Ecosystem Approaches in Canadian Waters

- As DFO's management focus expands to encompass more integrated management of human activities in the oceans, and as knowledge of links between climate, ecosystems and fishery productivity has increased, the need for much broader knowledge of ocean ecosystems (predator and prey species, indicator species, plankton, climate, currents, production processes) has become apparent
- Must monitor and understand the dynamics of a wider range of marine organisms, develop information on marine climate and its effects on ecosystems, and broaden our knowledge of human impacts (e.g., oil and gas) on all parts of marine ecosystems
- Developing the knowledge necessary for integrated management will require that ecosystem objectives be defined, especially for ecosystem components impacted by human activity

Ecosystem Approaches in Canadian Waters

- Canada (DFO) has adopted Ecosystem-Based Management (EMB) as basis for managing human activities in the oceans, under the Oceans Act (1997) and related policy instruments such as the DFO Strategic Plan and Canada's Oceans Strategy (COS)
- "The management of human activities so that ecosystems, their structure, function, composition, are maintained at appropriate temporal and spatial scales" - DFO IM Policy / Framework

Ecosystem Approaches in Canadian Waters

Ecosystem Based Management (EMB)

- Does not mean managing ecosystems, means managing people's activities
- All activities managed consistently against a backdrop of ecosystem considerations
- Sets direction to get where we need to go
- DFO has put objectives at the centre of its approach
  - Focus on defining desired future states of ocean ecosystems
  - Setting up indicators to show whether desired states being achieved
  - Reporting on status in relation to objectives
  - Ensure any changes we are causing in ecosystems are within the limits of the ecosystem to rebound

Ecosystem Approaches in Canadian Waters

- Approach has been developed through a Working Group on Ecosystem Objectives
  - members from a wide range of sectors and Regions in DFO, advising senior policy-makers in the Department
  - Scientific workshop in February 2001 recommended a basic objectives framework for application in integrated oceans management which has been accepted by the Department
- Approach to date focuses on the natural sciences, but is recognised that work on social and economic objectives is necessary to provide comprehensive science support for ecosystem-based management

Ecosystem Approaches in Canadian Waters

Approach has several elements

- Large ocean management areas (LOMAs) to be established within which ecosystem objectives set and within which other ocean management initiatives such as fishery management plans, marine protected areas and coastal management plans will nest
- Objectives will be defined within three « realms »
  - Conservation of components of biological diversity
  - Conservation of ecosystem function
  - Conservation of sediment and water quality
- Process of defining objectives to begin with conceptual objectives stating general goals, and continues as these are unpacked or refined to produce operational objectives against which performance can be assessed

Ecosystem Approaches in Canadian Waters

Approach has several elements (cont.)

- Operational objectives to be associated with specific management plans (sectoral or of limited geographic scope) or with broader integrated management plans
- Indicators associated with the conceptual objectives will be selected to support performance assessment
- Regular reports will be produced on indicators in relation to objectives to provide a « State of the Oceans » report
- Reference points related to the operational objectives will probably be a feature of the approach as well

Ecosystem Approaches in Canadian Waters

Five items represent a required “short list” of measurements for the assessment of marine ecosystem health

- Contaminants—the presence of harmful synthetic or natural chemicals that have been released by human activity
- Pathogens, biotoxins, and disease—which may harm marine biota and human populations
- Species diversity and size spectrum—a core measure of ecosystem structure
- Primary productivity and nutrients—a core measure of ecosystem function
- Instability—the ability of the ocean “climate” to have different states

Ecosystem Approaches in Canadian Waters

The framework for indicator selection can be translated into key ecosystem health questions

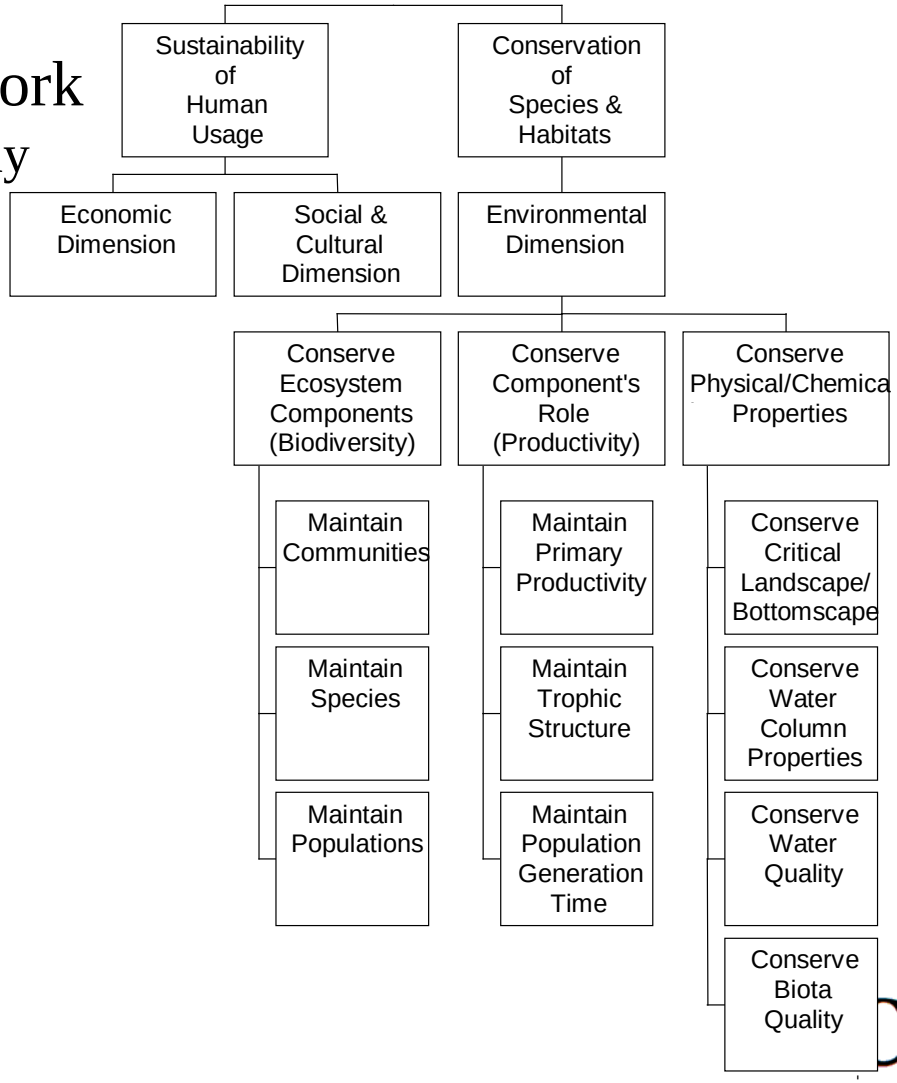
- What is happening to the environment [CONDITION]
- Why is it happening [STRESS]
- Why is it significant or important [EFFECT]
- What are we doing about it [RESPONSE]
- Is sustainability being achieved

Indicators that answer these questions serve to gauge progress towards preserving ecosystem health

Ecosystem Approaches in Canadian Waters

Conceptual Framework

- Component Hierarchy



Ecosystem Approaches in Canadian Waters

- Approach is being pre-tested in integrated ocean management initiatives in Canada and additional workshops to define operational objectives (termed marine environmental quality objectives when applied to integrated management or marine protected area projects) have been held
- DFO is now at the stage of wider and more formal piloting of the approach
- Issues which require further work at this time include
  - Finalising definition of large ocean management areas
  - Defining the best operational objectives and indicators for use
  - Developing science programs to support objective definition, indicator identification, monitoring and reporting (expansion here may require shifting effort away from other science areas)
  - Developing a reporting framework
  - Work on how to meet multiple objectives

Ecosystem Approaches in Canadian Waters

Challenges

- Complexities of natural and human systems which interact in oceans
- New way of conducting science and providing scientific advice
- Expanding from single species targeted fisheries management to Integrated Management planning with objectives that may include target, non-target and other species, and other marine uses and users
- Reduced effort in stock assessment resisted by industry or managers used to having detailed short-term forecasts
  - Can lead to intense political pressure
- Some DFO staff may not favour reducing effort in certain areas

Ecosystem Approaches in Canadian Waters

Challenges (cont.)

- Ecosystem modeling is a complex area with difficult technical challenges to resolve
  - Marine environments are unpredictable and results may not always be unequivocal
  - Boundaries of ecosystems difficult to define
    - distributions and exchange vary enormously (e.g.,tuna vs sea urchin)