

## Introduction

### 13.1 What This Part Includes

Part II explains why fuzzy sets and fuzzy logic overcome the inherent limitations of the traditional approach to environmental impact assessments. This part demonstrates how the modern approach works. The example is based on an environmental impact assessment conducted under the rules of the Washington State Environmental Policy Act (SEPA) by a large team lead by the JD White Co. [2].<sup>1</sup> The actual environmental impact assessment was done the traditional way as described in Part I. Much of the information required to apply the fuzzy logic approach in an actual assessment is missing from the written report.

Because the example was not designed or carried out based on requirements of the modern approach to a real environmental impact assessment, liberties are taken to generate required missing data and not all components are included in this demonstration model. However, using a real situation as a base is better than using a completely contrived situation.

There are many expert system shells available as proprietary or open source distributions. Some are useful for fuzzy logic and others are not. There are also tools, such as MatLab<sup>®</sup>, SciLab, and Octave (the

---

<sup>1</sup> The author of this book did not participate in any aspect of the SEPA process. All information for this example is extracted from the written document made available to the public.

latter two are open source equivalents of the first application) that are general mathematical and simulation solution packages. All of these have fuzzy logic components available. However, the software used in the example in this part is a proprietary system called FuzzyEI-Assessor™.

## 13.2 Description of the Project

The Port of Vancouver (USA) occupies the north bank of the Columbia River between the Interstate 5 bridge and a state wildlife refuge several miles to the west (Figure 13.1 on the next page). The Columbia Gateway area consists of 1,094 acres of land, designated by the port as Parcel 2 (35 acres), Parcel 3 (517 acres), Parcel 4 (112 acres), and Parcel 5 (430 acres). The Columbia Gateway river frontage spans Columbia River Miles (RM) 100-102 (Figure 16.1 on page 220). The port's intended use of this site was for planned development of water-related, heavy, and light industrial uses. Parcels 2 and 3 were designated for heavy industrial (MH) use and parcels 4 and 5 were designated light industrial (ML) by the City of Vancouver Zoning Ordinance; this fit into the port's growth plans for the site.

All environmental impact assessments conducted under the Washington State Environmental Act (and the federal National Environmental Act) begin with statements of purpose and need. These statements establish the rationale for development of a project or site. They also put the example environmental impact assessment into context with the location and regional setting.

## 13.3 Purpose

As part of its long-term planning process, the Port determined that development of Columbia Gateway would be necessary to meet its mission of providing economic benefit to the community through leadership, stewardship, and partnership in marine and industrial development.

The purpose of developing Columbia Gateway was to—

- Fulfill the port's mission of economic development.