Chapter 7

How to Make IAs More Practical

7.1 HIGHLIGHTS

This chapter portrays a streamlined, efficient, and effective IA process—a practical process based on realistic expectations and competent practice.

- The analysis begins with three applied anecdotes (Section 7.2). The stories describe applied experiences associated with efforts to make IA practice more practical.
- We identify the problem in Section 7.3, which is the tendency for IA processes to be unfocused, disconnected from reality, weak on implementation, of variable quality, and slow to learn from experience and practice. The direction we identify is ways of making the IA process more focused, relevant, feasible, competent, and effective.
- In Section 7.4 we introduce a diversity of concepts bearing on how the IA process can become more focused (on what matters), realistic (in terms of how management and decision making take place), feasible (in terms of decision making and implementation follow-through), competent (in process execution), and effective (in facilitating IA process management learning).
- In Section 7.5 we draw together the insights and lessons presented in Section 7.4. We describe the properties of a practical IA process at both the regulatory and the applied levels. In Section 7.5.1 we explore how IA requirements could be more practical. In Section 7.5.2 we illustrate how a practical IA process could be expressed at the applied level. In Section 7.5.3, we present an overview of practicality measures for various IA types (SA, SEA, EIA, EcIA, SIA, HIA).
- In Section 7.6 we address the contemporary challenge of CEA good practice. We describe CEA characteristics, analyze its current regulatory and applied status, and provide examples of good practices.
- In Section 7.8 we highlight the major insights and lessons derived from the analysis.

7.2 INSIGHTS FROM PRACTICE

7.2.1 The Great Whale Scoping Process: Confronting the Challenges of Northern Mega-Project EIA

The wild rivers of northern Québec have great potential for hydroelectric development. The Province's energy company, Hydro Québec, has exploited some of these resources, resulting in megaprojects that transmit electricity to southern regions but also involve a range of negative social and ecological impacts, experienced primarily by Cree and Inuit communities in their traditional territories. The hydroelectric development proposals in the James and Hudson Bay regions—some already operational, others only in the planning stages—fit into a larger pattern of megadevelopment in northern Canada in the form of mining, oil and gas extraction, pipelines, and other infrastructure. This tension was aptly described, in the context of the proposed Mackenzie Valley Pipeline in the Northwest Territories, as hinterland versus homeland. It is, in many ways, the narrative of the Canadian north in the last century, as industrialization made remote megadevelopment possible.

Many proposed northern Canadian megaprojects remain unrealized. In northern Québec, one of the largest proposals, the Great Whale River hydroelectric project along with its associated infrastructure, was withdrawn or canceled twice, once in the 1980s and again in 1994. With a $12 billion budget (in 1990 dollars), the Great Whale project would have involved river diversion, flooded areas for reservoirs, dam construction, and transmission lines. Moreover, it would have involved a new highway connecting, for the first time, the remote Inuit and Cree community of Kuujjuarapik/Whapmagoostui with southern Québec, a specter that raised great concern about potential social impacts. While it has not been built yet, and may never be built, the proposed Great Whale project and its considerable controversy set the stage for an innovative environmental assessment process, with enduring lessons.

In Canada, much of the formal EIA that takes place is of the "routine" or low-profile variety; however, in rare cases, an alignment of factors results in a panel review, the highest

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level of EIA, with increased opportunities for public involvement and more elaborate requirements for proponents. Factors may include the scale of the proposed undertaking, risks and uncertainties, public concern, and court decisions resulting from legal actions on the part of stakeholders. Governments have tended to be reluctant to convene review panels, but in some cases they are forced to do so, and these high-profile cases, in effect, remove all participants—proponents, agencies, responsible authorities, scientists, interveners—from their respective comfort zones. Some of the most notable review panel cases have unfolded, not surprisingly, in the north, where proponents believe that the financial costs and risks of development tend to make it viable only on very large scales, hence megaprojects.

When the EIA process for the Great Whale project finally resumed in 1991, it followed in the footsteps of notable forerunners such as the Berger Inquiry, which examined the proposed Mackenzie Valley Pipeline in a famous case that predated EIA; and the Beaufort Sea review, an elaborate "concept assessment" examining the general prospect of hydrocarbon development, in other words a kind of strategic EA exercise before its time. The Great Whale EIA process also unfolded at a time of heightened environmental concern, gathering momentum for sustainability as an overarching concept, increasing recognition of the rights of First Nations, and the internationalization of environmental issues, in which it became more common for American and European environmental groups to intervene directly in Canadian resource development cases. These factors, along with a court judgment that required a combined (rather than a split) review of the Great Whale project along with its infrastructure, heightened expectations for a state-of-the-art EIA process—one that would do justice to its scale, risks, uncertainties, and issues.

These pressures resulted in a joint federal/provincial review panel that included Cree and Inuit representation. Public scoping hearings were conducted in nine communities over a period of 23 days. A total of 94 briefs were received and approximately 250 people made oral presentations. The process received national news coverage. The panel received technical support from a team of professionals, and commissioned a series of reports aimed at documenting state-of-the-art practices. The intercultural context of the process challenged the panel to make EIA accessible, relevant, and meaningful to the Cree and Inuit communities. This, in turn, required that the process be open to diverse knowledge systems and patterns of expression, and then address all of the public input from scoping meetings in the drafting of the EIS Guidelines that would be submitted to the proponent. The Great Whale EIS guidelines reflect these imperatives with explicit, and probably unprecedented, requirements, such as "a multicultural definition of the environment," and the need for the proponent to pay close attention to the conceptual and symbolic systems of local people. Likewise, in addressing cumulative effects, social cohesion, safe access to resources, valued or sacred sites, and many other issues, the guidelines departed substantially from standard practice and sought to define and promote new and expanded approaches to EIA in intercultural settings.

The process later reached an anticlimax. The proponent issued an EIS, but by that time, the Québec government had decided to withdraw or at least postpone the Great Whale project. The controversy is memorable for its protests, high-profile media coverage, and court decision, while the joint panel review itself was truncated, with only its ambitious scoping process completed. But it remains a highlight in the history of Canadian EIA, with important lessons for the challenge of conducting meaningful and effective environmental assessment in remote regions characterized by diverse knowledge systems, limited baseline data, irreducible uncertainties, and intense pressures for megadevelopment and rapid change. EIA evolves and improves, not only through the cumulative lessons of many routine cases but also periodically through experimentation with new approaches in unusual cases.

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7.2.2 Intermediate Reports—A Practical Approach to Strengthening SEA Effectiveness and Consistency

During the strategic environmental assessment (SEA) of the urban plan of Ponteranica—a medium-size municipality in northern Italy—we experimented with the application of an approach based on the generation of a set of intermediate short reports. The purpose was to increase the interaction between SEA experts, planners, and decision makers, and, in turn, to enhance the overall effectiveness and consistency of the process. Existing regulations provide only for two reports to be produced during the SEA: a scoping report and a final environmental report. This was considered insufficient to guarantee a proper integration of SEA's outcomes into planning decisions. For this reason, immediately after the preliminary planning/SEA stages, a report detailing the criteria and indicators to be used to assess the sustainability of planning choices was produced. This report summarized the outcome of the first meetings with all actors involved, including formal public hearings. The indicators described were also used to generate a baseline reference study, which was then incorporated into a broader scoping report, made available on the web. As soon as major planning decisions emerged (e.g., concerning new infrastructures and facilities), an additional report was produced containing the reaction of the SEA team to those decisions, including comments for improvement and revision. This document was mainly used to facilitate interaction between technical experts and decision makers.

Later on, the plan started taking shape and its main features were sketched. A subsequent report was issued by the SEA team, this time containing an assessment of the alternatives concerning the main elements and decisions contained in those plan's features. The assessment was largely based on the indicators and guidance produced in the earlier reports. This increased the relevance of its arguments and conclusions. Finally, when a first draft of the plan was produced, a further report critically revised it. It focused on the elements that appeared to be inconsistent with the criteria and objectives set earlier in the process (including the objectives and expectations that emerged during the official public hearing) and captured in the previous reports. This led to the final revision of the plan. It was followed by a SEA short report suggesting appropriate compensation measures to offset the expected land requirements and impacts on natural ecosystems. Finally, the plan was submitted for consultation to the planning authorities. As required by SEA regulations, an environmental report was also issued and made public at this stage.

The approach was successful in strengthening the interaction between SEA experts, planners, and decision makers. It increased the consistency of the planning process, especially during critical moments (e.g., a change in the administration, following local elections that occurred midway through the process). The intermediate reports also served the purpose of recording the "storyline" of the process, keeping track of the evolution of the main planning decisions. This made it possible to document the role played by SEA in steering decision making, as well as some of its tangible results, which included:

- Reduction in the number of new urban expansion areas.
- Reduction of about 30% of the overall land take expected after full implementation of the plan.
- Improved design of the boundaries of land use conversion zones to minimize interference with the ecological network.
- Detailed guidance for ecological compensation interventions included in plan's regulations.

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7.2.3 Ohio River Mainstream Study—A Cumulative Effects Assessment Good Practice Example

Waterway navigation facilitated by locks and dams has existed on the main stem of the Ohio River for over 100 years. The 981 mile main stem, located in the Midwest region of the United States, stretches from Pittsburgh, Pennsylvania, to Cairo, Illinois. In Pittsburgh, the Ohio River is formed at the confluence of the Allegheny and Monongahela Rivers; and at Cairo, the Ohio River flows into the Mississippi River. Mined natural resources such as coal and stone and manufactured products such as petrochemicals and metals are moved up and down the main stem via towboats and various barge configurations. As such, waterway navigation has been and continues to be a vital link in the economic structure of the six contiguous states along the river (Pennsylvania, Ohio, West Virginia, Indiana, Kentucky, and Illinois). Further, such navigation is expected to remain a central influencing factor regarding commerce and economic growth in the region for the foreseeable future.

The design features, sizes, and locations of locks and dams on the Ohio River have evolved since the "wicket dams era" of a century ago. The U.S. Army Corps of Engineers (USACE) has been the lead federal agency since the inception of the navigation system. At the current time, there are 19 "high-lift" locks and dams either on the river, under construction, or authorized. Most locations are characterized by the presence of a main lock and a smaller auxiliary lock that is used during maintenance or rehabilitation periods for the main lock. Both locks may be used for commercial and/or recreational vessels.

Economic, engineering, and environmental issues were addressed in an Integrated Report including a System Investment Plan and Programmatic Environmental Impact Statement for navigation infrastructure to the year 2070 (US ACE, 2011). Economic issues were derived from a range of projections of navigation traffic increases, and cost inefficiencies that occur due to barge queuing when main locks are subjected to either scheduled or unscheduled maintenance or repair. Engineering issues encompassed the possibility of constructing increased sizes of auxiliary locks at several locations and development of risk functions and consequences of component failures that were used to proactively schedule major repairs, rehabilitations, and replacements at existing facilities. Environmental issues were addressed in a cumulative effects assessment and management (CEAM) study of the entire main stem navigation system (US ACE, 2011).

Due to the unprecedented nature of a CEAM study for the 981-mile main stem of the Ohio River, numerous challenges had to be addressed. These challenges provided the basis for delineating several good practice principles; such principles could be applied to other river-related and large-scale river basin studies. Five such principles are summarized below:

Principle 1. Because of multiple valued ecosystem components (VECs) that could be cumulatively affected over the long planning horizon, as well as multiple contributing actions to such effects, it was determined that *a systematic and flexible planning framework for the CEAM study should be utilized*. Further, after extensive discussions, it was also determined that *the framework should be applied on a VEC-specific basis*. The selected planning framework was

the 11-step CEAM process promulgated in 1997 (Council on Environmental Quality, 1997a). The steps were adjusted to fit the study spatial boundaries and types of cumulative effects. Further, when the study team focused its thinking such that they represented a particular VEC, for example, freshwater mussels, it was feasible to apply all 11-steps, or subsets thereof, to freshwater mussels and other relevant VECs.

Principle 2. Because of the newness of large-scale CEAM studies, it was determined that traditional project-focused public scoping would not be sufficient. Accordingly, in addition to the central planning team (CPT) for the study, it would be beneficial *to establish an interagency working group (*IWG*) to provide advice and continuing participation throughout the study*. The IWG consisted of approximately 25 members representing federal and state agencies with responsibilities for environmental management, as well as three NGOs. Six members were from the U.S. Fish and Wildlife Service, with one serving as the coordinator for the USFWS group; two were from the U.S. Geological Survey; and one was from the U.S. Environmental Protection Agency. In addition, the Ohio River Valley Sanitation Commission (ORSANCO), a federally chartered compact among several states in the Ohio River drainage, had two representatives. The remaining members were from natural resources or environmental management agencies in the six states bordering the Ohio River. The IWG had periodic meetings with the CPT. These one-day meetings included information dissemination and updates related to the study, status reports on specific research projects, and working sessions on integrative topics such as impact matrices and indicators for environmental sustainability. In addition, numerous public scoping meetings and interchanges with specific agencies were held during the study. These activities provided an informal continuous scoping process.

Principle 3. Determining the incremental contributions of multiple past, present, and reasonably foreseeable future actions (RFFAs) in relation to both individual and cumulative effects were also a challenge. Again, after considerable discussion, it was determined that *RFFA matrices could be used to delineate cause-and-effect relationships between the multiple actions and the selected VECs and their indicators*. More specifically, a total of 22 RFFA matrices were initially developed for 12 VECs and their associated indicators. The RFFAs, which also included continuing past and present actions, were defined as:

> Actions identified by analysis of formal plans and proposals by public and private entities that have primary (direct) or secondary (indirect) impacts on VECs associated with the Ohio River. RFFAs also include potential actions that are beyond mere speculation when incorporated in plans or documents by credible private or public entities. RFFAs may also include events forecasted by trends, probable occurrences, policies, regulations, or other credible data that may have bearing on the VECs.

A total of 87 types of RFFAs were identified and considered in the analyses; the types were divided into six categories: navigation investment actions, other USACE actions, "but for" actions (actions that would not occur "but for" the existence of the navigation system), actions by others, natural disasters, and regulatory environment. Each listed RFFA was characterized in terms of its anticipated time period of occurrence, probability of occurrence, and location on the River. The anticipated effects of each RFFA on each VEC or subcomponent were described in "smart cells" using Microsoft® Excel spreadsheets. Finally, the importance (high, medium, or low) of each RFFA relative to cumulative effects on each VEC or subcomponent was also described in "smart cells."

Principle 4. The ORMSS was conducted at a programmatic level; that is, the focus was on cumulative effects from a system-wide modernization plan for replacement and possibly new locks and dams. In this context, cumulative effects represented the integrative component of the effects of multiple actions on key VECs. Further, *the appropriate measure of such cumulative effects was assumed to be related to reaching or maintaining the environment sustainability (*ES*) of the key VECs*. Accordingly, a methodology for analyzing the historic, current, and future ES of selected VECs was developed. The methodology comprised four parts: (1) identification of "common effects" on the VEC or subcomponent thereof from the High and Medium importance RFFAs as delineated in the pertinent RFFA matrix; (2) selection of indicators of ES for the VEC or subcomponent thereof, and their tiered grouping, as appropriate; (3) description of the "connections" between the common effects (and related High and Medium importance RFFAs) and the indicator groups; and (4) assignment of a "bottom line" category to the ES of the VEC or subcomponent, based on considering the past, present, and future conditions. The ES categories included "not sustainable," "marginally sustainable," and "sustainable." Specific ES definitions were developed for each VEC or subcomponent. Further, it can be noted that the four-part approach represents the development of a specific conceptual model for each VEC.

Selected indicators were identified for the following key VECs—water and sediment quality, fish, mussels, riparian/-floodplain resources, health and safety, and water-based recreation. The indicators were identified by the ORMSS study team in conjunction with the IWG. Using the selected indicators for each VEC, an overall determination of sustainability was made for each VEC at three time intervals (past, present, and future). Applying this methodology to each VEC in the CEAM resulted in past, present, and future characterizations of ES that were included in bar graphs accompanied by summary descriptions of conditions.

Principle 5. Unique CEAM studies will typically require special studies and considerations related to mitigation and management. Examples within ORMSS included research studies and planning for cumulative effects mitigation and

management via usage of the expert elicitation process (EEP) (Swor and Canter, 2011). They included

- A study of various engineering and hydraulic factors related to Ohio River locks and dams, along with fish swimming velocities of 44 target species. The objective of this study was to assess upstream fish-passage opportunities through Ohio River main stem dams by relating historical hydraulic conditions at the dams to swimming capabilities of select native and nonnative fishes to determine if the dams are restricting upstream movements of fishes. Further, four additional field studies related to documenting actual fish movement and passage in the Ohio River.
- A study of winter habitat types used by fishes in two navigation pools, and comparison of the results between these downstream and upstream pools. The objective of this study was to examine how abiotic characteristics (e.g., channel morphology, latitude, and depth) regulate winter habitat use of critical fish species in the Ohio River.

A special planning study was focused on possible actions to restore aquatic and riparian ecological resources to a higher state of sustainability. The actions were identified via an EEP involving aquatic and riparian/terrestrial experts knowledgeable of Ohio River resources. The received information was synthesized into goals for the two selected VECs, actions or measures to attain the goals, and necessary monitoring to evaluate conditions. Finally, 26 types of ES actions were identified and classified into three broad groups of ES alternatives (Swor and Canter, 2011). They were then included in the decision-making stage along with four navigation improvement alternatives.

Final Observations. Planning and conducting regional-scale CEAM studies can be both challenging and complex. However, they can be accomplished by applying or modifying practices from EIA studies along with systematic approaches for addressing new themes such as analyses of environmental sustainability, and the development of strategic mitigation measures for the incremental effects from proposed actions along with regional management of cumulative effects resulting from multiple contributors. The above principles are illustrations of both modifications of existing EIA practices and the creation of new strategies for emerging CEAM challenges.

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7.3 DEFINING THE PROBLEM AND DECIDING ON A DIRECTION

The three stories address practicality in different ways. The first story describes a formal and ambitious scoping process that effectively integrated a diversity of stakeholder perspectives. The second story describes how the use of intermediate reports provided a practical approach to strengthening SEA effectiveness and consistency. The third story provides a good practice example of cumulative effects assessment. Key principles, with potentially broader application, are highlighted.

Practicality, as illustrated in Figure 7.1, has many dimensions. Each dimension encompasses numerous elements relevant to practicality in the IA process. The IA process, as expressed in IA theory and practice, can be much more practical.

Despite the widespread advocacy of screening and scoping too often, IA documents remain excessively descriptive, lengthy, and unfocused (Barrow, 1997; Ensminger and McLean, 1993; EC, 2009c; Ross et al., 2006; Tzoumis, 2007; Weston, 2011). IA processes continue to take too much time and to consume too many resources (Macintosh, 2010; Sadler, 1996; Wolfe, 1987). Alternatively, they operate within such severe time and budget restrictions that the potential for good practice is seriously inhibited (Clark, 1997; Offringa, 1997). Scoping, although demonstrably beneficial, is often either not applied or poorly applied (Morgan, 1998; Pinho et al., 2010; Sadler, 1996; Wood et al., 1996, 2006). Shorter IA reports, rather than being focused and streamlined, tend to be of poorer quality (Wood et al., 2006, 1996). Practice continues to lag well behind theory (Snell and Cowell, 2006). Practitioners continue to struggle with identifying major problems, root causes, priorities and impacts of real concern (Lee and Kirkpatrick, 2006; Sadler, 1996). They have difficulty in dealing with concepts like significance and sustainability (Retief et al., 2008). Key stakeholders and the public often are excluded from the scoping process (Snell and Cowell, 2006; Tsuji et al., 2011). Effectiveness ratings for study design activities such as problem definition, objectives determination, and terms of reference formulation leave considerable room for improvement (Lee and Kirkpatrick, 2006; Sadler, 1996). The dominance of efficiency arguments and ill-defined or excessive requirements, often in combination with gaps, overlaps, and coordination problems among government levels and across agencies, are still problems in many jurisdictions (Anderson, 2001; Ensminger and McLean, 1993; Offringa, 1997; Snell and Cowell, 2006). In short, IA documents, processes, and institutional arrangements could be more efficient and *focused*.

IA is plagued by such *reality*-related problems as (1) a gulf between how policy making and project planning take place and how IA processes and practices assume they take place, (2) IA theory not well grounded in or derived from IA practices and experiences, (3) IA practices poorly suited to

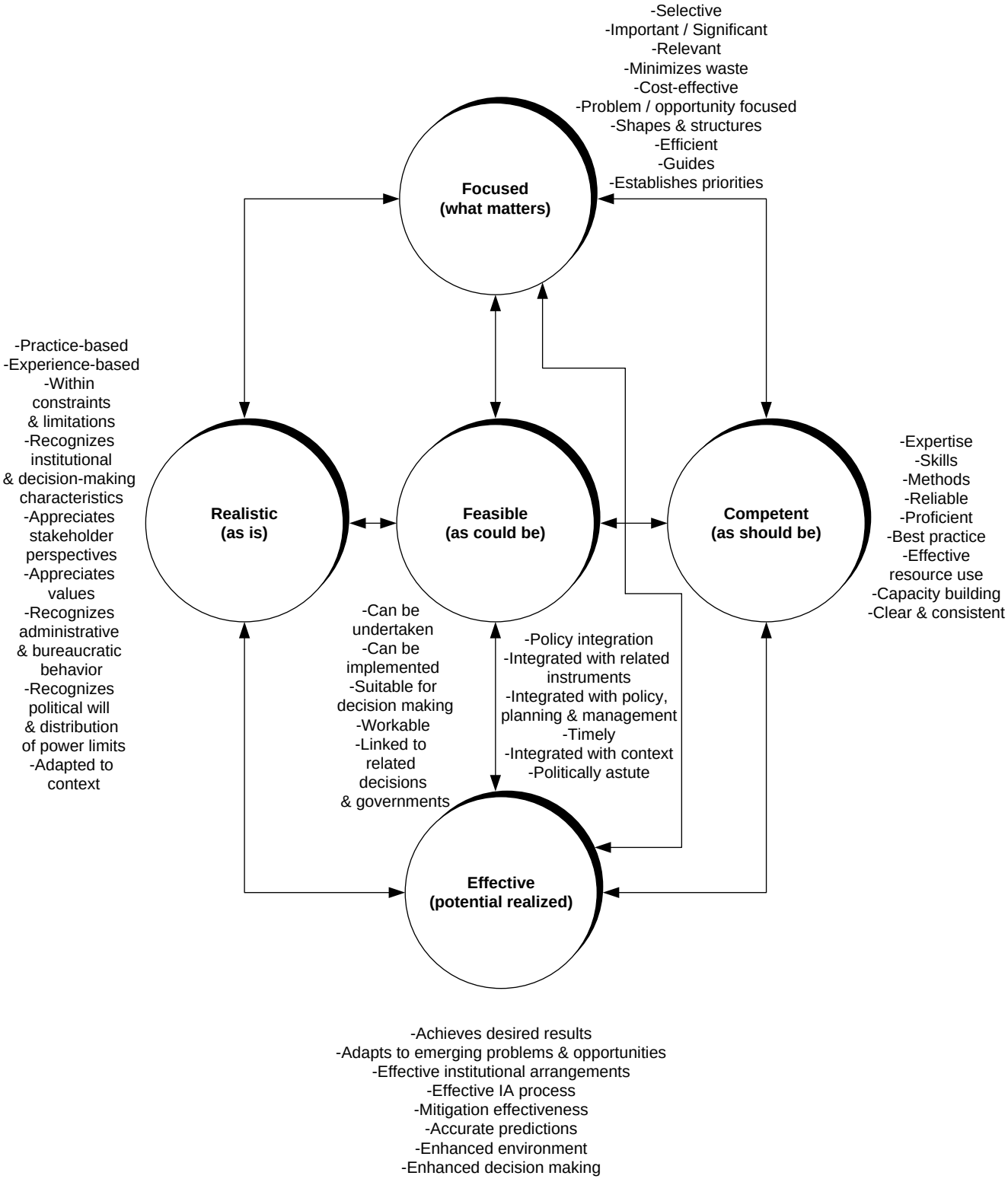

Figure 7.1 Examples of practicality dimensions.

the contexts in which they are applied, and (4) IA processes and practices that fail to appreciate and to integrate the perspectives, contributions, and implications of varying stakeholder values and perspectives. These problems suggest that IA theory and practice need a "reality check." Rational assumptions and fantasies (see Chapter 5) embedded in most IA process characterizations are rarely realistic (Snell and Cowell, 2006). Also unrealistic is the

naïve assumption that better information leads directly to better decisions (Fuggle, 2006). Human, institutional, and political characteristics, perspectives, constraints, and behavioral patterns need to be better understood, especially regarding how decisions are made and implemented (Sandham and Pretorious, 2008; Weiner, 1997; Zhu et al., 2010).

More consideration could be given to policy and decision-making models that mimic planning and decision making as they are (such as bounded rationality), in contrast to how rationality advocates would like them to be (Nilsson and Dalkmann, 2001; Nitz and Brown, 2001). An enhanced understanding of the role of politics in IA-related decision making is critical (Fuggle, 2006). Also essential is a better appreciation of how and why authorities resist and disown IA requirements (Weston, 2011). Further consideration needs to be given to the barriers to effective IA and the reasons why IA practice largely ignores and falls well short of good practice standard (Noble, 2009a; Polido and Ramos, 2011). Stakeholder perspectives need to be better understood (Au, 2006). More attention needs to be devoted to how to more effectively integrate indigenous people and vulnerable and poorly represented segments of the public into decision making (Baker and McClelland, 2003). Additional emphasis needs to be placed on effectively characterizing and addressing the complex problems encountered in IA practice (Morgan, 2006). Decision-making and implementation constraints are not insurmountable. But first they must be understood. The naïve expectation that rational and/or scientific IA documents and processes lead inevitably to environmentally sound decision making and implementation is questionable at best and at worst can reduce the relevance of IA outputs to major project and policy decisions (Nitz and Brown, 2001). The late (in the decision-making process) initiation of IA requirements and the large number of major decisions not subjected to IA requirements remain recurrent problems in IA practice (US CEQ, 1997a). More systematic consideration needs to be given to how IA systems affect, are integrated into, and positively influence (i.e., added value) policy making and project planning (Bartlett, 1989; Noble, 2009a; Retief et al., 2008). IA practitioners need to be better informed about the nature of policy-making and project planning processes (Nitz and Brown, 2001).

There is an urgent need to learn from experience and good practice (Glasson et al., 1999; Retief, 2007b; Sadler, 1996). Often IA requirements are not being satisfied (Weston, 2011). Even when mandatory requirements are met, best practice is largely dismissed (Polido and Ramos, 2011). Lessons and insights, derived from good practice, need to be better integrated into IA regulatory requirements, guidelines, and practices (ERM, 2000; Spooner, 1998; Tang, 2010). IA regulators and theorists should strive for an enhanced understanding of stakeholders (e.g., bureaucrats, politicians, proponents, practitioners, nongovernment organizations, and members of the public), perspectives, interests, and needs (Morgan, 2006; Rowson, 1997). The IA process (or more exactly, multiple IA processes) needs to be designed to more closely match contextual characteristics (Greer-Wooten, 1997; Nilsson and Dalkmann, 2001; Nitz and Brown, 2001; Whitelaw et al., 2009).

A practical IA process also must be prescriptive. The shift to the prescriptive does not mean an abandonment of the "real." A practical IA process remains realistic but also seeks out *feasible* actions that can be undertaken and implemented in varying contexts. IA practice needs to balance practicality and prescription. Too often IA practice (1) neglects the needs of decision makers, (2) has minimal effect on planning and decision making, (3) fails to influence or facilitate implementation, and (4) is not effectively integrated with other environmental management instruments, project planning, and public policy making (Tinker et al., 2005; Thérivel, 2010).

Providing relevant and sound environmental information and advice to decision makers, although necessary and improving, is far from the whole picture. A less passive approach to decision-making integration is needed (Cashmore et al., 2004). The needs, values, and perspectives of decision makers and of other stakeholders are often neither identified nor addressed (Polido and Ramos, 2011; Spooner, 1998; Wood, 1995). Provisions for impartial and democratically accountable decision making tend to be weak (Hinte et al., 2007). Postapproval management and follow-up remain more the exception than the rule (AGC, 2004, 2008; Lundberg et al., 2010; Sadler, 1996). Strategies are required to ameliorate implementation obstacles such as overlapping mandates, delays, late triggers, unclear, incomplete, or contradictory requirements and guidelines, coordination and consistency difficulties, and the propensity of agencies to treat IA requirements as a rigid paperwork exercise and bureaucratic hurdle (Anderson, 2001; Clark, 1997; Evaluation Partnership, 2007; Sadler, 1996; US CEQ, 1997a; Weiner, 1997). The potential for IA as a strategic decision-making tool is not fully realized (Clark, 1997). The relationship between SEA and project-level EIA is poorly defined (EC, 2009d; Fischer et al., 2009; Noble, 2009a). IA requirements are still rarely applied to major government decisions or to nongovernmental actions with potentially significant environmental consequences (Andrews, 1997). IA documents, when prepared, are commonly treated as a bureaucratic and administrative exercise and as decision implementation rather than decision-making documents (Ensminger and McLean, 1993; Noble, 2009a). Too little attention is devoted to establishing complementary links between EIA and SEA and project planning, policy making, and other environmental management and sustainability instruments (EC, 2009d; Nitz and Brown, 2001). By neglecting these practical decision-making and implementation considerations, the IA process often falls short of its potential.

Sound execution of the IA process requires *competence*. Much advice regarding methods and procedures is offered in IA texts and literature. But IA practice, as reflected in requirements, guidelines, and documents, too frequently fails to meet even minimum good practice performance

standards or to improve over time (Androulidakis and Kanakassis, 2006; Glasson et al., 1999; Hinte et al., 2007; Peterson, 2004; Sadler, 1996; Spooner, 1998; Tzoumis, 2007). Tested methodological frameworks are not broadly available or applied when they are available (Noble, 2009a). Public participation criteria are rarely met (Polido and Ramos, 2011). Poor quality and difficult (for the public and decision makers) to understand IA documents are still all too common (Alton and Underwood, 2003; Page, 2006; Ross et al., 2006). Often available methods are poorly applied (Ross et al., 2006). Activities such as scoping, the analysis of alternatives, significance determination, the consideration of substantive concerns such as health, the implementation of mitigation measures, the assessment of cumulative effects, and the design and application of follow-up continue to be poorly performed (Fischer, 2010; Jalava et al., 2010; Peterson, 2004; Ross et al., 2006; Sandham and Pretorious, 2008). As a consequence, methodological weaknesses all too often undermine the substantiation of findings (Lee and Kirkpatrick, 2006). The extreme variability in the quality of IA documents over time, from project to project and from region to region, is difficult to reconcile with the image of a "maturing" field of theory and practice (Ecologic et al., 2007; Renda, 2006). These shortfalls could simply be the result of a failure to apply available knowledge and insight. Perhaps the variability in quality could be largely explained by differences in the experience and expertise of practitioners (Barker and Wood, 1999).

Alternatively, IA literature could be "missing the mark" in meeting practitioner needs. Perhaps the guidance provided is too superficial, too scattered across numerous sources, too difficult to access, and too difficult to understand or apply (ERM, 2000). There may be insufficient time or money to apply "state-of-the-art" practice. Possibly the management skills and expertise required to "tie the pieces together" are insufficiently developed or inconsistently applied (Glasson et al., 1999). More capacity building could be required before IA practitioners achieve the necessary proficiency levels (Offringa, 1997). "Good practice" standards could be too general, contradictory, unrealistic, or poorly adapted to context (Põder and Lukki, 2011). Methods may need to become more cost-effective and more conducive to applying new technologies (Offringa, 1997). The skills and expertise required of practitioners could be more complex than the methods purveyors realize (Webster, 1997). Simply assuming that the necessary knowledge is available and that the problem will resolve itself as more experience is acquired is a dubious strategy given the continuing quality disparities after more than 30 years of IA practice. A more prudent strategy is to assume that IA competence deficiencies require an array of responses.

IA practicality "problems" are little more than impressions and the "solutions" offered no more than speculations if IA *effectiveness* is not systematically addressed. Considerable progress has been made in formulating and applying IA quality and effectiveness criteria and performance standards to documents, procedures, methods, and institutional arrangements (ERM, 2000; Sadler, 1996; Wood et al., 1996). These efforts, although laudable, barely "scratch the surface" in terms of what is required to "close the loop" from experience to learning (Glasson et al., 1999; Wood, 1995). The monitoring and auditing of actual environmental impacts (as compared with predicted effects), mitigation effectiveness, and decision-making effectiveness are still more the exception than the rule (AGC, 2004, 2008; Clark, 1997; Culhane, 1993; Lundberg et al., 2010; Morgan, 1998; Noble, 2009a; Sadler, 1996). The effectiveness of mitigation measures is rarely determined (Clark, 1997; Fischer, 2010). A much greater effort could be made to assess and compare IA methods, process designs, management strategies, and institutional arrangements, in varying contexts (Glasson et al., 1999; Zhu et al., 2010).

The contribution of IA to more environmentally sound planning and decision making and to a more sustainable environment is more often an assumption than a demonstrated outcome (Andrews, 1997; Retief, 2007b; Welles, 1997). SEA and EIA, although advanced as a solution to many environmental problems, have been far from effective in practice (Retief et al., 2008). The tendency has been for IA to be viewed as a procedure to be followed rather than as a proactive environmental management tool (Weston, 2006). Perception of results, in terms of influencing decision making and avoiding significant environmental effects, among stakeholders and among IA systems varies greatly (Heinma and Pöder, 2010; Heinma and Pöder, 2010; Macintosh, 2010; Pölönen et al., 2011). Evaluations of the quality of IA documents in terms of the treatment of substantive environmental concerns (e.g., biodiversity, health, and social) suggest little improvement (Bhatia et al., 2010; Kemm, 2005; Mandelik et al., 2005; Vanclay, 2010). Outcomes, in terms of contributions to sustainability, have tended to range from mildly positive to mildly negative (Thérivel et al., 2009). Application by the private sector of SA and SEA has been limited (Jay, 2005). The magnitude and nature of the contribution and which strategies and tactics effectively operate within constraints and overcome implementation obstacles are even less clear. In the absence of demonstrated contributions, it is difficult to argue for the continued allocation of resources to IA and for a well-defined role for IA within environmental management and sustainability strategies. What is required is a substantiated case that IA achieves desired results and adapts to emerging problems and opportunities.

The problem then is five clusters of interrelated problems, all bearing on the issue of practicality in the IA process. The direction is concepts and approaches for making the IA process more focused, realistic, feasible, competent, and effective. These approaches establish a foundation for practical IA regulatory requirements and practical IA processes.

7.4 SELECTING THE MOST APPROPRIATE ROUTE

7.4.1 Focused

The IA process, in its fullest expression, is, by definition, impossible. More environmental components and interactions, alternatives, and direct and indirect effects can always be suggested. The level of detail can always be increased. More parties can be involved. More participation can occur. More research can be undertaken of uncertainties. In short, there is no "stopping rule." As a result, the IA process can never be comprehensive. The real issue is how to focus or scope (used interchangeably here) the IA process to balance environmental objectives, available resources, and decision-making requirements. Figure 7.2 provides an overview of the major elements associated with focusing regulatory and applied IA processes.

Scoping focuses IA institutional arrangements, the IA process, and IA documents (Morgan, 1998). It determines what will and will not be examined (Wolfe, 1987). It establishes appropriate levels of detail for various analyses (Wolfe, 1987). It directs and structures the IA process, IA operational procedures, and institutional reforms. Scoping establishes priorities (Eccleston, 1999a). The benefits ascribed to scoping are considerable. Scoping, when effective, reduces the duration of IA planning and review processes, abbreviates IA documents, ensures efficient resource use, and identifies key issues, priorities, and problems early enough in the process to take appropriate action (Glasson et al., 1999; Sadler, 1996; US EPA, 1998b; Wolfe, 1987). It is conducive to early stakeholder involvement and can reduce the likelihood and severity of conflict among stakeholders (ERM, 2000; Sadler, 1996; US EPA, 1998b). Scoping focuses the process on potentially significant issues (for decision makers and the public), options, and impacts (Bond and Stewart, 2002; US CEQ, 2005a). It reduces the likelihood that resources will be wasted on insignificant concerns (ERM, 2000; US EPA, 1998a). Scoping contributes to higher quality IA documents and to more environmentally sound decisions (ERM, 2000; Sadler, 1996).

Narrowing the scope of the IA process, based on overview analyses and preliminary stakeholder discussions, however, can lead to the premature rejection of alternatives and to unanticipated effects (Erickson, 1994). The level of detail may not be sufficient to justify a clear distinction between significant and insignificant issues and impacts. Once an IA process is "scoped," the resulting study designs could be treated as "blueprints" to be followed regardless of changing circumstances. Sometimes a scoping process is unduly influenced by vested interests. These constraints can be ameliorated if alternatives and potential impacts are retained for further consideration if there is doubt regarding their suitability and significance. An open and staged process, with a high level of stakeholder participation, in combination with conservative assumptions, sensitivity analyses, peer review, and a careful scrutiny of the results of monitoring and effectiveness analyses, can reduce the likelihood of inadequately supported decisions (Morgan, 1998). Scoping works best, when there is early and ample stakeholder involvement (US EPA, 1998b; Morgan, 1998). Multiple perspectives should be brought to bear on scoping interpretations and decisions. Scoping need not be only a stage near the outset of the IA process. Instead it can be a scanning–focusing phase preceding more detailed analyses and prior to each IA process decision (Brown, 1998; Kennedy and Ross, 1992). Caution is essential, given the "broad brush" nature of the analyses. Sometimes this means scanning ahead. Sometimes previous decisions need to be reconsidered (Brown, 1998). Flexibility to adjust to changing circumstances is critical. Adequate consideration should be given to both biophysical and socioeconomic concerns (Erickson, 1994; Morgan, 1998).

Scoping can be applied at the outset to define the problem, establish the terms of reference, design the overall IA process, and set the study boundaries (Barrow, 1997; Sadler, 1996; Wood, 2000). It also can focus and structure each IA process activity and document leading up to (e.g., alternatives formulation and evaluation, baseline analyses, impact identification and prediction, public and agency consultation, document preparation) and subsequent to (e.g., monitoring, mitigation, auditing) proposal acceptance or rejection (Kennedy and Ross, 1992).

Scoping helps reform IA institutional arrangements. Screening distinguishes between actions subject and not subject to IA requirements. It also determines applicable approval streams. IA screening and scoping requirements are streamlined and focused by class or categorical IA requirements and by significance thresholds and criteria. Documents can be simplified by page limits, incorporation by reference, report format requirements, and page limits (Kreske, 1996). Review and approval can be expedited by timing and circulation limits, by merged and cooperative interagency and intergovernmental requirements, and by agency review guidelines. The latter directly link IA requirements to agency mandates, policies, programs, and priorities (Kreske, 1996). Meetings, workshops, study groups, task forces, expeditors, facilitators, mediators, and participant funding can constructively bring together interested and affected parties, both within and external to the government review process.

7.4.2 Realistic

A practical IA process is necessarily grounded in practice and experience. It is realistic. Figure 7.3 illustrates examples of distinctions potentially relevant to making the IA process more realistic. Table 7.1 presents a summary overview of the characteristics of several potentially relevant realism concepts. Collectively, these concepts suggest that knowledge is often subjective, pluralistic, experience-based, and socially constructed. Practice is concrete, action-oriented, critical, and experimental. Planning, policy making, and decision

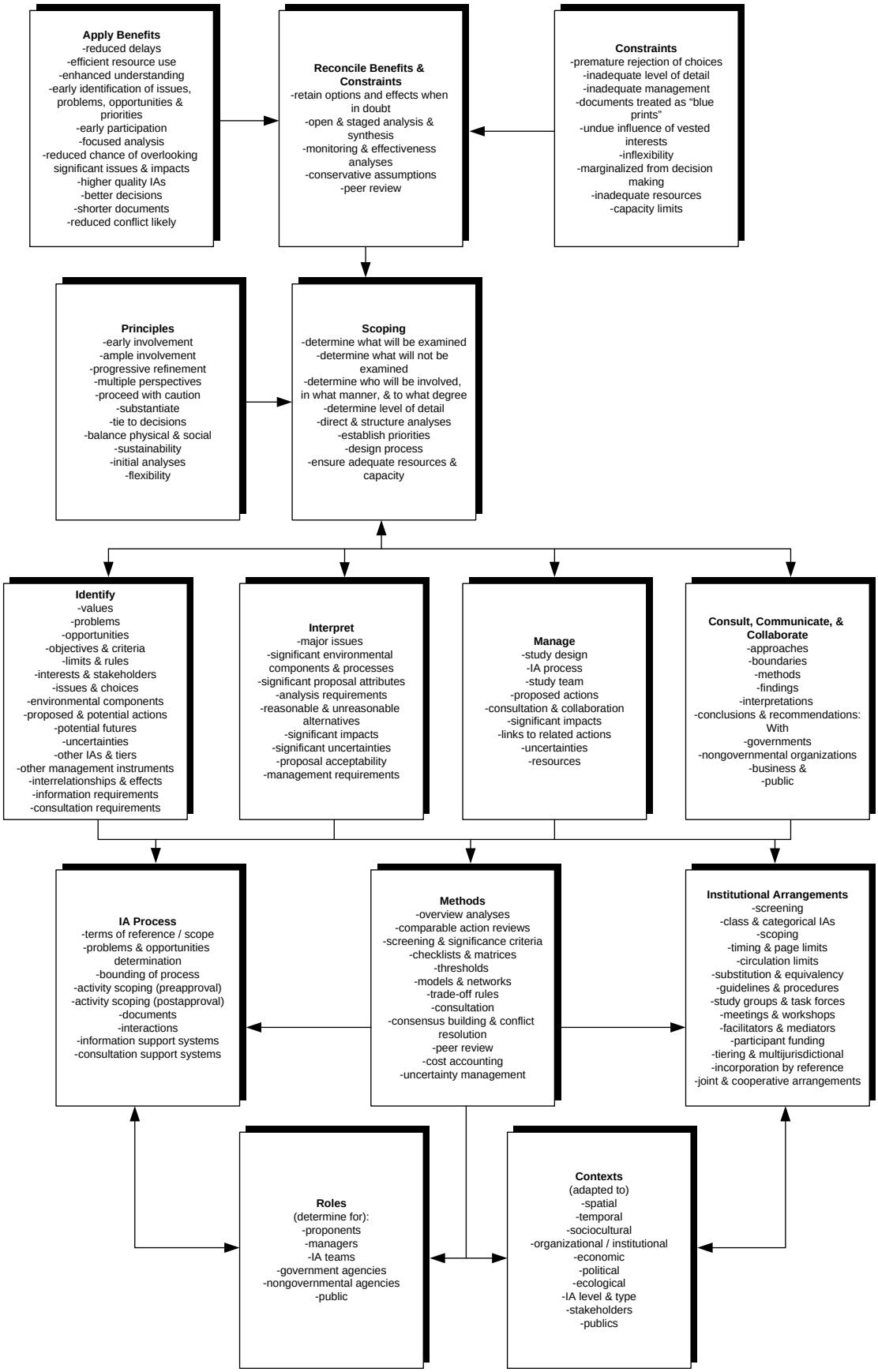

Figure 7.2 Focusing the IA process.

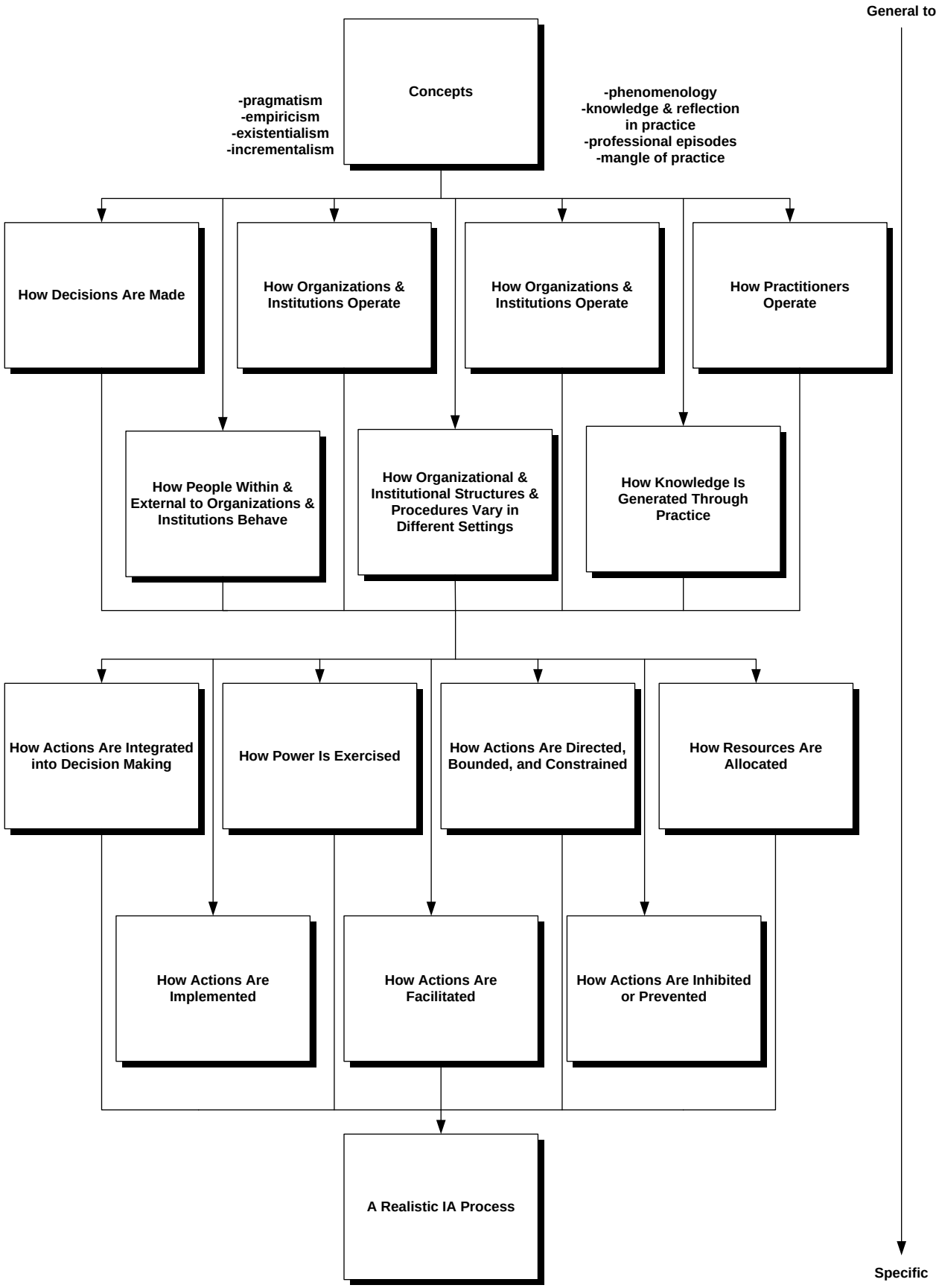

Figure 7.3 Realism in the IA process.

Table 7.1 Examples of Potentially Relevant Realism Concepts

Pragmatism	• A philosophy of everyday life; antifoundational; importance of dissent and irreverence • A plurality of shifting truths grounded in concrete experiences and language • Actions structured by subjective interpretations of the world; interpretations evaluated in terms of their practical implications; intent is to solve human problems • Concepts are socially constructed; truth not understandable outside the social and psychological processes and community that makes truth possible; justification from prior experience • Concepts, terms, and assumptions tentative and provisional—always open to further interpretation and criticism—fallibilism; prediction possible but limited • Focuses on concreteness, action, adequacy, facts, and power; turns from abstractions, verbal solutions, a priori reasons, closed systems, origins, fixed principles, and absolutes • Pluralistic—a plurality of traditions, perspectives, and philosophical orientations • No definitive formulation to problems and no clear solutions; all knowledge contingent • Learning by doing (learning and doing indivisible); learning a collaborative experience • Problems solved by common sense and experimentation; guided by changing experience
Empiricism	• Reliance on experience and observation alone • Founded on belief that all knowledge originates in experience or in the practice of relying on observation and experiment • Limited consideration of system or theory • Focuses on collecting facts and observation • Emphasis on information derived from human senses • Exemplified in studies of practice
Existentialism	• Point of departure experience rather than generalized concepts; all concepts derived from human perceiving, pattern forming, symbolizing, comparing, and conceptualizing • Emphasis on immediate experiences and individuals as autonomous moral agents • Terms described not defined; consistency only possible through repetition of experience; not possible to state assumptions and conclusions only reached based on implications • Different people reach different conclusions based on same information • Propositions have multiple meanings; communications failures expected • Reality only partially conveyed by symbols • Existence contingent (not independent of situation); only here and now meaningful and present experiences—complex, unique, correlated, uninterpretable, and uncommunicable
Phenomenology	• All knowledge is subjective • Analyzes and identifies basic features of subjective knowledge to understand individual and to make life more significant • Belief that people should be studied free from any preconceived theories and suppositions about how they act • Search for understanding of nature of act rather than explanation • Belief that for people world exists only as a mental construction; created in acts of intentionality
Incrementalism (also bounded rationality)	• Margin-dependent choices; successive limited comparisons; a process of gradual change (muddling through) • Restricted number of values, alternatives, and consequences; available means and solutions • Objectives adjusted to policies (means and ends overlap and reciprocal); no coherent set of goals • Analysis and evaluation—serial, remedial, socially fragmented, and unpredictable • Assumes ambiguous and poorly defined problems, incomplete information (baseline conditions, values, alternatives, consequences); thinking inseparable from context and experience • Decision making fragmented and largely reactive to external circumstances; not value-free; decision makers avoid uncertainty and adverse consequences • Appreciates human (especially expert) knowledge and control limits; political, social, and economic environments complex, uncertain and stable; planning incomplete, partial, collective, and episodic • Atomistic society and decentralized decision-making structures and procedures; policy making a negotiation and bargaining process involving a plurality of competing interests and values • Test of a good policy—agreement; driven by political circumstances; focus on political negotiations and coalitions • No to limited reliance on theory; adapted to limited cognitive capacities; influenced by free competition model of economics • Rationality bounded by cognitive limits, social differentiation, pluralistic conflict, and structural distortion

(*continued*)

Table 7.1 (*Continued*)

Knowledge and reflection in practice	• Each individual develops own way of framing (taken-for-granted assumptions) role (e.g., writer, organizer, advocate); may choose from profession's repertoire or fashion own interpersonal theory of action • Knowing in practice (common sense) directs and limits reflection in practice (thinking about what we are doing); self-reinforcing system in which role frames, action strategies, relevant facts, and interpersonal theories are bound together • Behavior understood in terms of problems set for self • Roles evolve in conversation with situation; practice as exploratory experiment (probing, playful) • Policies sometimes reframed in action; often as a result of reflecting on frame conflicts • Double visioning: awareness of own perspective and that of others • Rhetorical frames: underlies persuasive use of stories and arguments; action frames inform policy practice • Study of strategies to resolve frame conflicts (e.g., resistance, appealing to consensus, mapping one frame over another) • Policy design inevitably social, political, pragmatic, and communicative
Professional episodes	• A schematic framework for analyzing professional practice episodes • Theories are socially constructed; knowledge derived from action • Episodes analogous to dramas; practitioners construct performances with constituent others • Distinctions: institutional professional espoused theory vs. practitioner espoused theory, practitioner theory-in-use vs. practitioner espoused theory • Communications (talk is action) at core of professional episode • Practitioner strives for one or more of enhanced self-esteem, mastery of professional domain, cognitive and value consistency, self-actualization, or significant impact on world of contemporaries • Practitioner in performing concrete professional tasks is the ultimate theorist for each episode • Importance of concrete situation, language and communications, ambiguity, and evaluation
Critical theory	• Rationality types: cognitive–instrumental, moral–practical, and aesthetic–expressive • Reason anchored normatively (what individuals can mutually agree upon) and intersubjectively • Context-dependent • Forms of action: teleological/strategic and cognitive/instrumental • Action types: norm-regulated and moral–practical • Efficiency and truthfulness validity types • Distinction between deontological (means and ends chosen freely) and teleological (given ends, means to end) • IA must be free from control from any one party and from orientation toward a particular result • Open reflexive process (communicative rationality); criteria: truth, rightness, and truthfulness
Mangle of practice	• Human and nonhuman material agents (e.g., tools) intertwined and coevolve • Simultaneously objective, relative, and historical • Dialectic of resistance and accommodation • Favors antidisciplinary synthesis and multidisciplinary eclecticism • Multiple rather than monolithic conceptualizations, models, and approximation techniques • Data and theory not necessarily connected; approximations toward the truth • Practice aims to make associations (translations, alignments) between diverse elements

Sources: Blanco (1994), Bolan (1980), Braybrooke and Lindblom (1963), Elling (2007), Etzioni (1967, 1986), Forester (1989), Friedmann (1987), Hainer (1968), Lindblom (1965), Menard (1997), Nilsson and Dalkmann (2001), Pickering (1995), Schön (1983), Schön and Rein (1994), Simon (1976), Smith (1976), Verma (1998).

making are frequently constrained, decentralized, incremental, collaborative, communicative, political, and pluralistic. Society and environment (the context that circumscribes policy and decision making) are commonly fragmented, uncertain, complex, ambiguous, and unpredictable. Distinctions between theory and practice, ends and means, facts and values, and objectivity and subjectivity are artificial. These portrayals of "reality" challenge the value and validity of preconceived theories and suppositions, abstractions, fixed principles, absolutes, and symbolizing.

These realism concepts are largely a reaction against the rational assumptions (see Chapter 5) inherent in most policy, planning, and IA theories. Although they overstate decision-making constraints, they are a closer approximation of the environment within which most IA practitioners operate than the antiseptic versions of the IA process presented in most IA texts. These realism concepts, however, provide only impressions rather than a firm foundation for a practical IA process. What is required is a more detailed characterization of the "reality" of IA practice. IA literature and the

literature of related fields such as planning offer a sense of many aspects of IA practice. A more complete picture would draw heavily upon related fields such as political science and would integrate relevant distinctions and concepts from decision making, public policy, organizational, and administration theory.

A realistic IA process would recognize how decisions are made, how organizations are structured, how people behave in organizations, and how organizational structures and procedures vary depending on contextual characteristics. How IA practitioners operate (effectively and ineffectively) and how knowledge is generated through practice would be understood. The mechanisms by which IA-related actions are integrated within decision making would be appreciated. Factors that promote and impede the integration of IA and organizational planning and decision making would be evident (Keysar and Steinemann, 2002). How power is exercised, how resources are allocated, and how actions are bounded and constrained would be acknowledged. The various ways in which actions are implemented, facilitated, inhibited, or prevented would be understood.

A realistic foundation has been partially constructed within IA and even more so in related fields such as planning and public policy. The relevant analyses are widely scattered. Cognitive limits and the inherent knowledge uncertainties associated with decision making have been considered (Beanlands and Duinker, 1983; Nilsson and Dalkmann, 2001). The constraints and opportunities posed by institutional arrangements, the exercise of political power, bureaucratic behavioral patterns, and the implications of ecological, economic, social, and cultural conditions are sometimes noted.

Institutional arrangements concern the government structures and procedures pertaining directly (e.g., legislation, regulations, policies, guidelines, staff, and budgets) and indirectly (e.g., related policies, programs and activities, departmental and agency jurisdictions and responsibilities, interactions among agencies and with other government levels, controls, resources, coordination and information transmission mechanisms, antagonisms, procedures for mediating conflicts and for representing interests, general efficiency, accountability, and flexibility) to IA (Nilsson and Dalkmann, 2001; Pressman and Wildavsky, 1973; Rickson et al., 1990a; Smith, 1993; Shoemaker, 1994).

IA practitioners often see themselves as objective, independent, and apolitical advisors. But the IA process is inherently *political*. Politics is a major determinant of if and how IA requirements are applied. The lack of political will is a major impediment to achieving environmental objectives (Caldwell, 1997). Realistic IA practice appreciates how political power is used and misused (Smith, 1993). If political power is highly dispersed, evasion and the dilution of reforms is the usual result (Pressman and Wildavsky, 1973). Highly concentrated political power can be authoritarian, coercive, and narrowly focused. Inequities in the distribution of prestige, power, and equity can make it difficult to realize social objectives (Rickson et al., 1990a). A centralized and hierarchical style of governance can prevent or severely inhibit the negotiation and consensus building needed to facilitate public understanding and possibly support (Conçalves, 2002). Stakeholder roles, formal and informal procedures for forming alliances, intervention rules and political structures, and decision processes need to be considered (Smith, 1993). Control (e.g., procedural, judicial, evaluative, development aid agency, professional, and direct public and agency) mechanisms need to be taken into account (Ortolano, 1993).

Bureaucratic structures, procedures, and patterns of behavior strongly influence IA effectiveness. Bureaucracies exhibit such characteristics as fixed official jurisdictional areas, rationalistic division of labor, official duties, hierarchical structure, management by written rules, and expert management (Hummel, 1977). The role of bureaucracies can be negative or positive. When negative, there is a gap between what is important to the bureaucracy (e.g., precision, stability, formal rationality, formalistic impersonality) and what is important in society (e.g., justice, freedom, poverty, illness) (Hummel, 1977). A failure to institutionalize new forms of public participation into IA requirements and practices, for example, can result in a gap between public aspirations and expectations and available participation forms (Conçalves, 2002). Such gaps often reinforce public distrust and contribute to community opposition.

Negative bureaucratic behaviors that can impede environmental initiatives include, for example, rigidity, classification (oversimplifying the world), interagency and intergovernmental antagonisms, favoring routine and prescribed rules over policy, displacing ends with means, preferential treatment of some client groups over others, "empire building," overcommitment, and ill-defined criteria (Pressman and Wildavsky, 1973; Rickson et al., 1990a,b; Sorenson and Auster, 1989).

Often government participants will agree with substantive environmental ends but will still oppose or fail to facilitate a proposed action. Pressman and Wildavsky (1973) identify several reasons for this behavior including (1) direct incompatibility with other commitments, (2) no direct incompatibility but a preference for other programs, (3) simultaneous commitments to other projects, (4) dependence on others who lack a sense of urgency in the program, (5) differences of opinion on leadership and proper organization, (6) legal and procedural differences, and (7) agreement coupled with lack of power. Bureaucracies do not always exhibit such tendencies. Frequently, government officials assume a positive and proactive role in advancing environmental objectives. Still, it is prudent to be aware of general bureaucratic tendencies (positive and negative) and of the specific constraints and opportunities posed by the structures, procedures, and behavioral patterns of each government department and agency involved in the IA process.

A realistic IA process considers interrelationships between process and ecological, social, economic, cultural,

and political *contexts*. The dangers associated with uniformly applying standardized definitions of good IA practice and appropriate institutional arrangements are increasingly acknowledged. Particular attention has been devoted to the adaptations required to meet the needs of developing countries (Barrow, 1997; Lee, 2000; Rickson et al., 1990b; Smith, 1993). Comparable adaptations have been suggested for transitional economics, for northern environments, and for numerous other setting types. It is also necessary to make adjustments to suit the unique circumstances associated with a proposed action in a particular setting. The IA process is not simply designed to "fit" contextual realities. IA is an instrument for change. How contextual characteristics are likely to change, both positively and negatively, in response to changing IA requirements and practices should be considered.

Institutional, political, bureaucratic, and contextual constraints and opportunities are strongly influenced by the quality and effectiveness of IA practice. As documented in the "defining the problem and deciding on a direction" sections of Chapters 2–12, there remains a considerable shortfall between IA aspirations and achievements. Good IA practice can alleviate IA practice deficiencies. Part of good IA practice includes accounting for, and ameliorating where practical, institutional, political, bureaucratic, and contextual constraints. It includes taking advantage of opportunities. The full incorporation of realism into the IA process requires integrative frameworks, concepts, and distinctions, presented in a user-friendly format. It also necessitates a thorough canvassing of sources bearing on distinctions such as those presented in Figure 7.3. Most importantly, it requires empirical studies of IA practice—studies that systematically draw out positive and negative experience-based lessons and insights, with potential for broader application.

7.4.3 Feasible

A feasible IA process, as illustrated in Figure 7.4, is workable. It can be undertaken. It provides a decision-making basis. It can be implemented. It can be managed. It is appropriate to the context. It is built on a realistic foundation (i.e., it is experience and practice based). Consistent with realism, it is social, political, subjective, uncertain, and constrained. It is guided by strategies, informed by concepts, and aided by tactics—all of which are realistic and practical. It overlaps and is merged with decision making, implementation, management, and context. It contributes and adapts to IA reforms. Appropriate links are made to related tools and methods. It is integrated with related policies, programs, and plans. It is blended with organizational operations. It is linked to other decision-making levels, related environmental management instruments, and the relevant actions of other governments, the private sector, and nongovernmental organizations. It crosses disciplinary and professional boundaries. It is integrated, where practical, within synthesis (e.g., sustainability) frameworks.

Table 7.2 briefly describes a cross section of relevant feasibility strategies, concepts, and tactics. The IA process depicted in these sources is selective, cyclical, open, fluid, decentralized, and evolving. It is incremental but progressive. It learns through experimentation, reflection, and dialogue. It scans ahead and reconsiders past decisions. It continuously explores uncertainties, interconnections, complexities, and conflicts. It is reasonable rather than rational. It operates at multiple levels of detail. Preferred choices are not systematically and comprehensively compared. Rather, they are tested for agreement and feasibility. Then they are refined, adapted, and embellished to better meet agreed-upon needs, consistent with stakeholder perspectives. The process draws heavily upon knowledge derived from experience and practice. It operates within resource and other constraints. It transcends such false dichotomies as ends and means, technical and political, and objective and subjective. It freely crosses disciplinary and professional boundaries in the search for practical solutions to real problems. The process unifies planning, management, decision making, and implementation. It is connected, as needed, to related decisions, methods, and instruments. It is carefully matched to context—a context that is uncertain, complex, ambiguous, and subject to rapid and erratic change.

The unification of the IA process and *decision making* means that the process is built around decisions and the information, analysis, and interpretative needs of all parties involved in decision making. IA and organizational planning are ideally merged and concurrent (Keysar and Steinemann, 2002). At a minimum the IA process should strongly influence agency planning and decision making (see Chapter 3). Decision-making needs are anticipated, refined in consultation with stakeholders, and adapted as positions evolve and as new concerns emerge. IA documents cross-reference all requirements and comments. Reviewers and other interested and affected parties can, from the IA documents, readily determine how and where their concerns and requirements are considered. Reasons are provided for concerns and suggestions not addressed. The treatment of each requirement and suggestion is discussed with each party before documents are finalized.

A feasible IA process anticipates *implementation* requirements from the outset. Requirements are refined jointly with all parties likely to directly or indirectly influence implementation. Implementation commitments are clearly specified prior to approval. Close contact is maintained with agencies and departments likely to be involved in approvals and likely to impose conditions of approval. Conditions of approval are integrated into environmental management plans and strategies. Implementation includes such technical tasks as preparing monitoring reports, quality assurance, and assessing mitigation effectiveness. It also includes building coalitions of support, identifying and offsetting implementation obstacles, ensuring adequate resources to facilitate effective implementation, and making an effective, merit-based case, adapted to the needs, and

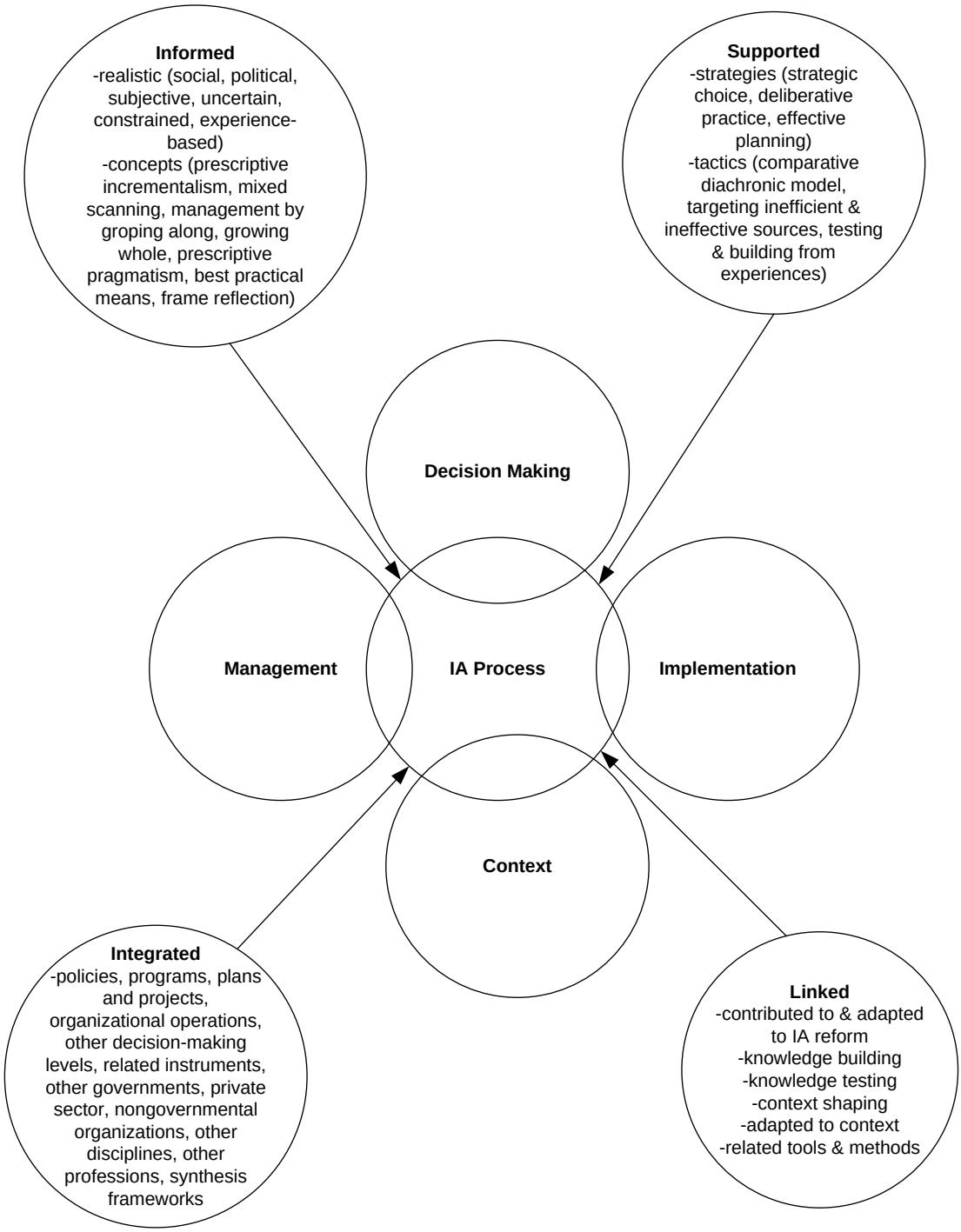

Figure 7.4 Feasibility in the IA process.

perspectives of each party associated with implementation (Wandesforde-Smith, 1989). Sometimes institutional capacity building is necessary prior to implementation.

The IA process is not designed and then adapted to the *context*. Process design commences only after the nature and potential implications of contextual characteristics are considered. The views of all interested and affected parties are actively solicited to ensure that the perspectives of each are reflected in the process (Rowson, 1997). The process is carefully designed and managed to account for IA regulatory requirements and institutional, ecological, social, cultural, political, and economic conditions, constraints, and opportunities (Barrow, 1997; Lee, 2000). Alternative IA process design types (e.g., rational, adaptive, conflict management) are appropriate for different contextual categories (e.g., varying levels of certainty and social conflict) (Nilsson

Table 7.2 Examples of Potentially Relevant Feasibility Strategies, Concepts, and Tactics

	Strategies
Strategic choice	• Strategic choice: choosing in a strategic way • Complementary aspects of any planning approach: technology, organization, process, and product • Four decision-making modes: shaping, designing, comparing, and choosing • Explores uncertainties about the working environment, guiding values, and related decisions • Distinguishes among: decision areas, links, schemes, and options • A sequence of structured workshops (can be supplemented by software) • Detailed guidance and practical advice provided (based on extensive experience from a variety of planning and development decisions) • Oriented toward interactive participation; a learning process • Issue oriented, cyclical, selective, and subjective • Systematically addresses lateral connections; addresses web of relationships between technical and sociopolitical streams • Addresses skill requirements and practicalities for each decision-making mode
Deliberative practice	• Process must be simultaneously interpretative, practical, political, and ethical (need to integrate theory, practice, pragmatism, and ethics) • Ethics not as standards to follow but as pragmatic action (the allocation and recognition of values) • Rationality is an interactive and argumentative process of marshalling evidence and giving reasons • Consensus building created on existing political stages (but also addresses power imbalances) • Need to improvise in complex and novel situations • Necessary to empathize with other parties and remain politically neutral at the same time • Critical listening, reflection-in-action, and constructive argumentation all interact • Importance of practical storytelling (letting stories supplement our limited rationality) • Challenge not to avoid, transcend, or displace conflict but to deal with practical differences in and through conflictual settings • A fluid process (issues formulated and reformulated) • Streams of choices, problems, solutions meet in unpredictable ways to shape ongoing, complex, and messy organizational outcomes • Argues for activist mediation (concern with process, efficiency, stability, and well-informed character of outcome)
Effective planning	• Planning as organizational learning • Importance of networking, learning from errors, experimentation, research, and pilot projects • Links strategic thought to implementation; a political and management activity • Need to build coalitions and networks to support proposal (building on shared values, importance of negotiations) • Technical and political considerations married • Stresses need to pay attention to logistics, reduce derailment potential, build trust, demystify, make contextual adjustments, and democratize • Process depends on transactions; continually evolving and engaged • Experience from the field the point of departure • Planning intertwined with management; argues for greater use of incentives and risk taking • Stresses value of making good on promises, correcting errors, removing mask of expertise, and delegating authority
	Concepts
Prescriptive incrementalism	• Various adaptations to incrementalism to make more prescriptive • Dialogical incrementalism (a dialogical process aimed at mutual understanding and agreement) • Purposive incrementalism (directed toward a purpose or vision and learning based)
Mixed scanning	• Comprehensive broad-angle analysis • Focusing on areas revealed by broad-angle analysis for more detailed scrutiny • Fundamental decisions set context for incremental decisions that lead to new fundamental decisions • Can be at several levels of detail and coverage
Management by groping along	• Experiment: determine what works and does not work • Progressively moves toward objectives; objectives well defined but means not; successes create new capabilities and motivate (strategy of small wins—facilitates learning and adaptation) • Test ideas before different audiences and gauge results; try different permutations and combinations

Table 7.2 (*Continued*)

	Strategies
Growing whole	• Goodness of fit between proposed action and context; sensitivity to stress and misfit • View of proposed action as a part of a growing whole (ecological, built, social, economic, cultural) • Assess how well preserves and enhances wholeness at many levels and in many ways • Move iteratively between ends and means, analysis and synthesis, rational and irrational, constraints and ideas; adds refinements, adjustments, and embellishments—all within a complex, ambiguous, organic, and evolving process • Involves multiple process designers; communications critical
Prescriptive pragmatism	• A philosophy of action; encompasses both doing good (moral and political) and being right (coherent and accurate technical analysis) • Includes human experience, practical activity, and democratic experience; importance of achieving and maintaining trust • A practical endeavor that links satisfying human needs with application experience
Best practical means	• Common approach to pollution control requirements • Practical taken to mean "reasonably practical" having regard to the state of technology, local circumstances, and financial implications
Frame reflection	• Scrutinize day-to-day tasks of practitioners; lessons from best practice and practice failure (practice wisdom, craft knowledge, experiential knowledge) • Transmit and exchange practical knowledge; policy evolves dialectically; policy discourse • Critically examine underlying assumptions, ideas, and beliefs; act from one perspective but be aware of others • Frame criteria: true, beautiful, just, coherent, utility, or fruitfulness
	Tactics
Comparative diachronic model	• A series of snapshots over time as development progresses; attempt to fill in what happens in between • Use of comparative and control studies to provide basis for impact study • Use of impact study (supported by comparative and control studies) as decision-making basis • Use of control study and postapproval impact analyses to manage impacts
Targeting inefficiency and ineffectiveness sources	• Counter negative bureaucratic tendencies by opening up systems, going outside the bureaucracies and with feedback and accountability loops • Undertake implementation analysis (consider implementation feasibility at early stages, anticipate implementation, backward mapping)
Testing and building from experience	• Use of pilot studies • Staged approvals • Identification and documentation of best practices (experimental knowledge, craft knowledge, true statements) • Use of empirical studies to provide insightful knowledge and accounts of practical constraints

Sources: Alexander et al. (1987), Behn (1988), Benveniste (1989), Burdge (1994), Etzioni (1967), Forester (1999), Friend and Hickling (1997), Gilpin (1995), Hoch (1984), Hummel (1977), Kørnøv (1998), Patton and Sawicki (1993), Sager (1994), Schön and Rein (1994), Sorenson and Auster (1989).

and Dalkmann, 2001). The role of the IA process as an instrument for changing the context is considered. Changing contextual characteristics are monitored up to and through implementation. The process is adjusted and refined as the context evolves. Multiple scenarios and sensitivity analyses ensure that the IA process and process outcomes are sufficiently "robust" to rapidly respond to changing conditions.

A feasible IA process treats impact *management* (project management is addressed in Section 7.4.4) as an ongoing function rather than as a stage at or near the end of the process. From the outset, consideration is given to how to avoid or minimize adverse effects, how to enhance benefits, how to offset inequities, and how to manage uncertainties. Mitigation is integrated into the alternatives analyses and into the proposal characteristics. Proponent and proposal-related impact management, compensation, and monitoring policies and strategies are formulated near the beginning of the process. They are refined jointly with stakeholders. Baseline analyses set up the environmental monitoring. Comparable action reviews, comparable environmental analyses, and pilot projects establish a foundation for impact analysis and management extending through the action life cycle.

Individual impact management measures (e.g., mitigation, compensation, local benefits, monitoring, contingency

measures, financial security, funding, environmental liability) are consolidated within an impact management strategy. The strategy specifies management objectives and principles, variables, spatial and temporal boundaries, resources, responsibilities, testing protocols, methods, contingency measures, reporting requirements and stakeholder involvement, and conflict resolution procedures (Canter, 1996; Glasson et al., 1999; UNEP, 1997). It is linked to proponent policies, programs, and environmental management systems, to government requirements (e.g., compliance monitoring), and to environmental monitoring systems (Canter, 1996). Commitments to communities are formalized, where warranted, in impact management agreements. The impact management strategy is refined and adapted prior to approvals and throughout the implementation period. Impact management outcomes are documented in a form suitable for controlling impacts, for assessing mitigation effectiveness, and for validating and refining methods (Canter, 1996). Results are shared with stakeholders.

IA is an evaluation tool. Evaluation methods also are used within the IA process. *Additional relevant methods* sometimes are applied outside or partially overlap with the IA process. Examples include feasibility studies, needs assessments, life-cycle analyses, risk assessments, technology assessments, futures research, total quality management procedures, economic and social cost–benefit analyses, policy and program evaluations, environmental management systems, and conflict management procedures (Gilpin, 1995; Mayda, 1996; UNEP, 1997; Ridgway, 1999). A feasible IA process addresses links to methods used outside the IA process. Cross-referencing can minimize duplication. Inconsistencies are identified. Integration potential may be considered, at least to the point that a clear and consistent basis is provided for decision making and implementation.

A feasible IA process has a reciprocal relationship with *IA reform*. The IA system does not stand still while the IA process for a single proposal unfolds—especially for a process that takes years to complete. The "rules of the game" change. New requirements are instituted. Additional guidelines are issued. Perspectives and positions change. Sometimes a proposal, when caught in mid review, is "grandfathered." More frequently, the changes are subtle, particularly in terms of evolving agency perspectives and positions. A feasible IA process strikes a balance between consistent review positions over time and adaptations to changing circumstances. This generally means constructive discussions, some reconsideration of previous decisions, and some refinements to analyses and documentation. The potential for major changes can be greatly ameliorated if close contact is maintained with review agencies and if the IA process is undertaken in accordance with good practice standards in addition to meeting regulatory requirements. There is usually a lag between IA requirements and good practice. Sometimes an IA process (especially for a large, complex proposal, one involving new technologies or where there are major environmental uncertainties) cannot be adequately reviewed or managed without IA system changes (Lee, 2000). Auditing the experiences associated with individual IA proposal reviews contributes to IA system reforms.

IA requirements and the IA process are interwoven with the actions of others. A feasible IA process is necessarily boundary spanning. Project-level EIA requirements and procedures tend to be more effective when defined within the context of SEAs and SAs and in relationship to national, regional, and local sustainability, environmental, resource management, social and economic policies, strategies, programs, and plans (i.e., tiering) (Gilpin, 1995; Lee, 2000; Sadler, 1996). The auditing of project-level EIA experiences can contribute to SEA policy-, program-, and planning-level reforms. IA works best when IA roles (e.g., IA preparation, IA review) are a natural extension of agency objectives, policies, and operating procedures. Ideally, agencies consistently apply explicit environmental and resource quality performance criteria and standards. The concurrent application of environmental approvals and permitting requirements can expedite the IA process (Sadler, 1996). The IA process is further facilitated if the proponent has an environmental management system (EMS) in place (Barrow, 1997). An IA is often the impetus for instituting an EMS (Glasson et al., 1999).

Government IA responsibilities are often subdivided between head office and regional offices. There tends to be a greater concentration of specialists at the head office. Occasionally, both head office and regional office specialists comment on an IA, not always consistently. Such divisions of responsibility need to be closely scrutinized. The process is more complex when there are multiple government levels (see Chapter 8). Intergovernmental agreements, informal coordination, area-wide planning and management, and procedures to ensure a single process, a single IA document, and consistent timing requirements have all contributed to improved coordination and a clearer division of responsibility. The increased application of regional sustainability strategies and regional environmental and resource management tools (e.g, the ecosystem approach, integrated environmental management, and adaptive management) have further facilitated joint planning and management among government levels (Margerum, 1997). Some coordination difficulties will always remain. A feasible IA process ensures that such coordination difficulties do not unnecessarily "bog down" IA preparation and review. Interconnections among the disciplines and professions involved in IA preparation and review are identified and explored (UNEP, 1997).

7.4.4 Competence

Competence is a key aspect of practicality. When things go wrong with an IA process, the tendency is to blame unforeseeable circumstances. More often than the participants care to admit the problems that arise are foreseeable

Table 7.3 Competency: Examples Roles and Responsibilities

Project Management (Project Manager, Project Coordinator(s), Technical Writer, Editor, Administrator)

- Formulate (with proponent and study team) overall approach, study design, IA process (activities, events, inputs, outputs), and general methods (identification, prediction, evaluation, interpretation, cumulative effects assessment—CEA, participation, mitigation, compensation, monitoring, management); clear rationale for each
- Establish management structure and determine appropriate level of detail for each activity
- Assemble study team and related resources; establish team roles, norms, and environment for joint action; arrange, with proponent, contracts
- Control and manage team organization, activities, budgets, timing, and schedule; set work standards
- Monitor and update project plan continually; keep project and progress (task completion, budget completion, schedule) records; communicate progress
- Establish priorities, objectives, and milestones, solve problems, manage conflicts, negotiate trade-offs, and remove roadblocks
- Manage core team and support staff; identify stakeholders
- Determine report formats, hardware and software requirements, mapping scales and database management and GIS requirements; establish tracking and sign-off procedures
- Identify, with team, analysis gaps, and research and training requirements
- Coordinate analysis (proposal, environment, proposal–environment interactions), synthesis (data, criteria, significance, CEA, conclusions, recommendations), and interactions (internal—technical and management, external—agencies, elected representatives, groups, and individuals)
- Guide and challenge study team—scope, level of detail, database, assumptions, interpretations, judgments, conclusions, recommendations
- Document and present (with input and review by study team)—study design, study team organization, general frameworks and methods, general conclusions and recommendations, overall interim documents, draft and final overall IA documents, and summary documents
- Guide—documentation and presentation by individual study team members; review and edit each input for consistency, quality, and substantiation
- Coordinate documentation consistent with study schedule and decision-making requirements
- Organize, with proponent and with public consultation specialists, public involvement program
- Participate in interactions with management, agencies, elected representatives, and public; act as spokesperson for team
- Ensure overall efficiency, relevance, and adequacy
- Identify uncertainties and risks and develop a management strategy to address; decide, with proponent how to address unforeseen circumstances; prepare change orders

Specialists (Design and Engineering, Disciplinary, Professional, Methodology, Public Consultation, Mediation, Conflict Management, Legal)

- Formulate own methods and assumptions
- Manage internal organization, time, budget, and tasks
- Undertake data collection, analysis, and interpretation
- Document and present methods, analysis, role in synthesis, conclusions, and recommendations
- Participate in formulation of overall approach, synthesis, and interactions
- Specialist advisors address discrete problems, methodology, applied research, comparable proposals, and environments
- Peer reviews of interim and draft documents (for proponent, reviewers, or for other participants)

Proponent (Co-Proponents, Lead and Secondary Agencies, Sponsor Agencies)

- Overall schedule and budgets
- Corporate policies, programs, and operations
- Characteristics of existing operations
- Priorities and requirements
- Proposal characteristics
- Terms of reference
- Commitments
- Higher level agency interactions
- Participation in public involvement process

Agencies and Governments (IA Agencies, Specialist Review Agencies, Other Government Levels, Indigenous Peoples' Governments)

- IA requirements and guidelines interpretations
- Technical requirements and guidelines interpretations
- Data provision, analysis, and interpretation
- Technical expertise
- Policy, program, and priority interpretation
- Experience with comparable proposals and environments
- Output review

(*continued*)

Table 7.3 (*Continued*)

Public (Nongovernmental Organizations, Directly Affected Groups and Individuals, Indirectly Affected and Interested Groups and Individuals)

- Provision of data
- Participation in scoping
- Data review and interpretation
- Participation in determining criteria importance, alternatives preference, impact management measures, conclusions, and recommendations

Interactions

- Within study team
- Between project managers and proponent
- Between project management, study team members, and specialist advisors
- Between project management, study team members, and agency representatives
- Between project managers, proponents and study team members, and elected representatives and public
- Mechanisms: management committees, steering committees, advisory committees, task force, workshops built around frameworks, or models and meetings

Sources: Coe (2012), Erickson (1994), Glasson et al. (1999), Greenall (1985), Harrop and Nixon (1999), Holling (1978), Kreske (1996), UNEP (1997).

and are resolvable through competent IA practice. Competence is much more than the appropriate application of the methods and models presented in most IA texts. The knowledge of specialists extends well beyond the overviews of disciplinary analyses presented in such references. If they are properly selected and coordinated, the specialists do not tend to be the problem. More frequently, problems arise with the ways in which individual analyses are guided, integrated, and applied. Sometimes, roles and responsibilities are poorly defined. Table 7.3 lists examples of roles and responsibilities for various participants in the IA process. Good practices are not always applied for activities that transcend individual specialties. Table 7.4 provides good practice examples for study team management, study team participation, database management, the application of geographic information systems (GIS), report writing and documentation, financial control and budgeting, and the preparation of work programs and schedules.

Competence-related problems continue to occur in the IA process, notwithstanding the ample, readily available advice and guidance, which should minimize such problems. Perhaps this shortfall between knowledge and execution can be partially explained by a failure to focus on recurrent, avoidable, competence-related problems. Twenty examples of such problems, together with suggested solutions, are provided in Table 7.5. These competence-related pitfalls are largely avoidable. They are not always obvious. Care must be taken to minimize the likelihood and severity of their occurrence.

7.4.5 Effectiveness

The final aspect of practicality is effectiveness. Feasibility addresses the workability of the IA process (i.e., can it be undertaken, and can it be implemented?). Effectiveness considers how well it was undertaken. Competence deals with adequate practice levels. Effectiveness "raises the bar." As illustrated in Figure 7.5, it addresses the quality of the inputs (e.g., institutional arrangements, processes, methods, participant performance, documents) and the effectiveness of the direct and indirect outputs (e.g., goals achievement, environmental changes, methodological performance, management performance, contribution to practice).

Reviews of *institutional arrangements* evaluate the adequacy of EIA and SEA policies, laws, regulations, and guidelines (Halstead et al., 1984). Such reviews consider such matters as application to significant actions, environmental and effects definitions, scoping provisions, requirements to address alternatives and cumulative effects, public consultation requirements, transparent decision making, provisions for follow-up, enforcement and auditing, appeal and dispute settlement provisions, and methodological guidance (Gibson, 1993; Sadler, 1996; Spooner, 1998). The suitability of organizational structures and procedures to undertake IA-related responsibilities can be assessed (Kreske, 1996). The capability and capacity of organizational systems to conduct good practice IA regulation can be evaluated based on such considerations as IA and environmental staff qualifications, workload and the human, financial, and other resources devoted to IA administration and enforcement.

The quality of *individual IA processes* can be assessed overall and for individual IA activities and components (Lee, 2000). The analysis of the overall IA process can address consistency with good practice and appropriateness to context. The extent to which the IA process supports transparent and accountable decision making can be evaluated. The appropriateness and effectiveness of the political, public, and government agency involvement procedures can be considered. The choice and manner of application of all methods (e.g., data collection, compilation and analysis, prediction, interpretation, CEA, management, involvement)

Table 7.4 Competency: Good Practice Examples

Study Team Management

- Involve team in designing and scoping; clearly define objectives, approach, and anticipated inputs and outputs
- Ensure that roles and responsibilities are well defined; set priorities and maintain momentum
- Provide guidelines for text and table formats to ensure consistent inputs
- Ensure a coordinated approach to external contacts
- Provide for reciprocity of influence (manager and specialists); facilitate dialogue and integration; recognize different "mind sets" of specialist types
- Emphasize early drafts and initial outputs; scan ahead and "test water"; early opportunity for internal and external review
- Sketch out alternative approaches for dealing with problems and conflicts
- Test and challenge basis for all interpretations and conclusions; be aware of own limitations and those of others; take corrective actions
- Focus on and manage a collaborative, constructive, and creative response to all problems and disputes
- Ensure project manager is not the "bottleneck"; employ core team on larger projects
- Allow for regular meetings and workshops at key decisions
- Use subgroups to address problems and to address interconnections among specialists
- Often management functions shared between internal (proponent) and external (consultants, secondments, term contracts); tends to be more effective if ongoing proponent involvement
- Keep a record of findings, events, directives, changes in direction, comments, concerns, agreements, and decisions
- Leadership skills: analysis, integration, management, communications, presentation, negotiation, problem solving, general knowledge of each specialty, ability to ensure quality of work, detailed IA knowledge and experience, ability to delegate
- Leadership style (e.g., command and control, empowerment, learning) must match situation
- Leadership qualities: action and results oriented, self-confident, self-starter, visionary, enthusiastic, energetic, reliable, mature, even-tempered, adaptive, politically astute, tolerant of uncertainty, sense of humor, and patience

Study Team Participation

- Study team selection: availability, expertise, proposal-type experience, IA experience, local environmental knowledge, study team experience, personality and attitude, receptivity to viewpoints of others, work traits, range of interests (broader better), writing and communications skills, listening skills, adaptability, ability to interact with public and politicians, ability and experience with hearings, oriented to work to schedule, willingness to travel and make site visits, professional credibility, adaptability; often prudent to make process competitive
- Study team style: interdisciplinary (coordination at higher level) and transdisciplinary (coordination at all levels) rather than disciplinary (specialization in isolation), multidisciplinary (no cooperation), or cross-disciplinary (rigid polarization)
- Often core team, each member of which spans a few disciplines; a useful middle ground between project management and full team of specialists when large project
- Prompt and ongoing attention to small group problems (e.g., leadership—authoritarian or leadership struggles, blocks in group development, poor decision making, interpersonal conflicts, communications difficulties, goal ambiguity)
- Importance of clear purpose, expectations, and accountability; clear terms of reference for each team member
- Participate and contribute to overall team activities (e.g., team discussions, agency consultations, alternatives analysis, significance interpretations, public involvement, synthesis and summary document preparation and review, presentations at events, links to related disciplines)
- Undertake specialist analyses in accordance with good practice standards of field, guidance from project management, and expectations of regulators
- Adhere to scope of work, budgets, and timing requirements; address implications of limitations and uncertainties
- Respond promptly and fully to all questions and concerns raised about analyses from study team, regulators, public, and peer reviewers
- Work with related specialties in addressing interconnections across disciplines and in formulating and applying integrative frameworks (e.g., modeling, CEA, impact management strategy)

Database Management

- Tie information to decision-making requirements
- Database management involves determining what data are to be collected, when, by whom, at what level of detail, and how to be collected, compiled, analyzed, interpreted, integrated, applied, supplemented, refined, presented, and monitored
- Data collected throughout process; dependent on requirements of activities and decisions
- Data management: continuous, evolving, and dependent on context
- Ensure that all data is complete, accurate, and properly referenced
- Should reflect priorities, should be guided by data management strategy, and should systematically identify and explore implications of errors (correct), gaps (fill when necessary), inconsistencies (resolve), and uncertainties (allow for)
- Interpret data reliability (sources, methods for collecting, methods for compiling)
- Involve stakeholders in data collection, analysis, and interpretation; make effective use of local and traditional knowledge
- Important that data can be retrievable, cross-checked, and updated; important that dated and referenced
- Consider environmental data available in computerized information and retrieval systems (e.g., government agency information systems, environmental databases, and electronic bulletin boards)

(*continued*)

Table 7.4 (*Continued*)

Geographic Information Systems (GIS) Application

- Can store, retrieve, analyze, and display spatial data
- Importance of availability and quality of spatial data
- Useful for mapping, overlays, baseline analyses, modeling, monitoring (regular updating), visual displays, video imaging, testing of alternatives, route and site selection, CEA (incremental impacts, biodiversity), and public consultation
- Takes time to set up; high training and technical requirements; data often not available in digital format; potential data and user-related errors; weak analytical capabilities
- Can be combined with GPS (global position systems), imagery from satellites, aircraft, and internet
- Assumes importance of environmental impacts dependent on spatial distribution of impacts
- Pitfalls: not taking into account purpose of map, zooming in to improve accuracy, neglecting map projections and coordinate systems, failing to document and evaluate map sources, not including necessary map elements, presenting too much information, inappropriate type faces, misrepresenting qualitative and quantitative data, mapping absolute values, and neglecting data collection effects

Report Writing and Documentation

- Design to suit audience
- Ensure documents are scientifically sound, easily understood, feasible, legally defensible, and timely
- Build around preliminary and then detailed outline
- Focus on what is important (issues and needs of readers); space devoted to topic should be consistent with importance for decision making
- Ensure that audience can readily determine how major issues were addressed
- Engage interested parties in meaningful dialogue
- Ensure that regulators can readily determine that all requirements satisfied
- Use simple and familiar language; be succinct and clear; minimize generalities
- Be concise, consistent, and defensible
- Ensure well-structured and visually attractive presentation (ample use of visual displays)
- Check for technical errors and mistakes; ensure factually accurate; avoid plagiarism and bias (use neutral language)
- Ensure a consistent writing and presentation style; review and edit for consistency
- Identify limitations and uncertainties; identify implications and strategies for addressing
- Allow for planning, organizational, and editing mistakes
- Use consistent referencing and numbering system, indentations, titles, headings, and margins
- Avoid clichés and jargon; avoid defensive language
- Be honest, objective, frank, complete, fair, transparent, and vivid
- List acronyms and sources; define technical terms and explain technical concepts
- Use accessible graphics
- Utilize peer review to reduce documents to a brief summary designed to match needs and perspectives of each audience
- Provide reasons for data, methods, assumptions, findings, interpretations, conclusions, and recommendations
- Provide summaries and use appendices, cross-references, and tiering to streamline text

Financial Control and Budgeting

- Match staff to available budgets over time
- Track project expenditures regularly
- Recognize that expenditures build to a peak
- Conduct a postmortem of budgeting experience
- Tie each expenditure to decision-making priorities
- Team leader to monitor resource use
- Apply, as needed, graphs, charts, and computerized techniques to track expenditures and to compare task completion with budget expended

Work Programs and Scheduling

- Work program addresses goals, issues, and problems
- Includes activities, tasks, events, inputs, and outputs; purpose, sequence, duration, personal, hours, disbursements, and budgets for each
- Need to address interactions among activities
- Allow sufficient time for unforeseen circumstances (float time)
- Maintain flexibility; provide additional time for agency and public involvement activities; dangerous to cut short
- Use of graphs, charts, and computerized techniques to chart actual progress against scheduled progress
- Critical paths methods can help determine overall structure; often helpful to provide a range of time estimates (worst, most likely, quickest)
- Allow sufficient time for internal and external review, editing, and consideration of interconnections

Sources: Alton and Underwood (2003), Antunes et al. (2001), Barrow (1997), Bendix (1984), Buckley (1998), Canter (1996), Greenall (1985), Harrop and Nixon (1999), Hodgson and White (2001), Jantsch (1971), João (1998), Kent and Klosterman (2000), Kreske (1996), Moreno and Catchpole (2012), Page (2006), Ross et al. (2006), Thérivel et al. (1992), Verma (1995), UNEP (1997), US EPA (1998b), Webster (1997).

Table 7.5 IA Competence-Related Problems and Solutions

Problem	Nature of Problem	Possible Solutions
IA managers as "bottleneck"	A project manager, on a large IA, can be overwhelmed if she or he attempts to take on all the project management responsibilities	A core team approach is more appropriate for a large project. The same problem can occur on even an intermediate-sized project if the project manager "micro-manages" every aspect of the IA process. A good team and effective delegation are essential. Effective delegation means strategic management not the absence of control and guidance
Project managers as "autocrats"	Some project managers have a tendency to equate project management as giving orders without reasons and not asking for suggestions or even tolerating feedback	Close and ongoing communications and consultation should be maintained with proponents, with other study team members, and with stakeholders. The project manager should provide a clear rationale for all instructions. Often others have useful advice to offer. The project manager should be a good listener and should actively seek constructive advice and criticism. Openmindedness, flexibility, and an even temperament are all part of leadership
Project managers as "doormats"	Sometimes, a project manager will offer limited direction or boundaries and then accept inputs from other team members without questioning assumptions, methodology, or the basis for conclusions or recommendations	Project managers need to have a clear vision of where the IA process is to go and how objectives are to be achieved. The IA process cannot be allowed simply to drift. The project manager has to have sufficient self-confidence, experience, and general knowledge to challenge specialists when inputs are unsubstantiated, incomplete, inconsistent with requirements, misdirected, badly written, poorly structured, or of dubious quality. She or he also has to ensure adherence to budget, scope, format, and timing requirements. The project manager should exercise such responsibilities firmly and calmly
Team members who aren't team players	Sometimes, specialist team members see their role as no more than undertaking and documenting their analyses. They see team interactions, compliance with document format requirements, and other general project activities as unnecessary distractions to be avoided where possible or, if necessary, reluctantly tolerated	IA is a highly interdisciplinary, often transdisciplinary, activity. This necessitates the full participation of specialists in such joint IA activities as scoping, alternatives analysis, significance interpretation, CEA, agency and public involvement, impact management, and document preparation and review. A unified and consistent documentation approach also is essential
Not up to the task	Sometimes, specialists are involved in an IA process, who do not have sufficient relevant expertise and experience in their field, in IA, in applied knowledge situations, concerning the local environment, regarding the proposal type, or in working on a team	This type of problem can generally be minimized with careful team selection and effective project management. The competency problem is more problematic at the project management level. Having extensive project management experience is not the same as having extensive IA project management experience and expertise. Sometimes, specialists in other fields are competent IA project managers. However, an in-depth understanding of IA as a field of theory and practice coupled with extensive IA project management experience is essential
A failure to focus	Sometimes, there is the belief in IA practice that all topics are equally important and the more documentation the better	A practical IA process is necessarily focused. Without focus important concerns receive too little attention and unimportant concerns receive too much attention. The net result is a protracted and costly IA process and IA documents of dubious quality. Unfocused documents tend to be highly descriptive and very lengthy. Decision makers and stakeholders have difficulty determining if and how their concerns and priorities are addressed. IA is a decision-making tool. As such the IA process should concentrate on providing a sound basis for making and implementing environmentally sound decisions

(*continued*)

Table 7.5 (*Continued*)

Problem	Nature of Problem	Possible Solutions
Gaps and blind spots	IA practice is sometimes subject to "tunnel vision." Occasionally, for example, the analysis of alternatives is too narrow, superficial, and abbreviated. Social, cultural, cumulative, and sustainability effects, together with public concerns, also tend to receive insufficient attention	Reasonable alternatives need to be systematically generated and evaluated. Social and cultural concerns need to be fully addressed. More attention also needs to be devoted to indirect, cumulative, and sustainability effects, although the situation is improving. IA practice sometimes concentrates exclusively on meeting IA regulatory requirements. The appropriate treatment of stakeholder concerns and perspectives is frequently just as important in determining whether an IA will be approved and effectively implemented. Care needs to be taken to ensure that all potentially significant effects are fully assessed
A failure to integrate	IA documents, which represent little more than a compilation of specialist inputs, are of limited decision-making value	Competent IA processes and documents trace through the interactions among disciplinary inputs. They systematically undertake such integrative activities as alternatives assessment, model building, assessing cumulative effects, and formulating impact management strategies. Integration also entails creatively accommodating multiple study team, proponent, regulator, and stakeholder perspectives and interests
A failure to substantiate	Sometimes, IA documents are full of unsupported assertions, claims, interpretations, and conclusions. Professional judgment is not enough	Assumptions, methodology, interpretations, and conclusions should always be supported by evidence and explicit reasons. In this way, judgments can be independently tested and evaluated
Artificial timelines and false economies	Sometimes, artificial time and budget constraints are imposed either at the outset of a process or when a process is taking longer than expected	These constraints can result in superficial, error-prone, and inadequate analyses and truncated agency and public consultation procedures. The most common outcome from artificial limits is a much more time-consuming, controversial, and costly review and approval process and a much greater likelihood of process failure. A focused and well-structured IA process can be expeditious and economically executed. Occasionally, there are "hard deadlines," emergency situations, and severe resource constraints, which necessitate an abbreviated, selective, broad-level, and "streamlined" IA process. But there are limits
Quantify everything	Forcing the quantification of qualitative data can distort the analysis of impacts and inhibit the reasoned comparison of alternatives	The desire for precise, verifiable predictions and consistent comparisons is laudable. However, the database must be capable of supporting such efforts. The inappropriate application of quantitative methods can imply a greater level of precision and control than can be supported and can make it more difficult for decision makers and stakeholders to understand or participate in the IA process
A failure to quantify	It can be extremely exasperating to read an IA document full of vague generalities and ambiguous statements. Appreciating the limits of quantification does not mean abandoning all efforts to quantify	Quantified predictions should be provided wherever practical, with due allowance for uncertainties. In this way, predicted impacts can be monitored, the accuracy of predictions determined, and the suitability of predictive methods evaluated. Precision in specifying mitigation measures is necessary for the measures to be implemented and for mitigation effectiveness to be determined
Bias and advocacy	It is not an appropriate role for IA practitioners or documents to "win" approval or "make a case" through the selective and biased use of evidence	The standard of IA success should not be approval. Instead, it should be an environmentally sound decision-making basis and an enhanced environment. IA professionals cannot be objective or value free. However, consistent with professional codes of practice, they can work toward IA objectives in a manner consistent with good

Table 7.5 (*Continued*)

Problem	Nature of Problem	Possible Solutions
		practice standards. It is essential to the credibility of the IA process and documents for the professional integrity of the study team to be maintained. IA documents should be scrupulously checked to ensure that there is no bias
A failure to adjust	Except on the simplest IA projects, a "carved in stone" approach to IA process management is rarely effective. Modifications occur in activity characteristics, environmental conditions, available alternatives, stakeholder positions, and regulatory requirements. Unanticipated events occur	An IA process also must evolve and adjust in response to changing circumstances. A gulf between what is needed of a process and what it can provide will emerge and progressively widen with an inflexible IA process, usually to the point that a major crisis occurs. The outcome from the crisis will tend to be either the termination of the process or major, costly, and time-consuming modifications. Such crises can be avoided or greatly ameliorated with an adaptive IA process
A failure to anticipate	IA practitioners sometimes complain when things go wrong that they were "blindsided" by unanticipated events and changing circumstances. Sometimes the complaints are valid. Often, however, there are ample early warning signs	Early warning signs can frequently be detected by scanning ahead, by frequent consultations with other parties, through pilot projects, with systematic assessments of comparable situations and by "pretesting" interpretations, options, and conclusions. A flexible IA process also makes it easier to anticipate and rapidly respond to change
A failure to communicate	An IA process can be greatly hampered by poorly structured, badly presented, and awkwardly written IA documents, even if those documents are technically sound	Competent IA documents and presentations should be clear, succinct, and tailored to the audience. Effective communications channels into the IA process from regulators and from other interested and affected parties are also essential
Participation without involvement	A sure sign of a questionable IA process is the tendency to count the number of meetings, attendees, and submissions (i.e., inputs) without detailing the changes to the process and documents resulting from stakeholder comments and suggestions (i.e., outputs). Involvement also is inhibited if participation largely consists of presentations (i.e., one-way communications)	Events conducive to two-way communications (e.g., workshops and open houses) and continuous involvement procedures (e.g., advisory committees) are less likely to result in an IA process characterized by participation without involvement
A lack of perspective	Environmental specialists, proponents, regulators, nongovernmental organizations and Indigenous people will often interpret the significance and acceptability of impacts and proposed actions very differently. Sometimes, IA documents ignore or gloss over these differences or assume that the professional judgment should be the sole basis for interpretations	The IA process and documents should reflect and accommodate this multiplicity of perspectives. There are many ways of looking at the world and how it should be. It is especially important that judgmental activities such as scoping, significance interpretation, the evaluation of alternatives, proposal acceptability and the determination of appropriate mitigation, compensation, and monitoring be interpreted from the perspective of each interested and affected party in the process. Consultation programs should also be tailored to a variety of needs and perspectives
One size does not fit all	An IA process that operates effectively in one setting can be entirely inappropriate in another. Context matters	The IA process should be designed to suit activity type and setting type characteristics. Further adjustments to suit unique activity and environmental characteristics are also essential. The goal should be an IA process that (1) fits the context (e.g., ecological, social, political, institutional, economic) and (2) selectively and positively influences the context (i.e., IA as an instrument for environmental enhancement and sustainability)
Neglect of follow-up	A well-designed and executed process and sound IA documents are necessary. They are not sufficient	Adequate attention must be devoted to follow-up issues, procedures, and requirements. Such concerns need to be addressed both prior to and throughout implementation

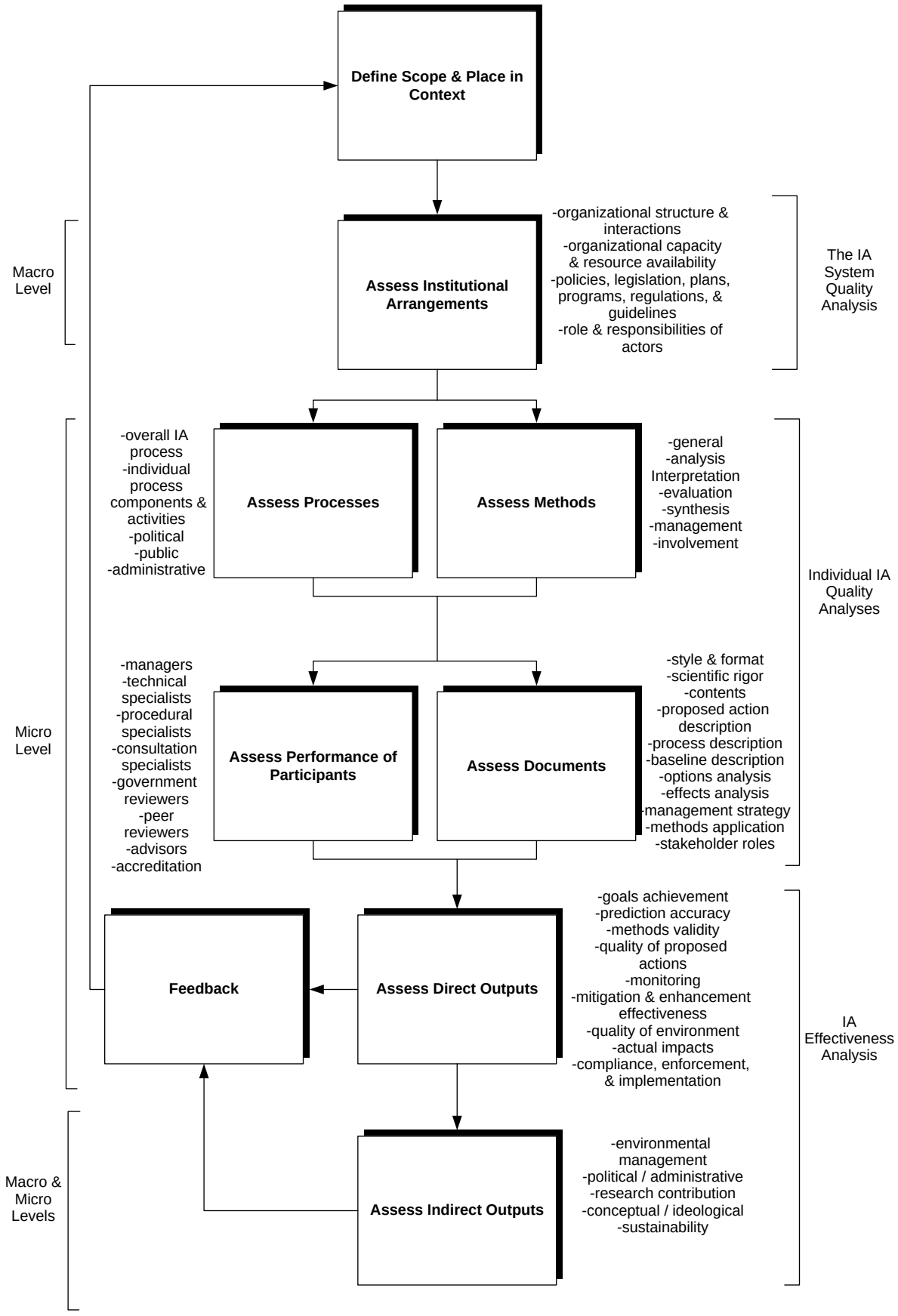

Figure 7.5 IA quality and effectiveness analyses. Adapted from Lawrence (1997a).

can be assessed (Ortolano, 1993). The qualifications, roles, and role performance of process participants (e.g., managers, technical and procedural specialists, government reviewers, peer reviewers, and advisors) can be analyzed. IA documents can be evaluated for style, format, content, and the treatment of individual IA activities, methods, and events (Barker and Wood, 1999; Wood et al., 1996). How well the documents focus on major concerns, comply with regulatory requirements, reflect stakeholder perspectives, and integrate public and agency concerns and contributions can be evaluated.

Direct and indirect outputs from IA processes can be assessed. Output analyses interpret results, both intended (relative to expectations) and unintended (positive and negative). Direct output analyses provide the basis for follow-up actions and practice refinements. Indirect output analyses are the means by which IA processes make substantive contributions to enhanced IA practice. Direct output effectiveness analyses address whether IA purposes, goals, and objectives have been achieved, the accuracy of environmental change and impact predictions, and the validity of methods (Barrow, 1997; Culhane, 1993; Tomlinson and Atkinson, 1987; UNEP, 1997). They can determine project modifications and quality, the suitability of monitoring measures, the effectiveness of mitigation and compensation measures, the quality of impact management, and the extent to which commitments are implemented, requirements are complied with, and adequate enforcement occurs (Glasson et al., 1999; Harrop and Nixon, 1999; UNEP, 1997; Wende, 2002). IA effectiveness reviews also can isolate factors that result in or impede effectiveness gains (Wende, 2002).

Indirect output analyses address the role of institutional arrangements and individual IA processes in furthering environmental management, environmental administration, and decision making, the IA knowledge base, and societal goals such as sustainability (Barrow, 1997; Glasson et al., 1999). Evaluations are undertaken of the contribution by IA to environmental objectives as compared to the costs and negative impacts incurred and relative to the achievements of other environmental management instruments. Such analyses can facilitate institutional arrangements reforms.

Numerous *methods* can be applied in effectiveness reviews (e.g., ad hoc procedures, checklists, applying principles, criteria or performance standards, the use of scaling levels) (Sadler, 1996; US EPA, 1998b). Effectiveness reviews can be undertaken by individual experts (internal or external, accredited or not accredited), panels of experts, public reviews, independent commissions, official inquiries, public reviews, or through legal proceedings such as court actions (Barrow, 1997; Tomlinson and Atkinson, 1987; UNEP, 1997). Various approaches can be adopted for conducting effectiveness reviews. A scientific-analytic, a management-efficiency, an interactive-interpretative, or an adaptive-evolving approach could be appropriate depending on such considerations as project complexity, data availability, degree of uncertainty, degree of controversy, and the rate and predictability of changing conditions (Culhane, 1993; Lee, 2000; Serafin et al., 1992). The interpretative nature of IA quality and effectiveness analyses underscores the importance of stakeholder involvement and perspectives (Spooner, 1998; UNEP, 1997; US EPA, 1998b).

Ideally an effectiveness review should include (1) a screening step (to reject an unacceptable action or document), (2) a performance analysis step (to evaluate actions or documents considered adequate but not necessarily consistent with good practice standards), (3) supplementary analyses (to overcome deficiencies), (4) clarifications (to resolve misunderstandings), (5) the documentation of findings at each decision (to ensure decision-making transparency), (6) provisions for agency and public involvement at each decision (to ensure full public and agency involvement in each step in the process), (7) monitoring or auditing analyses (to assess outputs), (8) an approval step (to provide a decision-making basis and to determine conditions), and (9) a modifications step (to adapt implementation to changing conditions).

7.5 INSTITUTING A PRACTICAL IA PROCESS

7.5.1 Management at the Regulatory Level

A practical IA regulatory system should (1) harmonize IA requirements among government levels, (2) ensure that IA roles among government departments and agencies, and among governments are well coordinated, (3) focus on what is important and minimize unnecessary costs and delays, and (4) ensure a minimum level of IA competence and contribute to an enhanced level of IA practice. The IA systems in the four jurisdictions (the United States, Canada, Europe, and Australia) all seek to achieve these objectives, albeit in different ways.

Table 7.6 identifies a range of approaches applied in the four jurisdictions for making IAs more practical. Practicality in IA processes, for example, can be facilitated by clearly defined environmental priorities at each government level, by measures to streamline, link, tier, harmonize, and integrate IA types and levels, and by efforts to enhance inter- and intragovernment coordination. It can be facilitated by review and dispute resolution mechanisms. It can be aided by measures to simplify and focus IA documents. It can be advanced by efforts to structure screening and scoping procedures. It can be furthered by initiatives to adapt IA requirements, guidelines, and procedures to different proposal types and settings. It can be advanced by efficiency and effectiveness guidance and by applied research. It can be facilitated by proactive efforts to involve agencies and the public in suggesting reforms.

Good practice examples, independent effectiveness reviews, and the auditing of IA requirements, processes, and documents can all further the cause of practicality. Examples of other potentially valuable practicality measures

Table 7.6 Positive and Negative IA Practicality Examples at the Regulatory Level

United States	Canada	Europe	Australia
(+) Provision to eliminate duplication with other governments (e.g., joint processes, documents, and public hearings), for addressing conflicts between federal and state or local planning, and for including state or local governments as joint or cooperating agencies	(+) Purpose of Act includes ensuring EAs completed in a timely manner	(+) Proposed Project Directive (PPD)—clarifies screening procedure; modifies criteria and specifies content and justification	(+) Extensive array of multilateral and bilateral agreements and transboundary regulatory provisions
(±) Programmic EISs for broad federal actions such as new programs and legislation; not widely applied	(±) Mitigation measures a requirement; limited to technically and economically feasible—issue of criteria for determining	(±) PPD—focused on projects with significant environmental effects; issue of criteria and cumulative effects with multiple smaller projects	(+) Accreditation procedure for equivalent state–territorial assessments and based on bilateral agreements; recognition that need explicit criteria and standards and transparent and inclusive procedure, including performance auditing
(+) Emphasis on plain language	(±) Timelines for EA decisions and stages	(±) PPD—decision and documentation time frames; uncertainty regarding IA quality implications	(+) Clear division of responsibility—national level focuses on identified matters of national environmental significance(Australian Government, 1999, 2007a)
(+) Numerous partnerships, shared databases and joint environmental planning and management among government levels and governments	(+) Encourages the study of cumulative effects in regions	(+) PPD—Detailed scoping requirements (e.g., decisions and opinions to be obtained, concerned authorities and publics, stages, duration, reasonable alternatives, significantly affected environmental features, information requirements and availability, methods)	(+) Recently accepted reforms should lead to greater use of SEA and enhanced coordinated tiering arrangements
(+) Provides for and encourages tiering of IA documents	(+) Offshore drilling boundary guidance (CEAA, 2003b)	(+) PPD—required to address cumulation of impacts	(+) Includes initial screening step
(+) IA streaming requirements (e.g., separate requirements for categorical exclusions, environmental assessments, environmental impact statements)	(+) Extensive guidance materials (CEAA, 2007a,b,c, 2009a,c,d, 2010a)	(+) PPD—detailed requirements regarding project characteristics, aspects of environment likely to be affected and likely significant adverse effects	(+) Streaming provisions allow for decisions based on referral information and preliminary documentation; recently accepted reforms should further simplify
(+) Formalized and detailed scoping requirements and guidance	(+) Provides for assessment of designated project in combination with other physical activities	(+) PPD—efforts to harmonize IA and other environmental requirements	(+) Timing requirements for each decision
(+) Considerable guidance on making process more efficient and timely (e.g., time lines, adoption of all or part by reference, concurrent circulation, early planning and scoping, dispute resolution, accelerated procedures, document length and focus, circulation limits, checklists) (US DOE, 1997))	(±) Minister can establish a committee when activities entirely within federal lands	(+) Screening and scoping required under SEA Directive	(+) CEA guidance (Court et. al., 1994)
(+) Interagency rapid response teams for transmission projects	(±) Focused on biophysical environment and effects within federal jurisdiction; issue of how selective approach can adequately address cumulative effects and sustainability	(+) SEA Directive—requirement to address cumulative and transboundary effects	(+) Class assessment provisions
(+) Mitigation and monitoring requirements and guidance	(+) Screening provisions	(+) Extensive array of guidelines, applied research, effectiveness analyses, and data sharing	(+) Specific document content requirements
	(+) Class EA provisions (CEAA, 2008a, 2009a)	(+) Efforts to facilitate tiering of SEAs and project-level EIAs	(±) General references to practical and feasible alternatives; depends on how defined
	(+) Scoping provisions		(+) Cost recovery consultation paper (Australian Government, 2011b)
	(+) Quality assurance and effectiveness analyses (Government of Canada, 2010b)		
	(+) Inter-agency coordination and CEA guidance (CEAA, 2003a; CEAWG and AXYS, 1999)		

(+) Effectiveness reviews and surveys
(+) Pilot project soliciting agencies and public to nominate projects employing innovative approaches to completing environmental reviews more efficiently and effectively; involves nomination and selection process
(+) Various measures to modernize and reinvigorate NEPA (US COR, 2005; US NTF, 2003)
(+) Documentation of NEPA success stories (Environmental Law Institute, 2010)
(+) CEA a requirement
(+) CEA and mitigation guidance (US CEQ, 1997b, 2005b, 2011)
(−) Lengthy documents and protracted process still a major concern

(+) Extensive array of guidance material (e.g., adaptive management); issue of application under new requirements (Government of Canada, 2010a,b; ESSA, 1982)
(±) Auditing role of Commissioner of the Environment and Sustainable Development and of government committees (Office of the Auditor General of Canada (AGC), 2004, 2008, 2009; Warawa, 2012)
(±) Focus on major projects; cumulative effects of small projects excluded
(±) Substitution/equivalency provisions could reduce potential for duplication and overlap; issue of criteria to be applied
(+) Cost recovery provisions
(+) Coordinative roles of Agency identified
(+) Agency leads a quality assurance program
(±) Exemption of infrastructure projects; issue of impacts
(−) Discretionary application of EA requirements leaves open opportunities for inconsistencies and quality issues
(+) SEA cabinet directive includes a preliminary scan step
(−) Minimal tiering

(+) Transboundary coordination efforts (e.g., SEA and EIA Conventions)
(+) Detailed screening, scoping, and document review and good practice guidance at multiple levels (Department of Communities and Local Government, 2006)
(+) Considerable internal and external advice and auditing (e.g., Group of EIA/SEA National Experts, European Court of Auditors, IA Board) (ERM, 2001a,b,c; EUCOTR, 2010; GHK, 2010; IEPP, 2004; Office of Management and Budget, 2008)
(+) CEA a requirement of the SEA Directive and the Habitats Directive
(+) CEA guidance (Walker and Johnston, 1999)

(+) IA legislation recently subject to major independent reviews (Hawke, 2009) (Australian Government, 2011e)
(+) Annual reviews of systems performance and operational reviews (Environment Australia, 2001)
(+) Performance audits by auditor general (Auditor General, 2002–2003)
(+) Detailed mitigation and monitoring requirements and guidelines
(+) Minister has authority to undertake compliance or performance audits
(+) Consideration of proponent's environmental record
(+) Extensive array of guidance materials including best practice guidance; provides both standard and tailored guidelines
(+) Required to address cumulative and transboundary effects

include experimental institutional arrangements for expediting IA review procedures, systematic and explicit mitigation, and follow-up requirements, transboundary IA coordination provisions, the class or categorical assessment option, cost-recovery initiatives, and the consideration of the proponent's environmental record.

Efforts to make IA more practical need to be approached and applied with sensitivity to potential repercussions. Measures (e.g., timelines) to reduce the duration of various IA stages can be helpful provided IA quality and stakeholder involvement are not inhibited. Focusing IA requirements on "major" projects or impacts might lead to the more efficient and effective allocation of resources. But such measures can result in major cumulative effects from multiple small projects. They also can result in major adverse individual or cumulative effects when "major projects or impacts" are ill-defined, and when highly sensitive or significant environmental receptors are adversely affected. Focusing IA requirements on narrow and selective definitions of the environment, effects and alternatives can result in process efficiencies. However, they also can result in disjointed analyses and unnecessary and more severe environmental impacts. This is especially the case in terms of sustainability and cumulative effects. Effective sustainability-related and CEA requirements and guidance are essential for enhanced IA practicality, consistent with the argument that they are simply good SEA/EIA practice.

Measures to screen out alternatives, which are not "reasonable or feasible," can be helpful, or they can lead to inconsistencies and inhibit effectiveness if requirements do not include explicit definitions, criteria, and procedures. Measures allowing lower government level IA requirements to substitute for senior government level IA requirements can reduce potential duplication and overlap. However, such measures can result in unnecessary environmental impacts and reduced stakeholder participation if they are not structured, justified, and supported by explicit criteria, and if they do not include independent auditing and appeal provisions. For example, exemptions of infrastructure and "green" projects can result in economic/environmental benefits. But they can lead to unnecessary adverse environmental impacts. Such adverse effects often can be ameliorated or avoided with expedited and streamlined IA requirements for such projects. Considerable discretionary authority can facilitate the introduction of effectiveness/efficiency initiatives but can result in unnecessary inconsistencies in the application of IA requirements.

The desire to expedite and focus IA requirements is a recurrent issue in IA regulatory practice. The more efficient use of available resources and the desirability of focusing on major potentially significant actions and effects seem to be obvious and sensible goals for IA regulatory reform. Oftentimes the pressure to make IA requirements more focused and efficient stems from IA processes associated with a small number of highly controversial proposed actions—IA processes that generated a huge array of documents, cost vast sums of money, and dragged on for many years. Before proceeding too rapidly with introducing measures to prevent the reoccurrence of such processes, it would be worthwhile to independently review the major "problematic" processes. Although regulatory inefficiencies may have contributed to the costs and delays, it is also possible that other factors (e.g., poor IA practice, external political conflicts, unique proposal, and/or setting characteristics) may also have played a prominent role. With a better "handle" on what went right and wrong with the high-profile examples, broader questions of the appropriate mix of measures for making IA requirements more efficient and focused can be more systematically addressed.

As illustrated in the four jurisdictions, there are a host of measures available, at the regulatory level, for expediting and focusing IA document preparation and review. All jurisdictions have many already in place. In addition to reviewing the major "bad examples," systematic reviews of the relative effectiveness of the current suite of methods would be a useful departure point. For example, there is already considerable experience with screening and scoping. Lessons and insights from other jurisdictions, allowing for appropriate contextual adaptations, also can be helpful. It is important to bear in mind that expediting and focusing measures inherently mean that some matters will not be addressed at all, some concerns will be addressed much more rapidly and much more superficially, and some parties will not be involved or involved much less fully. This is well and good if a clear distinction can be drawn between significant and insignificant effects and proposals, if cumulative effects are not an issue, and if there is minimal uncertainty regarding who represent the "major" stakeholders. But this is often not the case. Such reforms also mean that the purpose of IA is shifted from the comprehensive integration of environmental concerns into decision making at all levels to the integration of selective environmental concerns (tied to specified areas of jurisdiction) into selective proposals in selective settings. Whether this is a desirable direction for IA regulatory practice should be the subject of open debate.

What the preceding distinctions suggest, at the very least, is the need to systematically explore the procedural (e.g., less open and inclusive decision making) and substantive implications (e.g., cumulative and sustainability effects addressed to a much more limited extent) of IA regulatory expediting and focusing approaches. The implications of some efficiency measures may be almost entirely beneficial. However, others could be highly problematic in both a procedural and a substantive sense. The responsible and practical course of action is to ensure a sound understanding of likely outcomes before proceeding, and to independently evaluate the effectiveness of such measures on a regular basis.

Measures to enhance IA competence and effectiveness are essential if IA is to improve over time at the regulatory level. As pointed out, all the jurisdictions provide guidance,

support applied research, and undertake IA system effectiveness reviews and IA quality analyses. Independent reviews tend to have somewhat more credibility. Insights from other jurisdictions and from IA literature in general also can be helpful. Care needs to be taken to ensure that guidance neither restricts innovation nor "sets the bar too low" in terms of good practice. Many of the guidance documents in the four jurisdictions are dated. The impression is left that the suite of guidance materials and sponsored research that exists in the four jurisdictions is more the result of an "ad hoc" evolution of concerns and issues than the product of a systematic evaluation of what is needed to make the IA system operate more efficiently and effectively. Perhaps, a broader perspective is needed regarding the appropriate role of IA institutions in raising the level of IA practice at the regulatory and applied levels.

7.5.2 Management at the Applied Level

Figure 7.6 illustrates an example practical IA process. The figure and the process description that follows depict a focused, realistic, feasible, competent, and effective IA process. IA process managers can "pick and choose" the relevant and appropriate elements.

Start-Up Planning, decision making, and implementation are assumed to be integrated, constrained, decentralized, incremental, and partisan. It is recognized that many, often conflicting, parties and interests will need to be involved in the process. The context within which the IA process operates is expected to be uncertain and unstable.

The IA process is focused (through scoping) on what is relevant and important to regulators and other stakeholders. The initial scoping is supported by an overview of regulatory requirements and priorities, a scanning of key environmental and activity characteristics, and the identification of primary stakeholder issues and concerns. The problems to be solved, the needs to be met, and the opportunities to be taken advantage of are clearly identified. Priorities, boundaries, roles and responsibilities, major choices, sensitive and significant environmental components, major anticipated impacts, key activity characteristics, primary stakeholders, and critical issues (from the perspective of each stakeholder group) are determined. Scoping provides the basis for the IA process approach. The approach identifies major activities, events, inputs, and outputs. A study team, appropriate for addressing the identified issues, is assembled. An initial study design is prepared. The study design determines study organization, tasks, roles and responsibilities, budgets, and schedule. The approach, the study design, and political, agency, and stakeholder participation involvement approaches are formulated jointly with interested and affected parties.

The approach and study design are defined at a broad level of detail. They are expected to evolve and change through the process. There are major uncertainties regarding both ends and means. The "operating room" within which the process unfolds is highly constrained. Unforeseen and unforeseeable circumstances are anticipated to emerge through the process that will require approach and study design modifications and refinements. Ample "float time" is provided. Contingency funds are set aside for changing conditions.

Planning, Decision Making, and Implementation A practical IA process is nonlinear. It is iterative, cyclical, and incremental. It involves multiple stakeholders debating, discussing, negotiating, reviewing, analyzing, comparing, and bargaining about choices and constraints. The process is built around a series of decisions. It cycles back and forth among process elements. It is characterized by continuous learning. It provides for multiple interactions, for scanning ahead, and for feedback. It merges and transcends such conventional dichotomies as ends and means, objective and subjective, technical and political, analysis and synthesis, planning and implementation, and process and context. It crosses disciplinary and professional boundaries.

The process reflects bureaucratic and political requirements, preferences, and priorities. It operates within boundaries, acknowledges constraints and seeks out opportunities. It is focused, experimental, and action-oriented. Roles are negotiated. Ends are a general direction rather than precise objectives. Means are reasonable, available, and practical choices. The process is built upon a solid foundation of experience and practice-based knowledge, methods, insights, skills, and wisdom. Stakeholder perspectives, concerns, and preferences are integrated into the process. The process is designed to suit and refined to better match the context. Risks and uncertainties are freely acknowledged. The process proceeds cautiously and incrementally. Short-term time horizons largely predominate.

Choices that depart appreciably from current conditions, are highly uncertain, are potentially contrary to regulatory requirements, are controversial, are likely to be difficult or costly to implement, and are unlikely to be accepted by key stakeholders are quickly screened out. The key tests of a good option are regulatory compliance, stakeholder acceptance, ease of implementation, acceptable costs, and cost-effectiveness. Option comparison involves a reasoned exploration, from multiple perspectives, of implications and consequences rather than the formal application of evaluation methods. Once agreement is reached preferred choices are adapted, refined, and tested.

Outcomes from the process are formalized and documented in draft and final IA documents, consistent with regulatory requirements and agency expectations. Uncertainties regarding impact magnitude, impact significance, and mitigation effectiveness are incorporated into impact management strategies and tactics. Strategies are formulated, refined, and applied to facilitate approvals and implementation. Review and implementation tend to be incremental (e.g., phased approval), adaptive (e.g., continued focus on managing uncertainties), and conditional

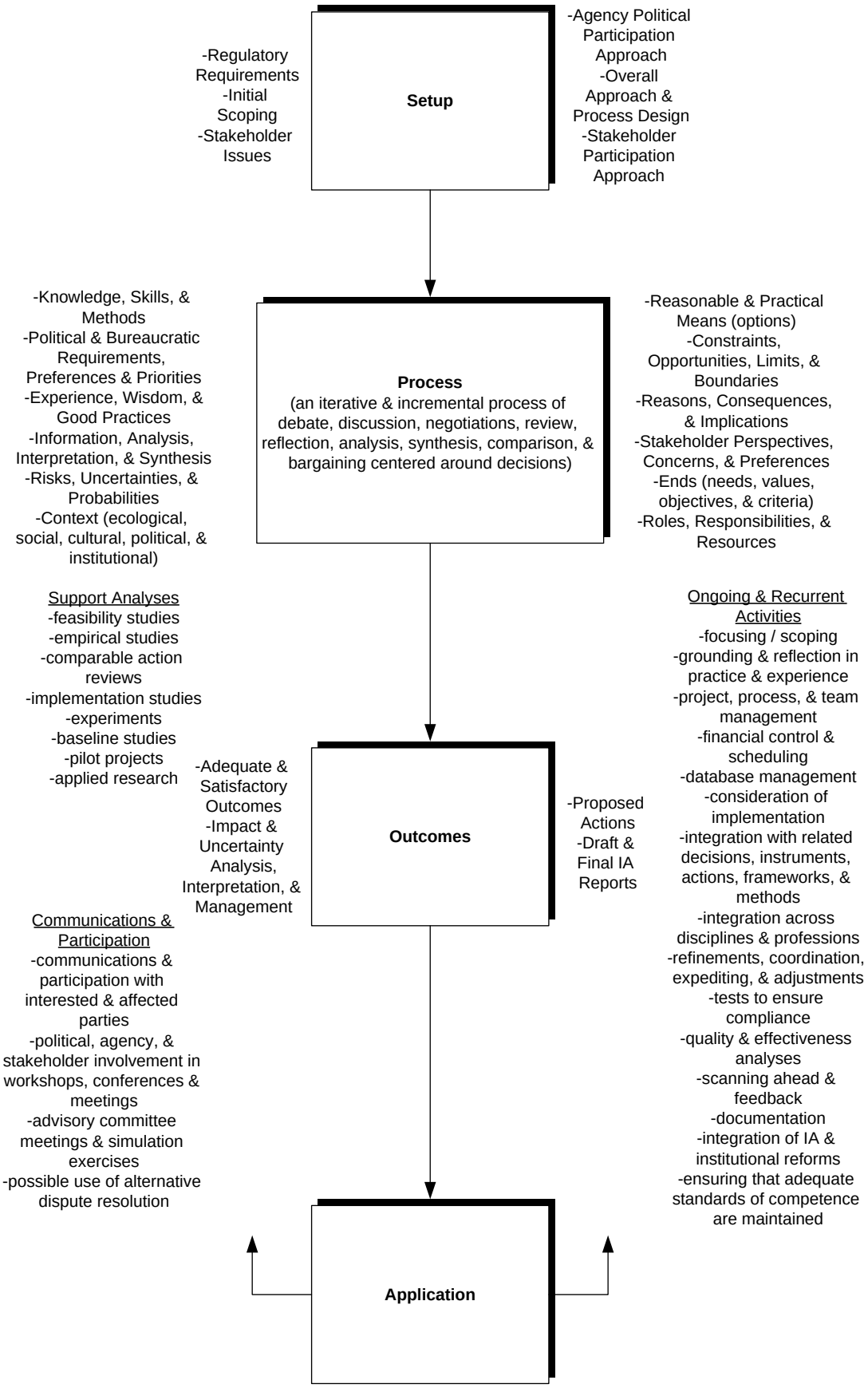

Figure 7.6 Example of a practical IA process. Adapted from Lawrence (2005a).

(e.g., ample provisional for monitoring and contingency measures). "Surprises" are expected to emerge during post-approvals. Surprises require both anticipation (to the extent practical) and prompt remedial action. The IA process extends through implementation. Direct and indirect outputs are assessed through effectiveness analyses. Knowledge, practice, and experience are considered tentative, contingent, partial, ambiguous, and uncertain.

Support Analyses Selective baseline analyses are periodically undertaken. These analyses focus on the requirements and expectations of regulators and of other stakeholders. Applied experience and practice-based knowledge are emphasized. Comparable actions, empirical studies, and implementation studies are reviewed to determine how power is exercised, how decisions are made, and how implementation obstacles and opportunities could be addressed.

Experiments and pilot projects are used to "test the water." Feasibility studies are undertaken to ensure that choices are cost-effectiveness and capable of implementation. Applied research is undertaken, where essential, to fill data gaps, which might impede decision making and implementation. Residual uncertainties are highlighted. Decision making and implementation implications of uncertainties are explored.

Ongoing and Recurrent Activities Focusing occurs with each cycle in the process. Documents, events, and interactions also are scoped. Analyses, interpretations, and conclusions draw heavily upon experience and reflection of practice. Action, process, and study team management, and financial and schedule control are maintained throughout the process. The database management system is continually updated and refined. Political feasibility and implementation requirements and implications are addressed, both prior and subsequent to approvals.

The IA process is integrated with decision making. It is linked to related decisions, actions, and environmental management instruments. Tiering and cross-referencing reduce paperwork, simplify review, and place the process and documents within a policy and strategic planning context. Related decision-making methods, such as cost–benefit analysis, feasibility studies, risk assessment, quality assurance, and technology assessment, are summarized and referenced, as appropriate. Critical links across disciplines and professions are identified. Individual analyses are integrated into methodological frameworks (e.g., sustainability assessment, integrated impact assessment) where needed to address cumulative effects and to ascertain progress toward broader environmental objectives.

Succinct and readily understandable interim, working, background, applied research, and consultation papers are prepared. They provide a clear decision-making basis, record decision-making process, and establish the basis for draft and final IA documents. Further refinements are introduced based on IA quality analyses of procedures, methods, documents, and participant performance and IA effectiveness analyses of interim outputs and comparable projects. IA documents incorporate stakeholder perspectives, demonstrate regulatory compliance, substantiate all assumptions, interpretations, and conclusions, and respond to the comments and suggestions of process participants. Interactions among process participants are coordinated. IA review, approval, and implementation are expedited. A minimum level of practice competence is maintained. Good practice is actively encouraged and facilitated. The IA process evolves in conjunction with IA and institutional reform.

Communications and Participation A practical IA process is open and interactive. Communications and participation with interested and affected parties are recurrent activities. Interactions are especially intensive leading up to and immediately following major decisions. Major perspectives are reflected in the analysis. All parties have an opportunity to review and respond to interim and draft IA documents. The concerns and priorities of all parties who could assume a significant role in approvals and implementation, in overcoming obstacles, and in building coalitions of support are solicited and documented.

Consultation methods conducive to identifying and accommodating differences (e.g., workshops, conferences, advisory committees) are applied as appropriate. Alternative dispute resolution methods, such as mediators and facilitators, are used when perspective and interest differences threaten the process. Close contact is maintained with regulators to minimize uncertainties regarding regulatory compliance. Consultation activities are both formal and informal.

7.5.3 Adaptations by IA Type

A practical IA process will vary by IA level and type. Table 7.7 provides examples of suggested SEA, EIA, EcIA, SIA, HIA, and SA practicality measures.

Crosscutting Themes Practical IA practices are not uniform among IA types. However, there are some themes that cut across IA types. All emphasize efficiency and effectiveness, the need for clear and understanding documents oriented to stakeholder interests and mandates, and the importance of ensuring adequate resources and IA capacity. They all recognize the importance of contextual variations and the central role of dialogue, persuasion, collaboration, and negotiations. Each seeks to accredit professionals in their field. They all appreciate the need to clearly understand the nature and most effective means of strategically influencing the bureaucratic/institutional planning/decision-making culture.

Practical SA Practice Practical SA practice focuses on the test of contribution to sustainability and the desire for multiple, reinforcing gains. Every aspect of the process must be geared to formulating and applying such tests.

Table 7.7 Practical IA Practice Characteristics by IA Type

Practical SA Practice	Practical SEA Practice	Practical EIA Practice
Uses thresholds, principles, and objectives to focus SA	Emphasizes role of collaboration, negotiation, and persuasion	Focuses on environmental regulatory requirements, issues, likely affected environmental components, and likely significant impacts
Focuses on multiple, mutually reinforcing gains rather than balancing; avoids undesirable trade-offs	Focuses on conflicts and policy and plan-making weaknesses and opportunities	Sets priorities and establishes temporal and spatial boundaries
Tests contribution to sustainability	Explores nature and validity of dominant arguments—clarifies SEA's purpose	Prioritizes participatory/open over technical/closed scoping
Looks for bridges to more lasting opportunities	Focuses on planning (plan-shaping activities) and decision-making links; focuses on implementation	Uses clear significance criteria
Screens for global warming impacts	Emphasizes organizational learning effectiveness	Emphasizes scoping of alternatives and mitigation
Recognizes interdependencies	Identifies concerns and information pertinent to subsequent tiers	Seeks consistency with local community environmental and social aspirations
and irreducibility of uncertainties and risks, accepts unpredictability and incomplete control; favors caution, resilience, and adaptability	Seeks enhanced understanding of stakeholder motives	Seeks enhanced understanding of context and decision-making culture
Identifies stakeholders and sources of resistance	Formulates, refines, and adapts conceptual models explaining how SEA works	Seeks enhanced understanding of links between EIA and community and regional planning
Seeks territorial/regional sustainability understanding; determines SA gaps	Seeks enhanced understanding of planning systems, cultures, and institutions to determine if effective SEA present	Determines why EIA documents poorly understood by decision makers and public
Uses frameworks for analyzing whether and how institutional changes for how sustainability can be achieved	Mediates between positivistic and postpositivistic approaches	Identifies lessons from court decisions
Uses frameworks for characterizing and grouping SA approaches and methods	Applies early enough to affect deliberation on purpose and options	States and justifies all assumptions
Identifies SA/SEA/EIA differences and good practice implications	Identifies how to break bureaucratic autonomy and ensure consideration of environment	Provides additional resources for scoping
Refines separate tools for high-level (international/national) SA	Seeks to enhance SEA ownership by planners	Institutes robust follow-up management and monitoring
Raises awareness of sustainability	Treats SEA as a social learning catalyst	Implements cost-effective mitigation, compensation, and management measures
Explores extent facilitates individual/organizational learning	Is both rational and collaborative	Seeks a better understanding of best management practices
Undertakes and facilitates sustainability capacity building	Enhances spatial data infrastructure	Identifies clear decision-making criteria
Tailors methods to SA context	Documents good practice SEA case studies and success stories	Provides more comprehensive and consistent guidance
Uses sustainability advisors	Develops and adapts SEA quality assurance checklists—identifies necessary and facilitating factors for SEA effectiveness	Institutes more training of practitioners and participants
Uses conceptual frameworks for assessing progress toward sustainability and for testing alternative SA approaches	Emphasizes SEA institutional capacity building	Makes EIA documents more understandable to decision makers and public
Assesses SA effectiveness for weak and vulnerable groups	Reinforces incentives to monitor	Seeks best practical approach (reviews and best practice)
Assesses procedural, substantive, transactive (worth time and cost), and normative effectiveness	Incorporates environmental limits	Assesses effectiveness in meeting community goals and aspirations
Shifts from procedural to substantive effectiveness emphasis (promoting SD)	Identifies effectiveness roles	Evaluates mitigation/compensation effectiveness
	Considers democratic, environmental, contextual and methodological effectiveness	Assesses consistency with best practices; recognize weaknesses of effectiveness tools (e.g., checklists)
	Identifies minimal SEA effectiveness requirements	Assesses effectiveness of requirements
	Assesses effectiveness—contribution to policy, planning, process quality, and quality of stakeholder involvement	Assesses effectiveness of impact and benefits agreements
	Seeks to demonstrate SEA added value, including indirect effectiveness and learning	

Focuses biodiversity screening and scoping on composition, structure, and processes key to biodiversity creation and maintenance and on biodiversity threats
Employs multiple spatial levels and long time horizons
Prioritizes ecosystem services
Focuses on protected areas and species
Promotes more holistic databases (regarding ecological functions, connections, and networks) and approaches (e.g., ecological service types)
Seeks an enhanced understanding of direct and indirect drivers of ecosystem change and of well-being of ecosystem service beneficiaries
Promotes most environmentally friendly alternative
Links IA and biodiversity-related treaties
Seeks to make biodiversity part of corporate responsibility
Considers use of use biodiversity screening maps and checklists
Engages biodiversity experts, encourages biodiversity partnerships, and information networks, and institutes more training and good practice guidance
Ensures sufficient resources
Provides for technical guidance
Assesses if and extent to which meets biodiversity and conservation objectives
Monitors cumulative ecological effects
Shares best practices and lessons

Focuses on key social and cultural issues, rights, and purposes
Emphasizes vulnerability of underrepresented and disadvantaged populations; stresses social distribution, environmental justice, and gender equality
Seeks free, prior, and informed consent
Seeks to understand social change and capacities to respond to change (resilience)
Seeks an enhanced understanding of institutional financial and professional constraints to SIA
Seeks an enhanced understanding of difficulties in applying social sciences in SIA
Recognizes the contested and political nature of SIA
Seeks to build social capital, social capacity, good governance, community engagement, and social inclusion
Integrates community and traditional knowledge
Formulates strategies for translating findings and recommendations into action
Ensures skilled and locally experienced SIA professionals
Facilitates SIA capacity building
Ensures practitioner involvement consistent with ethical guidelines
Accredits practitioners
Assesses effectiveness in terms of achievement of social purposes
Recognizes socioeconomic follow-up critical to effectiveness
Assesses SIA effectiveness within or independent from SEA/EIA
Assesses effectiveness in terms of realization of net social benefits

Focuses on protecting and promoting public health, health determinants, health outcomes, affected populations, health equity, and vulnerable subpopulations
Broadly defines health—environmental and social
Places particular emphasis on avoidable, involuntary, adverse, irreversible, and catastrophic health effects
In scoping assesses the quality of the evidence and designs monitoring surveillance systems
Seeks an enhanced understanding of why health outcomes so rarely considered in SEA/EIA and
varying levels of capacity and experience
Develops and tests HIA practices
Uses demonstration projects to test, refine, and demonstrate HIA methods and models
Seeks intersectoral dialogue and action for health promotion and to address health disparities
Seeks to demonstrate HIA decision-making benefits
Undertakes critical appraisals to determine what is a good quality HIA and good quality health integration
Seeks to raise decision makers' awareness of health and well-being consequences of choices
Meets HIA practice standards
Accredits and facilitates training of HIA practitioners
Evaluates completed HIAs; enhances practice guidance and monitoring and evaluation guidance
Disseminates review findings, case studies, and lessons
Audits HIA utility of HIA, decision-making influence, predictive accuracy, and mitigation effectiveness
Evaluates health outcomes (health improvements, reduced inequities)
Assesses effectiveness within or separate from EIA/SEA; refines and creates alternatives

Sources: Adelle and Weiland (2012), Ali et al. (2008), Athanas (2005), Alton and Underwood (2003), Atkinson and Cooke (2005), Baker and McClelland (2003), Baker and Rappaport (2009), Barnes et al. (2010), Becker et al. (2005), Bhatia et al. (2010), Bina (2007), Birley (2003), Bond (2004), Bond et al. (2012), Bond et al. (2003), Buuren and Nooteboom (2009), Cashmore et al. (2004), Chaker et al. (2006), Cole (2004), Cole and Fielding (2007), Connor and Dovers (2004), Craik (2008), Donnelly et al. (2008), Égré and Senécal (2003), Esteves et al., (2012), Fischer (2002, 2005), Fischer and Gazzola (2006), Forsyth et al. (2010), Galbraith et al. (2007), García-Montero et al. (2010), Gazzola (2008), Genter et al. (2008), Gibson (2006a, 2011) Govender et al. (2006), Hacking and Guthrie (2006, 2008), Harris-Roxas and Harris (2011), Harris-Roxas et al. (2012), Hayes and Morrison-Saunders (2007), Hildén et al. (2004), Hinte et al. (2007), IAIA (2002a, 2005, undated b), ICPGSIA (2003), Jha-Thakur et al. (2009), Kemm (2005), Kemm and Parry (2004a,b), Kobus (2005), Krieger et al. (2003), Landsberg et al. (2011), Lundberg et al. (2010), Mandelik et al. (2005), McCluskey and João (2011), Moles et al. (2008), Morgan (2012), Morrison-Saunders and Hodgson (2009), Mulvihill (2003), Noble (2009a,b), O'Faircheallaigh (2009), Page (2006), Petäjäjärvi (2005), Péti (2012), Pisani and Sandham (2006), Põder and Lukki (2011), Pope et al. (2004), Pritchard (2005), Quigley and Taylor (2003), Rajvanshi et al. (2011), Retief (2007a,b), Retief et al. (2008), Ross et al. (2006), Rotmans (2006), Sánchez and Gallardo (2005), Sánchez and Silva-Sánchez (2008), Scanlon and Davis (2011), Singh et al. (2009), Slootweg (2005), Slootweg et al. (2006), Slotterback (2008), Slotterback et al. (2011), Snell and Cowell (2006), Söderman and Saarela (2010), Stoeglehner et al. (2009, 2010), Tang (2010), Tetlow and Hanusch (2012), Thérivel and Ross (2007), Theophilou et al. (2010), Thérivel et al. (2009), Tsuji et al. (2011), Utzinger et al. (2005), Vanderhaegen and Muro (2005), Vanclay (2006, 2010), Waldeck et al. (2003), Wende et al. (2005), Weston (2011), Whitelaw et al. (2009), Winkler et al. (2011), Wood et al. (2006), Zhu et al. (2010).

The IA process and outcomes are viewed as a bridge to lasting sustainability opportunities. Practical SA practice readily screens out unsustainable choices and makes effective use of available sources of sustainability-based knowledge. It focuses on institutional barriers and required changes to ensure sustainability. It identifies and remedies capacity limitations that inhibit sustainability. It stresses the substantive over the procedural. It is adaptive, proceeds with caution (appreciating the implications of risks and uncertainties), and fully addresses contextual implications. It fosters organizational learning and public awareness, focuses on the implications for the most vulnerable, and tests for normative/substantive effectiveness.

Practical SEA Practice Practical SEA practice focuses on dominant arguments, on potential conflicts, and on policy and plan-making weaknesses and opportunities. It is founded upon a sound understanding of the policy and decision-making process. It emphasizes effective organizational learning and SEA ownership. It seeks an enhanced understanding of stakeholder motives, institutional characteristics, and planning systems and cultures. It effectively draws upon conceptual models, effectiveness analyses, and case study, and auditing insights. It strives to overcome bureaucratic autonomy and resistance, ensure that effective SEA conditions are present, and demonstrates the added value of SEA.

Practical EIA Practice Practical EIA practice fully integrates regulatory requirements, issues, and guidance, clearly identifies and substantiates priorities, boundaries, assumptions, and methods, and draws heavily upon insights from court decisions, best practices, case studies, and effectiveness analyses (appreciating the strengths and limitations of such tools). It emphasizes the value of scoping and the need to understand the perspectives of each stakeholder. It employs clear significance and decision-making criteria. It seeks consistency between EIA outcomes and community aspirations. It effectively utilizes community and regional planning to frame EIA-related decision making. It provides for appropriate training and capacity building for IA practitioners and other participants, and ensures cost-effective and robust follow-up measures.

Practical Ecological Impact Assessment (EcIA) Key biodiversity attributes, major ecosystem services, and protected areas and species are priorities with practical EcIA practice. Practical EcIA practice employs multiple temporal and spatial levels. It seeks an enhanced understanding of the direct and indirect drivers of ecosystem change, and of the well-being of ecosystem service beneficiaries. It operates within the context of international ecological and biodiversity treaties. It is guided by clear biodiversity and conservation objectives. It promotes the most environmentally friendly alternative. It monitors cumulative ecological impacts. Practical EcIA practice seeks to make ecological concerns part of institutional and corporate responsibility. Adequate resources are sought. Biodiversity experts are engaged. Biodiversity partnerships and information networks are encouraged. Training, technical guidance, and best practice lessons are provided.

Practical SIA Practice Practical SIA practice focuses on key social and cultural issues. It emphasizes the vulnerability of underrepresented and disadvantaged populations. It stresses social distribution, environmental justice, and gender equality concerns. Free, prior, and informed consent is sought. Practical SIA practice seeks to understand social change and response capacities, institutional and professional constraints to SIA, and the difficulties in applying the social sciences in SIA. It strives to build social capital, social capacity, good governance, community engagement, and social inclusion. It recognizes the inherently political and contested nature of SIA. It integrates traditional and community knowledge. It facilitates SIA capacity building. It appreciates the critical role of follow-up. It assesses effectiveness in terms of the achievement of social purposes and the realization of net social benefits.

Practical HIA Practice Practical HIA practice is focused on protecting and promoting public health, health determinants, health outcomes, affected populations, health equity, and vulnerable subpopulations. Health is defined broadly, with a particular emphasis on avoidable, involuntary, adverse, irreversible, and catastrophic health effects. Care is taken to assess the quality of the evidence and the adequacy of proposed methods. Practical HIA practice seeks to understand and overcome the barriers to HIA and to demonstrate the utility of HIA. It strives to raise awareness by decision makers of the health and well-being implications of choices. It facilitates HIA capacity building. A particular effort is made to raise the level of HIA practice, both within and separate from SEA/EIA, by drawing upon, contributing to, and broadly disseminating demonstration projects, effectiveness analyses, and critical appraisals.

7.6 CONTEMPORY CHALLENGE—CEA GOOD PRACTICE

7.6.1 Definitions and Distinctions

Cumulative effects assessment (CEA) systematically analyzes and assesses cumulative environmental change (Cooper and Sheate, 2004). It focuses on the receiving environment, and on whether individually minor effects will be collectively significant (Canter and Ross, 2010; Dixon and Thérivel, 2011; Noble, 2008). CEA simultaneously assesses the positive and negative effects (additive, interactive, synergistic, irregular) on given receptor(s) from existing, planned, proposed, and potential human activities (Greig et al., 2004; Hanna, 2009a; Noble, 2009a). It is especially concerned with whether the environment's assimilative capacity will be exceeded.

CEA assumes many forms. A basic distinction can be drawn between regional cumulative effects studies (effects-based, measures environmental responses or valued ecosystem components, analytic) and project CEA (stressor-based, cumulative effects associated with a particular change agent) (Creasey and Ross, 2009; Noble, 2009a). Further distinctions can be drawn for EIA-driven CEAs between single project CEA and multiple projects/multiple component activities. For SEA-driven CEAs distinctions can be drawn between CEAs for plans or programs for a particular resource or industrial sector and for CEAs of multiple plans or programs across sectors (Harriman and Noble, 2008). CEA can be performed on its own or as an integral part of an SEA or project-level EIA process (Harriman and Noble, 2008).

One variation of an SEA-driven CEA (or perhaps more appropriately a CEA-driven SEA), which has received particular attention is regional SEA (RSEA). RSEA is a tool that can support regional planning by assessing the cumulative effects associated with alternative development scenarios (Johnson et al., 2011). It helps identify land use strategies and management approaches consistent with desired environmental, social, and economic outcomes, including regional sustainability (Gunn and Noble, 2009a; Johnson et al., 2011). Defining characteristics of RSEA include—strategic, region-based, futures-oriented, alternatives-based, VEC-based, multiscale, multitier, multisector, adaptive and opportunistic, structured and systematic, cumulative effects driven, learning-oriented (based on feedback from follow-up and regional monitoring), and integrated with planning and decision making (Gunn and Noble, 2009a; Noble, 2008; Sadler, 2011b).

7.6.2 State of Practice

Notwithstanding the semblance of CEA regulatory requirements and a range of guidance material and applied research in most jurisdictions, the CEA state of practice is consistently characterized as overwhelmingly weak (Devlin and Yap, 2008; Dixon and Thérivel, 2011). To date, SEA has not emerged as an effective tool for identifying and managing cumulative effects (Sadler and Jurkeviciute, 2011). CEA is also rarely an integral part of project-level EIA processes (Noble, 2008).

Commonly cited limitations associated with CEA practice (when it is undertaken at all) include (1) weak conceptualization and scoping, (2) a lack of understanding of the causes of cumulative effects, (3) undefined or ill-defined thresholds, (4) the poor consideration of past or likely future activities, (5) the weak treatment of cumulative ecological, socio-economic, and sustainability effects, (6) a failure to appreciate the implications of scale, boundary, and IA-type differences, (7) poorly defined methods, (8) limited cumulative effects monitoring and management, (9) limited multistakeholder CEA involvement, (10) difficulty dealing with uncertainties and issues such as biodiversity and climate change, (11) minimal or poorly defined tiering arrangements, (12) weak integration into IA analyses (i.e., an afterthought), (13) poorly integrated into policy and planning, (14) and a lack of commitment by decision makers to the assessment and management of cumulative effects (Baxter et al., 2001; Canter and Ross, 2010; Connelly, 2011; Crooks and de Witt, 2009; Duinker and Greig, 2006, 2007; Gunn and Noble, 2011; Law et al., 2005; Lien et al., 2011; Senner, 2008; Thérivel and Ross, 2007).

These limitations are partially attributable to the regulatory level. It is not sufficient to require the consideration of cumulative effects. Assessing cumulative effects is severely hampered if (1) the environment and effects are narrowly and selectively defined, (2) if specific CEA-related triggers are not identified in IA requirements, (3) if IA tiering arrangements are not instituted, (4) if IA requirements do not outline minimal requirements for the conduct of CEA, (5) if IA terms of reference and related CEA guidance materials are dated and overly vague, (6) if there is insufficient interagency collaboration in the provision of baseline data and in the analysis and management of cumulative effects, (7) if the necessary financial resources and expertise are not in place, (8) if a clear commitment to regional planning, informed by CEA, is lacking, (9) if there is no to minimal CEA monitoring and follow-up, and (10) if the central role of uncertainties and the need for a precautionary approach to impact and uncertainty management is not broadly acknowledged (Canter and Ross, 2010). However, the regulatory level is not entirely responsible for the weak treatment of cumulative effects. Clearly, there is a considerable gap in practice between CEA aspirations and the reality of CEA practice.

7.6.3 Aspirations

CEA should operate at both the strategic and the project level, and at the regulatory and applied levels. CEA is a tool for influencing the pace and scale of development, and for predicting sustainability. Arguably, the assessment of cumulative effects is IA as it should be. CEA and IA both seek (or should) to protect and improve the receiving environment, and to further the cause of sustainability (Dixon and Thérivel, 2011; Senner, 2008). CEA, if practiced well, can facilitate cumulative effects significance interpretations, cumulative biodiversity effects interpretations, potential and desired futures characterizations, the determination of thresholds and appropriate activities, environmental justices analyses, and government resource management and allocation (Canter and Ross, 2010; Harriman and Noble, 2008; Hegmann and Yarranton, 2011; Kreig and Faber, 2004; Treweek et al., 2011).

7.6.4 Process

Characterizations of the CEA process closely parallel SEA and EIA process depictions, at least in terms of major stages/activities. For example, reference is made to scoping, baseline descriptions, impact predictions, alternatives assessment, significance determination, mitigation and

enhancement, government and stakeholder engagement, and impact management (Canter and Ross, 2010; Connelly, 2011; Dixon and Thérivel, 2011; Gunn and Noble, 2011; Johnson et al., 2011; João et al., 2011; Noble, 2008; Thérivel and Ross, 2007). However, CEA process depictions go on to stress the need to identify past, present, and likely future activities (cumulative change processes) that have or will affect receptors and lead to activities (Dixon and Thérivel, 2011; Noble, 2008; Thérivel and Ross, 2007). They construct and apply CEA frameworks (customized to the region and cumulative effects types). They systematically connect proposed and potential actions to selected VECs and their indicators. They formulate a regional vision. They generate and analyze alternative scenarios. They compare scenarios against significance thresholds. They build desirable and resilient futures (Atkinson and Canter, 2011; Canter and Ross, 2010; Connelly, 2011; Gibson, 2011; Gunn and Noble, 2009b, 2011; Johnson et al., 2011).

7.6.5 Methods

CEA methods have received considerable attention in IA literature in recent years. Commonly cited CEA methods include scenario development, causal chain and network analyses, conceptual frameworks, models, input–output analysis, adaptive management, overlay mapping and GIS, carrying capacity analysis, life-cycle analysis, and indicators and indices (Atkinson and Canter, 2011; Canter, 2008; Canter and Atkinson, 2010; Greig et al., 2004; Gunn and Noble, 2009a,b; Ross and McGee, 2006; Smit and Spaling, 1995; Thérivel and Ross, 2007). Given the dynamic, complex, and integrative nature of CEA, particular stress tends to be placed on quantification and on technical-/data driven methods (Dutta et al., 2004; Gunn and Noble, 2009b; Thérivel and Ross, 2007). More judgment-driven techniques, such as case study analyses, participatory appraisal, Delphi and multicriteria analysis, can assist in identifying critical linkages, in significance interpretations, and in facilitating stakeholder involvement (Crookes and de Witt, 2009; Gunn and Noble, 2009b).

The methods selected need to be adapted to the region and to cumulative effects types (Gunn and Noble, 2011). Care needs to be taken to identify and apply factors (e.g., salience, credibility, legitimacy) that facilitate or represent barriers to effective CEA (Kim, 2012). Flexibility and a VEC-based perspective are essential (Canter and Ross, 2010; Creasey and Ross, 2009; Duinker and Greig, 2006). Integrating the principles of the ecosystem approach, adaptive management, and a risk-based precautionary approach can be helpful (Canter, 2008; Canter and Atkinson, 2010; Sadler, 2011b; Treweek et al., 2011). Uncertainties, and related implications, should be acknowledged (Lien et al., 2011). Assumptions, key features, and a clear rationale for the methods selected should be provided (Canter, 2008; Thérivel and Ross, 2007). Resultant conclusions should be fully justified (Lien et al., 2011).

7.6.6 IA Levels

It has been consistently argued that CEA can, or at least should be, most effective at strategic levels (Cooper and Sheate, 2004; Duinker and Greig, 2006). A strategic level CEA complements and supports SEA, regional planning, and protected area management. It focuses on the resource and activity totality rather than only on assessing a proposed plan or program (Dixon and Thérivel, 2011; Greig and Duinker, 2007). It can help determine and apply environmental objectives, sensitive areas, and ecological thresholds. It can guide regional development (especially in relatively undeveloped areas). It can proactively identify and minimize cumulative environmental effects. It can provide an integrated appraisal of the ecological, social, and economic dimensions of sustainability. It can identify institutional and jurisdictional gaps. It can establish intergovernmental collaboration priorities (Connelly, 2011; Cooper and Sheate, 2004; Duinker and Grieg, 2006). It can help ensure that multiple activities, including the plan, do not have cumulatively significant effects (Dixon and Thérivel, 2011). CEA, at a strategic level, operates at different scales (e.g., subregional, regional, transboundary) (Cooper and Sheate, 2004). It can provide a pragmatic and balanced (potential activities vs. key receptors) approach whereby planners, stakeholders, and decision makers can understand and explore the potential cumulative effects of policies, plans, and programs (Cooper, 2011). Strategic level CEA can help frame, guide, and simplify project-level EIA (Connelly, 2011; Cooper, 2011).

Although cumulative effects can be more systematically addressed at the SEA level, there are also roles for CEA at the EIA project level. Project-level CEA can more systematically address indirect effects, reduce incremental contributions to cumulative effects, and place project impacts within the context of all potential impacts on receptors (Cooper and Sheate, 2004; Hinte et al., 2007). At the EIA level, CEA extends the IA process for projects. It emphasizes local project-based stressors and broadens the temporal and spatial scope of analysis to encompass other past, present, and likely future actions, (Dutta et al., 2004). There is some debate whether cumulative effects should be fully integrated into the EIA (assume all effects cumulative) or addressed in a separate section (own methodology, broader temporal and spatial boundaries, broader level of detail but still useful) (Bérubé, 2007; Duinker and Greig, 2006).

Regardless of the approach adopted, systematically including cumulative effects in project-level EIA enhances EIA practice (Connelly, 2011). However, CEA, at a project level, does not achieve a regional level of analysis and cannot effectively address regional issues such as environmental quality and biodiversity loss (Connelly, 2011; Duinker and Greig, 2006). SEA-level CEA can address cumulative effects at the source (policies and plans) (Johnson et al., 2011). It also has the temporal and spatial breadth necessary for encompassing cumulative effects that extend over long time periods and entail multiple sources

and pathways (Johnson et al., 2011). But CEA at a regional level, because it is retrospective, has limited predictive capabilities. It also often lacks an institutional "home base" and an "action-forcing" mechanism for ensuring that decision making is actually influenced (Gunn and Noble, 2009b).

The issue, therefore, is not so much whether CEA is best applied at the strategic or project level but how cumulative effects can be integrated into both levels in a holistic and complementary manner (Hacking and Guthrie, 2006; Thérivel and Ross, 2007). Multilevel CEA involves more than tiering whereby SEA-level CEA scopes and frames project-level CEA. Foresight and dialogue between levels are essential (Gunn and Noble, 2011). Oftentimes a multilevel, multiscale analysis is more consistent with regional and project planning as it actually occurs in practice (João, 2007).

7.6.7 Decision making, Implementation, and Management

CEA can facilitate acceptability decisions by placing development within an historical context and within possible future trends (Hegmann and Yarranton, 2011). It can provide decision makers with reliable predictions and help ensure that the pace and scale of development remain within regional capacities (Gibson, 2011; Hegmann and Yarranton, 2011). CEA-related decisions are facilitated when there is a shared regional vision regarding the future state of the environment and development (Gunn and Noble, 2009b). It tends to be more effective when it is sensitive to key decision windows and when it is broadly recognized as more than "adding up" environmental effects (Gunn and Noble, 2009b). CEA should contribute to decisions directed toward mutually reinforcing and lasting environmental gains (Gibson, 2011).

CEA impact management should encompass both incremental effects mitigation and local and regional effects management (Canter and Ross, 2010). For CEA impact management to be effective, there should be adequate institutional support for regional monitoring and follow-up and a high degree of collaboration among agencies and stakeholders (Noble, 2008). A CEA impact management system should be independent and tiered (Gibson, 2011; Noble, 2008). It should address both effects and compliance management, and the anticipation and recognition of emerging concerns (Gibson, 2011).

7.6.8 Future Actions

The gap between CEA theory and practice will be narrowed when and to the extent that there is additional institutional support, applied research, good practice guidance, tiering mechanisms, agency-stakeholder collaboration, CEA training and education, and regional monitoring and follow-up (Burdge, 2004; Canter and Ross, 2010; Gunn and Noble, 2011; Noble, 2008). The consciousness and skills of consultants, proponents, and regulators regarding CEA need to be raised (Duinker and Greig, 2006). Potential priorities for targeted research and pilot projects include such matters as the bridging of SEA and EIA in CEA, the establishment of cumulative effects thresholds and boundaries, the management of the uncertainties associated with cumulative effects, efficient and effective cumulative effects management measures including offsets, and the testing and refinement of CEA methods (Connelly, 2011; Dowlatabadi et al., 2003; Lien et al., 2011).

7.7 SUMMING UP

This chapter portrays a streamlined, efficient, and effective IA process—a practical process based on realistic expectations and competent practice. The three stories address practicality in different ways. The first story describes a formal and ambitious scoping process that effectively integrated a diversity of stakeholder perspectives. The second story describes how the use of intermediate reports provided a practical approach to strengthening SEA effectiveness and consistency. The third story provides a good practice example of cumulative effects assessment. All three stories underscore the importance of matching process to context. The stories provide only a partial and preliminary impression of how an IA process can become more practical.

The problem is the tendency for IA processes to be unfocused, disconnected from reality, weak on implementation, of variable quality, and slow to learn from experience and practice. Several concepts are introduced to make the IA process more focused, relevant, feasible, competent, and effective. The concepts provide the basis for practical IA requirements and practical IA processes. A practical IA process is assessed against ideal IA process characteristics.

IA documents too often are unfocused and excessively descriptive. IA processes frequently take too much (or too little) time and consume too many (or too few) resources. Planning and IA processes and theory and practice are still widely separated. IA processes sometimes are poorly adapted to context. They do not always adequately integrate stakeholder values and perspectives. IA processes could make better use of experience and good practice. They neglect the needs of decision makers. They can fail to facilitate implementation. Sometimes, they are poorly integrated with other environmental management instruments and with public policy making. There is too much variability in IA competence levels. They do not adequately maintain and enhance IA quality and effectiveness.

A practical IA process *focuses* on what is relevant and important. Focusing or scoping can be applied to IA institutional arrangements, to IA documents, and to IA process activities, inputs, and outputs. Scoping is based on clearly defined and consistently applied principles. It identifies the possibilities, decides what is important, shapes and structures the process, and involves interested and affected parties. Numerous scoping methods are available. Scoping roles are clearly defined. The conduct of scoping varies depending on context.

A practical IA process is grounded in practice and experience. It is *realistic*. A realistic IA process understands how decisions are made, how organizations operate, how organizations are structured, how people behave in organizations, and how organizational structures and procedures vary in different settings. It accounts for how practitioners operate and how knowledge is generated through practice. It is aware of how actions are integrated into decision making, how power is exercised, and how resources are allocated. It considers how actions are implemented, facilitated, inhibited, and prevented.

A practical IA process is *feasible*. It is workable. It can be undertaken and implemented. It is informed by concepts, guided by strategies, and aided by tactics. It merges the IA process with decision making, implementation, management, and context. It is linked to related tools and methods. It contributes to and is adapted to IA reforms. It is integrated with policies, plans, and programs, with organizational operations, with other decision-making levels, and with related instruments. It is harmonized with other governmental requirements and is coordinated with private sector and nongovernment organizational activities. It addresses interconnections among disciplines and professions. It is embedded within synthesis frameworks.

Competence is essential in a practical IA process. It pertains to the qualifications of participants and to the conduct of analyses. It includes the choice and execution of roles and responsibilities by project managers, specialists, proponents, governments, and the public, both individually and collectively. It includes such joint IA process activities as study team management, study team participation, database management, the application of geographic information systems, report writing, documentation, financial control, budgeting, and the preparation of work programs and schedules. It actively avoids and minimizes recurrent, avoidable, competence-related problems.

A practical IA process is *effective*. Effectiveness addresses how well the process worked. It concerns the quality of inputs (e.g., institutional arrangements, processes, methods, participant performance, documents) and the effectiveness of direct and indirect outputs (e.g., goals achievement, environmental changes, methodological performance, management performance, contribution to practice). IA quality and effectiveness analyses raise the level of IA practice. They distinguish between acceptability and performance levels. They provide an opportunity to correct deficiencies. They involve interested and affected parties. They provide a clear rationale for all interpretations and conclusions. They document results in a form suitable for enhanced practice.

A practical IA regulatory system harmonizes IA among government levels, ensures that the IA roles of government departments and agencies are well coordinated, focuses on what is important, minimizes unnecessary costs and delays, ensures an adequate level of IA competence, and contributes to enhanced IA practice. The four jurisdictions apply multiple methods to achieve these objectives. The diversity of approaches points to the potential benefits of knowledge sharing. Uncertainties regarding performance suggest the need for additional effectiveness analyses.

A practical IA process is focused, realistic, feasible, competent, and effective. It focuses from the outset on regulatory requirements and stakeholder issues. It is based on a well designed but flexible overall approach and study design. The approach includes procedures for involving governments, politicians, the public, and other stakeholders. The process is built around decisions. It is iterative and incremental. It involves debate, discussion, negotiation, review, reflection, analysis, synthesis, comparison, and bargaining among interested and affected parties. The process integrates ends, means, constraints, analyses, knowledge, methods, skills, experience, uncertainties, requirements, perspectives, and concerns. It operates within available resources, clearly defines roles and responsibilities, explores consequences and implications, provides a rationale for interpretations and conclusions, and is adapted to the context. It applies impact and uncertainty analyses, interpretation, and management to identify adequate and satisfactory options and to select and refine proposed actions. It prepares draft and final IA documents. It formulates impact management and implementation strategies. It is merged with approvals and implementation. It evaluates the effectiveness of direct and indirect outputs.

A practical IA process is supported by baseline analyses, by applied experience, and by practice-based knowledge. It applies experiments, pilot projects, feasibility analyses, and targeted research to refine and test interpretations and conclusions. It identifies residual uncertainties and their implications. Many activities in the process are recurrent or continuous (e.g., focusing, management, considering implementation, competence tests, integration, quality and effectiveness analyses, the incorporation of knowledge and experience, documentation). Close contact is maintained with interested and affected parties. Communications and participation focus on issues and perspectives directly bearing on decision making and implementation. A practical IA process effectively integrates practicality measures associated with different IA types.

The effective analysis and management of cumulative effects is essential in a practical IA process. Effective CEA begins at the regulatory level. The assessment of cumulative effects should be a requirement at the SEA and project EIA levels. Mechanisms need to be in place to harmonize (e.g., tiering) and coordinate the analysis and management of cumulative effects among government levels and across IA types. There should be sufficient requirements and guidance in place to ensure an adequate quality of CEA practice. The treatment of cumulative effects in IA practice should facilitate the realization of CEA objectives, be consistent with CEA good practice standards, and be appropriate to the context. Good practice CEA includes effective follow-up. It also should contribute to the CEA knowledge base.