Getting organized
Watershed management

- Phase 1 → getting organized
- Phase 2 → problem & opportunity identification
- Phase 3 → developing goals, objectives, & restoration alternatives
- Phase 4 → implementing, monitoring, evaluating, & adapting
Getting organized

- Phase 1 → getting organized
  - Setting boundaries
  - Forming an advisory group
  - Establishing technical teams
  - Establishing point of contact & a decision structure
  - Identifying funding sources
  - Facilitating involvement & information sharing among participants
  - Documenting the process

FISRWG, 1998
Getting organized

- Phase 1 → getting organized
  - Setting boundaries—geographical boundaries that outline the area of concern and provide a starting place to build community involvement
  - Factors to consider:
    - Boundaries should be relevant to ecological and geomorphological processes
    - The nature of human-induced disturbance, including the magnitude of its impact on the stream corridor
    - The social organization of people, including where opportunities for action are across the area

FISRWG, 1998
Getting organized

- Phase 1 → getting organized
  - Regarding the “social organization of people”
    - Often watershed management is driven by the community. Some issues that trigger the decision to develop a watershed plan are:
      - Flood protection
      - Increased development pressures
      - Recreation/aesthetics (e.g., river walks, boating, fishing, swimming)
      - Protection of drinking water sources
  - A bottom-up structure is emphasized

USEPA, 2008
Getting organized

- Phase 1 → getting organized
  - Forming an advisory group
    - The decision maker(s) forms the advisory group
    - Made up of key participants, including private citizens (e.g., grassroots organizations), public officials, public interest groups, economic interests, any other groups or individuals that would be affected by or are interested in restoration

FISRWG, 1998
Getting organized

- Phase 1 → getting organized
  - Forming an advisory group
  - Too small a group may be unrepresentative, but too large a group makes consensus building difficult → balance is needed

- The advisory group meets to:
  - Carry out restoration planning activities
  - Coordinate plan implementation
  - Identify public interest in the restoration effort
  - Make diverse viewpoints & objectives known to decision makers
  - Ensure that local values are taken into consideration during the restoration process

FISRWG, 1998
Getting organized

- Phase 1 → getting organized
  - Establishing technical teams
  - An interdisciplinary technical team is needed, e.g.,

- Decision Maker
  - Responsible for organizing the advisory group and for leading the stream corridor restoration initiative. The decision maker can be a single organization or a group of individuals or organizations that have formed a partnership. Whatever the case it is important that the restoration effort be locally led.

- Technical Team
  - Analyzing condition of stream corridor structure and functions.

- Advisory Group
  - Provides consensus-based recommendations to the decision maker based upon information from the technical teams and input from all participants.

- Technical Team
  - Analyzing social and cultural issues and concerns relevant to the stream corridor restorative initiative.

- Technical Team
  - Coordinating public outreach efforts and soliciting input from interested participants.

- FISRWG, 1998

- Foresters
- Legal consultants
- Botanists
- Microbiologists
- Engineers
- Hydrologists
- Economists
- Geomorphologists
- Archaeologists
- Sociologists
- Soil scientists
- Rangeland specialists
- Landscape architects
- Fish and wildlife biologists
- Public involvement specialists
- Real estate experts
- Ecologists
- Native Americans and Tribal Leaders
- Technical Team
  - Researching and evaluating funding options for the stream corridor restoration initiative.
Getting organized

- **Phase 1 → getting organized: establishing technical teams**

  Defining a gravel shoal (i.e., a riffle) from different perspectives...

<table>
<thead>
<tr>
<th>Manager</th>
<th>View</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineer</td>
<td>Control river morphology &amp; maintain efficient water transfer</td>
<td>Complex frictional component to model in a 1-D hydraulic model</td>
</tr>
<tr>
<td>Ecologist</td>
<td>Morphological components are viewed in isolation as habitat elements</td>
<td>Valuable spawning ground and area of water aeration</td>
</tr>
<tr>
<td>Geomorphologist</td>
<td>Studies landform nature, origin, process of development, and material composition</td>
<td>Part in sediment supply system → sediment transfer &amp; storage</td>
</tr>
</tbody>
</table>

Sear, 1994
Getting organized

- **Phase 1** → getting organized
  - Establishing technical teams

- Technical teams should represent:
  - Interagency interests
  - Public interests
  - Private interests

- Members of the technical teams can also be advisory board members
- They may also be decision makers

FISRWG, 1998
Getting organized

Phase 1 → getting organized

- The final advisory group and technical team members

Five categories of people involved:

1. People responsible for implementing the plan
2. People affected by plan implementation
3. People that can provide information on the issues & concerns in the watershed
4. People who have knowledge of existing programs or plans that you might want to integrate into your plan
5. People that can provide technical & financial assistance in developing & implementing the plan

Consider these entities:

1. Landowners
2. County or regional representatives
3. Local municipal representatives
4. American Indian tribes
5. Business & industry representatives
6. Citizen groups
7. Community service organizations
8. Religious organizations
9. Universities, colleges, & schools
10. Environmental & conservation groups
11. Soil & water conservation districts
12. Irrigation districts

USEPA, 2008
Getting organized

- Phase 1 → getting organized
  - The final advisory group and technical team members—commitment: FISRWG says that the process takes 2-3 years

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Spatial scale (m)</th>
<th>Temporal scale (years)</th>
<th>Geomorphic function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catchment</td>
<td>$10^1-10^6$</td>
<td>$10^4+$</td>
<td>Water/sediment cycling</td>
</tr>
<tr>
<td>Network</td>
<td>$10^0-10^5$</td>
<td>$10^3+$</td>
<td>Water/sediment transmission</td>
</tr>
<tr>
<td>Valley floor</td>
<td>$10^2-10^4$</td>
<td>$10^2-10^4$</td>
<td>Water/sediment storage</td>
</tr>
<tr>
<td>Floodplain</td>
<td>$10^1-10^3$</td>
<td>$10^2-10^3$</td>
<td>Water/sediment storage</td>
</tr>
<tr>
<td>Corridor</td>
<td>$10^0-10^3$</td>
<td>$10^1-10^2$</td>
<td>Wildlife transmission/storage</td>
</tr>
<tr>
<td>Meander</td>
<td>$10^1-10^2$</td>
<td>$10^1-10^2$</td>
<td>Water/sediment transfer/storage</td>
</tr>
<tr>
<td>Pool-riffle</td>
<td>$10^1-10^2$</td>
<td>$10^1-10^2$</td>
<td>Water/sediment transfer/storage</td>
</tr>
<tr>
<td>Bar</td>
<td>$10^0-10^2$</td>
<td>$10^0-10^2$</td>
<td>Sediment storage</td>
</tr>
<tr>
<td>Dune/Ripple</td>
<td>$10^{-1}-10^0$</td>
<td>$10^{-1}-10^0$</td>
<td>Sediment transfer</td>
</tr>
<tr>
<td>Particle</td>
<td>$10^{-2}-10^1$</td>
<td>$10^{-2}-10^2$</td>
<td>Fundamental sediment unit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Scale of operation (m)</th>
<th>Timescale (years)</th>
<th>Social function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geomorphology</td>
<td>$10^{-1}-10^6$</td>
<td>$10^{-1}-10^4+$</td>
<td>Strategic planning/Design</td>
</tr>
<tr>
<td>Ecology/Biology</td>
<td>$10^1-10^3$</td>
<td>$10^0-10^1$</td>
<td>Conservation/Restoration</td>
</tr>
<tr>
<td>Chemistry</td>
<td>$10^2-10^3$</td>
<td>$10^{-1}-10^1$</td>
<td>Quality Control</td>
</tr>
<tr>
<td>Engineering</td>
<td>$10^0-10^3$</td>
<td>$10^0-10^2$</td>
<td>Protection/Control</td>
</tr>
<tr>
<td>Landscape</td>
<td>$10^2-10^3$</td>
<td>$10^0-10^1$</td>
<td>Restoration/Protection</td>
</tr>
<tr>
<td>Economy</td>
<td>$10^1-10^3$</td>
<td>$10^0-10^1$</td>
<td>Quality Control—value for money</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Individual</th>
<th>Scale of influence (m)</th>
<th>Time of influence (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Politician</td>
<td>$10^{-2}-10^6$</td>
<td>$10^0-10^2$</td>
</tr>
<tr>
<td>Human</td>
<td>$10^{-2}-10^3$</td>
<td>$10^0-10^2$</td>
</tr>
</tbody>
</table>

Sear, 1994
Getting organized

- Phase 1 → getting organized
  - Establishing point(s) of contact & a decision structure
  - Develop basic protocols
    - Select officers
    - Establish ground rules
    - Establish a planning budget
    - Appoint technical teams

FISRWG, 1998
Getting organized

- Phase 1 → getting organized
  - Identifying funding sources
    - Public → state and federal funds available through various sources; matches/cost-sharing may be required
    - Private → landowner contributions, donors
  - The funding agency will likely influence restoration decisions or be the decision maker

FISRWG, 1998
Getting organized

- Phase 1 → getting organized

- **Resources**
  - USEPA [http://www.epa.gov/efinpage/guidebook.htm](http://www.epa.gov/efinpage/guidebook.htm)
  - USEPA [http://cfpub.epa.gov/fedfund/](http://cfpub.epa.gov/fedfund/)
  - National Park Service [http://www.nps.gov/plants/restore/funding.htm](http://www.nps.gov/plants/restore/funding.htm)
  - River Network—private funding (membership required) [http://www.rivernetwork.org/](http://www.rivernetwork.org/)
Getting organized

- Phase 1 → getting organized
  - Facilitating involvement & information sharing among participants

### Tools for Facilitating Participant Involvement and Information Sharing During the Restoration Process

<table>
<thead>
<tr>
<th>Tools for Receiving Input</th>
<th>Tools for Informing Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Public Hearings</td>
<td>- Public Meetings</td>
</tr>
<tr>
<td>- Task Forces</td>
<td>- Internet Web Sites</td>
</tr>
<tr>
<td>- Training Seminars</td>
<td>- Fact Sheets</td>
</tr>
<tr>
<td>- Surveys</td>
<td>- News Releases</td>
</tr>
<tr>
<td>- Focus Groups</td>
<td>- Newsletters</td>
</tr>
<tr>
<td>- Workshops</td>
<td>- Brochures</td>
</tr>
<tr>
<td>- Interviews</td>
<td>- Radio or TV Programs or Announcements</td>
</tr>
<tr>
<td>- Review Groups</td>
<td>- Telephone Hotlines</td>
</tr>
<tr>
<td>- Referendums</td>
<td>- Report Summaries</td>
</tr>
<tr>
<td>- Phone-in Radio Programs</td>
<td>- Federal Register</td>
</tr>
<tr>
<td>- Internet Web Sites</td>
<td></td>
</tr>
</tbody>
</table>

FISRWG, 1998
Getting organized

- Phase 1 ➔ getting organized
  - Facilitating involvement & information sharing among participants
    - The following tables from *Integrated Watershed Management* highlight:
      - Techniques for information dissemination
      - Techniques for receiving information
      - Two-way communication techniques—small group meetings, large group meetings, and detached techniques (correspondence, TV, radio, telephone hot line)

Heathcote, 2009
Getting organized

- **Phase 1 → getting organized**
  - Facilitating involvement & information sharing among participants

<table>
<thead>
<tr>
<th>Table 4.2</th>
<th>Techniques for Information Dissemination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technique</td>
<td>Description</td>
</tr>
<tr>
<td>Public Information Meeting</td>
<td>Large open meeting to inform public about proposed agency action.</td>
</tr>
<tr>
<td>Open House</td>
<td>An informal, all-day opportunity for public to tour displays and chat with agency representatives.</td>
</tr>
<tr>
<td>Permanent Information Center</td>
<td>A permanent office where interested citizens can chat with staff and pick up project information.</td>
</tr>
</tbody>
</table>

(Continues)
Getting organized

- **Phase 1 → getting organized**
  - Facilitating involvement & information sharing among participants

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**Table 4.2 (Continued)**

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Room Setup</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newsletters</td>
<td>Regular information releases from the project team, usually mailed to a specific distribution list.</td>
<td>Not applicable.</td>
<td>Allows dissemination of more detailed information than is usually possible in meetings. Provides continuity and builds profile.</td>
<td>Costly to edit and produce. Readership may be much less (or more) than distribution. High costs may limit distribution and, thus, impact.</td>
</tr>
<tr>
<td>Information Brochures</td>
<td>Printed booklets with brief descriptions of project activities and progress, distributed in schools, libraries, and by mail on request.</td>
<td>Not applicable.</td>
<td>An easy-to-understand format for the lay reader. Provides a permanent record of project activities for later reference.</td>
<td>May oversimplify complex issues. Time-consuming and costly to produce. Costs may limit distribution and, thus, impact.</td>
</tr>
<tr>
<td>Newspaper Articles</td>
<td>Easily understood articles about the project in local newspapers.</td>
<td>Not applicable.</td>
<td>Reaches a wide audience at no cost to the project. A very useful method of announcing future meetings and other events.</td>
<td>Reporter may not present issues as the project team would like to see them presented. Project credibility and trust can be damaged by “bad press.”</td>
</tr>
<tr>
<td>Television and Radio Coverage</td>
<td>Very brief (usually less than one minute) overviews of project goals and activities.</td>
<td>Not applicable.</td>
<td>Reaches a wide audience at no cost to the project. Excellent way to raise project profile; especially useful for key events.</td>
<td>Coverage is very brief and may trivialize complex issues. Reporter may not present issues or events as the project team would like to see them presented.</td>
</tr>
</tbody>
</table>

Heathcote, 2009
Getting organized

- **Phase 1 → getting organized**
  - Facilitating involvement & information sharing among participants

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Room Setup</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Hearing</td>
<td>Formal public meeting held in courtroom-like setting. Sometimes required by law.</td>
<td>Usually courtroom setting (chair or tribunal presides over meeting, with many participants seated in rows).</td>
<td>Provides a formal mechanism for the public to ask questions and voice concerns before agency representatives. Many participants may make presentations at a hearing. Relatively inexpensive.</td>
<td>Usually a one-time event that does not allow participants to see direct results of their presentations. Can be excessively formal and adversarial and thus may discourage participation. Costs may rise if legal representation becomes necessary or the hearing is prolonged.</td>
</tr>
<tr>
<td>Surveys</td>
<td>Formal assessment of public views on key issues using mailed, telephone, or in-person questionnaires.</td>
<td>Not applicable.</td>
<td>Properly designed, a good survey produces quantitative data on public attitudes and values. Can be a cost-effective way of determining the opinions of a large number of people.</td>
<td>Costly to prepare and distribute. Requires an expert for questionnaire design (improperly worded questions may result in answers that are difficult to interpret or that do not address the issue of interest.)</td>
</tr>
<tr>
<td>Key Informant Interviews</td>
<td>Agency staff conduct detailed interviews with people who are considered central to the project or the decision-making process.</td>
<td>Interviews can be conducted in any small private location such as a private office, home, or restaurant.</td>
<td>Provides a detailed and immediate assessment of how various interests want to be involved in the process, and about their interests and concerns. Allows the building of personal relationships with those who may be key later in the process.</td>
<td>Clumsy interviewing style can alienate key informants, who may also be key participants. Key informants may not necessarily represent wider public opinion. Expensive and time-consuming.</td>
</tr>
</tbody>
</table>

Heathcote, 2009
Getting organized

- **Phase 1 → getting organized**
  - Facilitating involvement & information sharing among participants

Table 4.4 Two-way Communication Techniques

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Room Setup</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Presentations</td>
<td>Formal or informal presentations to local groups by agency representatives or specialists, with opportunity for open discussion provided.</td>
<td>Depends on size of group. Up to 30 people may be accommodated around a large table. Larger groups should be set up in auditorium style.</td>
<td>Efficient, usually inexpensive method of transferring information. Smaller groups allow good opportunity for discussion of issues and concerns, and for answering specific technical or process questions.</td>
<td>May have to be repeated many times with different groups to capture the desired audience; thus potentially costly and demanding of staff time. Groups may vary in their response, but format does not allow resolution of differences or building of consensus.</td>
</tr>
<tr>
<td>Joint Field Trips</td>
<td>Visits to sites where action is proposed or problems exist. Participation by a range of interested publics with agency representatives.</td>
<td>Usually requires some form of transportation, depending on size of group (e.g., minivan, small bus, car pooling) but no other facilities needed.</td>
<td>Excellent opportunity for joint evaluation of site conditions. Small group size can facilitate sense of team building and trust. May be required under some legislation.</td>
<td>Can be costly, depending on location of site and nature of transportation. Benefit usually limited to a small group of potential participants. Visit may not reveal all major issues or concerns.</td>
</tr>
<tr>
<td>Working Committee</td>
<td>Citizen representatives are included in the committee structure of the project and work on project tasks alongside agency representatives.</td>
<td>Usually boardroom setup, with chairs organized around a table large enough to accommodate the expected number of participants.</td>
<td>Reduces need for costly public meetings and open houses. Builds expertise in the public. Face-to-face contact on a regular basis can build trust and respect on both sides. Can open up and resolve other community issues.</td>
<td>The need to keep committee membership small limits number of public who can participate; not all viewpoints may be represented. Agenda may drift to unrelated topics. Different levels of technical preparation may demand a long learning curve for the committee and slow progress.</td>
</tr>
</tbody>
</table>

Heathcote, 2009
Getting organized

- Phase 1 → getting organized
  - Facilitating involvement & information sharing among participants

### Table 4.4 (Continued)

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Room Setup</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshops</td>
<td>Small-group meetings with a mixture of presentation and hands-on activities, designed to address specific issues or learn about new concepts.</td>
<td>Seminar setting, with desks or tables arranged informally before a podium. Format may change as workshop progresses from formal presentations to working sessions.</td>
<td>Intimate, informal atmosphere encourages learning. Allows building of trust among participants. A good approach for joint evaluation of data or new institutional options. Creates a sense of equality and teamwork among participants.</td>
<td>Must be well focused, usually on a single issue or task. Benefits from leadership by a trained facilitator. Without these elements, the workshop may drift and fail to produce useful results.</td>
</tr>
<tr>
<td>Public Meeting</td>
<td>Large open meeting to present information about proposed activity and provide a forum for public commentary.</td>
<td>Auditorium set up, with seating for large number of participants and front podium for presentations.</td>
<td>Efficient, usually inexpensive method of meeting with a large number of people. Allows many viewpoints to be heard in a large public forum.</td>
<td>Impersonal and distant. Attracts only those with the time and interest to come. Can be difficult to control if audience becomes restless or hostile to proposals.</td>
</tr>
<tr>
<td>Litigation</td>
<td>Legal action (lawsuit) between two parties, conducted before a judge in a courtroom setting.</td>
<td>Courtroom setting.</td>
<td>Allows for systematic presentation of information by both sides in a disagreement. Impartial arbirer (judge) decides case on the basis of evidence presented.</td>
<td>Time-consuming, costly, and strongly adversarial. Destroys trust and confidence in opponent. May not resolve all key issues in the dispute, yet may create significant barriers to future progress.</td>
</tr>
</tbody>
</table>
Getting organized

- Phase 1 $\rightarrow$ getting organized
  - Facilitating involvement & information sharing among participants

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**Detached Techniques**

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exchange of Views by Correspondence</td>
<td>An exchange of letters, e-mail, videotape, or audiotape in which questions are asked by one side and responded to by the other side.</td>
</tr>
<tr>
<td>Television or Radio Phone-In Programs</td>
<td>A TV or radio host and guest(s) invite and respond to questions and comments phoned in by members of the public.</td>
</tr>
<tr>
<td>Appropriate broadcast facilities.</td>
<td></td>
</tr>
</tbody>
</table>

- Allows systematic evaluation of a range of issues. No time pressure, so format allows research to be conducted before response must be prepared. Inexpensive. Yields accurate information on technical issues and concerns about process.
- Open to any interested participants. Anonymity may encourage callers to ask difficult or controversial questions. Reaches a very wide audience at no cost to the project. Good for raising project profile.
- Remote and distant, so does not build trust among the parties. No joint analysis of data, so misconceptions or misinterpretations may occur. Format limits responses to questions asked, so related community issues may not be raised or resolved.

- Brief questions and answers may oversimplify complex issues. Format is very difficult to control—agency representative may end up in the “hot seat,” answering questions that were not anticipated or are unrelated to the advertised topic. Poor responses can create an impression of incompetence or indifference.

*Heathcote, 2009*
Getting organized

- **Phase 1 → getting organized**
  - Facilitating involvement & information sharing among participants

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Room Setup</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Ombudsman or Advocate</td>
<td>A respected individual is appointed as liaison between the public and the agency on environmental/planning matters.</td>
<td>Office and meeting space for the ombudsman and any associated staff.</td>
<td>If public mistrust of government is high, an ombudsman can create a bridge between the public and the agency. One-to-one contact allows detailed discussion of concerns in an informal setting.</td>
<td>Costly (because of staff and resource demands). Ombudsman may not be seen as truly impartial or trustworthy by public or agency and therefore may not have all requisite information. Ombudsman’s power to resolve disputes may be limited.</td>
</tr>
<tr>
<td>Public Cleanup Events</td>
<td>The public is invited to spend a weekend cleaning up some valued local site (beach, river) under the auspices of the project.</td>
<td>None. Refreshments may be provided for participants.</td>
<td>Very attractive to the media and to the public. Creates a sense of personal contribution to a community goal. Generally low in cost, although some staff supervision is advisable. Raises public profile of the planning exercise.</td>
<td>Event achieves primarily cosmetic effects and does not usually resolve fundamental issues of resource management or impaired environmental quality. Turnout may be disappointing in poor weather, and the media may interpret this as lack of public interest in the project.</td>
</tr>
<tr>
<td>Telephone Hot Line</td>
<td>Dedicated telephone line staffed by knowledgeable agency personnel. Interested members of the public may call at any time and have questions answered.</td>
<td>Requires office space and one or more dedicated telephone lines.</td>
<td>Convenient and easy to use. A good way for the public to obtain information about forthcoming events and meetings.</td>
<td>Inadequate knowledge on the part of staff can lead to an impression of incompetence or indifference. If callers must be directed to another individual to have a question answered, there may be a sense of “getting the runaround.” Relatively costly as compared with other methods.</td>
</tr>
</tbody>
</table>

Heathcote, 2009
Getting organized

- **Phase 1 ➔ getting organized**
- **Documenting the process**
  - The watershed plan is the ultimate document, but the checklist tracks useful info throughout the entire process

---

**Restoration Checklist (Adapted from National Research Council 1992)**

**During Planning...**
- Has all potential participants been informed of the restoration initiative?
- Has an advisory committee been established?
- Have funding sources been identified?
- Has a decision structure been developed and points of contact identified?
- Have steps been taken to ensure that participants are included in the restoration processes?
- Has the problem that requires treatment been investigated and defined?
- Has consensus been reached on the mission of the restoration initiative?
- Have restoration goals and objectives been identified by all participants in the restoration effort?
- Has the restoration been planned with adequate scope and expertise?
- Has the restoration plan had an annual or mid-course correction point in line with adaptive management procedures?
- Have the indicators of stream corridor structure and function been directly and appropriately linked to the restoration objectives?
- Have adequate monitoring, surveillance, management, and maintenance programs been specified as an integral part of the restoration plan? Have monitoring costs and operational details been integrated so that results will be available to serve as input in improving techniques used in the restoration work?
- Has an appropriate reference system (or systems) been selected from which to extract target values of performance indicators for comparison in conducting the evaluation of the restoration initiative?
- Have sufficient baseline data been collected over a suitable period of time on the stream corridor and associated ecosystems to facilitate before-and-after treatment comparisons?
- Have critical restoration procedures been tested on a small experimental scale to minimize the risks of failure?
- Has the length of a monitoring program been established that is sufficiently long to determine whether the restoration work is effective?
- Have risk and uncertainty been adequately considered in planning?
- Have alternative designs been formulated?
- Have cost-effectiveness and incremental cost of alternatives been evaluated?

**During Project Implementation and Management...**
- Based on the monitoring result, are the anticipated intermediate objectives being achieved? If not, are appropriate steps being taken to correct the problem(s)?
- Do the objectives or performance indicators need to be modified? If so, what changes might be required in the monitoring program?
- Is the monitoring program adequate?

**During Postrestoration...**
- To what extent were restoration plan objectives achieved?
- How similar in structure and function is the restored corridor ecosystem to the reference ecosystem?
- To what extent is the restored corridor self-sustaining (or will be), and what are the maintenance requirements?
- If all stream corridor structure and functions were not restored, have the critical structure and functions been restored?
- How long did the restoration initiative take?
- What lessons have been learned from this effort?
- Have those lessons been shared with interested parties to maximize the potential for technology transfer?
- What was the final cost, in net present value terms, of the restoration work?
- What were the ecological, economic, and social benefits realized by the restoration initiative?
- How cost-effective was the restoration initiative?
- Would another approach to restoration have produced desirable results at lower cost?
References