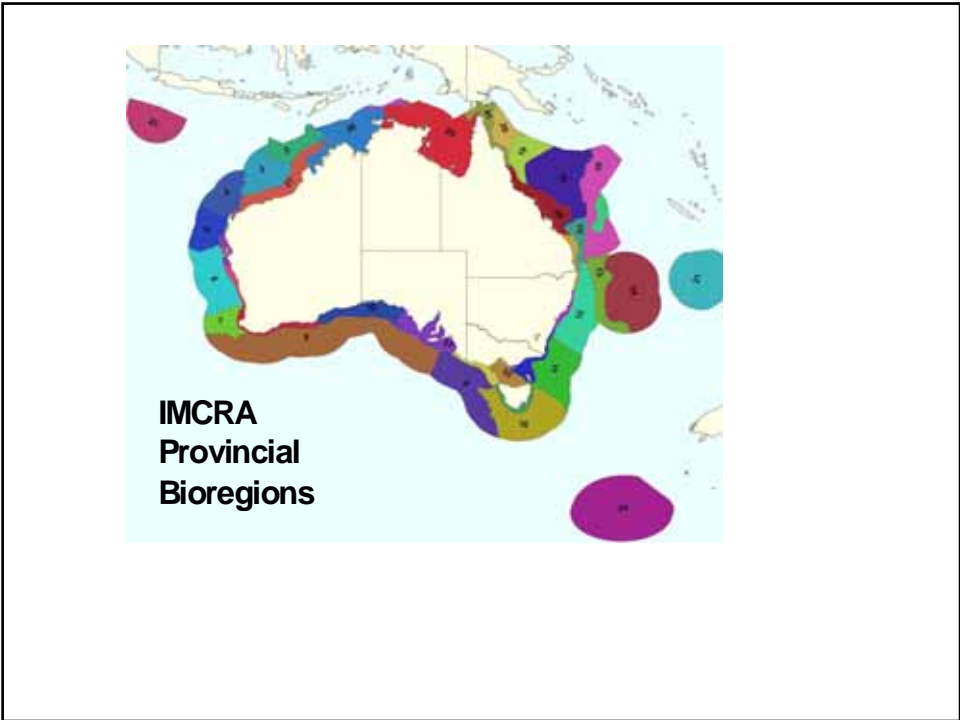


**“Working Together to Maximise
Sustainable
Agricultural Production in
Australia”.**

Joe Baker
Chief Scientific Advisor,
Queensland DPI&F

POINTS TO PONDER

- Ecosystem Considerations –
the World’s and Australia’s Agriculture
and Aquaculture
- The Role of Fertilizers – Past,
Present and Future
- The Impact of Genetic- and
Nano-technologies
- Environmental Issues
- Measuring performance



Marine Bioregional Planning Regions

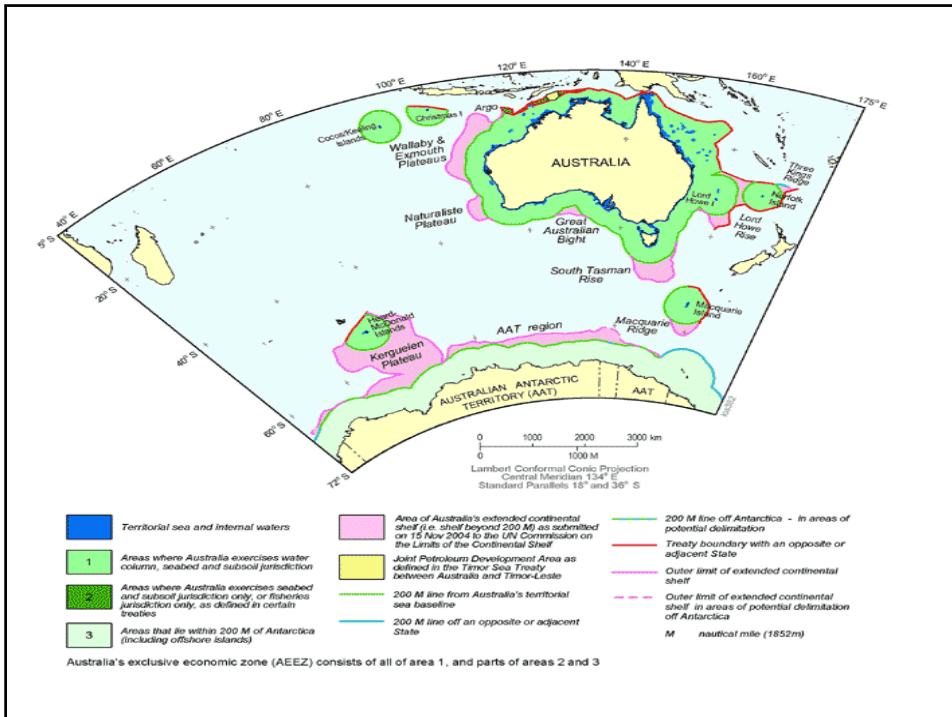
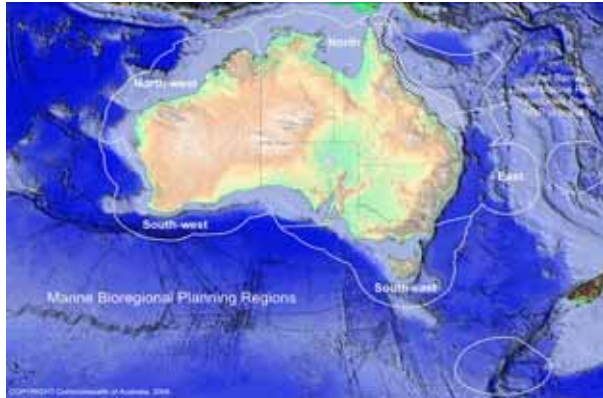


TABLE 1

World fisheries production and utilization

	1998	1999	2000	2001	2002	2003*
	<i>(million tonnes)</i>					
PRODUCTION						
INLAND						
Capture	8.1	8.5	8.7	8.7	8.7	9.0
Aquaculture	18.5	20.2	21.3	22.5	23.9	25.2
TOTAL inland	26.6	28.7	30.0	31.2	32.6	34.2
MARINE						
Capture	79.6	85.2	86.8	84.2	84.5	81.3
Aquaculture	12.0	13.3	14.2	15.2	15.9	16.7
TOTAL marine	91.6	98.5	101.0	99.4	100.4	98.0
Total capture	87.7	93.8	95.5	92.9	93.2	90.3
Total aquaculture	30.6	33.4	35.5	37.8	39.8	41.9
Total world fisheries	118.2	127.2	131.0	130.7	133.0	132.2

**The Millennium Ecosystem
Assessment (MA)**

Some significant findings

The MA focuses on the linkages between ecosystems and human well-being and, in particular, on “**ecosystem services.**” Ecosystem services are the benefits people obtain from ecosystems. These include **provisioning services** such as food, water, timber, and fiber; **regulating services** that affect climate, Floods, disease, wastes, and water quality; **cultural services** that provide recreational, aesthetic, and spiritual benefits; and **supporting services** such as soil formation, photosynthesis, and nutrient cycling.

The human species, while buffered against environmental changes by culture and technology, is fundamentally dependent on the flow of ecosystem services.

The structure and functioning of the world's ecosystems changed more rapidly in the second half of the twentieth century than at any time in human history.

- More land was converted to cropland in the 30 years after 1950 than in the 150 years between 1700 and 1850. Cultivated systems (areas where at least 30% of the landscape is in croplands, shifting cultivation, confined livestock production, or freshwater aquaculture) now cover one quarter of Earth's terrestrial surface. (See Figure 1.) Areas of rapid change in forest land cover and land degradation are shown in Figure 2.
- Approximately 20% of the world's coral reefs were lost and an additional 20% degraded in the last several decades of the twentieth century, and approximately 35% of mangrove area was lost during this time (in countries for which sufficient data exist, which encompass about half of the area of mangroves).
- The amount of water impounded behind dams quadrupled since 1960, and three to six times as much water is held in reservoirs as in natural rivers. Water withdrawals from rivers and lakes doubled since 1960; most water use (70% worldwide) is for agriculture.
- Since 1960, flows of reactive (biologically available) nitrogen in terrestrial ecosystems have doubled, and flows of phosphorus have tripled. More than half of all the synthetic nitrogen fertilizer, which was first manufactured in 1913, ever used on the planet has been used since 1985.

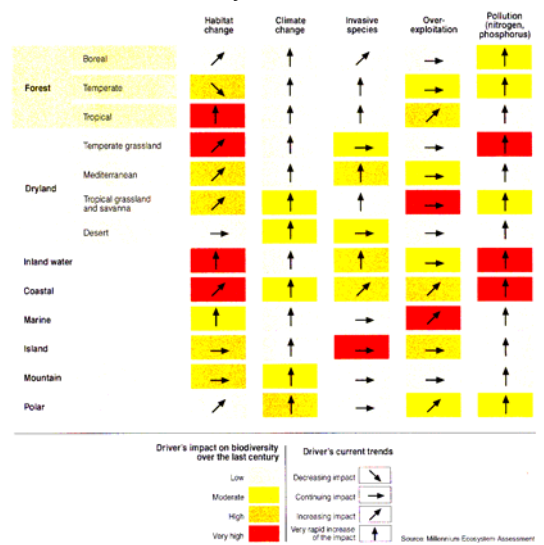
Three major problems associated with our management of the world ecosystems

- First, approximately 60% (15 out of 24) of the ecosystem services examined during the Millennium Ecosystem Assessment are being degraded or used unsustainably, including fresh water, capture fisheries, air and water purification, and the regulation of regional and local climate, natural hazards, and pests. The full costs of the loss and degradation of these ecosystem services are difficult to measure, but the available evidence demonstrates that they are substantial and growing. Many ecosystem services have been degraded as a consequence of actions taken to increase the supply of other services, such as food. These trade-offs often shift the costs of degradation from one group of people to another or defer costs to future generations.

- Second, there is *established but incomplete* evidence that changes being made in ecosystems are increasing the likelihood of nonlinear changes in ecosystems (including accelerating, abrupt, and potentially irreversible changes) that have important consequences for human well-being. Examples of such changes include disease emergence, abrupt alterations in water quality, the creation of “dead zones” in coastal waters, the collapse of fisheries, and shifts in regional climate.

- Third, the harmful effects of the degradation of ecosystem services (the persistent decrease in the capacity of an ecosystem to deliver services) are being borne disproportionately by the poor, are contributing to growing inequities and disparities across groups of people, and are sometimes the principal factor causing poverty and social conflict. This is not to say that ecosystem changes such as increased food production have not also helped to lift many people out of poverty or hunger, but these changes have harmed other individuals and communities, and their plight has been largely overlooked. In all regions, and particularly in sub-Saharan Africa, the condition and management of ecosystem services is a dominant factor influencing prospects for reducing poverty.

Main Direct Drivers of Change in Biodiversity and Ecosystems



Division 2 – Key definitions

Subdivision 1 – The environment and its values (Queensland)

8. “Environment” includes –
- a) **Ecosystems and their constituent parts, including people and communities; and**
 - b) **All natural and physical resources; and**
 - c) **The qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community; and**
 - d) **The social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).**

ACT Definition of the Environment

ACT Environment Protection Act 1997,
“environment” (in the Interpretation section)
means each of the following:

- a) The components of the earth, including soil, the atmosphere and water;
- b) Any organic or inorganic matter and any living organism;
- c) Human made or modified structures and areas;
- d) Ecosystems and their constituent parts, including people and communities;

ACT Definition of the Environment cont.

- e) The qualities and characteristics of places and areas that contribute to their biological diversity and ecological integrity, scientific value and amenity;
- f) The interactions and interdependencies within and between the things mentioned in subparagraphs (a) to (e) (inclusive);
- g) The social, aesthetic, cultural and economic conditions that affect, or are affected by, the things mentioned in subparagraphs (a) to (e) (inclusive).