$paratext[1Level]

1 Scientific Logic and the Environmental Review Process

The Baseline Study In Environmental Conflict Resolution

1-1 Introduction

Environmental problems result from man-made insults associated with the design and management of synthetic, engineered systems nested within the natural ecosystems.

1-3 Legislative Standards

As a "bug picking zoologist, my understanding has come not from formal academic education, but rather from the empirical experience as chairman of the Michigan Environmental Review Board of the State of Michigan. Currently, there exists three alternative mechanisms to resolve environmental conflicts in our state.

For those classes of environmental issues where the mechanisms are known and stimulus-response curves have been scientifically established, rules and regulations can be embodied in legislation and enforced by traditional activities. In general, damage functions must be directly observable and easily measured.

1-4 *Michigan Environmental Protection Act*

Legislation was adopted in 1971 through the efforts of Dr. Joseph Sax, law professor, and Tom Anderson, state legislator, that makes it legal for a citizen to sue any federal, state, industry, municipality or other individual for something called "unreasonable pollution."Furthermore, "unreasonable pollution" was purposefully not defined. If formal standards do exist, they can be utilized as baseline measurements of reasonable behavior, otherwise the judge may set standards based on social necessity.

The wetlands were classified into types, mapped and areal extents determined. Total vegetated wetlands in Willapa Bay and its contiguous drainage area were estimated to be about 6,000 hectares. Of this total, about 2,500 hectares have been diked for various purposes. Some of the diked areas remain as agricultural grasslands still under some tidal influence, while others have been filled to become uplands. All are partially or wholly removed form directly interacting as a part of the estuarine ecosystem (Table 1).

Projections in Table 2 were developed directly in response to pressures to quantify impacts on natural systems. Lack of specific information and hesitancy to project or extrapolate data is easily interpreted as a lack of real significance by the non-biologist. The complexity and interrelatedness of a natural system cannot be conveyed easily in the context of a typical study exercise. We have progressed from answering the question of "What biota are affected?" to "How are these biota affected (qualitatively)?" to "How much are these biota affected (qualitatively)?" This last question is exemplified in the above table of biomass data. The next question we will

have to deal with requires contrasting the relative amount of affected biota to that of unaffected biota. Loss of several thousand Dungeness crabs to a hopper dredge in an embayment during one day's dredging should sound significant, but when related to the entire 259 square kilometer estuary and the knowledge that one crab will produce in excess of one million offspring per year, this premise is open to question.

Concurrent with the environmental analyses, economic analyses of the dredging project were also completed. Suffice it to say that annual benefits were found to be $333,300 compared to annual costs of $593,000. Less than 10 full-time jobs in the local community were found to be dependent on shipping commerce using the main navigation channel.

1-5 *Study Findings*

A very abbreviated review of a few major findings is sufficient for discussing how technical environmental information is (or is not) input to the planning process. Wetlands extent in Grays Harbor, summarized in Table 3, provides a data base for some first order conclusion.

One of the rarest salt marsh types in the harbor, sedge marsh, has been most frequently diked and/or filled for disposal of dredged material. In fact, its present rarity is due in some measure to dredging and filling—not because of any insidious desire to fill the rarest habitat areas, but simply because sedge marshes occur (ed) in the inner harbor where developable land is most coveted and ample dredged material has been available as fill. Some of these fills have evolved into present sedge marshes although usually of lesser area

than before. An added

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			and inventory studies showed a rather important dependence of

Table 1: Lakes Studied

Name
Continent
Area
Depth
Caspian Sea
Asia-Europe
143,244
3,363
Superior
North America
31,700
1,330
Victoria
Africa

26,828
270
Aral Sea
Asia
24,904
220
Huron
North America
23,000
750
Michigan
North America
22,300
923
Tanganyika
Africa
12,700
4,823
Baykal
Asia
12,162
5,315
Great Bear
North America
12,096
1,463
Malawi
Africa
11,150
2,280
Great Slave
North America
11,031
2,015
Erie
North America
9,910

210
Winnipeg
North America
9,417
60
Ontario
North America
7,550
802
Balkash
Asia
7,115
85
Ladoga
Europe
6,835
738
Chad
Africa
6,300
24
Maracaibo
South America
5,217
115
Onega
Europe
3,710
328
Eyre
Australia
3,600
4
Volta
Africa
3,276
—

Titicaca
South America
3,200
922
Nicaragua
North America
3,100
230
Athabasca
North America
3,064
407
Reindeer
North America
2,568
720
Turkana
Africa
2,473
240
Issyk Kul
Asia
2,355
2,303
Name
Continent
Area
Depth