Newsletter

No. 187

August 2015

ACN A0008011S

South Gippsland CONSERVATION SOCIETY Inc.

Inverloch's Shifting Sands - It's Complicated

Associate Professor David Kennedy gave a very informative talk to a large group of interested people at the Inverloch Hub in June. David is a Geomorphologist from Melbourne University, and is currently the only Coastal Geomorphologist active in Victoria.

He explained that erosion regularly occurred as a result of storm events along coastlines. Erosion can also be a result of cyclic movement of sand within a coastal system. These cycles can be decadal or longer, and may also be subject to oscillations due to the El Nino Southern Oscillation phenomenon that affects the Pacific Ocean. Sand moves laterally on beaches due to longshore drift, and also alternates between onshore and offshore deposition in response to wave conditions.

Limited data exists on the history of erosion/deposition of sand on Victorian beaches, so it is not always possible to say with certainty whether current sand movements are part of longer term cycles.

Beaches are dynamic, and their sand is always moving in response to incoming wave energy. That movement can extend out to 50 metres depth of water, where seafloor sand is disturbed and mobilised by large waves passing through the water column above. Sand movement also extends into the dunes above beaches, where the combination of high tides, large waves and storm surges can cause catastrophic erosion events. Dunes act as stores of sand which are mobilised during these events. Dune sand, once removed, eventually returns, with one study on the NSW coastline showing most eroded sand returned within 9 years after a major storm in 1974.

Storm events typically cause a "flattening" of the beach profile, where sand is transported from the upper levels of a beach to the lower levels and offshore. The zone in which these types of sand movement occur - between the dunes and the offshore seabed - is the "Active Zone" and its dynamic nature needs to be allowed for when planning any infrastructure.

Sea walls are often used to combat erosion but are vulnerable to failure. High-energy waves batter the walls and the reflected waves can drag sand away from the base, thus undermining the wall and causing collapse. The erosion rate at either end of a sea wall can be double the pre-wall rate as storm waves "outflank" the wall, eroding past the ends and removing loose sediment from behind.

Many Victorian coasts are "geologically constrained" by limited sand supply.

Marram Grass (*Ammophila arenaria*) has been introduced from overseas to stabilise eroding sand. Its effect on coastlines can be to trap more sand than the native Spinifex, thereby causing foredunes and dunes to become steeper and narrower, and more prone to catastrophic collapse. The effects of other introduced coastal plants such as Sea Spurge and Sea Wheat Grass has not yet been studied.

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Introduced from Europe, Marram Grass is generally undesirable even though it helps stabilise sand dunes.

Photo:- Malene Thyssen via Wikipaedia

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The Fascinating World of Insects

Bronwyn Swartz from the Royal Botanic Gardens, Cranbourne presented a highly informative and entertaining talk to the Community Education program's June session. She is passionate about insects [all 86,000 (and counting) Australian species of them] and loves her workplace inside a big native forest! Her talk included mites which technically aren't insects.

Bron is a Nursery Technician, and has formerly worked with the DPI assisting with various aspects of their Biological Control program. She rarely uses chemicals on insects in a garden situation, as there is nearly always another way of dealing with them.

The best source of info about beneficial insects and how you can encourage them can be found in "The Good Bug Book", available through Australasian Biological Control. For instance aphids are controllable with the aphidus wasp. Green lacewings are a general predator of other insects including pest species, and their eggs can actually be bought at some garden supplies!

Another excellent book is Bert Brunet's "Australian Insects" and there are plenty of specialist books, websites and CDs available too.

Australian insects evolved independently after Australia split from Gondwana around 80 - 100 million years ago. Most of them are still unnamed and undescribed. Australian plants are able to exist because of the insects that have evolved with them. There are even 6000 species of weevil in Australia and 1500 species of native bees!

Bron has recently been working on the Xanthorrhoea Moth which was thought to be killing our iconic Grass Trees. She found that 380 species of insects live on and around the Xanthorrhoeas so spraying probably wasn't a great idea! It also emerged that the moth wasn't actually causing the problem – they were just eating the decaying tissue. Enquires continue but compaction has been found to be part of the problem.

Beneficial Insects

Wasps – most are useful in that they control other insects. Aphid wasps are great at eating aphids. Many mites are beneficial too – Orange-snout Mite eats Two-spotted Mite helping with control. The bright-red Velvet Mite is very useful too. There are 300 species of assassin bugs in Australia killing other insects with their stabbing mouthparts. Dragonflies, the ancient inventors of flight, are great predators too.

Pollinators. Our native flora is pollinated by 1,500 species of native bees, along with bee-flies and hoverflies.

Pests

Millipedes can get in plague proportions. Certain moths are problems – a light trap can help with control. Two-spotted Mites are best controlled by *not* spraying as natural predators will come in. Longicorn grubs might kill your favourite Eucalypt but are a vital source of food for black cockatoos.

The best control for European wasps is to find and destroy their nests. Wasp traps can be effective but should be placed away from peopled areas, as the bait can actually attract the wasps in.

Australia has so far been fortunate to have avoided contracting the Varroa Mite infestation that is devastating honeybees overseas.

Interesting

- "Bluebottle ants" which are the big, iridescent blue ants that look superficially like bullants, are actually wasps not ants, and are relatively harmless.

- Hot forest fires can be devastating for insect populations. They are more favoured by cool mosaic burns.

- Plague Soldier Beetles aren't a problem – they just look like they would be!

Bron's overall message is that we should generally look after our insects as they look after us. Their massive diversity and omnipresence means that we should only intervene carefully when we really need to.

Mike Cleeland and Frank Hirst

The Good Bug Book Second Edition

The Good Bug Book contains information about all the biological pest control organisms that can be bought 'off the shelf' in Australia and New Zealand from members of Australasian Biological Control (ABC).
This second edition (110 pages) contains descriptions of twelve new organisms that were not included in the first edition.
Topics covered include:

- descriptions of each beneficial organism and its lifecycle (illustrated with colour photographs)
- pests controlled
- suitable crops and environments
- how to handle and manage the parasites and predators before release, at release, and after release
- cultural practices that promote establishment of beneficial organisms
- compatibility of beneficial organisms with various pesticides.

A general section on integrated pest management (IPM) rounds out the book.
The Good Bug Book is a valuable resource for crop growers, agricultural and horticultural advisers and consultants, students and teachers of agriculture and horticulture, and anyone else interested in integrated pest management.
Available from members of Australasian Biological Control (ABC).
Also Available on CD

Bioenergy Taking Off in Gippsland

The Gippsland Bioenergy Forum was held over two days in Heyfield during June. It was delivered by the Victorian Bioenergy Network in conjunction with Agribusiness Gippsland, and supported by Regional Development Australia, Sustainability Victoria, and Wellington and Latrobe LGAs. More information on Victorian Bioenergy and the event can be found at http://bioenergyvictoria.net.au/events/ including a number of the presentations.

The format of the first day was a series of presentations covering technology, business case and introductory information. Over 90 people attended the Heyfield Hub representing local government, consultants, waste producers, waste processors, research, finance, community groups and just themselves. Highlights included:

East Gippsland Water Presenting on their refurbished Waste Water Treatment Plant. This old plant was built in 1939 with an anaerobic digester (AD) added in 1984. It recently has recommissioned the AD and is testing various options of managing organic wastes to create electricity and compost/soil conditioner. EGW is taking food waste from a local food manufacturer, sludge from the waste-water treatment plant and green waste from the council. The benefit is that the landfill sees organic waste diverted avoiding GHG and leachate production, and freeing up tip space. The Water Authority can capture the gas to run a turbine to meet up to half of the energy demands of the site while the water is released to the RAMSAR wetland, McLeod's Morass. The food manufacturer avoids sending organic waste to landfill and reduces its carbon footprint and waste cost.

Pyrenees Shire This was a presentation on the demonstration site at Beaufort Hospital which featured in *Newsletter 181 (March 2014)*. Previously the heating for the hospital used LPG costing $100kpa. The project saw the installation of a boiler fed with waste wood chipped at the local sawmill. This has seen a saving $44k and 56 tonnes CO_2 emissions annually. Timber waste is significantly cheaper than bottled gas and clearly renewable. This project has also led to the sawmill installing its own boiler (using waste sawdust, bark and shavings) and has led into other projects such as the Horsham Aquatic Centre. Capital costs have been high, but running costs are low and long life is expected. The project has provided lots of lessons, but most important is to lock in feedstock supply before installation. http://www.pyrenees.vic.gov.au/What_We_Do/Environment/Regional_Bioenergy_Project/Central_Highlands_-_Beaufort_Hospital

Energence This is a company providing bioenergy technology to industry. They have installed heating

Feedstock delivery to the Yarragon biomass heating plant

systems in two large glasshouses (up to 5ha) near Yarragon which grow eggplant and tomatoes. Both used to use briquettes but now utilise timber waste and forestry residue which are abundant locally. Neither of these plants is government funded but will soon repay the capital cost as the fuel cost is between $^1/_5$ and $^1/_3$ of natural gas price. The material can be up to 60% moisture content due to plant preheating. The next big advance Energence is working on is to be able to use the flue gases to increase CO_2 (and thus growth) in the greenhouses as you can with natural gas. http://energence.com.au/

CharMaker Earth Systems build the mobile CharMaker pyrolysis plant in a shipping container. Loaded with material from vegetation clearing, wood packaging, demolition waste, old railway sleepers, storm debris, spent fruit trees, powerline prunings or Bluegum plantation waste it produces biochar and cooking charcoal. The biochar process fixes a proportion of the carbon in the original material for a very long time. The process also produces bio-oil, pyrolysis oils and wood vinegar (extra process to capture).

It can be run in built-up areas (no smoke) and has few regulatory hurdles as it's mobile. It's operated remotely from a lap-top. There's a unit in the North East used mainly for riparian willows, sold as horticultural char in Master's Hardware. It costs $345K to buy one or $1500/day to hire with staff.

Biofuel/Bioenergy Consultant. This presentation was on practical considerations for investment and was a sobering reminder of the challenges that bioenergy supporters and proponents face in making a project a reality. Amongst the many components of getting a project realised are:- locking in a supply chain of feedstock and markets for the end products, debt finance, equity, technology matching the situation, scale, relevant government regulation/legislation, local and state policies, suitable locations, community support and social licence, employment, revenue from offtakes and

markets, reputation and risk. Where projects can be realised, there are regional champions to bring parties together with investment expertise.

Heartwood Plantations This was a presentation from a forester who manages 50 plantation investments over 2000ha of native high-value hardwood They are harvesting around 4000m^3 per year but will soon be up to 15,000. Growing 4 species which are high density and thus high calorific value. They undertake thinning at 3-5 years and 9-12 years. Leaves and bark are left in the plantation for nutrient recycling but a huge amount of small wood is available for energy capture before it rots down and releases the CO_2 it has stored. Around 40% of residue at the sawmill (green and dry) could be utilised onsite for combined heat and power, rather than any export electricity to the grid which would only return a fraction of its true value.
www.heartwoodplantations.com.au

Quantum Power. This company has delivered 11 large-scale anaerobic digestion systems and biogas-fuelled power plants across Australia using Clean Energy Finance Commission funding. They have delivered projects around rendering works, abattoirs, and pig, chicken and food processing plants. Projects range from electricity substitution (storing biogas and using during peak demand hours) and diesel replacement. The advantage of biogas is that it can produce base-load power 24/7 and thus has a high rate of return. The technology can treat any "food" materials such as proteins, fats, carbohydrates. The anaerobic digestion lagoons are generally in-ground as this can be just a third of the cost of an above-ground systems. Gas is then captured and fed through a generator to produce electricity for onsite consumption. Heat from the generator is run through an exchanger to warm the digester. Excess gas is minimised but flared off when necessary. It is generally difficult to get export arrangement of electricity into the grid – hardly worth it at 6.2c/kWhr. The calorific value of biogas is 22MJ/m^3 cf. natural gas at 38MJ/m^3. Scale of projects ranges from $1.5-$25M. Their experience is that smaller projects are more challenging than larger ones.
www.quantumpower.com.au

That evening participants attended a dinner at the Traralgon Vineyard where an inspirational story was told by the Koo Wee Rup Regional Health Service on how they are delivering an environmentally sustainable health service with adaptation and planning for climate change at the forefront of their operations.

Day two saw over 50 attendees board a bus and visit a number of sites including;

•**Australian Sustainable Hardwoods** in Heyfield using wood waste from their operations to fire boilers that heat the kilns for drying timber;

•**Gippsland Water Factory** in Maryvale using waste water from residents and industry to generate biogas which runs a gas turbine meeting a third of the facility's energy needs;

•**HRL Technology Biomass Testing Laboratory and Pellet Plant** in Morwell that can turn any form of waste biomass into pellets for firing;

• and a large scale **tomato grower** in Yarragon that has abandoned lignite briquettes for waste timber chips to heat its hot house.

There was overwhelming support for this component of the forum, allowing participants to see bioenergy in action. There was surprise from many of the locals that there were so many existing facilities and operations using bioenergy in the region right under their noses.

Due to the nature of the energy market current being over supplied with electricity, and falling demand, the message around the applicability for using bioenergy was consistent. There is a place for bioenergy energy current in small scale, site or precinct applications where users have a ready supply of biomass waste material and a need to meet a localised demand of heat and electricity. The timing of the forum was just prior to the Federal Government moving to include native forest timber residues in the RET and did not come up in discussions.

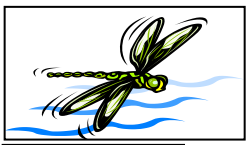
Luke Wilkinson and Frank Hirst

Wilsons Promontory Virtual Herbarium

This virtual herbarium provides access to a significant collection of plant and algal species from Wilsons Promontory National Park. It's now available online and can be accessed directly from the SGCS home page. Species pages of almost 500 taxa from 124 families are presented, with images and information about the distribution and descriptive features of the plant, plus links to additional information, maps and images. You can search for species by various features, including name, flower colour and habitat.

This project conserved and digitised a significant collection of plant and algal specimens from WPNP collected from 1959 to 1974 by University of Melbourne staff and students, including internationally renowned botanists and ecologists. Originally housed in the Botany Laboratory at Tidal River, the collection was donated to U of M, by Parks Victoria, in 2011 for its long term management, storage and preservation. The WPVH was built to ensure the original specimens are readily available for public access. It includes high resolution images of the herbarium specimens, photos of the live plants in situ, descriptive information and links to further information.

Not surprisingly, Mary Ellis has had a fair bit to do with this valuable resource.



Bunurong Coast Education

Home Education Program

INVERLOCH. 2015

Bunurong Coast Education

in conjunction with SGCS invites you to

Home Ed 2015

Science & Environment Program

With our Education Officers Rod & Mike

Are you educating your child at home? Are you looking for something interesting and different to be involved in? We offer an exciting series of monthly activities designed to meet your needs.

Wednesday 12th August 1.30 pm	Aquariums; how to set up your own home aquarium
Wednesday 16 September 1.30 pm	Invertebrates; netting and identification
Monday 5 October 10am	Dinosaurs; Field Trip to the Dinosaur Dig Site
Monday 5 October 1.30 pm	Volcanoes; Field Trip to the Cape Paterson Volcanics
Monday 19th October 10.30 am	Volcanoes; Field trip to the Cape Paterson Volcanics
Thursday 19th November 10.30 am	Rockpools; Fieldwork with Marine Invertebrates
& 2 pm	Invertebrates; netting and identification
Wednesday 9th December 8.00 pm	Astronomy; stars and planets in the Astronomical Telescope

Bookings: Contact Mike Cleeland on 0447352619 or email on **bce@sgcs.org.au**

Cost; $15 per student or $25 per family (parents & supervisors free)

All sessions meet at the Bunurong Environment Centre

Cnr The Esplanade & Ramsay Bvd, Inverloch

(continued from page 1)

Global sea level has risen steadily since the last glacial maximum (LGM) some 20,000 years ago. At that time it would have been possible to walk across what is now Bass Strait, and into Tasmania. As a result of a warming climate, sea level rose to a point where around 5000 years ago it was more than a metre higher than today. It then dropped back, but has since resumed rising over the last century, and is currently rising at around 3mm/year on average.

As sea level dropped over the last few thousand years, the Inverloch foreshore prograded (built out) southwards from the old cliffline that can now be seen stranded inland. So as sea level rises into the future, does that mean that the new coastline will be eroded and lost? "Maybe" according to Prof, Kennedy.

Longshore drift of sand in response to waves hitting beaches at an angle is also an active process in this area. Locals will have noticed that the wreck of the Amazon has been exposed by sand removal this year, while there has been considerable sand build up at Point Norman. Are these two processes the result of longshore drift eastwards from one place to the other? Nobody is quite sure. Could sand move offshore between Inverloch and locations as far away as Cape Paterson? Again, no research has confirmed this possibility.

Mike Cleeland

Useful Indigenous Plants

Ferns

Austral Bracken *Pteridium esculentum*

The rhizomes are edible late summer to autumn – pound to extract the starch and cook as cakes on the coals. Tips of the fronds are nutty – eat raw. Eat uncurled fronds (fiddle heads) – heat and eat. High in protein and zinc. Stomach cancer? Leaves and stalks were made into a drink

Brown skin from the rhizomes (underground stems) was peeled, boiled and the decoction drunk as an antidote for pain.

Rhizome stem used to treat diarrhoea and intestinal inflammation. Rhizome can be boiled in lard or oil to make an ointment for wounds. Used to prepare leather. Juice from young stems used to relieve insect bites.

Despite its toxins Bracken was a valuable food source for Aboriginals

Photo:- Wikipedia

Juice used in Underwood's snake antidote. Poisonous to introduced domestic animals.

Initiates the regeneration of degraded land – holds the soil from eroding, fronds cool the soil and maintain humidity to allow plant germination. Important coloniser. Reproduces vegetatively so makes viruses ineffective.

Five poisonous principles in bracken – heat in cooking destroys these poisons.

Monocotyledons

***Dianella revoluta* Spreading Flax-lily**

Aborigines ate the fruits (but some poisonous), seeds (sweet nutty flavour), roots after pounding and roasting. Used the berries for a permanent blue dye. Leaves made a strong fibre for string and plaited in baskets.

***Ficinia nodosa* Knobby Club-sedge**

Used for weaving.

***Juncus pallidus* Pale Rush**

Used for weaving.

***Lomandra longifolia* Spiny-headed Mat-rush**

Aborigines soaked the flowers to make a sweet drink, ate the tiny creamy flowers and seeds.

Important plant for string manufacture and weaving e.g. baskets, eel traps. Leaves picked, split into two, dried for 3+ days and dampened 24 hours to make pliable. Used for tying up limbs, for bandages.

***Phragmites australis* Common Rush**

Aborigines ate the tuber as a medicine – for arthritis, jaundice, food poisoning. Underground shoots are like bamboo shoots – edible. Sharpened ends of the stems were used to skin animals and to cut the umbilical cord.

Stems were used as hafts for spears, cut into segments for necklaces and nose ornaments, used as snorkels when catching waterbirds. Stems were woven into rope for bags and baskets. Early settlers used the plant for thatch and explorer Eyre made a thatched hut. Today used in wetlands to purify water.

***Poa labillardierei* Common Tussock**

Woven into string for nets, baskets, mats.

***Triglochin procerum* Water Ribbons**

Edible tubers.

***Typha* species Cumbungi**

Aborigines baked the underground stem, chewed it to extract the starch and the stringy leftovers were rolled into twine. The stem tasted of leek, the young shoots like artichoke, the pollen nutty. New shoots were eaten raw, roots and stem baked. Pollen could be baked into a cake.

The starchy tuber was used for dysentery. Aborigines used Cumbungi string to make large nets, the flower head for torches. Cumbungi pollen has been used as an absorbent in surgery and a dressing for wounds. Soft down was a bandage for wounds, pillow stuffing and used for flotation in life rafts.

Dicotyledons

***Acacia mearnsii* Black Wattle**

Aborigines chewed the gum, mixed it with water to make a jelly. Wattle barkers from Van Dieman's Land pre-1835 – bark used in tanning. Aborigines used bark and twigs as a poison to stun fish. Timber used for boat building as it could be easily steam-bent.

***Acacia melanoxylon* Blackwood**

Aborigines infused bark in water and bathed arthritic joints. The gum was edible. Inner bark fibres were used for string, to make fishing lines. Bark and twigs used as a poison to stun fish.

Timber was used for spears, woomeras, boomerangs, shields, coolamons. Was used to make walking sticks, gun stocks, racquets, sounding boards of pianos, beer barrels, casks for whale oil, cabinet timber.

***Acacia sophorae* Coast Wattle**

Aborigines steamed the young pods over a fire, eating

the cooked seeds. Liquid from the bark used to tan skins, fishing nets and sails.

Blossoms cooked in fritters and pikelets. Wattle seed in biscuits, cakes, icecream (dried seed twice roasted and ground). Stabilises coastal dunes, provides shelter.

***Allocasuarina verticillata* Drooping Sheoak**

Named after the cassowary as the leaves resemble the bird's plumage. Aborigines ate the young shoots and emerging cones. Wood was suitable for boomerangs, spears and woomeras.

Needles could be used for tinder, bedding, although ghostly wind through the leaves kept people from camping in the groves. Easily split, it was used by settlers for shingles and firewood. Sapwood to make a gargle for toothache.

***Banksia integrifolia* Coast Banksia**

Aborigines soaked the flower cones to make a sweet drink; flower syrup was used for sore throats and colds. Dry flower cones were used as strainers or as fire carriers.

Early settlers filled the dried cones with dripping and used them as night lights. Timber was used for bullock yokes, boat knees and for wood turning. Honey producers put the hives into groves of banksias.

***Bursaria spinosa* Sweet Bursaria**

Contains aesculin, a product in sunburn creams and UV filters and prescribed in medicines. Soaked leaves turn the water blue, absorbing ultraviolet light; add vinegar or lemon juice and water turns red; add caustic soda, back to blue. Acts like litmus paper.

Useful in gardens, farm corridors. Flowers attract native wasps which lay their eggs in Christmas Beetle larvae and thus stop defoliation.

***Eucalyptus obliqua* Messmate**

Aborigines made coarse string for bags and nets from the inner bark. Bark was used for fishing torches, tinder, canoes. Leaves can be used for dyeing: yellow, green, grey. Timber for Wonthaggi mines, sleepers, shingles, joinery, furniture, wine casks, fence palings. Used in paper pulp.

***Eucalyptus pryoriana* Coast Manna**

Koala habitat; old trees have hollows for birds, animals, bees. Aborigines moistened the bark and leaves and applied to sore eyes; leaves were chewed to cure diarrhoea; the smoke from burning leaves reduced fever.

Aborigines ate lerp (manna) and the sugary pellets of dried sap caused by insect borers. Timber used for shields, coolamons, water containers.

***Leptospermum laevigatum* Coast Tea-tree**

Cook and early explorers used the tips to make a tea to prevent scurvy. A passable lemony tea can be made from the tips.

***Leucopogon parviflorus* Coast Beard-heath**

Ripe berries were nutritious and thirst-quenching in summer.

***Melaleuca ericifolia* Swamp Paperbark**

When in flower, the snapper are on the bite. Indicator of swampland – soaks up excess moisture.

Aborigines used the flowers for a sweet drink, the soft papery bark to swaddle babies. Bark was used to make fishing floats. Wood was suitable for spears, clubs, digging sticks.

***Melaleuca squarrosa* Scented Paperbark**

Nectar and crushed leaves were made into a drink. Planted to subdue malarial vapours in swamps.

***Myoporum insulare* Common Boobialla**

Edible but bitter fruit. Infuse the branchlets in boiling/hot water – with the liquid scrub the head to treat general ailments. Use as a windbreak or quick-growing shelter belt. Fire retardant.

***Rhagodia candolleana* Seaberry Saltbush** *(pictured)*

Aborigines ate the leaves and berries (which are bitter). Squashed berries gave a dye, used by the settlers as red ink.

***Rubus parviflorus* Native Raspberry**

Ripe berries were an Aboriginal delicacy. Raspberry leaf tea was used as a gargle for sore throats, for diarrhoea and to ease pain.

***Sambucus gaudichaudiana* White Elderberry**

Edible berries.

***Solanum aviculare* Kangaroo Apple**

Berries when soft are edible but not tasty – some say too poisonous to eat. Rub-on treatment for sunspots and skin cancers (Curaderm cream, produced in Brisbane).

Steroidal saponins in their leaves, stems, fruit (solasodin) – major source of steroids; contraceptive pill, treats asthma and arthritis, sex hormones used for menopausal disorder, infertility and impotence. Huge plantations are grown in Russia and Hungary to source the contraceptive pill.

Terri Allen

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South Gippsland CONSERVATION SOCIETY Inc.

August 2015 Edition No. 187

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