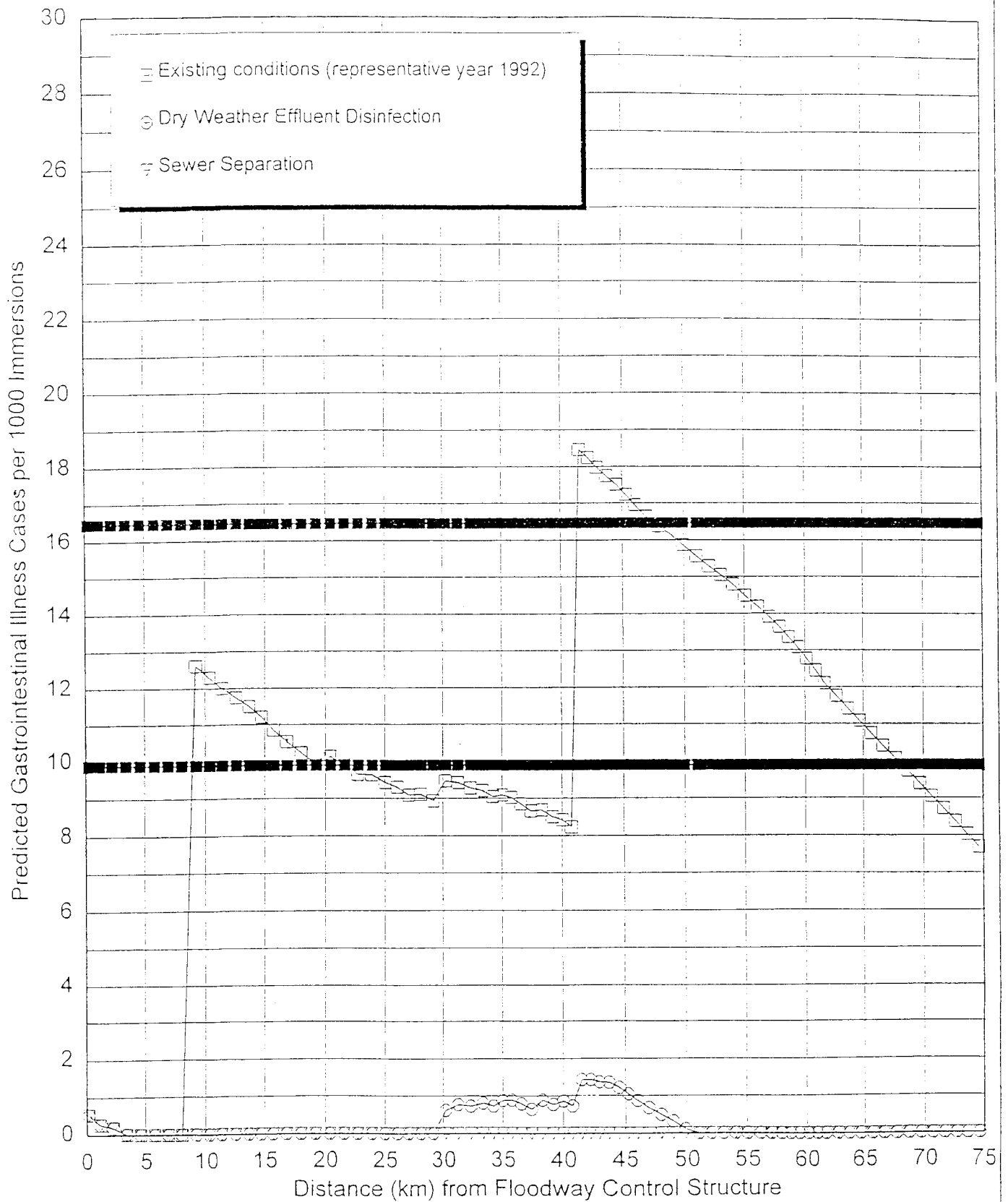


Figure 1.0

- upstream of the urban reaches of the rivers 1-13 cases GI/1,000 immersions (geometric mean fecal coliform concentration of 20 cfu/100 mL);
- within the urban reaches 8-26 cases GI/1,000 immersions (geometric-mean fecal coliform concentrations of 10-1,100 cfu/100 mL).

For comparison, the “acceptable” risk rate, i.e., at the Manitoba Environment objective of 200 fc/100 mL, is estimated to be about 9-19 cases GI/1,000 immersions (the estimates vary depending on dose-response model used).

3.5.4 CSO Control Methods and Potential Benefits

Potential CSO control options will reduce the levels of indicator bacteria and pathogens in the rivers and should provide some reduction in health risk, as described below and on Figure 1:

- disinfection of the 3 Water Pollution Control Centre treated effluents provides some reduction in the recreation-risk rate in the river reaches immediately downstream of these facilities
 - the benefit is estimated between 50 to 100 avoided cases in Winnipeg and Selkirk combined;
- assuming disinfection of WPCC effluents, the subsequent separation of combined sewers in Winnipeg would have little effect on the Winnipeg urban river recreational seasonal caseload of GI, resulting in a predicted reduction of 3-7 GI cases
 - these benefits of health-risk reduction would not be measurable (<1 case GI/year).

The reduction in risk rate and overall gastroenteritis caseload from these control options is considered very modest. The extent of river use influences the magnitude of the predicted caseload more than the concentration of the indicator bacteria, according to the typical dose-response models. If more extensive primary recreation use of the Red and Assiniboine rivers was to occur, the disease caseload arising from the additional exposures would likely increase, even with better quality of the water.

There are many reasons to consider CSO control. These include compliance with environmental policy, improvements in aesthetic or microbiological water quality, response to public perception, etc. The available epidemiological evidence indicates, however, that the public-health benefits of CSO control will be very small and unlikely to be measurable. CSO control is therefore fundamentally a public-policy and regulatory-compliance issue, and not a public-health issue.

3.6 PUBLIC BROCHURE AND SURVEY

A brochure is being prepared which will be sent to all people on the CSO database. The brochure is intended to describe the challenges involved, the options available for controlling CSOs, and background regarding the process underway to address relevant issues. It will emphasize the importance of public participation and the value of public opinion in identifying the level of river water quality the public finds acceptable and willing to finance.

A copy of the brochure and questionnaire will be sent to all people on the CSO database. As well, the questionnaire will be administered by telephone to a random subset of the general public.

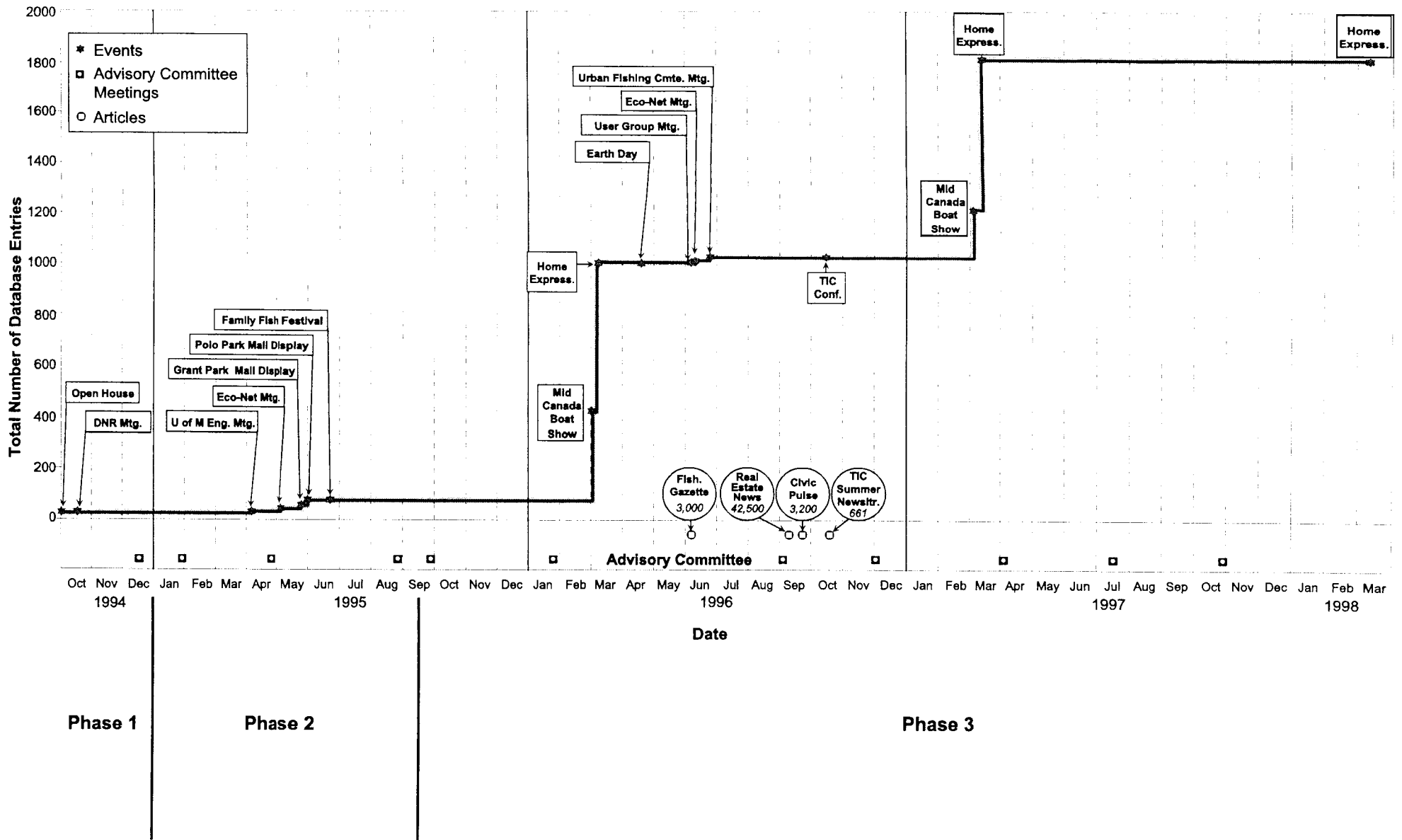
This feedback will be considered in the evaluation of alternative control plans.

4. OVERVIEW OF PUBLIC CONTACTS

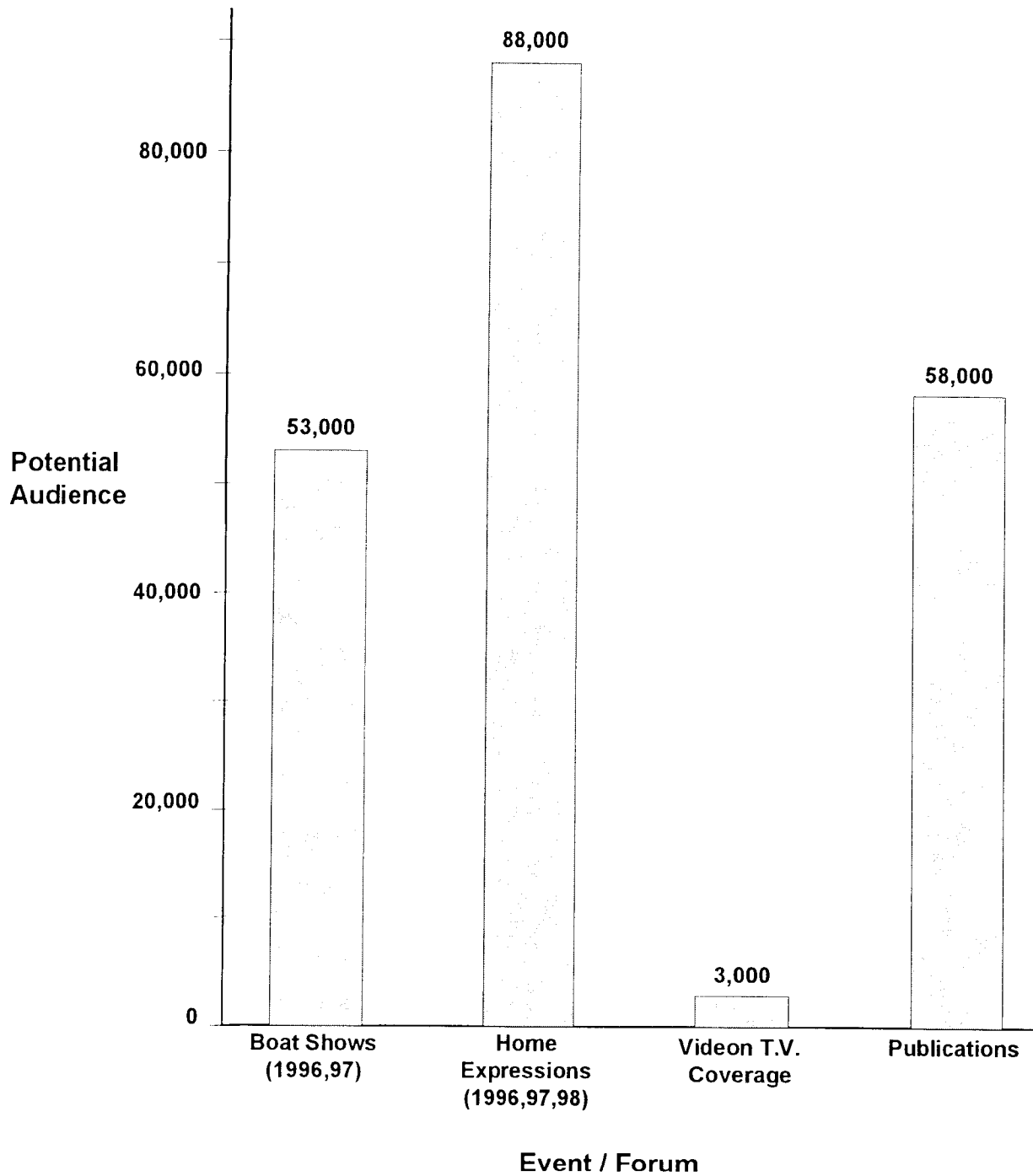
Figure 2 provides the highlights of the public communications activities conducted to date and the corresponding entries into the CSO database. Public Communications activities include open houses, meetings with various river-use interest groups, mall displays, and staffed information displays at river-related family festivals and trade shows.

As evident in Figure 2, each Phase of the study involved progressively more activity in public communications. By the end of Phase 2, perhaps a few thousand citizens had been exposed to CSO information through public events. During Phase 3, six annual events were attended with information displays (Home Expressions Shows [3], Mid-Canada Boat Show [2] and Earth Day [1]). Also in Phase 3, information was presented to focus groups in meetings with several "User Groups" at once, and separate meetings with groups such as the Eco-Net and Urban Fishing Committee. CSO-related information was also published in publications such as the Fish-Gazette, the Real Estate News, the Civic Pulse, and the International Coalition's (TIC) summer newsletter.

CSO Study Team information appearing at two Boat Shows, three Home Expressions shows, and presented in print and television, accounted for a potential audience of approximately 200,000 people who were exposed to CSO Study information provided by the Study Team in Phase 3 (Figure 3).



Overview: Public Contacts
Figure 2



**Potential Phase 3 Audience:
CSO Study Team Information
Presented to Public Displays,
TV Media Coverage and Publications**

Figure 3

5. PHASE 4 ACTIVITIES PLANNED

The completion of Phase 3 represents a major milestone. A range of potential CSO control plans will be identified along with their different characteristics including cost, performance measures, constructability, environmental benefits, etc. The last phase of the study will involve development and evaluation of several selected alternative control plans for public, administrative and regulatory review.

Phase 4 will include a reassessment of Phase 3 technical activities and the most appropriate public consultation activities leading to the upcoming CEC hearings. This reassessment and guidance from the City Senior Administration will provide direction for Phase 4 public communication activities.

APPENDIX A

Layout of CSO Displays for Public Events



Combined Sewer Overflows

What is a Combined Sewer Overflow?

- In a combined sewer system, both storm water and sewage flow through the same pipe. If the pipe cannot handle the volume of water, the excess flows out into the waterway.
- Storm water is not treated, so it can contain a lot of pollutants.
- Sewage is treated at a wastewater treatment plant before being released into the waterway.
- When a combined sewer overflow occurs, untreated sewage is discharged into the waterway.
- This can cause health problems, such as stomach and respiratory illnesses, and can also harm the environment.

Environmental Review of Urban Effects

- An Environmental Review of Urban Effects (ERUE) is a study that looks at the quality of air, water, and land in an urban area. It is used to help make decisions about how to manage the area.
- The ERUE for the City of Winnipeg was completed in 2004. It looked at the quality of air, water, and land in the city and its surrounding areas.
- The ERUE found that there are several areas in the city that are experiencing environmental problems. These include:
 - Air quality: There are several areas in the city where air quality is poor. This is due to traffic and industrial activities.
 - Water quality: There are several areas in the city where water quality is poor. This is due to combined sewer overflows and other sources of pollution.
 - Land use: There are several areas in the city where land use is not sustainable. This is due to a lack of green space and other factors.
- The ERUE also found that there are several areas in the city that are experiencing environmental benefits. These include:
 - Air quality: There are several areas in the city where air quality is good. This is due to a lack of traffic and industrial activities.
 - Water quality: There are several areas in the city where water quality is good. This is due to a lack of combined sewer overflows and other sources of pollution.
 - Land use: There are several areas in the city where land use is sustainable. This is due to a lack of green space and other factors.

What are the Effects of CSOs on River Quality?

- The water quality of the Red and Assiniboine Rivers is affected by CSOs. This is because CSOs discharge untreated sewage and storm water into the rivers.
- CSOs can cause a number of problems, including:
 - Reduced oxygen levels: CSOs can reduce the amount of oxygen in the water, which can harm fish and other aquatic life.
 - Increased turbidity: CSOs can increase the amount of sediment in the water, which can make it difficult to see and can harm aquatic life.
 - Increased bacteria: CSOs can increase the amount of bacteria in the water, which can cause illness in people and animals.
 - Increased nutrients: CSOs can increase the amount of nutrients in the water, which can cause algal blooms and other problems.
- In February 2004, the River Quality Action Plan was developed. This plan aims to reduce the number of CSOs and improve the quality of the rivers.
- The plan includes a number of measures, including:
 - Reducing the amount of storm water that enters the sewer system.
 - Improving the sewer system to prevent overflows.
 - Treating storm water before it enters the waterway.
- The plan also includes a number of educational programs to help people understand the importance of reducing storm water runoff.

Where are these Overflows Located in Winnipeg?

- The City of Winnipeg has identified several areas where combined sewer overflows are most likely to occur. These areas are:
 - The downtown core: This area has a high density of buildings and a lot of impervious surfaces, which can cause a lot of storm water runoff.
 - The industrial areas: These areas have a lot of factories and other industrial buildings, which can cause a lot of storm water runoff.
 - The residential areas: These areas have a lot of houses and other buildings, which can cause a lot of storm water runoff.
- The City of Winnipeg is working to reduce the number of overflows in these areas. This includes:
 - Installing storm water management systems, such as rain gardens and permeable pavement.
 - Improving the sewer system to prevent overflows.
 - Treating storm water before it enters the waterway.

The Combined Sewer Overflow Management Study

- The CSO Study has been organized into three phases:
 - Phase 1: Assessment. This phase involved identifying the locations and causes of CSOs.
 - Phase 2: Planning. This phase involved developing a plan to reduce the number of CSOs.
 - Phase 3: Implementation. This phase involves putting the plan into action.
- The City of Winnipeg is currently in Phase 2 of the study. This involves developing a plan to reduce the number of CSOs.
- The plan includes a number of measures, including:
 - Reducing the amount of storm water that enters the sewer system.
 - Improving the sewer system to prevent overflows.
 - Treating storm water before it enters the waterway.
- The City of Winnipeg is also working to educate the public about the importance of reducing storm water runoff.

Aquatic Life

- The quality of the water in the Red and Assiniboine Rivers is important for the health of the aquatic life that lives in the rivers.
- CSOs can cause a number of problems for aquatic life, including:
 - Reduced oxygen levels: CSOs can reduce the amount of oxygen in the water, which can harm fish and other aquatic life.
 - Increased turbidity: CSOs can increase the amount of sediment in the water, which can make it difficult for fish to see and can harm their gills.
 - Increased bacteria: CSOs can increase the amount of bacteria in the water, which can cause illness in fish and other aquatic life.
 - Increased nutrients: CSOs can increase the amount of nutrients in the water, which can cause algal blooms and other problems.
- The City of Winnipeg is working to reduce the number of CSOs and improve the quality of the rivers. This includes:
 - Reducing the amount of storm water that enters the sewer system.
 - Improving the sewer system to prevent overflows.
 - Treating storm water before it enters the waterway.
- The City of Winnipeg is also working to educate the public about the importance of reducing storm water runoff.



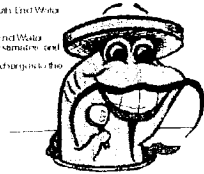
nd River Water Quality



Addressing Dry Weather Issues

Wet weather flows are the primary source of pollution to the river. The wastewater treatment plant (WWTP) is designed to handle the average flow of the river during wet weather.

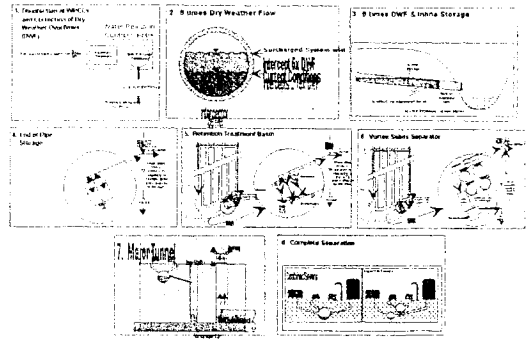
The process of treating wastewater at the WWTP and the End-Use of the River is the primary concern. The WWTP is designed to handle the average flow of the river during wet weather.



Evaluation of Various Control Options

The water quality control program is evaluated by the City of Los Angeles. The program is designed to handle the average flow of the river during wet weather.

- 1. Most significant wet weather flow is the result of the rain.
- 2. The water quality control program is designed to handle the average flow of the river during wet weather.
- 3. The water quality control program is designed to handle the average flow of the river during wet weather.
- 4. The water quality control program is designed to handle the average flow of the river during wet weather.



Addressing Wet Weather Issues

Wet weather flows are the primary source of pollution to the river. The wastewater treatment plant (WWTP) is designed to handle the average flow of the river during wet weather.

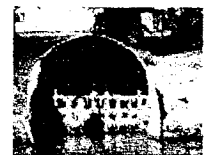
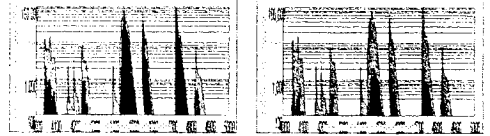
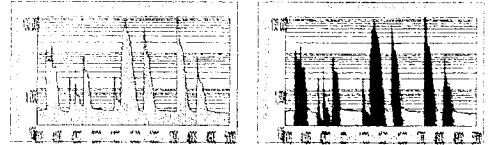
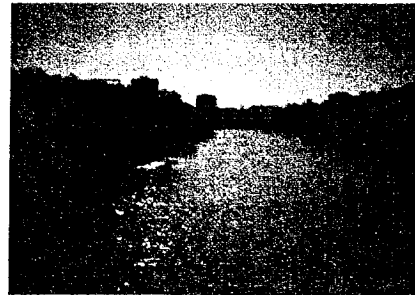
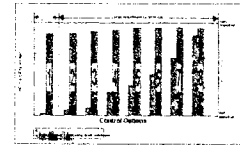
The process of treating wastewater at the WWTP and the End-Use of the River is the primary concern. The WWTP is designed to handle the average flow of the river during wet weather.



What Happens Next

Wet weather flows are the primary source of pollution to the river. The wastewater treatment plant (WWTP) is designed to handle the average flow of the river during wet weather.

- 1. The water quality control program is designed to handle the average flow of the river during wet weather.
- 2. The water quality control program is designed to handle the average flow of the river during wet weather.
- 3. The water quality control program is designed to handle the average flow of the river during wet weather.
- 4. The water quality control program is designed to handle the average flow of the river during wet weather.



APPENDIX B

Brochures/Handouts Distributed at Public Events

RIVER QUALITY AND COMBINED SEWER OVERFLOWS

City of Winnipeg
Water and Waste
Department



UPDATE
January, 1997

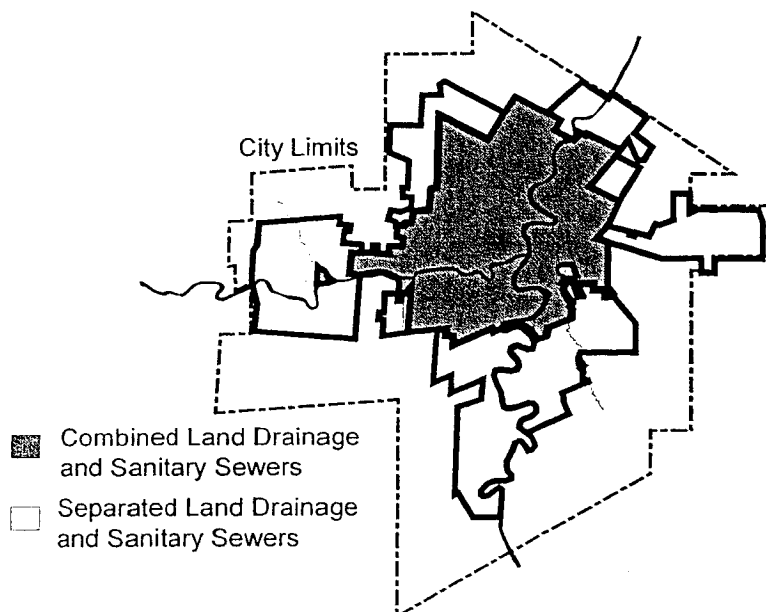
In January 1996, the City published its first Update Brochure providing information on; Winnipeg sewer systems; what a combined sewer overflow is, and the City's study which is considering the impact of CSOs on river quality and the costs and benefits of CSO control options for Winnipeg. This study is known as the **Combined Sewer Overflow Management Study**.

About 40% of the City is serviced by Combined Sewers. These sewers carry sewage from homes and businesses to treatment plants for treatment during dry weather. But when it rains, these sewers carry both sewage and run-off. The flow of stormwater run-off during most rainstorms is very high and not all the "combined" flow can be transported to the treatment plants. Instead, a portion of the diluted sewage is discharged directly to the rivers. This is called a **Combined Sewer Overflow (CSO)**. There are about 70 Combined Sewer

outfall locations along the Red and Assiniboine Rivers. Dilute wastewater overflows from these outfalls happen, on average, 21 times during the recreational season (May to September).

CSOs contribute to the pollution of our rivers. The diluted, untreated sewage contains microorganisms

from human and animal waste, and objectionable floating debris such as feminine hygiene products, condoms and syringes. This floating debris looks bad. The overflows also contain some of the microorganisms which are pathogens (disease causing), and which can pose a health risk to those who use the river for recreational activities that involve immersion in the water (e.g. water skiing).



THE STUDY

The City initiated the Study in 1994 to understand the effects of CSOs on river quality and to determine what should be done to improve the situation. The study is split into 4 phases, as follows:

Phase 1

Defining the effects of CSOs on river quality.

Phase 2

Evaluating the options for controlling wet weather flow.

Phase 3

Evaluating costs and benefits of potential plans.

Phase 4

Developing an implementation plan for cleaner rivers.

The study is currently in Phase 3. Phase 3 will refine the analysis of costs and benefits, and develop potential plans for controlling combined sewer overflows.

CSO control technologies can range from simple measures such as optimizing the use of the existing infrastructure, to structurally intensive remedial works such as separation of the sewers. The benefits derived from these different options vary, as do the costs.

PHASE 3 PROGRESS

Since completion of Phase 2, work activities have included:

- continued data collection and monitoring; and
- technical evaluations.

DATA COLLECTION AND MONITORING

Extensive amounts of information are required to adequately understand and quantify the CSO issues. The ongoing data collection programs include monitoring of rainfall, runoff (flow and quality), and river water quality. Two new initiatives were undertaken in Phase 3 as discussed.

1. Floatable Characterization

This past summer the Team utilized a **Floatable Collection Systems** to determine the type and amount of floatable debris that enters the river from a CSO outfall pipe after rainfall events. The system consisted of a floating boom which was draped with a net extending to the river bottom.

2. Treatability Study

Samples of Combined Sewer Overflow were collected during rainfall events of 1996 and analyzed in a laboratory to determine the effectiveness of various treatment alternatives. Knowing the "treatability" will permit the study team to estimate the size and cost of various treatment options.



Floatable Collection System

TECHNICAL EVALUATIONS

Utilizing previously developed computer models of the sewer network and river systems, the study team has been refining control alternatives. The focus of much of the work is on the in-line storage option.

In-line Storage

During rainstorms, a portion of the overflow could be contained within the sewer system and pumped to the treatment plants for treatment as capacity allows. This type of control is known as **in-line storage**. This can be accomplished through use of a gate or inflatable dam as illustrated below.

Flows from small rain storms would be prevented from discharging to the river by closure of the gate. Flows from larger rain storms would be partially stored and the excess would overflow to the river. This option is expected to:

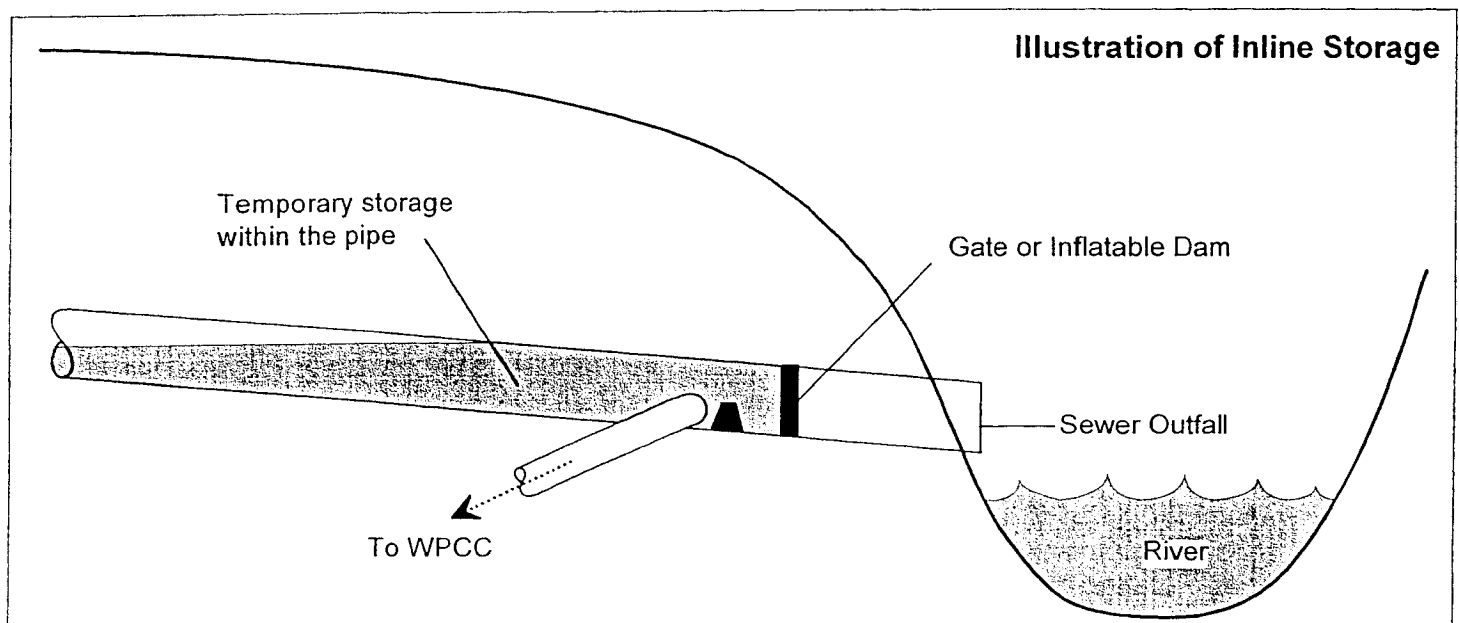
- cost about \$85 Million;
- reduce the volume of overflows by about 50%; and
- reduce the number of CSOs from 21 to 10, or less, during the recreational season.

For small storms which would be completely stored in the sewer, no floatables or microorganisms would be discharged. However, overflows would still occur

(resulting in the discharge of floatables and microorganisms) from large rainstorms.

There are a number of constraints which must be applied to the in-line storage option. It must not increase the risk of basement flooding or cause any other undesirable effects. To confirm the suitability of this option, the study team has been developing a Pilot Study to be carried out during the summer of 1998.

Phase 3 has also continued with evaluation of other options, and is beginning to consider combinations of options to develop alternative implementation plans.



PUBLIC COMMUNICATIONS

This past year the Team has participated in a number of public events including the Mid-Canada Boat Show and Home Expressions 1996 held at the Convention Centre, and The Family Fish Festival at The Forks.

A number of presentations were made to various interest groups including, the Jet Sport Association, Yacht Clubs, Harbour Patrol, environmental groups, and members of the scientific community. The Team also completed several articles in community newsletters and other publications including, the Fisherman's Gazette, Real Estate News, Civic Pulse etc.

Upon completion of each phase of the CSO Study, a summary of the Phase studies and results are compiled into a report. The Phase 2 report was completed and distributed last August to members of the public who had requested further information about the study and to members of various special interest groups such as environmentalist, river users etc. Subsequent Phase reports will be sent to individuals listed in the database. The list is comprised of individuals who have shown past interest in the Study.

ISSUES AND CHOICES

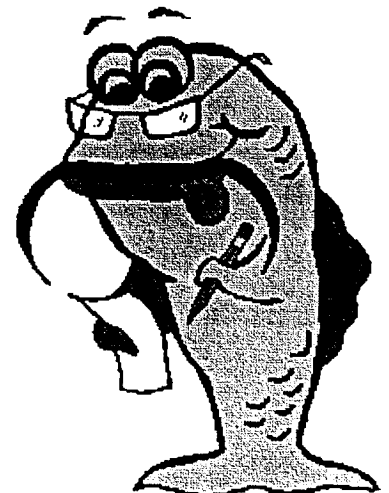
Addressing the CSO problem raises some very important issues and choices. The water quality and policy issues have been identified for public review in previous reports and updates.

In review of the control options and in eventually selecting the most suitable option, choices will need to be made. CSO controls are costly and raise public value judgements and policy matters. Ongoing public input will continue to help define the levels of control for CSOs that are cost-effective, practical and which provide acceptable environmental stewardship.

PLEASE GET INVOLVED

If you would like to receive the Study Phase reports, call (204) 986-3333 or send a letter by mail using the address provided below.

CITY OF WINNIPEG
CSO MANAGEMENT STUDY
WATER AND WASTE DEPARTMENT
1500 PLESSIS ROAD
WINNIPEG, MAN.
R2C 5G6



RIVER QUALITY AND COMBINED SEWER OVERFLOWS

City of Winnipeg
Water and Waste
Department



UPDATE

January, 1996

What is a combined sewer overflow?

In some areas of Winnipeg, both rainwater runoff and sanitary wastewater are collected in the same sewer. These sewers are called combined sewers.

Generally when it rains, the combined sewers can't carry all the rain and wastewater to the treatment plant. Instead, much of the rain and wastewater mixture overflows to the Red or Assiniboine Rivers. This flow is called a *combined sewer overflow (CSO)*.

Why do we have combined sewers?

Like many cities established in the late 1800s, Winnipeg first installed combined sewers. All wastewater and surface runoff went directly to the rivers through these large collector sewers. As our city grew, the water in the rivers could not assimilate our wastewater.

In the mid-1930s, Winnipeg started building sewage treatment plants. During dry weather, flows from combined sewers went to these plants for treatment. When

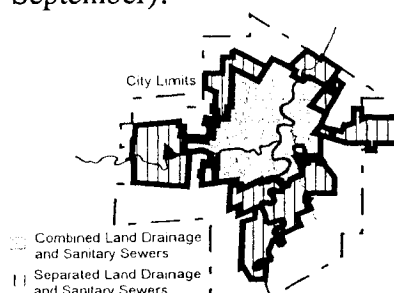
the rain fell or snow melted, the treatment plants couldn't handle all the flow. The excess went directly to the rivers.

The City stopped building combined sewers in the late 1950s. Since then all new subdivisions have been built with separate sewer systems where wastewater and runoff are collected in separate pipes.

Where do these overflows occur in Winnipeg?

About 40 percent of the city is still served by combined sewers.

Over 70 outfalls are located along the Red and Assiniboine rivers within this area. Wastewater overflows from these outfalls on average 18 times during the recreation season (May to September).



River quality in Winnipeg undergoes environmental review

In 1989, the Minister of Environment asked the Clean Environment Commission to study the quality of the Red and Assiniboine Rivers within and downstream of Winnipeg. The Commission held public hearings to help determine the appropriate uses for our rivers and the river water quality needed to protect these uses.

In 1992, the Commission made several recommendations, including the recommendation that the City should study the effects of combined sewer overflows (CSOs) on the rivers and determine what should be done to improve the situation. The Minister of Environment accepted the Commission's recommendation in 1993. In response, the City initiated a CSO study, which is required to be completed in 1997.

What is the CSO Management Study?

The City's study of our combined sewer system will consider:

- which river uses should be protected;
- the impact of CSOs on river water quality;
- the effectiveness of control options in meeting water quality objectives;
- the costs and benefits of control options; and
- which alternative best suits Winnipeg's situation.

The study has four phases.

- Phase 1 Defining the effects of CSOs on river quality
- Phase 2 Evaluating the options for controlling wet weather flows
- Phase 3 Evaluating costs and benefits of potential plans
- Phase 4 Developing an implementation plan for cleaner rivers.

Phase 3 of the study has recently commenced.

When the plan is completed, it will be submitted to the Clean Environment Commission for their consideration.

How do CSOs affect the quality of our rivers?

The first phase of the study determined how CSOs affect various aspects of river quality.

Aquatic Life

To determine the effect of CSOs on aquatic life, the City has been measuring the quantity of oxygen and ammonia in the water. Both oxygen and ammonia levels affect aquatic life. Oxygen is consumed in the breakdown of organic matter in the water. The more oxygen is used to break down organic matter, the less oxygen is available for fish. Ammonia forms when human wastes break down and can be poisonous to fish. Studies have shown CSOs do not significantly affect the oxygen or ammonia levels in the water.

Recreation

When a CSO occurs, bacteria from human and animal waste are discharged into the rivers. These bacteria can cause flu-like illnesses and skin or eye irritation in people who swim or waterski in the rivers. The risk to public health can be estimated by measuring the number of coliform bacteria in the water. After a CSO, coliform levels in the rivers generally do not meet provincial guidelines for recreational use.

Garbage in the rivers

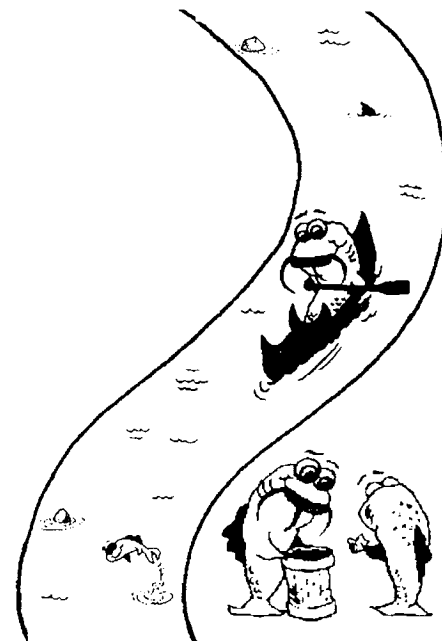
You may have noticed garbage like cigarette butts, drinking

straws and food packaging floating in our rivers. These floatables are especially noticeable after it rains. When it rains, garbage can travel to the river in two ways. First, rainwater picks up litter on the street as it flows to the street inlets. Second, CSOs carry both street litter and waste material that some people flush down their toilets, such as personal hygiene products and dental floss. If it is raining, this debris may travel with the wastewater to the river.

Phase 2 concerns

Because CSOs do not appear to have any effect on fish in our rivers, Phase 2 did not consider this issue.

Phase 2 concerned itself with getting rid of garbage in the rivers and with making the rivers suitable for recreation.



How could we control CSOs?

The Phase 2 portion of the study listed and analyzed a number of ways to control CSOs. The options fell into three categories.

- Options which improve the existing sewer system so that it can better handle rain and melted snow
- Structurally intensive options such as underground storage tunnels or completely separating the sewers throughout the City
- Options to remove floatables, such as screens and nets installed at sewer openings

Options in each category were analyzed for their relative performance in the following areas:

- cost;
- effect on number and volume of overflows;
- and
- effect on coliform levels.

Cost

Costs ranged from relatively low (for simple changes to the existing system) to \$1000 million (for structurally intensive options).

Effect on combined sewer overflow

Simple changes to make the best use of the current system reduce CSOs from 18 to about eight during the recreation season.

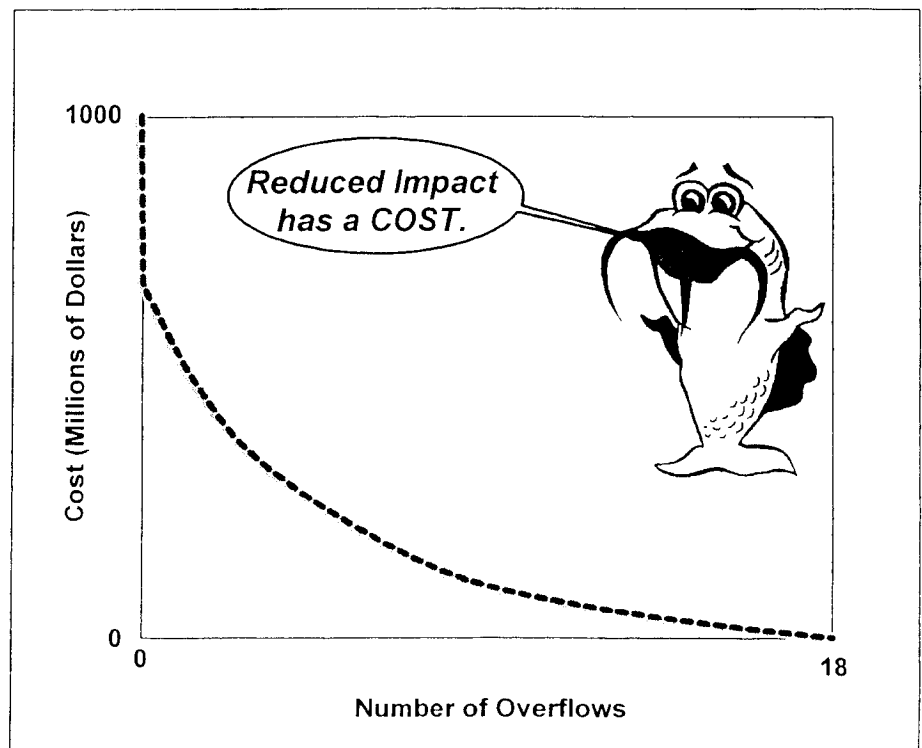
Only the most expensive options will eliminate CSOs entirely.

Effect on coliform levels

Coliform limits have been established by the Province of Manitoba for different types of recreation.

When our rivers reach Winnipeg, they already contain some coliforms.

Under existing conditions, our rivers meet the limits 50 percent of the time for waterskiing and similar activities and 80 percent of the time for boating and fishing. (Swimming is not recommended in our rivers at any time because of the strong currents, and slippery and steep bank conditions).



Disinfecting effluent from the treatment centres will mean rivers meet the recreational limit over 80 percent of the time.

Making additional modifications to maximize the use of the existing system would cost 60 to 70 million dollars. As a result, the rivers would meet the recreational limit 90 percent of the time.

Adding structurally intensive control options would cost at least \$300 million and mean the rivers could meet the limit for recreational objectives 95 percent of the time.

The more costly control options would further reduce coliform

levels only slightly. This is because during intense rainfall events the rain and wastewater mixture would not be completely contained. The resulting overflows would produce peaks of high coliform levels for a day or two (after the rainfall). The rest of the time, the coliform levels in our rivers meet recreational objectives with disinfection at treatment plants.

Even if we choose the control options that eliminate untreated CSOs (complete separation), we would still have occasional high levels of fecal coliform from land drainage sewer discharges and from problems that occur before the rivers get to Winnipeg.

Public communications

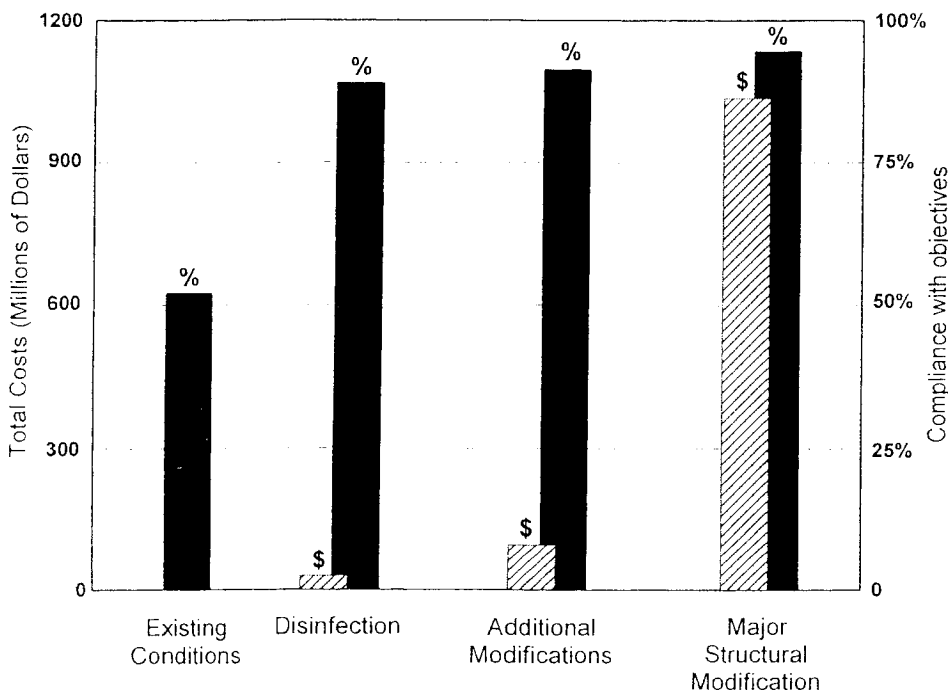
The study team has been providing information to the public as the project proceeds. An Advisory Committee reviews the team's progress and provides advice to the team on study issues. Special interest groups are also consulted. These groups include interested stakeholders, scientific and academic communities, and environmental issues groups. As the study progresses, the City intends to keep you informed with mailings, open houses, and other events.

Please get involved

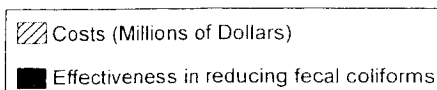
The City of Winnipeg has an obligation to spend money wisely. Much of the information the City will use to balance the environmental responsibilities, costs and benefits of CSO control will come from meetings with individuals such as you.

Please complete the questionnaire and comment section and mail it to the Water and Waste Department at the address provided.

Phone: (204) 986-3333



Control Options



FISH HANDLING AND FOOD SAFETY

Fish from the Red and Assiniboine Rivers in Winnipeg are a safe and nutritious source of food if properly handled, stored and cooked. The following guidelines are similar to those recommended for hamburger during the barbecue season and will assist you in the enjoyment of fish caught in Winnipeg's rivers.

A. PREPARATION

CLEAN HANDS, CLEAN UTENSILS AND COOL TEMPERATURES

- To protect yourself from cuts and possible infections and to protect the fish should you choose to release it, you are advised to wear gloves when handling fish.
- If you intend to take your fish home, use a picnic cooler with ice to maintain cool safe temperatures while you fish and during transportation home.
- Before filleting or processing your fish, rinse the fish thoroughly with running water by holding its tail and rinsing down to its head. Also rinse out the gill cavities and mouth. This will get rid of most of the river residues and allow for easier handling.
- Wash your hands before processing your fish.
- Fillet or process your fish on a wooden or plastic cutting board (do not use plywood as it splinters easily and cannot be cleaned thoroughly).
- Rinse your fillets or cuts after processing and immediately wrap them up and place in the refrigerator.
- Thoroughly clean and sanitize your cutting board and knives after use.

SANITIZE MEANS: Rinsing of clean boards and knives in a sink or basin containing clean warm water and household bleach (1 tsp per gallon or 4 litres of water).

B. COOKING

- Thorough cooking of all meats including fish is extremely important to ensure safety. Fish should be cooked until it flakes easily and is firm.
- Wash you hands before cooking and handle the portions with utensils (such as tongs or lifters) as much as possible.
- Always use a clean plate for the cooked fish.

---- ENJOY YOUR MEAL ----



THE CITY OF WINNIPEG
COMMUNITY SERVICES
ENVIRONMENTAL HEALTH SERVICES DIVISION

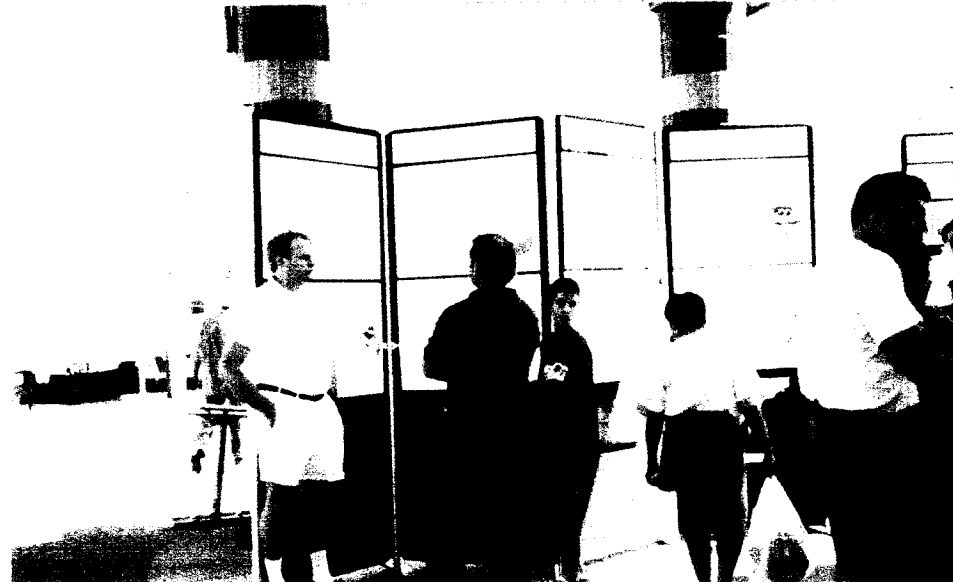
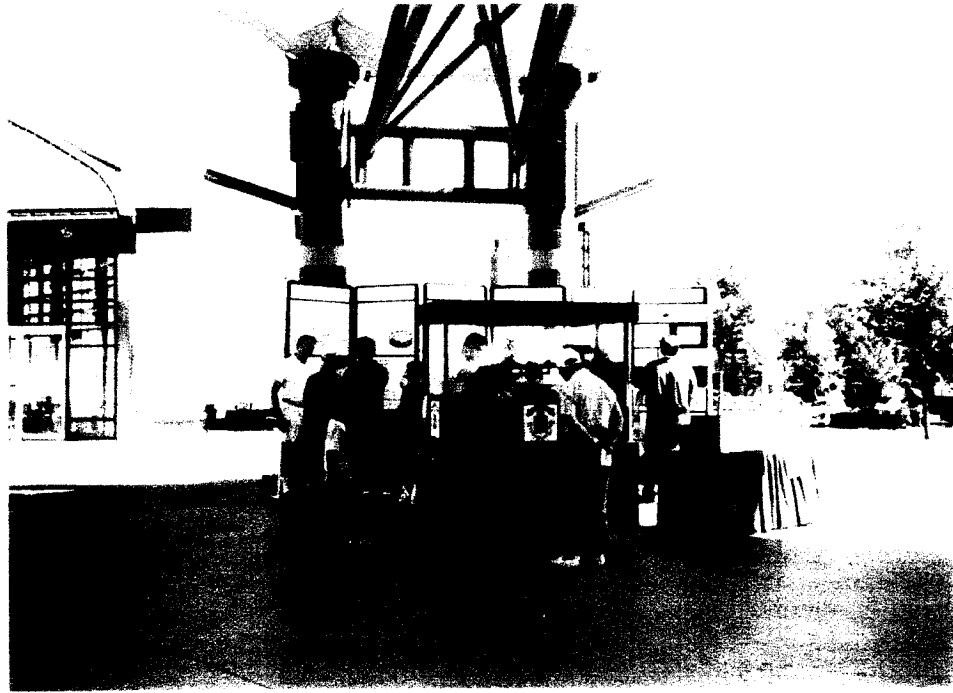
Manitoba



Health
Public Health Branch

APPENDIX C

**Photographs from Family Fish Festival
(Forks 1996)**



Photos from
Family Fish
Festival
(June '96)
at The Forks

APPENDIX D

**Letters Accompanying Phase Reports; Mailed Out to
the Public and Special Interest Groups**

**List of Scientific Community Representatives Sent a
Phase 2 Document**

Letters Received From Scientific Community

Tuesday, September 24, 1996

Pat Madden
RCMP Under Water Recovery Team
1091 Portage Avenue
Winnipeg, MB R3C 3K2

Dear Pat:

RE: CITY OF WINNIPEG COMBINED SEWER OVERFLOW STUDY
Our file No. 020-17-01-01-10

The City of Winnipeg is conducting a study to evaluate the effects of Combined Sewer Overflows (CSOs) on river water quality. Since commencement of the study in 1994, the City has been involved in a number of public events where we have displayed the progress of the study.

The enclosed copy of the "CSO Management Strategy Phase 2 Report" will provide you with an overview of the current status of the study and an outline of the CSO control options. The information is intended to be in sufficient detail for you to understand and evaluate the issues. This report and subsequent reports are meant to provide you with enough information to develop an informed opinion regarding what you believe to be the best CSO management option for Winnipeg.

The CSO issue is a major public policy issue involving tradeoffs. The high cost of CSO control must be compared to the benefits received. Public input and opinion will be a major influence in the decision making process.

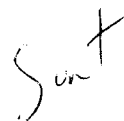
By reading the enclosed information and continuing to participate, you will be a member of a group of approximately 1,000 individuals we call the "informed public". We encourage you to help define the direction of the study by advising us of the issues you feel are important, and the concerns and opinions you have on water quality issues. Near the end of the study we intend to survey all or a portion of the "informed public". The collective opinions of this group will be presented to the authorities at the next round of regulatory hearings (in 1997).

If for whatever reason you do not wish to participate further, please advise us by calling 986-3333, leaving your name and requesting to be removed from the CSO database. You may also know of family or friends who would be interested, so please pass on the report and advise them to register on the database with us if they wish to participate.

Thank you for your interest. We look forward to your continued involvement. If you have questions, comments or require further information, please refer to the report section titled "For More Information".

Sincerely,

E. J. Sharp, P.Eng
CSO Project Director



Aug. 13, 1996

Mr. Nick Carter
Winnipeg Water Group
83 Athlone Dr.
Winnipeg, MB R3J 3K9

Dear Mr. Carter:

RE: CITY OF WINNIPEG COMBINED SEWER OVERFLOW STUDY
Our file No. 020-17-01-01-10

As you may recall, the City of Winnipeg is conducting a study to evaluate the effects of Combined Sewer Overflows (CSOs) on river water quality. Since commencement of the study in 1994, the City has been involved in a number of public events where we have displayed the progress of the study. Through the public events, you have expressed an interest in this study and therefore we are sending you further information.

The enclosed copy of the "CSO Management Strategy Phase 2 Report" will provide you with an overview of the current status of the study and an outline of the CSO control options. The information is intended to be in sufficient detail for you to understand and evaluate the issues. This report and subsequent reports are meant to provide you with enough information to develop an informed opinion regarding what you believe to be the best CSO management option for Winnipeg.

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By reading the enclosed information and continuing to participate, you will be a member of a group of approximately 1,000 individuals we call the "informed public". We encourage you to help define the direction of the study by advising us of the issues you feel are important, and the concerns and opinions you have on water quality issues. Near the end of the study we intend to survey all or a portion of the "informed public". The collective opinions of this group will be presented to the authorities at the next round of regulatory hearings (in 1997).

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Thank you for your past interest. We look forward to your continued involvement. If you have questions, comments or require further information, please refer to the report section titled "For More Information".

Sincerely,

E. J. Sharp P.Eng
CSO Project Director

SCIENTIFIC/ACADEMIC

Dr. Tom Carter
Dept of Geography
University of Winnipeg
515 Portage Avenue
Winnipeg, MB R3B 2E9

Valel (Val) T. Chacko
Environment Canada
513 - 269 Main Street
Winnipeg, MB R3C 1B2

Professor T. Elefsinoitis
University of Manitoba
Dept. of Civil Engineering
Rm 342 - Engineering Bldg
Winnipeg, MB R3T 5V6

Cathy A. Ford
Environmental Science Officer
520 Walker Avenue
Winnipeg, MB R3L 1C1

Professor Goldsbrough
Botany Department
University of Manitoba
Winnipeg, MB R3T 2N2

Dr. Harvey Halverson
Microbiology Dept
University of Manitoba
Winnipeg, MB R3T 2N2

Dorothy Majewski
Freshwater Institute
501 University Crescent
Winnipeg, MB R3T 2N6

Diane Malley
Fisheries and Oceans
Freshwater Institute
501 University Crescent
Winnipeg, MB R3T 2N6

Professor Daryl McCartney
University of Manitoba
Dept. of Civil Engineering
Rm 342 - Engineering Bldg
Winnipeg, MB R3T 5V6

Professor J. Oleszkiewicz
University of Manitoba
Dept. of Civil Engineering
Rm 342 - Engineering Bldg
Winnipeg, MB R3T 5V6

Mr. Joe O'Connor
Natural Resources
Fisheries Branch
200 Saulteaux Crescent
Winnipeg, MB R3J 3W3

Jim Popplow
Manitoba Public Health Officer
301 - 800 Portage Avenue
Winnipeg, MB R3G 0N4

Gordon Robinson
Environmental Science Program
231 Machray Hall
University of Manitoba
Winnipeg, MB R3T 2N2

Dr. Allan Ronald
Associate Dean
Faculty of Medicine
A108 - 753 McDermot Avenue
Winnipeg, MB R3E 0W3

Dave Rosenberg
DFO - riverine macroinvertebra
501 University Crescent
Winnipeg, MB R3T 2N6

John Shearer
Manitoba Naturalists Society
10 Harry Collins Avenue
Winnipeg, MB R2M 4N2

Kent Simmons
Biology Department
University of Winnipeg
515 Portage Avenue
Winnipeg, MB R3B 2E9

Professor S. Simonovic
University of Manitoba
Dept. of Civil Engineering
Rm 342 - Engineering Bldg
Winnipeg, MB R3T 5V6

J Warrenner
166 Cheriton Avenue
Winnipeg, MB R2G 0E3

Loreen Yanish
Box 40 Fisheries Branch
200 Saulteaux Crescent
Winnipeg, MB R3J 3W3

PROFESSOR DON BURP
U of M
CIVIL & GEOLOGICAL ENG.
WINNIPEG, MB
R3T 5V6

THESE PEOPLE WERE SENT A PHASE 2
DOCUMENT SEPT. 10, 1996

Tuesday, September 10, 1996

Winnipeg, MB

RE: The City of Winnipeg Water and Waste Department's Combined Sewer Overflow (CSO) Management Strategy Study

Dear :

On behalf of the City of Winnipeg, Water and Waste Department we are pleased to provide you with the enclosed report which provides a summary of this Study's progress to the end of Phase 2. The CSO Study Team is currently working on Phase 3 of this Study.

The Combined Sewer Overflow Management Strategy Study is a comprehensive study of the impacts of Combined Sewer Overflows on the quality of water in the Red and Assiniboine Rivers in and downstream of Winnipeg. The following is a general outline of CSO Study issues. The Study is considering:

- which river uses should be protected,
- the impact of CSOs on river water quality,
- the effectiveness of control options in meeting water quality objectives,
- the costs and benefits of control options, and
- which alternative best suits Winnipeg's situation.

The Clean Environment Commission has recommended that, during dry weather, the Red River be protected for primary recreation and the Assiniboine be protected for secondary recreation.

Phase 1 of the CSO Study defined the effects of CSOs on river water quality and concluded that the two water quality issues most affected by CSOs are bacterial content and floatable material in the river. Phase 2 identified options and estimated approximate costs for controlling combined sewer overflows. Phase 3 entails a detailed evaluation of costs and benefits of the CSO control options. Phase 4 will include a plan for resolution of the CSO issue resulting in improved river water quality.

It is the Study Team's objective to receive constructive reviews of the Project from individuals such as yourself. Therefore, if you have any questions or comments regarding the effect of combined sewer overflows on river water quality, or would like to meet with the CSO Study Team to discuss the Study, please feel welcome to call or write the CSO Project Director. The number and address are provided on the last page of the enclosed Phase 2 document.

The City would value your contribution to this Study.

Government of Canada
Gouvernement du Canada

Fisheries and Oceans
Pêches et Océans

Post-it™ Fax Note	7671E	Date	Nov 27/96	# of pages	2
To	Mike McKernan	From	D. Cobb		
Co. Dept.	Tris	Co.			
Phone #		Phone #	983-5735		
Fax #	942-2548	Fax #	984-2402		

November 26, 1996

Mr. Ed Sharp, P. Eng.
Project Manager
City of Winnipeg
Waterworks, Waste and Disposal Dept.
1500 Plessis Road
Winnipeg, MB R2C 5G6

Your file Votre référence

Our file Notre référence

COPY

Dear Mr. Sharp:

Re: The City of Winnipeg Water and Waste Department's Combined Sewer Overflow (CSO) Management Strategy Study, Phase 2 Report

The Department of Fisheries and Oceans (DFO) welcomes the opportunity to comment on the above document. The City of Winnipeg should be commended on its commitment to meeting the Provincial Government's water quality objectives. DFO offers the following minor comments with the hope that Phase 3 will result in the eventual goals of controlling the impacts of combined sewer overflow on the receiving waters of the Red and Assiniboine Rivers.

1. Our work on the Assiniboine River in 1992 suggested that it was not a normal flow year. The "recreation" season flows were approximately 50% of long term average monthly flows at Headingly. This might have an effect on your modelling of faecal coliform loading values (p. 5&6). As you are well aware, the Assiniboine River is somewhat regulated at the Lake of the Prairies, and depending upon the year, there may not be "natural flows". Moreover, flows in the Red and Assiniboine Rivers are often unimpacted following heavy storms in the Winnipeg vicinity, thus when combined sewers are spilling sewage into the river, there is no dilution effect from higher river discharge, which explains the wet weather spikes as seen on page 7. Perhaps a very simple explanation of this situation could be included to help explain the figure on page 7.
2. It should be explained to the general public that the graphs on page 7&8 use the log scale on the y-axis. This often confuses people who are not used to working in this scale.
3. Page 20. The expensive options on this page don't appear to improve the wet weather control with respect to compliance. Perhaps the city will eventually be stuck with a situation in which the use of disinfection will control dry weather faecal coliforms, and they will choose the best option for the dollar for wet weather control.

Freshwater Institute
501 University Crescent
Winnipeg, Manitoba
R3T 2N6
(204) 983-5000

Institut des eaux douces
501 University Crescent
Winnipeg (Manitoba)
R3T 2N6
(204) 983-5000

Mr. Ed Sharp
November 26, 1996
Page 2.

DFO looks forward to Phase 3, and welcomes the opportunity to continue its participation in offering technical advice in this worthwhile endeavour by the City of Winnipeg.

Sincerely,



Donald G. Cobb
Impact Assessment Biologist
Saskatchewan and Manitoba Area

cc: D. Majewski
J. Stein

0422348 FAX

COPY

St-Boniface
General Hospital



THE UNIVERSITY OF MANITOBA

Post-It™ Fax Note	7671	Date	Oct 11	# of pages	1
To	G. Ronald	From	Ed Sharp		
Co./Dept.	TATEES	Co.			
Phone #		Phone #			
Fax #	942-2548	Fax #			

Room C5124-409 Tache Avenue,
Winnipeg, Manitoba
Canada R2H 2A6
(204) 237-2922 (204) 237-7425 (FAX)

95 OCT 11 AM '96

September 25 1996

Mr. Ed Sharp, P.Eng.
Project Manager,
City of Winnipeg
Waterworks, Waste & Disposal Department,
1500 Plessis Road,
Winnipeg, Manitoba.
R2C 5G6

*File
510 A 3847*

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Dear Mr. Sharp:

I have just read the Phase 2 report by your office on CSO management strategy. This, from my perspective, is an excellent report and identifies the issues and opportunities in a way in which I would readily appreciate. I agree with your presentation of the options and feel that it now needs to be discussed more widely within the media, open house events, and other milieu to ensure that there is an understanding of the options and costs for the city.

I will continue to encourage compromise with consensus. As you know, I don't feel that there is much evidence from existing data to suggest that human illness is arising the quality of the water in our rivers. Although surveillance and continued vigilance is necessary, I would not, from the data supplied, be enthusiastic about spending large incremental sums of money on waste water management. The opportunity cost when other needs are so evident lead me to encourage you to pursue a reasonably effective response. Personally I feel that if the Red River can meet the requirements for primary recreation over 80% of the time during the summer months, this is satisfactory. At some point we should also again review the evidence that has led to the setting of the "fecal coliform: standards. Do these continue to be valid?

Again, my thanks for letting me read the document. I appreciate the quality of both the information and its presentation.

Yours sincerely,

Allan Ronald, OC MD FRCC S.H. Choudhri

AR/rs
c.c.: Dr. M. Fast

Dr. G.K.M. Harding
Dr. R.B. Light
Dr. P.J. Plourde
Dr. A.R. Ronald

10 Harry Collins Avenue
Winnipeg, Manitoba
R2M 4N2

December 2, 1996

Mr. Ed Sharp, P.Eng.
Project Manager
City of Winnipeg
Water and Waste Department
1500 Plessis Road
Winnipeg, Manitoba
R2C 5G6

RECEIVED
WATERWORKS, WASTE
& DISPOSAL DEPT

'96 DEC -5 AM 104

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Dear Mr. Sharp:

I am replying, albeit rather belatedly, to your request for my input regarding the CSO Project in general and Phase 2 Report in particular.

First, let me state my particular perspective. I am not an engineer. My professional expertise is as an aquatic ecologist. I also have been active in the monitoring of various environmental issues in the province, and am a past-president of the Manitoba Naturalists Society. I am, of course, also a homeowner and rate-payer in Winnipeg.

I have reviewed the Phase 2 Report, prepared for the City of Winnipeg by Wardrop Engineering and TetRES Consultants. I will not attempt to comment in detail on the engineering aspects of the report, but I do have some comments based on my perspective as an ecologist and naturalist.

The report lays out, in workmanlike fashion, water quality problems associated with combined sewer overflows to the Red River, as identified by the Manitoba Clean Environment Commission. It then proceeds to identify several technical options that would address, to a greater or lesser degree, the problems of water quality. Each option is explained in some detail, and categorized according to engineering feasibility, relative effectiveness, and estimated cost of implementation.

As with most technical solutions to pollution control, the costs rise sharply as treatment attempts to reach 100% compliance with target standards. The explicit message of the study is that full compliance with CEC recommendations would be very costly (probably more than a billion dollars) and would require complex technical installations that would be difficult to construct and maintain. The implicit message seems to be that the benefits of this full compliance would not justify the cost, and that taxpayers could, or would, not afford it.

I have no problems with the analysis as far as it goes. My problem lies with what is not said in this report.

The CEC expressed concerns about oxygen concentrations for support of aquatic life and bacterial contamination as a human health issue. The report deals with these, and lays out the cost-benefit analysis from a technical standpoint. One criticism I can make is that little or no mention is made of other possible contaminants, such as metals and organochlorines, that are more persistent in the environment and could have more lasting effects on downstream users and ecosystems. However, I understand that these issues are beyond the strict scope of this study.

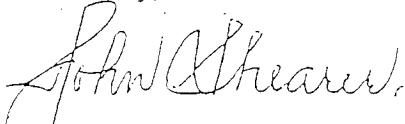
A more pertinent criticism, perhaps, is that the report focuses almost exclusively on engineering solutions to treat or capture the waste after it has entered the sewers. What about public education to encourage reductions of the amount and toxicity of waste before it is released to the sewers? What about legislation to force individual generators of waste to minimize their contributions to the problem? I realize that these measures are not going to bring about immediate or total solutions, but they are the ultimate solution and they could help to reduce the engineering costs and their associated problems. For example, any additional use of chlorine for disinfection carries with it long-term environmental costs.

*Source
Control*

Ultimately, the decision will be based on the public and political will of Winnipeggers and Manitobans. How much are we collectively prepared to sacrifice, either through higher taxes or through changing lifestyles and expectations, to ensure the health of the Red River (and Lake Winnipeg), both for human use and for the support of aquatic life? Humans have long relied on dilution and natural biochemical processes to clean water they have soiled and contaminated. As our population grows and becomes more urbanized, and as we increase the quantities and toxicities of waste that we produce, the capacities of these natural processes to clean our wastewater are frequently exceeded. Do we not have an ethical, and moral, obligation to ensure that the water we take from rivers and lakes is returned in a condition comparable to that in which we received it?

I have no problem with the engineering analysis in this report. My concern is that the report, by itself, fails to adequately address the complex social, ecological, and ethical problems that are an essential part of the decision-making process that we face. To ignore these is to present an overly simplistic view of the issue.

Sincerely,


John Shearer

Monday, September 30, 1996

Diane Malley
Freshwater Institute
501 University Crescent
Winnipeg, MB R3T 2N6

RE: The City of Winnipeg Water and Waste Department's Combined Sewer Overflow (CSO) Management Strategy Study

Dear Ms. Malley:

On behalf of the City of Winnipeg, Water and Waste Department we are pleased to provide you with the enclosed report which provides a summary of this Study's progress to the end of Phase 2. The CSO Study Team is currently working on Phase 3 of this Study.

The Combined Sewer Overflow Management Strategy Study is a comprehensive study of the impacts of Combined Sewer Overflows on the quality of water in the Red and Assiniboine Rivers in and downstream of Winnipeg. The following is a general outline of CSO Study issues. The Study is considering:

- which river uses should be protected,
- the impact of CSOs on river water quality,
- the effectiveness of control options in meeting water quality objectives,
- the costs and benefits of control options, and
- which alternative best suits Winnipeg's situation.

The Clean Environment Commission has recommended that, during dry weather, the Red River be protected for primary recreation and the Assiniboine be protected for secondary recreation.

Phase 1 of the CSO Study defined the effects of CSOs on river water quality and concluded that the two water quality issues most affected by CSOs are bacterial content and floatable material in the river. Phase 2 identified options and estimated approximate costs for controlling combined sewer overflows. Phase 3 entails a detailed evaluation of costs and benefits of the CSO control options. Phase 4 will include a plan for resolution of the CSO issue resulting in improved river water quality.

It is the Study Team's objective to receive constructive reviews of the Project from individuals such as yourself. Therefore, if you have any questions or comments regarding the effect of combined sewer overflows on river water quality, or would like to meet with the CSO Study Team to discuss the Study, please feel welcome to call or write the CSO Project Director. The number and address are provided on the last page of the enclosed Phase 2 document.

The City would value your contribution to this Study.

APPENDIX E

Articles From Various Publications Regarding CSOs

WINNIPEG'S COMBINED SEWER OVERFLOW MANAGEMENT STUDY

BY GEORGE REMPEL,
TETRES CONSULTANTS

The City of Winnipeg's Water and Waste Department is conducting a comprehensive planning study to determine the effects of combined sewer overflows (CSO) on river water quality and related river uses. The key product of the study will be the establishment of a *cost-effective, prioritized implementation plan for remedial work based on assessment of costs and benefits of practicable CSO control alternatives.*

About 10,000 ha of Winnipeg's overall developed area of 28,000 ha are serviced by 43 combined sewer districts. Each of these districts overflow between 7 to 37 times (average 21 times) during the recreation season (May to September, inclusive) into the Red and Assiniboine Rivers.

The rivers are highly valued as aesthetic amenities. Public access to the rivers has been improved through river walkways and other downtown developments. Boating and fishing are very popular activities, while swimming and waterskiing (primary recreation) occur to a limited extent.

Recent public hearings confirmed the need to protect primary recreation on the Red River during dry weather conditions. As a result of these findings, the City plans to implement disinfection of the wastewater treatment plant effluents. The issue of defining appropriate wet weather objectives has been deferred for public regulatory meetings in 1997. Accordingly, the City engaged a consulting team (TetrES Consultants Inc., Wardrop Engineering Inc., in association with CG&S and EMA) to study water quality in the receiving stream, including

an assessment of the significance of the different sources and quality of urban discharges to the river during dry and wet weather conditions.

The overall approach to the study has been to focus on those water quality uses which are potentially affected by urban discharges, especially wet weather flows (WWF).

Extensive modelling of the discharges and the associated receiving stream quality under existing DWF and WWF conditions for a range of CSO control options is being carried out. The objective of the receiving stream modelling is to provide the policy-makers and the public with information on how WWF, particularly CSOs, affect the existing water quality and how control options would improve the water quality and enhance beneficial use of the rivers. A series of integrated mathematical computer models are being used to simulate system hydrology, pollutant loads, conveyance hydraulics and control options.

The study has been separated into four phases to organize the progressive technical evaluation and to provide for communicating study issues and results to interested publics and stakeholders. The study is scheduled for completion in 1997.

In Phase 1 of the study, activities focussed on the assembly and assimilation of available information on the existing wastewater conveyance and treatment system, and its response to dry weather and wet weather events in Winnipeg.

In Phase 2, the Study Team assessed the City's urban hydrology, sewer infrastructure, control systems, pollutant loadings and the receiving streams. Impacts to the rivers as a result of CSO discharges (determined to be elevated fecal coliforms and floatable debris) were evaluated. Applicable control technologies and costs were identified.

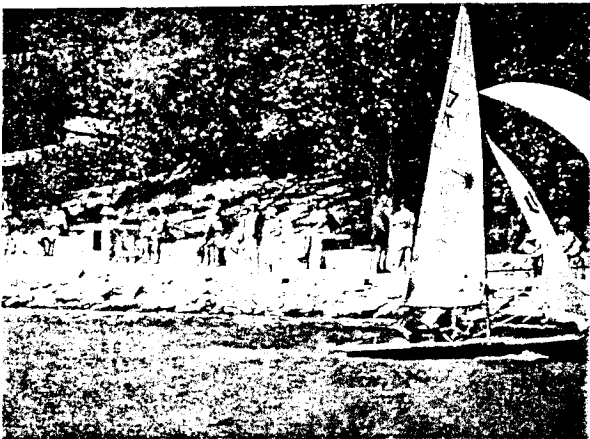
Phase 3, which is currently underway, will develop and evaluate a range of alternative control plans. External dialogue with the public, regulatory agencies and special interest groups will take place. A number of demonstration control projects are expected to be initiated.

Phase 4 of the study will focus largely on the preparation of a proposed implementation plan for the City of Winnipeg. Upon completion of the study, the City will provide the Clean Environment Commission with study results. ■



The Forks waterfront—where the Red River meets the Assiniboine—with marina and riverwalk in the heart of Winnipeg.

PHOTO: H. KALEN. COURTESY OF TOURISM WINNIPEG



City of Winnipeg's riverwalk on the Assiniboine River.

PHOTO COURTESY OF TOURISM WINNIPEG

WINNIPEG REAL ESTATE NEWS

**YOUR GUIDE TO
REAL ESTATE
FOR SALE IN
WINNIPEG AND
SURROUNDING
AREAS**

FREE

DIRECTORY

- Building Lots - Pages 50-51
- Character Homes - Page 60
- Commercial Properties - Pages 52, 53
- Condominiums - Pages 68-77
- Cottages - Pages 59
- Current Multiple Listings - Pages 15-52
- First Time Buyers - Pages 58, 59
- Homes On The Border - 61-67
- Mobile Homes - Pages 53
- More Fine Homes - Page 53
- New Homes - Pages 93-99
- Rural and Country - Pages 54, 57
- Showcase - Page 78



1919 strike
A large crowd gathered in front of a building during the 1919 strike.

- Features**
- Editor's Comment - page 2
 - Mortgage table - page 2
 - Home handyman - page 3
 - Kip Park - page 3
 - Heritage - pages 4 & 5
 - Blitz & pieces - page 6
 - Crossword - page 6
 - Students and law - page 7
 - On the house - pages 8
 - Ready for fall - page 9
 - Wood-burning - page 10
 - Equipment - page 10
 - Heating problems - page 11

<http://www.mls.ca>
Over 600 Winnipeg MLS listings
are available through the Internet.

**Special
river front
section**
on pages 6 to 67

River water quality in city

The Red and Assiniboine rivers are important natural amenities for Winnipeg. They offer scenic waterfront for parks and walkways, and are used extensively for recreational boating and sport fishing.

However, they are also the discharge point for the city's storm sewers and sewage treatment plants.

Prior to construction of the original North End Water Pollution Control Centre in the 1930s, all sewage from the city flowed daily into the rivers. The situation has changed dramatically since that time.

Today, all sewage generated in dry weather is processed in sewage treatment plants. The city's three water pollution control centres are valued at about \$500 million, not including the numerous pumping stations and extensive sewer network. But even though water quality has improved dramatically, there are still concerns about the quality of our river water.

In some areas of Winnipeg, both rainwater run-off and wastewater are collected in the same sewer. These systems are called combined sewers.

During dry weather all wastewater in a combined sewer is directed to one of three Water Pollution Control Centres for treatment. However, if the capacity of this type of single pipe collector sewer is exceeded, as usually happens during rainfall events, a mixture of rainwater run-off and raw sewage will be discharged from any of about 70 combined sewer outfalls directly into the Red and Assiniboine rivers.

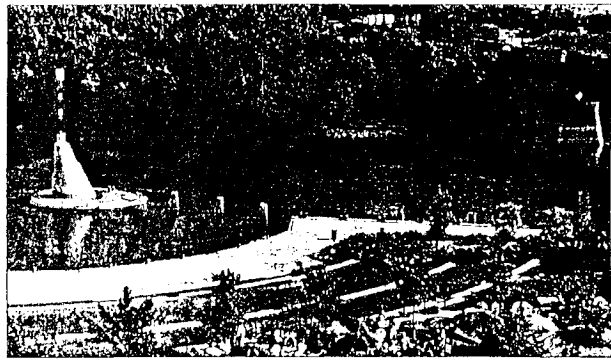
This discharge is called a combined sewer overflow. CSOs occur an average of 21 times during the summer season (May to September).

Combined sewers service roughly 40 per cent of Winnipeg and are found in areas of the city developed before the 1960s. The city stopped building combined sewers in the late 1950s. Since then, all new subdivisions have been built with separate sewer systems where wastewater and rainwater run-off are collected in separate pipes.

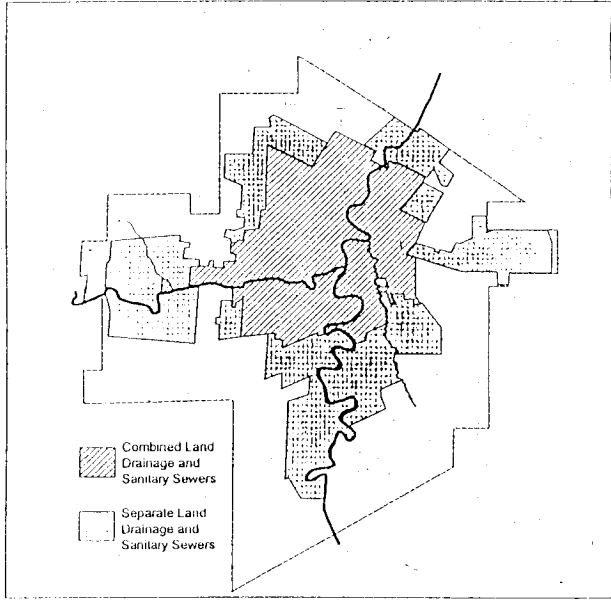
Regardless of the weather, wastewater from areas serviced with a Separate Sewer System is always conveyed to a Pollution Control Centre for treatment.

In 1989, the provincial minister of environment asked the Clean Environment Commission to convene public hearings and provide recommendations on proposed water quality objectives for the Red and Assiniboine rivers within and downstream of Winnipeg. These public hearings were held to help define appropriate river uses such as recreation, irrigation, consumption, etc., and the river water quality that is required to protect these uses.

In 1992, the CEC recommended, in part, that the Red River be protected for primary recreation (water-skiing, jet ski-



The Red River as seen from The Forks. (Photo by Aperture.)



ing and swimming) and the Assiniboine River be protected for secondary recreation (boating, fishing and hiking), during dry weather conditions.

In addition, the CEC concluded that there was insufficient site-specific information to provide recommendations for management of combined sewer overflows and subsequently recommended that a comprehensive study on CSO management be undertaken.

The city's CSO Management Strategy Study is divided into four phases.

Phase 1 examined the effects of CSOs on river water quality and concluded that the two water quality issues most affected by CSOs are bacterial content and floatable matter in the rivers.

Phase 2 identified options and esti-

imated approximate costs for controlling combined sewer overflows.

Phase 3 is currently being conducted and entails a detailed evaluation of costs and benefits of the CSO control options.

Phase 4 will include development of a plan to implement the best control options for improved river water quality.

This project presents many challenges for the city. There is a huge inventory of old sewers, the technical analysis is very complex, and costs of control options are high and have benefits which are difficult to quantify.

In river water, oxygen is used to breakdown organic matter such as human and animal waste. Consequently, if more or-

(See CONTROL, page 8)

Open house worth effort

When you have listed your property for sale with a REALTOR, one of the marketing methods the REALTOR might suggest to you is an open house on a weekend.

You may be familiar with open houses: perhaps you attended an open house when you purchased your home, or held one when you sold your last home. The benefit of having an open house is that it allows a number of potential purchasers to go through a home in a short period of time, increasing the exposure your home receives.

Once you and the REALTOR have decided on a date for an open house, there are a number of things you can do to make your property as attractive as possible to give the best first impression. Remember, first impressions are lasting impressions.

Outside

Keep your property in top condition:

Fridge features

Slide-out shelves, handy water dispensers, automatic ice makers, and wine racks are just a few of the options available on the newest refrigerators. Today's models include features that manufacturers weren't even dreaming about when this handy appliance was introduced 80 years ago.

The refrigerator is one of the hard-

est working appliances in your kitchen. Thanks to modern innovations, it can also be one of the most convenient.

One of the best changes has been a move to spill-proof glass shelves. These see-through systems are much easier to clean and adjust than their wire ancestors and include raised edges to contain spills. Some even slide out to offer better access to food,

or fold up to made room for taller items. Humidity-controlled crispers are successful in helping vegetables stay fresher longer, and temperature-controlled meat drawers feature a duct that sends more cold air directly into the space.

See-through compartments, enclosed door bins, and adjustable door shelves are just a few of the other additions to new fridges.

Automatic ice makers have been around for a while and have proven to be a popular feature. Today's systems can produce three to four pounds of ice a day while only taking up about one cubic foot of freezer space.

And if you really want to treat yourself to a special feature on your new fridge, a wine or bottle rack will help prevent a cluttered door.

Whatever it was, an open house is usually worth the extra effort it takes to prepare for it.



If you have pets or you smoke, air out the rooms as much as possible, since the fresher the air is, the better.

Day of the open house

Try to find somewhere else to be during the open house: people are more comfortable looking around and poking into closets and cupboards when the owner is not present.

Take your pets with you when you leave for the open house as they may intimidate or bother prospective purchasers.

Put all personal property like jewelry, money and medication out of sight and in a safe, secure place. Think about moving fragile items to less exposed areas to minimize the chance of breakage.

Once the REALTOR arrives for the open house, go through the house with him or her for a quick inspection before you leave. Once you are sure

you've done what you can to maximize your home's appearance, go on your way and let the REALTOR handle the rest.

When it's over

On your return when the open house is over, the REALTOR will tell you how many people attended and whether there was any special interest shown by anyone. Feel free to ask questions.

You may not have a flood of offers as a result of the open house, but it's very possible that the eventual purchaser first saw your home during the open house. Who knows — maybe it was that last-minute re-arrangement of two chairs, or the uncluttered look that caused the purchaser to come back for a second, closer look.

— provided by Manitoba Hydro.

Control options start at \$100 million

(Continued from front page)

ganic matter is present, more oxygen is used for decomposition of organic matter, and less oxygen is available for fish.

In addition, ammonia, which is produced by decomposition of human waste, has been shown to be harmful to fish, i.e., it may reduce fish reproductivity or damage fish tissue.

After monitoring oxygen and ammonia levels in Winnipeg's rivers, Phase I studies concluded that CSOs do not significantly alter these concentrations in the rivers.

Urban fishing

In addition, the Manitoba Natural Resources has spearheaded a promotion of urban fishing. Manitoba Health and the City of Winnipeg Community Services have both indicated that fish from the Red and Assiniboine rivers are a safe and nutritious source of food if properly handled, stored and cooked.

Of concern for the CSO Management Strategy Study are the bacteria levels from human and animal waste which are discharged into the rivers. Bacteria can cause flu-like illness and skin and eye irritation in people who are in contact with the water.

High bacteria levels are prevalent particularly after a CSO and can persist until the bacteria perish, approximately three days, depending on conditions.

Risk to public health is typically estimated by measuring the number of fecal coliform bacteria in the water. After a CSO, fecal coliform levels in the rivers generally do not meet provincial guidelines for recreational use, and at times of heavy rainfall can vastly surpass them.

Another area of concern for the CSO Management Strategy Study is the presence of garbage floating on the rivers.

When it rains, garbage can travel to the river in two ways. Firstly, rainwater can carry litter and other contaminants off the

streets via combined sewers (and storm sewers in areas with a separate sewer system), and secondly, anything floatable that is flushed down the toilet can, in the event of a CSO, surface in the rivers.

Control of CSOs

Ways to deal with the problem of CSOs fall into three categories:

- Options which maximize the existing sewer system.
- Structurally intensive options.
- Options which screen overflows to prevent floatable matter from reaching the rivers.

Each of these options are under consideration.

Preliminary costs range from less than \$100 million dollars, for wastewater effluent disinfection and existing system maximization, to about 10 times that much for separation of combined sewers.

Maximizing the existing sewer system would cost approximately \$85 million. This option would mean the rivers meet primary recreation standards (water-skiing, jetskiing and swimming) 92 per cent of the time, and secondary recreation standards (boating, fishing and hiking) 95 per cent of the time during the recreation season.

To increase the average time period where primary recreation standards are met to 95 per cent during the recreation season would cost at least an additional \$300 million.

Even complete separation of combined sewers into a separate sewer system (the most costly option) would not mean the recreational bacterial concentration objective for dry weather could always be met.

Coliform bacteria levels in the rivers would still exceed the provincial objective for primary recreation after a rainfall because storm sewer run-off containing animal feces and other contaminants, as well

as contaminants from upstream of Winnipeg, would still be discharged into the rivers without prior treatment.

Netting and mechanically cleaned bar screens are alternatives, estimated to cost \$100 to 200 million, under consideration for removal of floatable material.

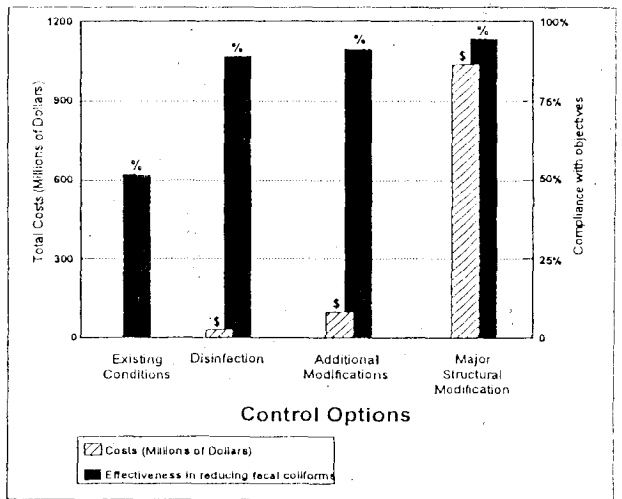
How clean will these options make the river? The Red and Assiniboine rivers carry a high level of suspended material, such as silt native to the region, so the proposed CSO control options will not change the murky appearance of the water. Improvements will be found in the amount of floating matter visible on the water surface, and in the microbiological content of the river water.

The CSO Study includes a comprehensive public communication program.

Public hearings, scheduled for 1997, will be held to set final water quality objectives after completion of the study. At the hearings, the Clean Environment Commission will hear presentations from the city and other groups and individuals with an interest in the issue. The CEC will ultimately make a recommendation to Manitoba's environment minister.

Public opinion will be a major consideration in the Clean Environment Commission's recommendation. Therefore, groups and individuals are encouraged to take an active role in helping to establish priorities for Winnipeg's rivers. For further information on the CSO study, contact the water and waste department at 986-3333.

— provided by the City of Winnipeg



River Quality in Winnipeg Undergoes Environmental Review

Have you ever fished the Rivers in central Winnipeg and noticed a large pipe protruding from the riverbank? Have you ever been fishing in the rain, hoping for a big one, and noticed wastewater discharging from this pipe? Have you ever noticed, during or after the rain, things floating on the River that are normally flushed down the toilet? If so, your favourite fishing spot on the Red or Assiniboine may be at the site of a combined sewer outfall.

In some areas of Winnipeg, both rainwater run-off and wastewater are collected in the same sewer. These sewers are called combined sewers. During dry weather all wastewater collected is directed to one of three City of Winnipeg Water Pollution Control Centres for treatment. If the capacity of this type of single pipe collector sewer is exceeded, as happens during rainfall, a mixture of surface run-off and raw sewage may be discharged from any of about 70 combined sewer outfalls directly into the Red and Assiniboine Rivers. The discharge is called a combined sewer overflow (CSO).

Combined sewers service roughly 40% of Winnipeg, generally in areas of the City built before the 1960s. The City stopped building combined sewers in the late 1950s. Since then all new subdivisions have been built with separate sewer systems where wastewater and run-off are collected in separate pipes.

It is an accepted truth that fish will congregate where two streams of water meet, and as a result anglers tend to look for spots where waters converge. Winnipeg has several spots where natural streams flow into our Rivers, but it also has many more places where less natural flows enter the Rivers. Fish, however, are rather indiscriminating and will enjoy the increased available food and current or pools created by these overflows.

But what is the effect on the fish in the River? Can they be eaten? Is it safe to even touch them?

In 1989, the Minister of Environment asked the Clean Environment Commission to convene public hearings and provide recommendations on proposed water quality objectives for the Red and Assiniboine Rivers within and downstream of Winnipeg. The public hearings were to help define appropriate River uses such as fishing, waterskiing, swimming, boating etc., and the River water quality required to protect these uses.

The Clean Environment Commission ultimately concluded that there was insufficient site specific information to provide recommendations on regulation of combined sewer overflows, and therefore recommended that a study be undertaken. The City's study is divided into four phases. Currently the City is conducting Phase 3 of the study. Phase 1 defined the effects of CSOs on River water quality in terms of water sample analysis, Phase 2 defined options for controlling wet weather flows, Phase 3 entails an evaluation of costs and benefits of the CSO control options, and Phase 4 will include development of a plan to solve the combined sewer problem.

The impact of CSOs on Aquatic life in the Rivers was examined in the first phase of this study. Aquatic life concerns that were addressed in phase 1 included monitoring of levels of oxygen and ammonia.

Oxygen is used in the breakdown of organic matter, such as human waste, in water. Consequently, if more organic matter is present, more oxygen is used, and less is available for fish. In addition, ammonia, which is produced by decomposition of human waste, has been shown to be harmful to fish, it may reduce fish productivity or damage fish tissue. After monitoring oxygen and ammonia lev-

els, it was concluded that CSOs do not significantly alter these concentrations in the Rivers.

Manitoba Health, and the City of Winnipeg Community Services have both indicated that fish from the Red and Assiniboine Rivers in Winnipeg are a safe and nutritious source of food if properly handled, stored and cooked. They state that fish should be treated with similar precautions that are used when preparing and cooking ground beef. If you have any concerns about handling, eating, and cooking fish from Winnipeg's Rivers, Manitoba Health, Public Health Branch or The City of Winnipeg Environmental Health Services Division can answer your specific questions.

Of concern for the CSO study are the

by Tetres Consultants Inc.

bacteria levels from human and animal waste which are discharged into the Rivers. Fecal coliform bacteria from warm blooded animals can cause flu-like illnesses and skin and eye irritation in people who are in contact with the water. Higher bacteria levels are prevalent particularly after a CSO event and can persist for about three days, until the coliform bacteria die off.

Risk to public health has been estimated by measuring the number of coliform bacteria in the water. After a CSO, coliform levels in the Rivers generally do not meet provincial guidelines for recreational use, and at times can vastly surpass them.

continued on page 21
Environmental Review

Light Jigging never fails. The trout will blow the bait out before you know what happened. (I've found power baits to be little more forgiving in this situation. Fish seem to like the taste of the product and are not as quick to spit it out.)

Now boat control, that will be my responsibility. It's very important to position the boat directly over the lures so that they stay at a constant depth. If you want to change lure depths, reel up or down five feet at a time. Staying over your lure will allow for a much better feel for your bait, as well as a more effective hook set. Since the wind has come to join our fishing party today, I'll keep the boat on the spot by shifting the Mercury in and out of gear.

Now to the business of catching a lake trout: When you feel a strike, reel as much stretch from your line as possible and then set the hook hard. If you don't get the slack out of the line, you won't get a hook up. If you feel a bump, but no weight, quickly let your lure drop five to ten feet then stop. This is what you're looking for, something typical of a feeding laker. A lake trout will take a run at the bait, butting it with its head or thrashing at it with its tail. This will be the bump. By allowing your lure to sink, the trout will turn to eat its wounded prey.

Reel up! Reel up! Your line has gone slack and unless you've found a way to feat your bait on the bottom in one hundred ten feet with only forty-five feet of line out, a laker has your jig and is still swimming up with it. Okay, you've got all the slack out. Now set the hook hard! Good hook set! You've got him now! You're on your own.

Lake trout are one of the best fighting fish anywhere in the fresh water world, making long powerful runs into the depths. An added bonus that increases the laker's value as a year round sport fish, is its ability to release air from its bladder. When we pull fish from a depth of twenty feet or more, they'll get a condition that a diver would call the bends. Because the pressure in the shallower water is lower than in the depths where they came from, their air bladder will over inflate to a point where it will do internal damage and most likely kill the fish. Because the laker can release this excess pressure, we're able to fight this fish up from the deeper water during the summer and safely release them to fight again.

So there you go, a nice fourteen pound lake trout on light tackle. Make sure the flash is on the camera, tip your hat back so that we can see who you are and smile. By using spinning gear, we can keep our lure presentation very simple and the ensuing fight with this lighter equipment will challenge even the most seasoned angler.

P.S. Lake trout are very slow growing and live in a very fragile environment. (A three pound lake trout may be as old as thirty years) Please practice catch and release.

Clear skies and calm water...

SUPPORT
THE FISHERMAN'S
GAZETTE
GET A
SUBSCRIPTION
FOR YOURSELF
OR
A GIFT SUBSCRIPTION
FOR SOMEONE
YOU LOVE
TODAY
SEE PAGE 16

*Master Angler Gold
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slow. You might even want to try letting your bait sit right on the bottom some days. If you put some time in you're bound to hook one of those whoppers that the Red River is so famous for. The fishing usually remains good until at least January so you might want to give early ice a try also.

Fall is also a great time to chase rainbows. Rainbow Trout that is! These scrappy fish really put on the feedbag once the leaves change colour, and can be very easy to catch. There are plenty of good lakes in Manitoba if you check the master angler books. My favourite is Bower Lake in Turtle Mountain Provincial Park. The lake has plenty of big bodied bruisers cruising it's shoreline just searching for something to bite on to. I usually park my boat alongside a weed edge or a point and cast out a lindy rig baited with an inflated nightcrawler on an eighteen inch snell. Spinners, spoons and Rapalas also work well on this body of water, and roe sacs can be dynamite.

You might like to try your luck for Brown Trout also at this time of year. Elgin Reservoir or Tokaruk Lake are both good bets for trophy class browns. Elgin browns are suckers for brown trout roe in the fall, and will also take Nightcrawlers at times. Large natural rapalas also take a fair share of large fish. Tokaruk browns will take nightcrawlers and minnows and can also be caught effectively by long line trolling green or black streamer flies.

Come December you might want to take a trip to Rock Lake near Pilot Mound for trophy class Perch. Last year the early ice action was out of this world. Quite a few monster over two pounds were caught, some of which weighed in over two pounds. These fish were suckers for silver flash lures baited with small live

minnows so be sure to bring some along. There are plenty of fish all over this lake so you don't have to be at a particular location. I recommend trying plenty of spots until you locate a school of actively feeding fish.

January is big Northern Pike time, and Big Whiteshell Lake is one of many good bodies of water that produces them. Large fullbees on quirk strike rigs under Polar tip-ups is the way I like to fish them. You don't catch as many fish with big baits but it's still the quickest way to bag a trophy. Funnelled areas between islands and shorelines are good places to try, and rocky points are also good attractants. Set your tip ups at various depths until you find out where the big fish are feeding. I like my baits to sit three or four feet above the bottom because pike like to attack upwards.

February is a good time to try for Black Crappie and my choice would be Lake Minnevasta near the town of Morden. Try fishing the deeper main lake basin near the dam or the dike. The fish often congregate near there throughout the month. Small Jigs baited with small minnows or maggots are standard fare for these light biters. These fish usually suspend and a flasher depth finder can be a great asset for catching them. If you don't have one of these handy tool's you'll have to find them the hard way. Drop your bait to the bottom and jig and twitch it a few times. If nothing happens give your reel a full crank, jig a little then try another depth, jig a little, and crank, and so on. If you catch a crappie drop your bait back down to the bottom and crank until you reach the same depth.

Well, thirteen species should keep you busy for a while, so I think I'll stop right there. Remember to practice catch and release so that others can share the joy of catching a trophy class fish, and if you do manage to strike gold and we should meet, please be kind and don't say the annoying words, "What's so hard about getting the Gold Badge!"

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Another area of concern for the CSO study is the presence of garbage floating on the Rivers. When it rains, garbage can travel to the River in two ways. Firstly, rainwater can carry litter off the streets into the sewers, and secondly, anything floatable that is flushed down the toilet can, in the event of a CSO, wind up in the River.

Ways to deal with the problem of CSOs fall into three categories: screening of the overflows to prevent floatable matter from reaching the Rivers, options which improve the existing sewer system, and structurally intensive options such as under ground storage tunnels or separation of combined sewers.

Each option is being analyzed for its relative performance in the following areas: cost, effect on number and volume of overflows, and effect on fecal coliform levels. Costs range from a few million dollars for minor improvements to the existing system, to about one billion for sewer separation.

Maximizing the existing sewer system would cost taxpayers approximately 70 million dollars, and this option would mean the Rivers meet recreational standards (fishing waterskiing, swimming, boating) 92% of the time. To improve this to 95%, it would cost an

additional 230 million dollars. Even complete separation of combined sewers, would not mean the recreational limit set by the Clean Environment Commission could be met 100% of the time. The coliform levels in the Rivers would still exceed the recommended limit for primary recreation after a rainfall, because land drainage run-off, containing animal feces etc., would still be discharged into the Rivers without prior treatment.

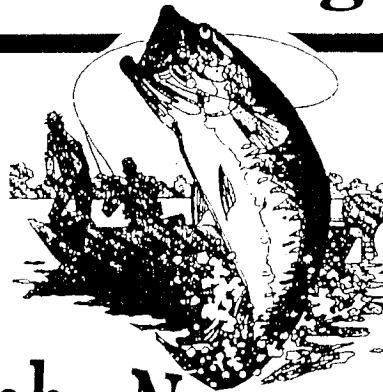
Netting, screens and other forms of capture systems are being considered for removal of floatable matter from outfalls.

Fish from the Red and Assiniboine Rivers are considered safe to eat. Contact with River water while fishing, however, may be a health risk caused by combined sewer overflows. Washing hands after handling fish or immersion in the River is recommended.

After completion of the study in 1997, the Clean Environment Commission will again hold Public Hearings. Public opinion will be a major consideration in defining which River uses should be protected, so it is in everyone's interest to take an active role in defining the future of Winnipeg's Rivers. If you would like further information on the CSO study, please contact the City of Winnipeg Water and Waste Department 986-3333.

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RIVER WATER QUALITY

AND COMBINED SEWER OVERFLOWS

The Red and Assiniboine Rivers are important natural amenities for the City of Winnipeg. They offer scenic water front for parks and walkways, and are used extensively for recreational boating and sport fishing. However, they are also the discharge point for all of the City's storm sewers and sewage treatment plant discharges.

Prior to construction of the original North End Water Pollution Control Centre in the 1930's, all sewage from the City flowed directly to the rivers. The situation has changed dramatically since that time. Today, all sewage generated in dry weather is processed in sewage treatment plants. The City's three water pollution control centres are valued at about

called combined sewers. During dry weather, all wastewater is directed to one of the water pollution control centres for treatment. If the capacity of this type of single pipe collector sewer is exceeded, as happens during most rainfall events, a mixture of surface run-off and raw sewage is discharged from any of about 70 combined sewer outfalls - directly into the Red and Assiniboine Rivers. The discharge is called a combined sewer overflow (CSO), and occurs an average of 21 times annually during the recreation season (May-September).

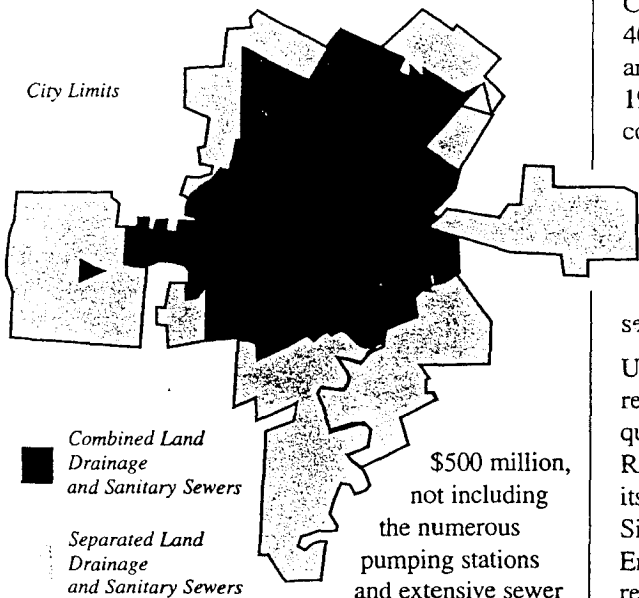
Combined sewers service roughly 40% of Winnipeg, generally in areas of the City built before the 1960's. The City prohibited construction of combined sewers in the late 1950's. Since then, all new subdivisions have been built with separate sewer systems where wastewater and surface run-off are collected in separate pipes.

Until recently, the City had responsibility for protecting water quality in the Red and Assiniboine Rivers, and accordingly developed its own pollution control program. Since the passage of the Manitoba Environment Act in 1987, the responsibility lies with the Province of Manitoba. As a result, the City is now required to comply with certain water quality standards and study other water quality issues in preparation for the setting of appropriate standards. The impacts of combined sewer overflows on river water quality is one the City is currently studying.

The Combined Sewer Overflow Study is being undertaken by the Water and Waste Department. Barry MacBride, Manager of Engineering for the Department's Engineering Division states, "The Combined Sewer Overflow issue is one of the biggest public policy issues facing the City."

Because of the scale of the issue, the department is conducting a comprehensive study. Ed Sharp serves as the Project Manager for the Study which has been assigned to the consulting engineering firm of Wardrop Engineering in association with TetRES Consultants. Sharp explains, "The project presents many challenges: we are dealing with a huge inventory of old sewers, the technical analysis is very complex, the costs of the options are high and the benefits are difficult to quantify."

The study is divided into four phases. Currently the City is conducting Phase 3 of the study. Phase 1 defined the effects of CSOs on river water quality, Phase 2 defined options for controlling wet weather flows, Phase 3 entails an evaluation of costs and benefits of the CSO control options, and Phase 4 will include development of a plan to solve the combined sewer dilemma.



though water quality has improved dramatically, there are still concerns about the quality of our river water.

In older areas of Winnipeg both rainwater run-off and wastewater drain together into the same sewerpipe. These sewers are