



Seagrasses

from Forum presentation by Sue Murray Jones, 26/09/2010

SA has high biodiversity with 12-14+ species of seagrasses spread over 5000 square kms, and Adelaide originally had extensive seagrass beds.

5200 hectares have been lost in last 50 years – mostly *Amphibolis* also *Posidonia*. The loss correlates very well with effluent and stormwater discharge and population growth.

Seagrasses are vulnerable

Erosional scarps formed as seagrasses are lost are fast moving.

Seagrasses are generally slow growing – scars from seismic tests in Spencer Gulf 50 years ago are still visible. Seagrasses shape their environment – once the sediment is unconsolidated there is usually no recolonisation. The correlation between population density and seagrass loss over time is strong.

Why have they been lost?

Possible stressors include pollutants, decreased salinity, poor light and eutrophication (excess nutrients).

Pollutants? - NO

Water has been tested in 8 sites for a range of biocides including organochlorines, organophosphates, triazine and glyphosate – all are below limits of detection. Sediments were also tested for the same chemicals plus hydrocarbons and heavy metals. Heavy metals were detected in some locations.

Decreased Salinity? - NO

Mature *Posidonia* and *Amphibolis* are not affected by short term reductions in salinity, and it took 7 weeks in salinity of less than 1ppt to kill seagrass. Seedlings/seeds are stressed or killed by less than 10ppt – but such levels are extremely low and very unlikely.

Loss of Light? – MAYBE

Seagrasses need a relatively high proportion of surface irradiance, and need more light than algae. There has been much investigation into light. A light shock experiment was carried out to reduce light over an area of seagrass by 99% for 6 weeks. There was some decline, but not complete. Sedimentation of reefs is damaging, but maybe not so much with seagrasses. Light is

unlikely to be the primary factor in seagrass loss.

Nutrients? – YES

Excess nutrients is the most widely reported cause of seagrass loss.

Nutrients encourage growth of epiphytes, which block light absorption, gas exchange and nutrient uptake. High nutrient levels can have a direct toxic effect.

An experiment was carried out adding Osmocote™ to both *Posidonia* and *Amphibolis* beds and there were very dramatic effects within one year.

Conclusions

- There has been massive loss of *Amphibolis* off Adelaide
- Experiments showed *Amphibolis* and *Posidonia* are highly sensitive to excess dissolved nutrients
- *Amphibolis* and *Posidonia* seem to be resilient to light starvation
- *Amphibolis* is not recovering naturally off Adelaide, but *Posidonia* is in places



What can we do?

- Improve water quality
- Protect what's left (Marine Parks)
- Monitor condition (AMLNRM/DEWNR/SARDI)
- Restore it

Over the past eight years, many methods have been trialled for re-establishing seagrasses.

More than \$800K funding has been spent in developing a successful way to regenerate seagrass beds. Seedlings have been deliberately planted.

The best method seems to be recruitment of natural seedlings. Causes of seedling loss include bag failure, which is a materials science problem.

The Better Bags project may help.

A Physics department was interested, and a grant was received from Flinders Uni.

They developed a treatment using a nanotechnology approach.

The material is biodegradable, but will last as long as needed.



Field trials are underway. The project has been funded by the Australian Research Council, SA Water and AMLNRM.

EPA monitors the blue line every few years. Beachport is also being impacted by drains in the southeast – there has been significant seagrass lost.

