

RESTORATION OF THE COAST: A PROPOSAL FOR POSITIVE TECHNOLOGY TRAINING

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Introduction

The coastal habitats and estuaries of the world's oceans have been modified by man's activities for centuries in the old world and for decades in the new world. When natural products and manufactured goods began to be shipped by sea between ports on the Mediterranean and European coasts, harbours developments became necessary for docking and loading facilities. The great harbours at the river mouth cities such as London, Amsterdam, and Rome converted estuarine mudflats and marshes to docks built of stone and timber. The natural productivity of algae and invertebrates in these habitats, used in the food webs supporting fish and birds, have been lost for centuries in these areas. The loss of coastal habitats owing to shipping activities began in North America in the 19th Century (e.g. New York harbour and San Francisco Bay). In Asian countries such as Japan the loss of habitat because of construction of shipping facilities increased significantly in this century. Relative to older docking facilities, which were usually along the margins of an estuary, more habitat is damaged construction of the modern seaport because of requirement for extensive backup land.

Environmental policies in many countries are at present encouraging the reversal, or at least cessation, of the trend toward habitat loss on the coastal zone. Restoration is possible with existing technology, directed in a positive fashion and focusing on the management of ports and harbours. There is scope for international cooperation to improve the efficiency of this process and the International University for the Bio-Environment (I.U.B.E.) could have an improved role in achieving this goal. The bio-management of ports can be improved by better communication between engineers and biologists. If training at the I.U.B.E. were organized so that bioengineering became part of the curriculum, the University could contribute to the goal.

A course could be developed which dealt with the principles of bio-management of ports and harbours, with emphasis on restoration of biological diversity and productivity. The following are some topics which could fit into the syllabus of such a course:

- Estuarine ecology
- Designing harbours to maximize biological productivity
- Restoration and development of critical habitats, e.g. seagrass beds and mangroves during harbour modifications.
- Circulation patterns in relation of harbour structures (quays, causeways)
- Oil spill cleanup and international regulations
- Transport of organisms from one port to another in ballast water of ships and ways to prevent inter-continental movement of harmful organisms
- Constructive use of dredge spoil (islands, pits)
- Disposal of contaminated spoil from abandoned harbours
- Ocean dumping regulations
- Design of channels and turning basins
- Sedimentation: longshore drift, riverborne sediment, slumping
- Waves and tsunamis
- Biological and engineering aspects of tides
- Landscape analysis

The course could also be organized under more general headings such as:

- Bio-management of world harbours
- Principles of estuarine ecology
- Principles of harbour design and coastal engineering
- Ecological hydraulic models
- Design of new harbours
- Redesign of existing harbours

- Improving management of existing harbours
- Restoring productivity of abandoned harbours

Summary of proposal

For effective implementation of restoration policies in harbours, biologists must work with engineers who are designing new facilities and maintaining existing ones. Training at the proposed International University for the Bio-Environment could help overcome this communication gap, as shipping and harbour construction is a classical international activity with major biological implications. In some countries there are opportunities for exchange of information between biologists and engineers (e.g. Coastal Zone conferences). However, these tend to deal with specific studies and not organized for students. In general there are no fora which provide for exchange of information between engineers and biological scientists in different countries. Nevertheless, port development in one country often is directly tied in with harbour construction in another, resulting in cumulative, international impacts.

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