

Notes for

SHEET 6. AUSTRALIAN SOILS and POPULATION GROWTH

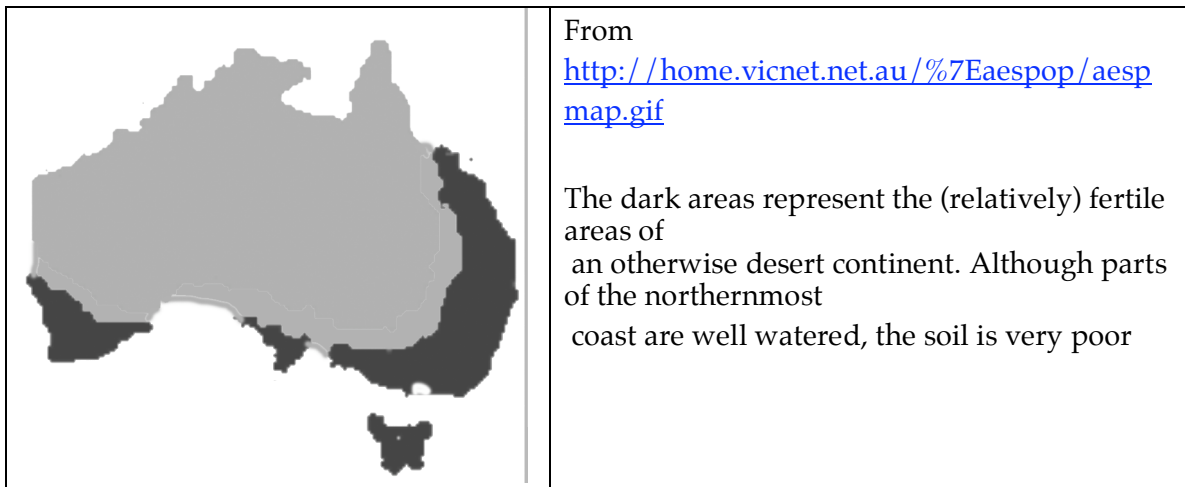
Australian soils are complex but some general statements about their history explain the problem that as Europeans have assumed that we have deep, fertile European soils. However, much of our Continent is very old eroded soil, and much of the rest is quickly leached of its fertility after the first few lush crops. See the history of Gondwanaland, and how it lost its green, documented by paleobotanist Mary White.

Include graphics:

A map of Australia showing:

1. Desert soil or rock - lacks too many essential nutrients
2. Semi-desert - some missing essential nutrients could be replaced
3. Low fertility - cannot sustain pasture or agricultural use without substantial fertilizer replacement
3. Medium fertility - can sustain pasture or forest
4. High fertility - good agricultural land
5. Super fertility - will not need fertilizers for yonks.

Maps showing salination, erosion, nutrient imbalances etc.



And see <http://home.vicnet.net.au/~aespop/aespmappage.htm>

Also maps to show

- soils threatened by salinity etc,
- areas of degradation since settlement.
- Aerial fotos of before and now.

Problems:

- A coming problem of Australian forestry that much of the soil cannot bear repeated felling.
- Natural fire cycles for old-growth forests and burn-offs have the problem that each time the poor Australian soil loses nutrients that are not replaced. There is immediate new fertility from the ashes – but much of the rest of the fertility has blown out to sea or elsewhere, or eroded away. Every fire leaves the soil worse

off – and yet repeat burn offs are at present our only solution to prevent terrible bushfires.

- The cost of agriculture for Australian soils - how much a bag of wheat can cost the future.
- Dust – how much is lost in dust blown out to the Pacific – thru storms, drought, cattle, motorbikes, droving, four-wheel drives. These are not considered – but they play serious parts.
- Australian gardens – how much they take of river sand, sphagnum moss, and all forms of fertiliser because not as rich as European soils – leach out quickly after the first plantings after native vegetation is removed.

The general poverty of Australian soils is due to lack of volcanic or glacial activity required to renew soil. the most recent volcanic activity was ten million years ago in the South East portion of the continent (which is relatively fertile).

Australia has few permanent rivers. Extensive manipulation of its fragile river systems for irrigation, combined with massive deforestation, has accelerated soil degradation and contributed to extensive salinisation and creeping desertification.

The 'islands' of comparative fertility are also the preferred habitat of most Australian fauna, which must compete for these areas with the rapidly growing, highly urbanised human population.

From the 1994 Report: "*Australia's Population 'Carrying Capacity': One nation - two ecologies.*" <<http://www.vicnet.net.au/%7Eaespap/aespicdidyouknow.htm>>

SOME CHARACTERISTICS THOUGHT TO BE TYPICAL OF AUSTRALASIAN ECOSYSTEMS

It is now widely believed that Australian animal and plantlife have adapted to prevailing conditions over the past 40 million years or so, using some of the following typical characteristics: They grow and reproduce very slowly. The number of big warm blooded carnivores at the top of the food chain is very small and those animals tend to be little. The biggest carnivores tend to be cold blooded, like lizards and crocodiles, which have lesser energy requirements. Metabolisms tend to be slow to conserve energy use. Diversity of species is extremely high with a correspondingly minutely adjusted ecosystem incorporating highly specialised characteristics and co-operative behaviours. Some interesting adaptations amongst plants include the fact that Australia possesses the largest variety of carnivorous plants in the world. It is thought that these plants supplement our notoriously nitrogen deficient soil by obtaining nitrogen from live prey.

"..Poor soils and the El Nino Southern Oscillation cycle have put a premium upon retaining and rapidly recycling nutrients. This can be done most efficiently by various species developing intimate relationships. Species which belong to an ecosystem which does not have such efficient nutrient recycling are rapidly selected against. Those which co-operate in large, complex systems to maximise the availability of nutrients - such as corals, fish and other creatures of the Great Barrier Reef, or the plants and animals of the Australian rainforests - have a competitive edge..."

"The highly coevolved ecosystems that have resulted from this evolutionary pressure are extraordinarily good at maximising whatever nutrients are available ... [but they

are] extremely fragile" From Dr Tim Flannery's *The Future Eaters* 1994.

THE REASON FOR EUROPE'S FAMOUSLY FERTILE SOIL

Europe is mountainous and fertile with predictable seasonal patterns. Only 8000 years ago the last glaciers of the most recent European ice age melted, leaving a rich legacy of countless millions of tons of pulverised rock, releasing nutrients and laying down deep and fertile soils.

THE DIFFERENCE BETWEEN EUROPEAN AND AUSTRALASIAN ECOSYSTEMS

The plants and animals that survived in the post ice age European environment were those that could survive close to human settlement and that bred fast, travelled far, were not highly specialised, and could quickly take over new territory and out breed, outstrip and outhunt less consumeristic species. These animals and plants didn't need to worry about conserving energy because there was no nutrient shortage. The plant species we call "weeds" all have such characteristics. So does the fox, the rabbit, the rat and European man.

"Europe is only slightly larger than Australia, but is home to over 660 million people, compared with Australia's 18 million. Despite [Europe's] enormous human population, it still has the resources needed to support 27 species of mammalian carnivores, including two species of bears, which are the largest land based carnivores of all. [But] the warm blooded carnivore assemblage of Australia is pitiful by comparison, the largest of its few species (most now extinct) weighing a mere 60kg." (From Tim Flannery's *The Future Eaters*, p.305.)

(Includes notes from Sheila Newman)