APPENDIX B

ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGIES
## APPENDIX B. ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGIES

<table>
<thead>
<tr>
<th>Name</th>
<th>Application</th>
<th>Description</th>
<th>Reference</th>
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<tbody>
<tr>
<td><strong>Economic Tools</strong></td>
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<tr>
<td><strong>Checklists</strong></td>
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<tr>
<td>World Bank Environmental Impact Checklist</td>
<td>Scoping, Development of Alternatives, Mitigation</td>
<td>These checklists are designed to be used in identifying significant environmental impacts, project alternatives, and special issues associated with development projects. They are qualitative and predictive in nature. More than 35 types of projects are represented, including housing, agriculture, and industrial development.</td>
<td>World Bank, 1991. Environmental Assessment Sourcebook. Volumes II and III.</td>
</tr>
<tr>
<td>Model EIS scoping checklist NY DEC</td>
<td>Scoping</td>
<td>This is a checklist of topics intended to initiate development of a detailed scope for an EIS. The checklist helps identify topic areas to be addressed in the EIS.</td>
<td>New York State Department of Environmental Conservation, 1982. State Environmental Quality Review Handbook.</td>
</tr>
<tr>
<td>Checklist of potential environmental impacts of transportation project</td>
<td>Scoping</td>
<td>This checklist was designed to help identify environmental impacts associated with planning, design, construction, and operation of a transportation project.</td>
<td>Arthur D. Little, Inc. 1971. Transportation and the Environment: Synthesis for Action: Impact of the National Environmental Policy Act of 1969 on the Department of Transportation, Vol. I-III, prepared for the Office of the Secretary, Department of Transportation.</td>
</tr>
</tbody>
</table>
### Matrices

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Impact Assessment</th>
<th>Description</th>
<th>Reference</th>
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<tbody>
<tr>
<td>Leopold Matrix</td>
<td>Impact Assessment</td>
<td>This matrix is used to identify potential impacts associated with a project or alternatives. It assists performing a comprehensive review of the variety of interactions between project elements and environmental parameters, to identify important environmental factors, data needs, and less damaging alternatives.</td>
<td>Leopold, L. B., F. E. Clarke, B. B. Hanshaw, and J. R. Balsley. 1971. A procedure for evaluating environmental impact. Circular 645. U.S. Geological Survey, Washington, D.C.</td>
</tr>
<tr>
<td>Loran Methodology</td>
<td>Impact Assessment</td>
<td>This method uses a matrix of 234 project activities and 27 environmental features to identify critical environmental areas. Each element in the matrix is scaled and results input to an algorithm that aggregates impact scores. It is used to identify critical environmental areas.</td>
<td>Thompson, M. A. 1990. Determining impact significance in EIA: a review of 24 methodologies. Journal of Environmental Management 30:235-250.</td>
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</tbody>
</table>

### Scaling or Weighing Techniques

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<tr>
<th>Methodology</th>
<th>Impact Assessment</th>
<th>Description</th>
<th>Reference</th>
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<tr>
<td>Crawford Methodology</td>
<td>Impact Assessment</td>
<td>Methodology was devised for use in highway route planning. It makes extensive use of public involvement and the Delphi Technique. The technique is used as a basis for analyzing the value trade-offs involved in a decision between project alternatives. Results show each alternative as a percentage of maximum possible positive or negative impact.</td>
<td>Thompson, M. A. 1990. Determining impact significance in EIA: a review of 24 methodologies. Journal of Environmental Management 30:235-250.</td>
</tr>
<tr>
<td>Fischer and Davis</td>
<td>Impact Assessment</td>
<td>This method is used for determination of impact, although it does not differentiate between impact magnitude and significance. Impacts are assigned a positive(+) or negative(-), and the degree of impact is assigned subjectively. Designators are used to indicate short-term or long-term impacts. Scores achieved are used to compare alternatives.</td>
<td>Thompson, M. A. 1990. Determining impact significance in EIA: a review of 24 methodologies. Journal of Environmental Management 30:235-250.</td>
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<tr>
<td>Ground Disturbance Model</td>
<td>Impact Assessment</td>
<td>This GIS-based tool is a model that combines GIS database layers of land-cover, slope categories, and transportation to quantify and map the area of potential land disturbance into 5 levels of magnitude.</td>
<td>Rasmussen, W. O., R. N. Weisz, P. F. Folliott, and D. R. Carder. 1980. Planning for forest roads—a computer assisted procedure for selection of alternative corridors. Journal of Environmental Management 11: 94-104.</td>
</tr>
<tr>
<td>Visual Contrast</td>
<td>Impact Assessment</td>
<td>This GIS-based tool provides a measure of visible change in the landscape. It combines GIS data for landcover, terrain, land-use and the proposed project description to map a visual contrast representing the level of change in the characteristic landscape.</td>
<td>Jensen, J., and G. Gault. 1992. Electrifying the impact assessment process. The Environmental Professional 14:50-59.</td>
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</tbody>
</table>
### Overlay Mapping and GIS

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<thead>
<tr>
<th>Model</th>
<th>Impact Method</th>
<th>Description</th>
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<tbody>
<tr>
<td>Visibility Model</td>
<td>Impact Assessment</td>
<td>This GIS model is constructed using digital terrain data and selected land-uses to map &quot;viewsheds&quot; over digitally modeled terrain in the project study area. Resulting maps show visibility as distance thresholds of visual perception, and can be used by GIS impact models to determine potential visual impacts of construction and operation of the project.</td>
<td>Jensen, J., and G. Gault. 1992. Electrifying the impact assessment process. The Environmental Professional 14:50-59.</td>
</tr>
<tr>
<td>Public Accessibility Model</td>
<td>Impact Assessment</td>
<td>This GIS-based tool estimates the degree of remoteness of areas along transmission line routing alternatives. It uses GIS data on transportation and ground disturbance to estimate the increase in area accessible by roads in remote areas.</td>
<td>Jensen, J., and G. Gault. 1992. Electrifying the impact assessment process. The Environmental Professional 14:50-59.</td>
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### Chemical Fate and Transport Models

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## Chemical Fate and Transport Models

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<thead>
<tr>
<th>Models</th>
<th>Impact Analysis and Prediction</th>
<th>Description</th>
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<tbody>
<tr>
<td>Fish Uptake and Food Chain</td>
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<td>Variety of models used to estimate concentrations of chemicals in aquatic</td>
<td>Mackay, D., and S. Paterson. 1993. Exposure Assessment: Mathematical Models of transport and</td>
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<td>Michigan.</td>
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<td><strong>Chemical Fate and Transport Models</strong></td>
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<tr>
<td><strong>Sensitivity Analysis</strong></td>
<td>Decision Making</td>
<td>This technique identifies the parameter or variable of a model that is most sensitive to change. Use of this technique helps modelers and decision-makers understand how changes to input of an analysis affects the predicted impact of a proposed action.</td>
<td>Jorgensen, S. E. 1991. Environmental management modeling. In: Introduction to Environmental Management (eds. P. E. Hansen and S. E. Jorgensen). Elsevier, New York. 403 pp.</td>
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<tr>
<td><strong>Field Studies</strong></td>
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<th><strong>Chemical Fate and Transport Models</strong></th>
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<td><strong>Field Reconnaissance</strong></td>
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<td><strong>Field Survey</strong></td>
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<td>Chemical Fate and Transport Models</td>
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<td>Inter-disciplinary team development</td>
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