

**A PRIMER ON RISK MANAGEMENT  
IN THE PUBLIC SERVICE**

**A Background Document for  
CCMD's Action-Research Roundtable  
on Risk Management**

**by  
Stephen Hill  
University of Calgary**

## Contents

1	Introduction .....	3
2	What Is Risk? .....	3
3	“Managing” Risks? .....	4
4	Risk Management Frameworks.....	5
5	Identifying Risks .....	6
6	Assessment of Risk .....	6
	6.1 Technical Risk Assessment.....	7
	6.2 Risk Communication.....	8
7	Responding to and Managing Risks.....	9
	7.1 Development of Policy Options .....	9
	7.2 Apportioning Responsibility and Liability.....	10
	7.3 Determining the Desired Degree of Precaution .....	11
	7.4 Implementation.....	12
8	Monitoring Effectiveness: Feedback and Learning .....	12
9	Conclusion.....	13
	References .....	14
	Appendix: Some Additional Learning Resources .....	15

## **1 Introduction**

This primer is not meant to be an exhaustive review or treatment of risk management. Rather, the intent is to create a common point of departure for learning and work on what constitutes good risk management and what obstacles might be encountered in incorporating risk management into government decision making. To encourage a broad readership, an effort has been made to avoid technical jargon and to keep the primer succinct. Readers who want more comprehensive information are encouraged to refer to the list of additional resources at the end of the primer.

## **2 What Is Risk?**

The Treasury Board has defined risk as “the uncertainty that surrounds future events and outcomes. It is the expression of the likelihood and impact of an event with the potential to influence an organization’s achievement of objectives” (TBS 2001). Risk, therefore, is the probability that an event in the future, either good or bad, will occur. We often focus on the negative aspect of risk (e.g., being killed, losing money, being embarrassed, etc.) but it is important to remember that risk includes both positive and negative events.

Risk reflects the things in the future that we are concerned about, be they money, our health, jobs, our children, or the environment. Risk decisions can have an effect upon finances, health, the environment, other countries, laws and regulations, and political futures.

The concept of risk has captured a growing importance in modern society, reflecting the public’s desire for safer foods and drugs, a cleaner environment, and safer products alongside higher standards of living. Risk management often requires us to make trade-offs. Actions and innovations with potential benefits should be balanced against their potential costs. Many of the risks in modern society are a result of benefits derived from social and technological innovation. Risk management reflects a desire to improve decision making under uncertainty: to maximize the benefits and to minimize the costs.

For the public sector, an overriding concern in risk management is our duty of care to the public – risks should always be managed with the public interest foremost in mind.

### **3 “Managing” Risks?**

We all routinely deal with risk in our personal and professional lives. However, risk management requires us to move beyond intuitive and implicit decisions about risk; it requires active management in a systematic, holistic, and integrated manner. Risk management may require decision makers to make trade-offs between competing interests and values. Deciding how the distribution of potential benefits and losses should be apportioned is an important aspect of managing risks.

The Treasury Board has described risk management as “a systematic approach to setting the best course of action under uncertainty by identifying, understanding, acting on and communicating risk issues” (TBS 2001). The systematic approach referred to is designed to help public servants:

- recognize and address important risks;
- facilitate decisions about how to handle these risks;
- monitor progress in managing these risks; and
- learn how to make improvements in dealing with risk.

The intent of risk management is to increase the benefits and decrease the costs for uncertain activities. Government deals with risk through various roles, for example, as protector of rights, in creating the conditions for economic prosperity, in maintaining environmental integrity, in improving human health, or through the delivery of government services. In almost every case, risk management requires decision makers to balance and make trade-offs between competing interests in their attempt to find an optimal and acceptable solution. Solutions to risk management problems will likely entail making policy choices to identify and warn people to modify their behaviors; reduce risks via regulation (or other instruments); or compensate persons impacted negatively by a risk event.

## 4 Risk Management Frameworks

The International Organization for Standardization (ISO) has defined risk management as the identification, analysis, evaluation, treatment (control), monitoring, review and communication of risk. These activities can be applied in a systematic or ad hoc manner. The presumption is that systematic application of these activities will result in improved decision making and, most likely, improved outcomes.

Many frameworks for risk management have been developed to assist decision makers deal systematically with risk. These include the Canadian Standards Association risk management guideline (CAN/CSA-Q850-97 — see [www.csa.ca](http://www.csa.ca)), the Criteria of Control (CoCo) model developed by the Canadian Institute of Chartered Accountants (see [www.cica.ca](http://www.cica.ca)), the Risk Management in Public Policy Framework developed by the Assistant Deputy Minister Working Group on Risk Management (see [www.pco-bcp.gc.ca/public\\_e.htm](http://www.pco-bcp.gc.ca/public_e.htm)), and the Treasury Board Integrated Risk Management framework among many others. We will not elaborate on these frameworks further here, except to say that they represent the theoretical ideal for risk management. However, these frameworks all have a common basis: the fundamental steps in the decision-making process. The basic steps in a risk management decision-making process include:

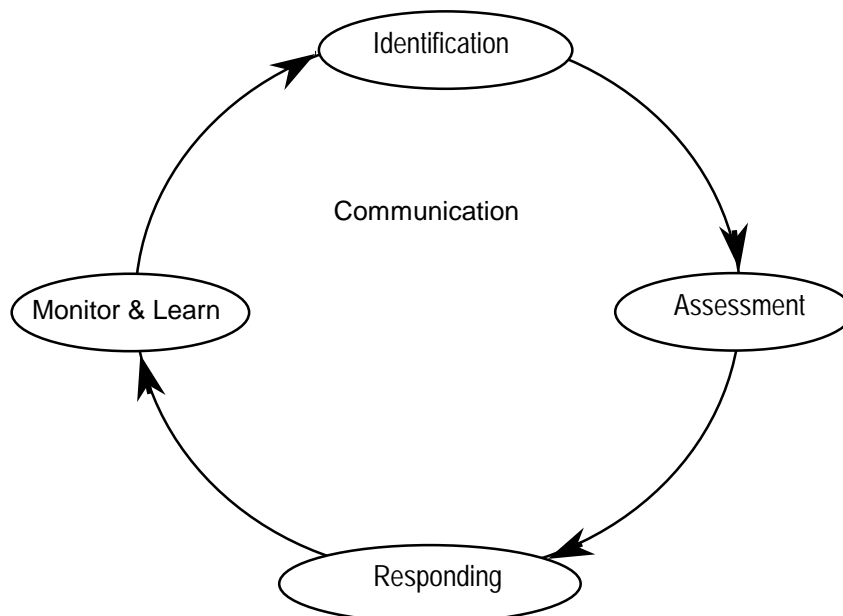


Figure 1. The Basic Risk Management Cycle

Practical application of the general elements within these frameworks presents many challenges — as always, “the devil is in the details.” The following sections explore each step of this basic risk management cycle.

## 5 Identifying Risks

Identifying and acknowledging a risk is the first step toward managing it. There are many different types of risks to which we should remain attentive. Good risk management requires a holistic, interdisciplinary, and interdepartmental effort to identify a wide variety of risks. It also requires an ongoing effort to scan the environment for emerging and changing risk conditions. Keeping a generic list of risks might help prevent potential risks from being overlooked or forgotten. Often, risks are classified according to the valued entity at risk, such as:

- human health and safety;
- environmental resources;
- property, buildings, or other assets;
- financial (e.g., exchange rates, interest rates, commodity prices);
- political and reputational;
- technological (e.g., Y2K, Internet); and
- operational (organizational interruption, liability).

## 6 Assessment of Risk

Determining the risks that we are most concerned about is fraught with controversy. Slovic (1992, 119) has said: “There is no such thing as *real risk* or *objective risk*.” He implies that risk is not something waiting to be measured independent of our minds, cultures, politics and worldviews — it is inherently subjective. For instance, a scientist’s probabilistic risk estimate, while stemming from scientific theory and information, may include professional judgement about the importance of certain outcomes, the acceptability of uncertainty, and so on. The layperson’s risk estimate, while less systematic than a scientist’s, is intuitively sophisticated and may reflect important considerations that differ from a scientific assessment. The essential point is this: science

is a critical tool for assessing the probability and consequences of risks; however, it must be considered within a broader social framework in order to understand what risks, and what level of risk, are important and acceptable to the public. Policy makers must determine estimates of risk that are both technically and socially valid.

Academics and practitioners in the field of risk management have suggested that risk communication — an ongoing dialogue about what risks we are collectively concerned about and how best to manage these risks — is the best way to reconcile disparate views and resolve public controversy. Effective risk communication requires transparent and honest exchange of information, something that has proven to be difficult for both the private and public sectors.

### **6.1 *Technical Risk Assessment***

Risk has been defined as the probability or likelihood of an event times its consequence. There are a number of normative processes for the scientific assessment of risk, primarily depending upon the domain of the risk assessment. For example, environmental impact assessment methodologies have been improving over the past thirty years; product assessment methodologies are established for drugs, foods and other consumer goods; health risk assessments for chemicals are becoming more sophisticated; and financial risk assessment methods are established in business. There are two general methods for predicting the likelihood of future events:

- using historical information to create probabilistic forecasts of future events; and
- modeling the future

Table 1. Some common risk assessment methodologies.

Discipline	Risk Assessment Methodologies
Engineering	<ul style="list-style-type: none"> <li>• Hazard and operability study (HAZOP),</li> <li>• Failure modes and events analysis (FMEA),</li> <li>• Fault tree analysis (FTA)</li> </ul>
Insurance, investment	<ul style="list-style-type: none"> <li>• Credit risk assessment, insurance risk histories</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• Environmental impact assessment (EIA)</li> <li>• Life-cycle assessment (LCA)</li> <li>• Ecological risk assessment (ERA)</li> <li>• Environmental site assessment (ESA)</li> <li>• Population viability Assessment (PVA)</li> </ul>
Health	<ul style="list-style-type: none"> <li>• Health risk assessment (based on toxicology, epidemiology, exposure assessments, etc.)</li> <li>• Drug approvals</li> </ul>

It is important for managers to have a good understanding of the technical risk assessments that they are managing.

## 6.2 Risk Communication

Risk communication involves the two-way exchange of information between interested parties in order to make decisions about how best to manage risks. Practice and research in risk communication have been described as progressing through a series of chronological stages (Powell and Liess 1997; Fischhoff 1995):

- i. focusing on the science, getting the numbers right, and simply providing so-called objective risk information (up to mid-1980s);
- ii. explaining, educating, and persuading the public about technical risk assessments (mid-1980s to mid-1990s); and
- iii. building relationships and trust through open dialogue, partnership, and shared decision making (mid-1990s forward).



The emerging consensus in the literature is that to be effective, risk communication must involve some degree of shared participation in decision making, although the extent of this sharing is open to debate. Broad participation may be difficult or destabilizing in the short term, but will lead to more transparent, robust, and acceptable policy decisions in the long run.

Risk communication must carefully consider the following components:

- credibility and trust issues with the source (e.g., Peters, Covello and McCallum 1997);
- complexity issues with the message (e.g., risk comparisons, Fischhoff 1995);
- perception issues with the receiver (e.g., Slovic 1987, 1999); and
- channel problems such as media distortion (Jungerman 1997).

Powell and Liess (1997) have argued that failures in risk communication (i.e., the social amplification of risk (Kasperson et al. 1988) are the result of an information vacuum, where those who are responsible for scientific risk assessment make no *special* effort to regularly communicate their results to the public. Instead, the information vacuum is filled by other sources. The partial or irregular translation of scientific information, combined with channel distortions, public perception and incorrect information creates risk communication failures.

## **7 Responding to and Managing Risks**

### ***7.1 Development of Policy Options***

The management and control of risk requires an understanding of the probability and hazard related to an activity. For situations where uncertainty is high, a strategy of experimentation, careful monitoring, and adaptive management may be most appropriate. However, it can be difficult for those in positions of authority to explicitly acknowledge uncertainty and their inability to predictably control the future. Public pressure often calls for decisiveness and action, even if that action is unwarranted or unjustified.

Also important is the question of where risk management efforts should be directed to be most effective (Figure 2). Should initial actions be controlled (e.g., by preventing initial action)? Should changes in the system be better managed (e.g., by controlling and restricting application)? Or should we focus on monitoring and mitigating the consequences (e.g., controlling potential impacts or providing compensation)? Further to these concerns is the question of when to reduce probabilities and when to reduce the consequences of a potentially adverse outcome.

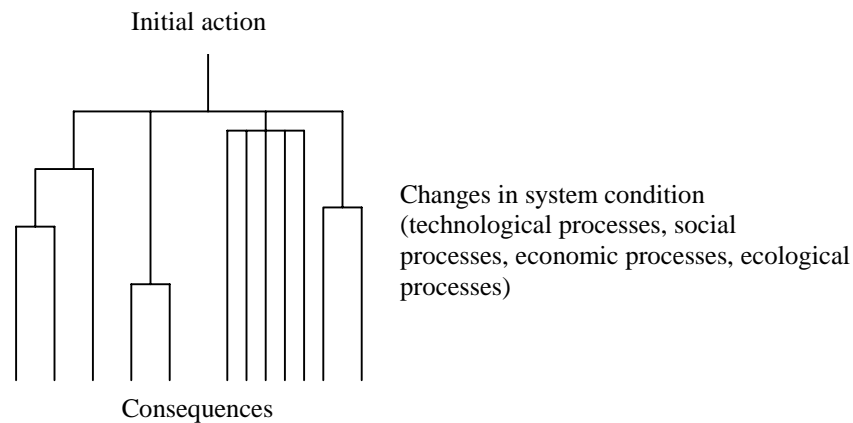


Figure 2. A system and the areas of intervention to control or minimize risk.

Public sector risk managers have a number of policy tools at their disposal for managing and minimizing risks, and for dealing with the impacts from potentially adverse outcomes after the fact. These policy instruments vary in their degree of coercion from direct regulation, to economic instruments, to voluntary initiatives, to education and communication. When developing policy, clear objectives and goals should be set and programs put in place to meet these objectives. If feedback and monitoring indicate that the objectives are not being met, the programs should be changed. If the objectives prove to no longer be relevant, then new ones should be established. These objectives should be consistent with legal, statutory, and international requirements.

## **7.2 Apportioning Responsibility and Liability**

Determining who should bear the responsibility and cost for managing a risk is perhaps the most contentious issue in public policy risk management. How should the potential

benefits and costs be distributed within society? For example, Canadian and U.S. governments are, through the court system, trying to sort out how the health-care costs for smoking-related disease should be apportioned between smokers, the tobacco industry, and the government. A second example is determining who, among private landowners and the public, should bear the burden and cost for protecting species at risk of extinction. The way that potential costs and benefits are apportioned will be different in every case. The understanding, perception and acceptability of different risks will, in part, determine how the responsibility for risk is divided.

Issues of fairness and justice quickly arise in any discussion of responsibility for risks. The processes used to apportion liability and responsibility if a potentially adverse outcome comes to fruition are important. For example, questions requiring answers include: Will the public bear the cost? Will the private sector advocate be responsible? What will be done for victims who suffer adverse impacts involuntarily (e.g., those who acquired hepatitis C from blood)? How will irreversible impacts be compensated (e.g., the extinction of species and ecosystems)? Early and continuing engagement of stakeholders and the public in a meaningful and transparent discussion of the risks will help to ensure acceptable priorities and apportioning of responsibilities. This is the cornerstone of effective risk communication: meaningful dialogue between interested parties about the most appropriate way to manage risk.

### ***7.3 Determining the Desired Degree of Precaution***

There is a presumption that science is able to adequately inform us about both the probability and consequences related to certain actions or interventions. For many well-defined issues (e.g., some types of health risk assessment), the cause-and-effect relationships are sufficiently well understood to resolve our risk questions. However, for situations where complexities are significant and cause-and-effect difficult to define (e.g., social systems, climate systems, ecological systems), science has more trouble predicting hazards and assessing probabilities within a comfortable margin of certainty. When insufficient knowledge or information results in scientific uncertainty, in particular for situations where potentially adverse outcomes may be significant or irreversible,

application of a *precautionary approach* has been advocated. The precautionary principle was defined in Principle 15 of the Rio Declaration (UN 1992): “In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.” The precautionary principle is an attempt to acknowledge and address uncertainty and complexity. While interpretations of the principle vary depending on the circumstances, the principle involves some notion of erring on the side of caution when decisions must be made without the benefit of complete scientific knowledge.

Given the ambiguities regarding the degree of precaution required for different decisions, extensive dialogue between government, the public, and interested stakeholders is needed to determine an acceptable course of action.

#### **7.4 Implementation**

Implementing a risk management system requires a set of responsibilities and accountabilities for carrying out the program to be determined and assigned. The organizational structure and incentive system must be aligned with the goals and objectives of the risk management program. Those responsible for carrying out the program must have the necessary abilities, and training and education must be provided if specific competencies need to be developed.

Programs and procedures should be written down to ensure that experiences and expectations are clear to all involved, particularly to those who are new to the process. Documents related to a risk management system should be made available to as many people as possible.

### **8 Monitoring Effectiveness: Feedback and Learning**

Monitoring the effectiveness of our risk management is imperative for feedback, learning and improvement. Effective risk management uses a systematic process for making decisions. It is important to continually examine how public sector risk-based decisions

are being made — In an ad hoc manner or using a comprehensive process? For each specific decision, effectiveness will depend on the specific nature of the risk at hand. In some cases, a good process will lead to a bad outcome; this is to be expected. However, a good process will ensure that bad outcomes are recognized early and that changes and modifications are made.

How do we know if our management of risks is effective? There is merit in measuring the effectiveness of the risk management process: the presumption that good risk management will improve decision outcomes is intuitively appealing. However, there is also merit in measuring the outcomes of risk management, although this can be difficult.

Indicators that measure outcomes will need to be developed on a case-by-case basis. To develop process-oriented indicators, we must establish the criteria for an effective process. Ideally these will stem from a decision-making process based on the identification-assessment-respond-monitor cycle.

## **9 Conclusion**

This short primer has reviewed some of the basic concepts of risk management, particularly as they apply to the public service. It has given a brief introduction to the basic steps in a risk-management decision process: risk identification, risk assessment, responding to and managing risks, and monitoring and learning about how risk is being managed.

Effective risk management involves systematically addressing risk issues; it strives not to be ad hoc. Effective risk management also involves both technical and social dimensions since risk is defined both technically and socially. Because of this, effective risk management requires ongoing communication and dialogue with the public and effective stakeholders regarding both the characterization and management of risk.

## References

- Fischhoff, B. 1995. Risk perception and communication unplugged: Twenty years of process. *Risk Analysis* 15 (2): 137–45.
- Jungerman, H. 1997. When you can't do it right: Ethical dilemmas of informing people about risks. *Risk Decision and Policy* 2 (2): 131–45.
- Kasperson, R.E., O. Renn, P. Slovic, H. S. Brown, J. Emel, R. Gobel, J. X. Kasperson, and S. Natick. 1988. The social amplification of risk: A conceptual framework. *Risk Analysis* 8: 177–87.
- Leiss, W. et al. 2000. *Risk issue management: A new approach to risk controversies*. (Under review for publication by McGill-Queen's University Press, Montreal. © William Leiss 2000.)
- March, J. G. 1994. *A primer on decision making: How decisions happen*. Toronto: The Free Press.
- Peters, R. G., V. T. Covello and D. B. McCallum. 1997. The determinants of trust and credibility in environmental risk communication: An empirical study. *Risk Analysis* 17: 43–54.
- Powell, D. and W. Liess. *Mad cows and mother's milk: The perils of poor risk communication*. Montreal: McGill-Queen's University Press.
- Slovic, P. 1987. Perception of risk. *Science* 236: 280–85.
- . 1992. Perception of risk: Reflections on the psychometric paradigm. In *Social Theories of Risk*, ed. S. Krimsky and D. Golding. Westport, CT: Praeger Publishers.
- . 1999. Trust, emotion, sex, politics, and science: Surveying the risk-assessment battlefield. *Risk Analysis* 17 (4): 689–701.
- Treasury Board of Canada Secretariat (TBS). 2001. Integrated risk management framework.
- United Nations (UN). 1992. The Rio Declaration on Environment and Development.

## Appendix: Some Additional Learning Resources

### **Government of Canada**

#### Treasury Board Secretariat

TBS documents found at [www.tbs-sct.gc.ca](http://www.tbs-sct.gc.ca) — go to Policies and Publications, Risk Management, Policies and Publications.

- *Best Practices in Risk Management-Coordinated Conclusions from PMN and KPMG* (1999-04-01).
- *Best Practices in Risk Management: Private and Public Sectors Internationally* (1999-04-27).
- *Review of Canadian Best Practices in Risk Management* (1999-04-26).
- *Risk, Innovation and Values — Examining the Tensions* (1999-04-15) [This document examines the tension that exists between the desire for innovation in the public sector and an aversion to the risk of failing and public scrutiny.]

#### Privy Council Office: Assistant Deputy Minister Working Group on Risk Management

- *Final Report*. January 1999. Risk Management in Public Policy, Assistant Deputy Minister Working Group on Risk Management. Available online at [www.pco-bcp.gc.ca/public\\_e.htm](http://www.pco-bcp.gc.ca/public_e.htm). [This is a very good overview of the issues with risk management and public policy. The report includes a useful framework for risk management and public policy.]

### **Conference Board of Canada ([www.conferenceboard.ca](http://www.conferenceboard.ca))**

Canadian Council on Risk Management — [www.conferenceboard.ca/ccrm](http://www.conferenceboard.ca/ccrm)

Members (about 30) of the Council are senior executives in charge of risk management at prominent Canadian organizations, both public and private. The Council activities are steered by an advisory committee, drawn from members, who provide input on the research agenda and proposed meeting agendas via conference call. There are two meetings per year.

Global Council on Risk Management — [www.conferenceboard.ca/gcrm](http://www.conferenceboard.ca/gcrm)

#### **The Conference Board of Canada Publications**

- Birkbeck, Kimberley. *Integrating Risk Management: Strategically Galvanizing Resources in the Organization – Proceedings of the 1998 International Conference on Risk Management*. April 1998.
- ——. *Realizing the Rewards in Risk: How Integrated Risk Management Can Benefit Your Organization*. June 1998.
- ——. *Staying Out of Court: Alternative Dispute Resolution as a Business Tool*. June 1998.

- ———. *Forewarned is Forearmed: Identification and Measurement in Integrated Risk Management*. February 1999.
- Birkbeck, Kimberley, Peter Lok and Hugh Williams. *Managing European Monetary Union: Risks and Opportunities for Canadians*. January 1999.
- Birkbeck, Kimberley and Hugh Williams. *Beyond the IT Department: Business Risk and the Millennium Bug*. March 1998.
- Nottingham, Lucy. *A Conceptual Framework for Integrated Risk Management*. September 1997.

### **9.1 Canadian Standards Association ([www.csa.ca](http://www.csa.ca))**

“Risk Management Guideline for Decision-Makers: A National Standard of Canada.” (CAN/CSA-Q850-97). October 1997.

### **9.2 Canadian Institute of Chartered Accountants ([www.cica.ca](http://www.cica.ca))**

- Canadian Institute of Chartered Accountants (CICA). *Guidance on control*. 1995. [Written by the CICA Criteria of Control Board. This document describes a framework for designing, implementing and continuously improving control in order to help achieve organizational objectives. Specifically, the publication sets out criteria for effective control in an organization, including a definition of control and twenty “criteria of control,” and provides a framework for developing, assessing and changing control.]
- Canadian Institute of Chartered Accountants (CICA). *Learning about risk: choices, connections and competencies*. 1998. [Written by the CICA Criteria of Control Board. This document examines generally the nature of risk and offers some risk models. It offers some propositions about how risk identification and assessment are addressed.]

### **Academic**

There are a number of academics in Canada with an expertise in risk management.

### **Centres, Institutes and Chairs Related to Risk Management**

Institute for Risk Research, University of Waterloo ([workbench.uwaterloo.ca/irr](http://workbench.uwaterloo.ca/irr))

The Institute for Risk Research (IRR) was established in 1982 to conduct research on risk management and to establish a knowledge base to assist Canadian governments, public organizations and industry in risk management decisions and policies. Research and development on measures of safety, risk management of dangerous goods, safety of blood systems, etc.; provision of membership services for risk experts in Canada; risk publications and educational programs have all contributed to the mission. The IRR Web site has a link to the Network for Environmental Risk Assessment and Management (NERAM), which is run by the IRR.



Chair in Environmental Risk Management, University of Alberta  
([www.ualberta.ca/~envrisk/erm.html](http://www.ualberta.ca/~envrisk/erm.html))

Research into environmental and health risk management.

Chair in Risk Communication, University of Calgary ([www.ucalgary.ca/~wleiss](http://www.ucalgary.ca/~wleiss))

Research into risk communication and public policy issues.

Program for Risk Professionals, Simon Fraser University ([www.sfu.ca/cstudies/pd/frm/](http://www.sfu.ca/cstudies/pd/frm/))

This is a continuing education program geared toward financial risk management. The Canadian Risk Management Council of the Risk and Insurance Management Society, Inc. sponsor the program.

### Some Important Journals

*Risk Analysis* — the journal of the Society for Risk Analysis ([www.sra.org](http://www.sra.org)). Published by Plenum Press. [A well established journal with a focus on scientific risk assessment journal for health, environmental and technical risks, although it regularly has articles examining risk from a social science perspective.]

*Journal of Risk Research* — the journal of the Society for Risk Analysis (Europe and Japan). Published by Routledge. [A new journal, started in 1998, that focuses on social science perspectives of risk.]

*Risk Decision and Policy* — published by Routledge. [Started in 1996 to examine social science perspectives of risk of central importance to policy makers in business and government. This journal seems to be a useful resource for monitoring the academic discussions regarding risk and public policy.]

*Risk: Health, Safety & Environment* — the journal of the Risk Assessment and Policy Association. [A journal started in the early 1990s. Many articles from back issues are available at [www.fplc.edu/RISK/RskINDX.htm](http://www.fplc.edu/RISK/RskINDX.htm)

*Journal of Risk and Uncertainty* — published by Kluwer Academic Publishers. [A more theoretical examination of decision making under uncertainty and risk.]