

Securing the Future for Estuarine Plants

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Acknowledgement

With great Appreciation and Acknowledgement to the Peoples who have lived on and with this Land for many thousands of years. To those of the past, present and future.

As people of today, we are all stewards of this Land. May our connection be strong, our care deep and may we appreciate what has gone before us and what will go after us.

We Acknowledge the many Aboriginal Countries of this Large Island and particularly to those of this Homeland.



Freshwater Saltwater by Jessica Birk

Background

Natural ecological processes and plant abundance in most estuaries along the south eastern Australia coast have been seriously damaged. Often as a result of industrial, urban and agricultural development in each catchment. In many estuaries, notably Port Phillip, the Hunter River, Newcastle, Lake Illawarra and Sydney Harbour there has been questionable or unsustainable development and practices. In Sydney Harbour there is more than 20 million tonnes of highly contaminated sediment.

The health of an estuary (particularly the 160+ intermittently closed and open lakes and lagoons) can be measured by the extent and type of development in its catchment. Contaminants from the catchment inevitably destroy, degrade or change ecological processes and wildlife in the estuary and the impact extends into the ocean.

Estuarine environments throughout much of south-east Australia have or are declining because of loss of habitat.

Looking at what is happening to the Estuarine Plants tells us a lot about the Estuaries – and the story has not been good.

But there are good things happening as well:

Communities *are* more engaged in knowing what is under the water and how their actions assist or impact.



Eco-tour focusing on Seagrass and Saltmarsh. Called Fish for Tomorrow.

Seagrass and Saltmarsh are now almost as well-known as Mangroves. With positive community support we have moorings being converted from swinging chains to seagrass friendly ones. Saltmarsh re-creation projects are more common and there are stories of achieving the desired aims.

Foreshore restoration projects maybe assisting in improving the intertidal habitats, vertical flat sea-walls are a thing of the past (usually!). The process of the Estuary Management Plans has provided a framework for estuarine rehabilitation works. Yet it can be a challenge to get the community involved in ways that is not just vested interest. An 'experts' recommendations can still be ignored by elected representatives (with a variable amount of knowledge on Coastal or Estuarine processes).

The Book *Estuarine Plants* collates years of work in Estuaries and looks at what is needed to secure their future and maintain the ecosystem functions they provide.

This paper has been written in an informal way and uses colloquial language. This has been done deliberately to emphasize the need for information that reached the mass public. As this is a paper and not an 'in-field excursion' the paper should contain links to videos showing the key points made. Such links may be added in the future.

Bringing Back the Estuaries – Estuary Ecosystems Into the Future

From this paper we aim to assist the Managers, Care Takers and Stewards of estuarine areas (including Traditional Owners, Local Government, State Government, CMAs, Neighbors, Local Community, Fishers, NGOs, Schools, and You....) to have more practical skills, and information, so they can get a broader base of the population knowing and feeling connected the Estuaries and Estuarine habitats.

To do this the paper here presents:

- i) Information about Estuaries, the book provides information on where we are today in relation to estuarine vegetation (and how we got to where we are with Australian Estuaries).
- ii) case studies and references to case studies so people can draw on practical 'real-life' information and know what is happening and what has been working/or not working in the area of protecting and rehabilitating estuarine habitats.
- iii) Inspiring People – this paper shares some tips and examples of how to inspire people so that every body's actions move to bringing back the estuarine vegetation and ecosystems rather than continuing the way of decline. This includes challenging the way we do science and implement our conclusions.
- iv) Importantly this paper introduces the book *Estuary Plants* an epic collection of specialist chapters by field and scientific experts. Geoff Sainty key author and Publisher is a man with Passion and over 50 years on-ground experience. Geoff knows how to cut through to what is useful.

In the Beginning.....

The Long History Indigenous Care and Connection

Acknowledgement to the Original Peoples of this big Island who have, and continue to, Care for Estuaries the places of the mixing of fresh and salt.

Traditionally Estuaries are plentiful places and important not only for the local People but as gathering places for many Peoples

Today we must all share in Care taking as our Coasts and Estuaries are not separate from us. Their health is our health and happiness and our great grand children's health and happiness.



Maclean and its Rivers – Jessica Birk

Today within New South Wales 75% of the population lives in towns and cities built adjacent to estuaries. Nationally, 80% of us live within 100 km of the coast. Australian population is ~ 90% living on the Coastal Zone and this includes many living directly on Estuaries or in their catchments. Estuaries have been degraded and modified particularly over the past 100 years.

Some differences may look like benefits – such as perceived improved water quality post putting in structures to force an estuary to stay open. But such actions have consequences such as replacing the diversity of salinity that occurs in open / close systems with a uniform sea-strength salinity. This in-turn influences the habitats and micro-habitats with the estuary with impacts on those plants and animals and physical and chemical processes that occurred in the fresh or brackish waters or where triggered by changes in salinity.

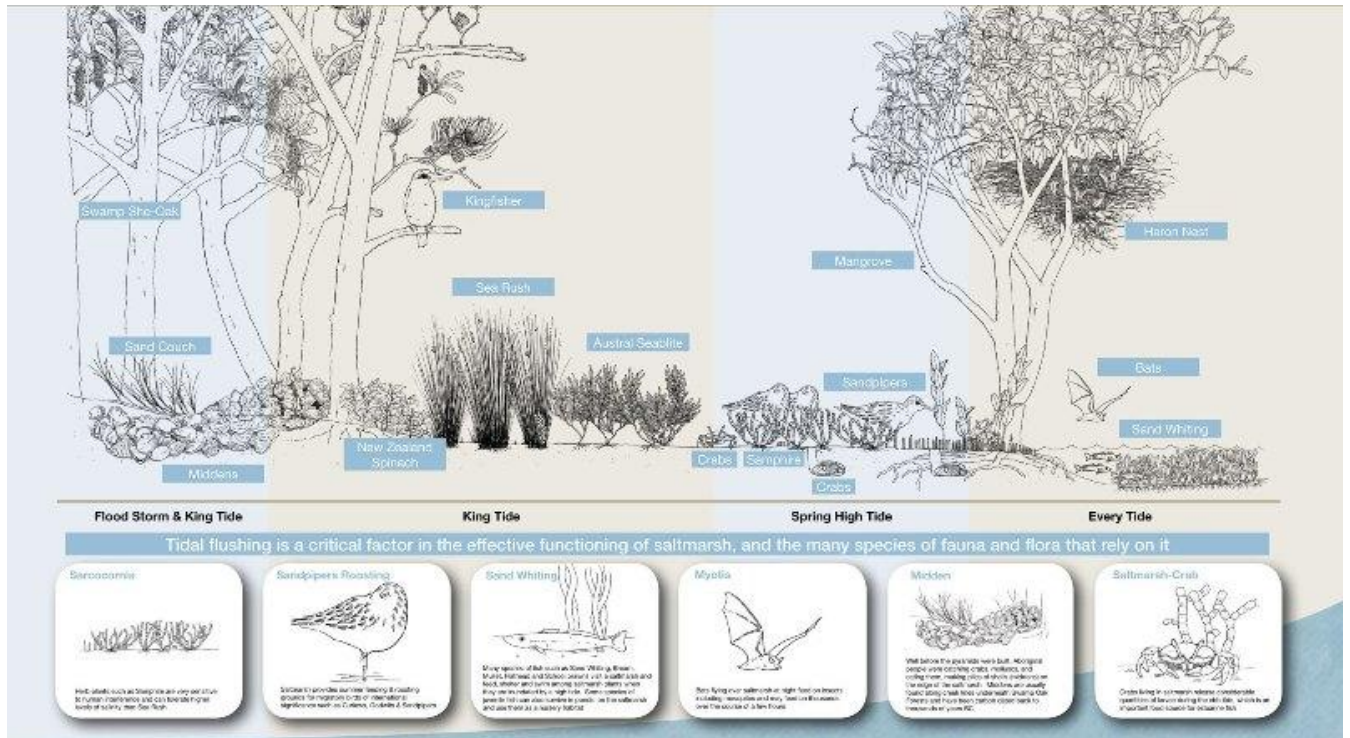
So in 2011 we are looking at how to move forward in a more caring and sustainably way.

A concept to consider is challenging the traditional science of seeing the natural world as a soup of discrete items. It is time to see with new eyes - recognising that the layers of interrelations are beyond the scope of well replicated experiments (although we definitely still need those!).

If one thinks in only a linear way of cause and effect the chances are they will not know to look for changes widely. In this way subtle changes can go unnoticed. Despite being subtle such change can build to have significant effects.

Today's paper is simple though - taking a journey from the deeper water of seagrass meadows to the only occasionally inundated areas of Saltmarsh – and presenting ways to assist in bringing back the estuarine vegetation.

Upfront it is acknowledged that the health of an estuary is an expression of its catchment. This paper however is focusing on the plants in the estuary and assisting people's in their knowledge and beliefs such that their behaviours align with a diversity of native estuarine vegetation for the long-term.



Estuarine Vegetation Profile for NSW. Created by Ricki Coughlan for Hawkesbury Nepean Catchment Management Authority

People know about terrestrial vegetation - being land based we see it and there is a general feeling about deforestation being 'not good' and the need to protect remnant vegetation, islands of vegetation, corridors etc. Estuary plants are however largely unseen and the idea that we are losing them has not reached the general populace.

Have You.....

Watched the tide rise in the Mangrove Forests and the crabs seal up their burrows?

Seen the little fish come in and swarm the Saltmarsh pools in the king tides?



Have you snorkelled or dived in the shallows of an estuary or peered through a bathyscope (underwater look tube)?



Gazed over a Saltmarsh at sunrise or sunset?



If yes wonderful – gets some friends and take them along for the next time.
If not it's time to get out there ☺

So part of this paper and presentation is to help really elevate the knowledge of what is underwater. It is really a very beautiful place and it need not just be the domain of the snorkler, the estuary scientist, researcher – or the fish...



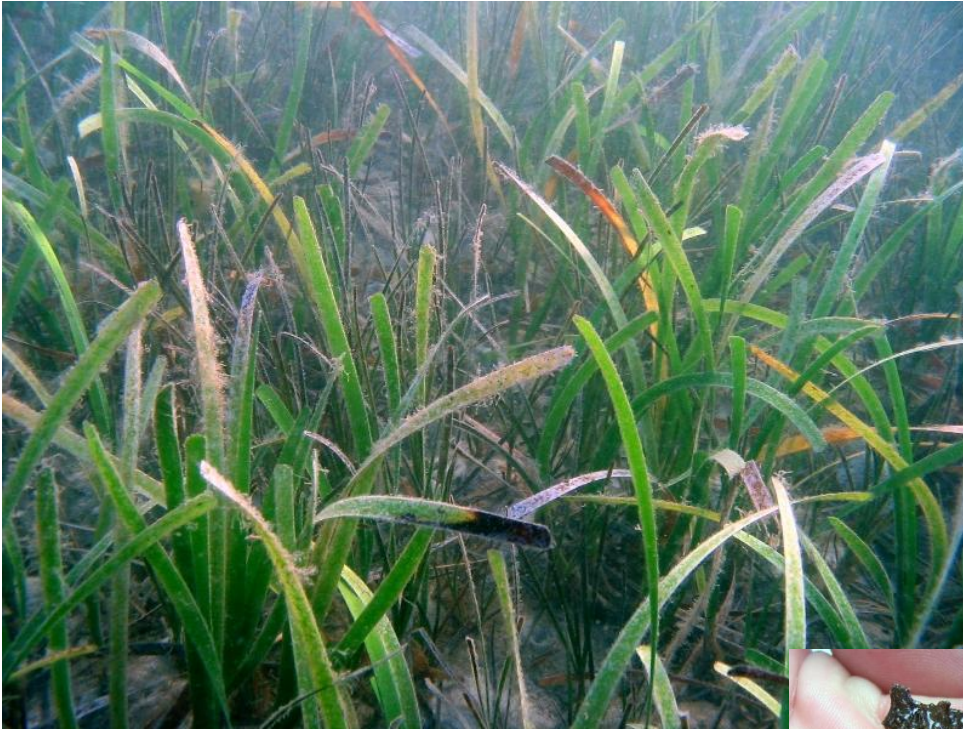
So let's get the photos the videos, imagery (and the underwater experiences field trips, kids etc, up to for all to see and experience and thus get a feeling of being connected to, Care and then Take Action in ways that move towards rehabilitating, expanding and protecting these natural areas.

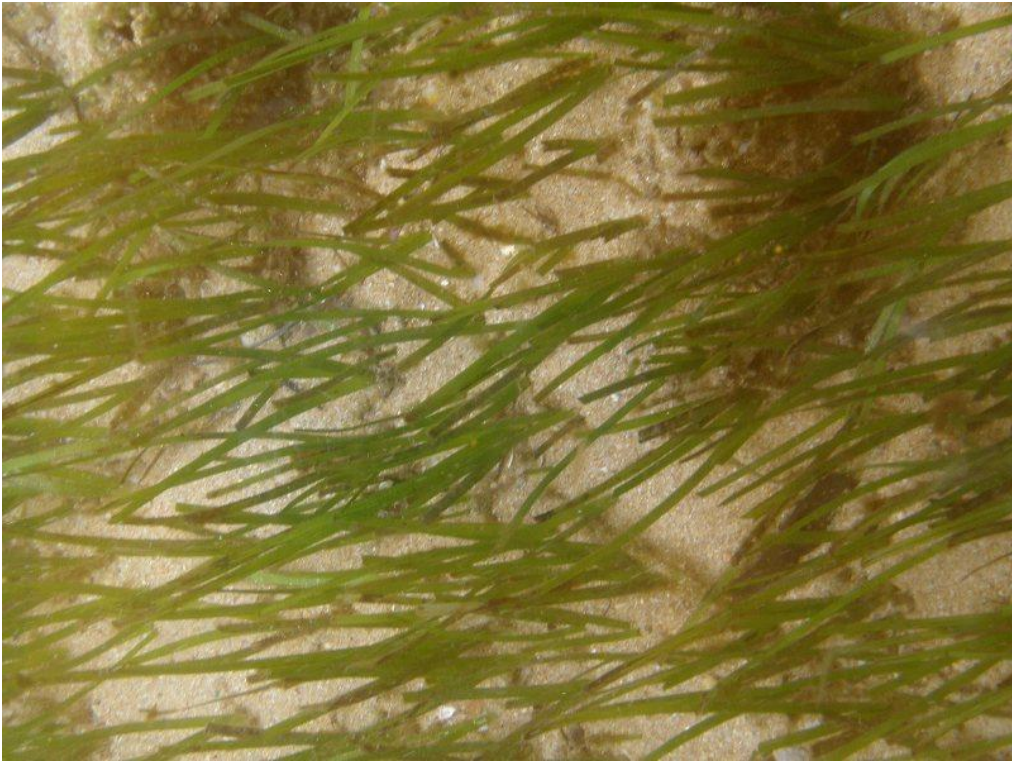
...and yes take your camera everywhere so you can share what you see!



Case Studies

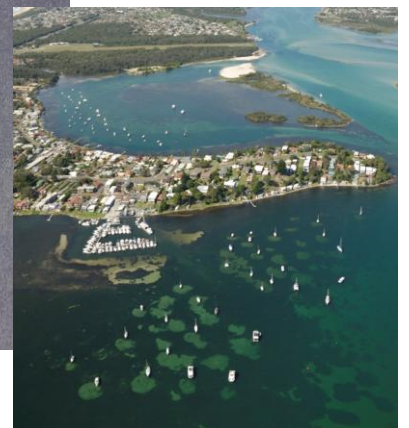
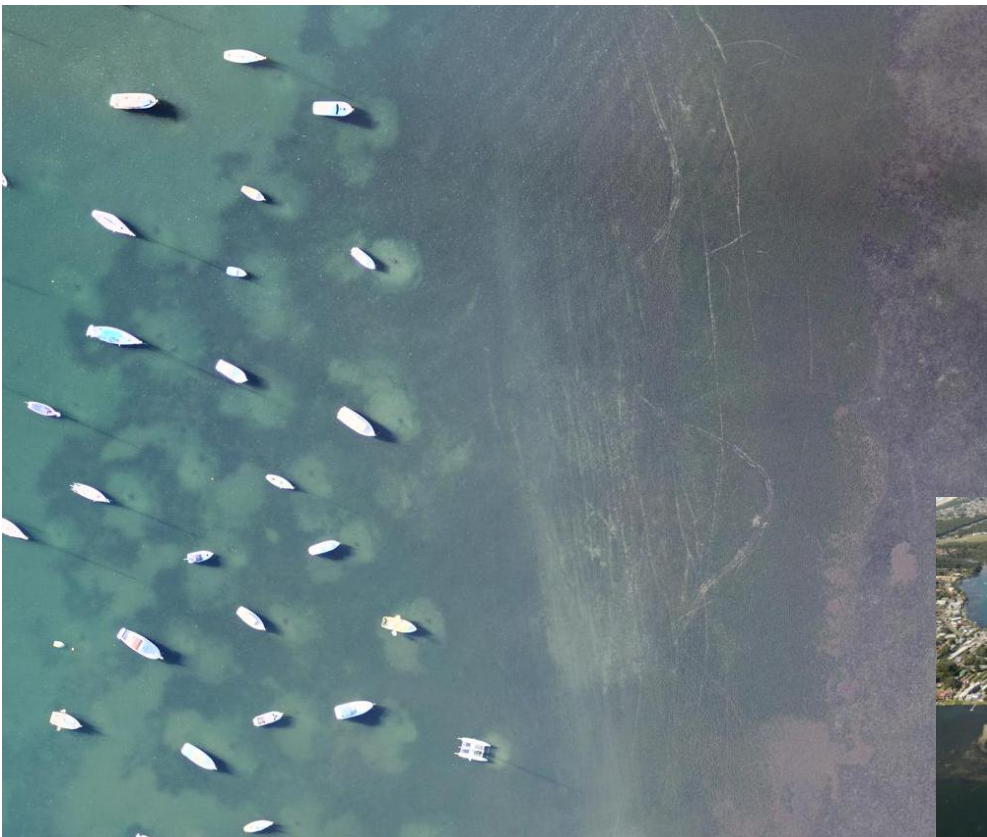
SEAGRASSES



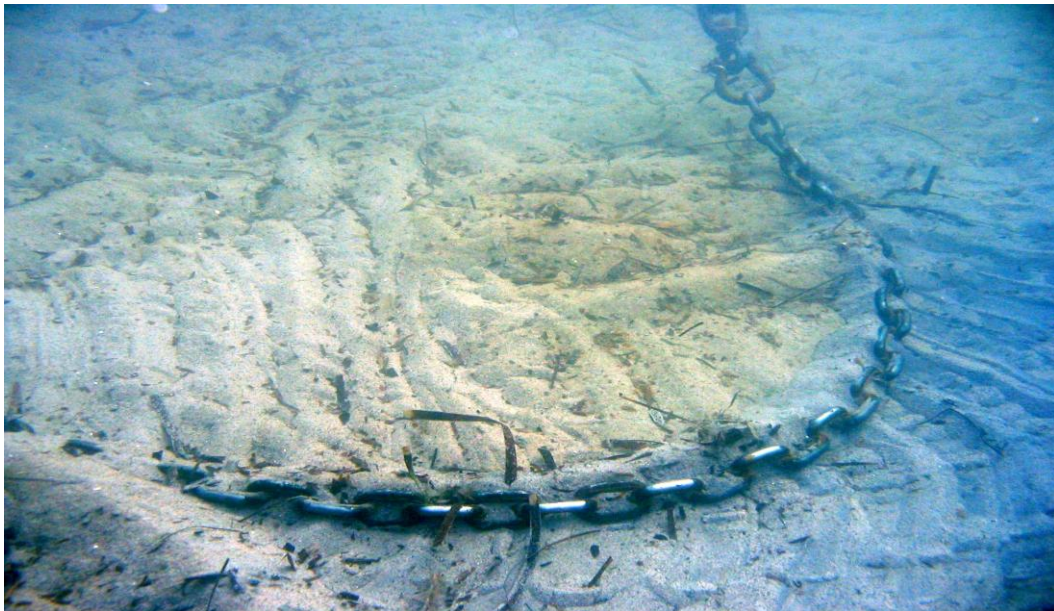


Moorings in the Seagrasses.

The images tell the story – Swing Mooring cut holes in the seagrass beds. Replacing Swing Moorings with Sea-grass friendly moorings results in there being no chain to drag along the sea floor.



Boat moorings are highly damaging to seagrass and alternative mooring systems are required. A project replacing the existing damaging moorings to seagrass friendly moorings in Pittwater has been undertaken as a joint project by Hawkesbury Nepean Catchment Management Authority and Department of Investment and Industry (Fisheries) and Pittwater Council with moorings designed by Seagrass Friendly Mooring Systems. To date there has been 32 swing moorings replaced and the start of a monitoring program to see the influence of removing the swing moorings. Seagrass friendly moorings do not include dragging chain. Seagrasses can then recolonise (albeit taking a long time). Seagrass transplants of *Zostera* spp. are possible in some circumstances.



Damaging chain (swing) mooring



Seagrass friendly mooring

Sea-grasses and Boating

Boating and associated infrastructure can modify the estuarine environment in many ways. Vessels move invasive pests from one estuary to another on their hulls and entangled in their propellers. Antifouling paint, oil and sewage pollute waterways. Marinas introduce structure where it would otherwise be absent.

Dredged channels modify current flow and require maintenance that may periodically create sediment plumes. Boating may impact estuarine plants, and which arguably represent a greater threat to aquatic vegetation. The first is the scarring of bottom habitats by propellers, anchors and mooring chains. The second is the production of waves by boats (Dr Melanie Bishop 2011).

Sea-grasses are often damaged in ways where it doesn't have to be. For example people could drive motor boats through deeper areas and lift the engine before going to shore over seagrass beds. Access could remain but more care taken.

Drag and cut marks from motors can be seen throughout this seagrass at Careel Bay and this is an area with currently few motors boats. So in some areas it is just about having people know more about the seagrass and when their engine gets stuck they don't put it on full throttle to get the 'weed' and sand out of the way. You go a different route or life the motor, row a bit or walk the boat in – still damaging but less so.



Cuts through both *Zostera* sp. and *Posidonia* sp. Beds – Palm Beach NSW



Damaging from Wake

In terms of management as we get larger populations we have to have designated areas and types of craft for moving in and out of these special zones.

Rehabilitating Seagrasses

This section is an extract from a chapter by Dr Melanie Bishop in the Estuary Book.

The seagrasses of south eastern Australia differ markedly in their ability to recolonise patches that have been denuded by boating activity. Fast-growing Halophila spp. has the greatest capacity for recovery and may recolonise a denuded patch within months. Recolonization of Zostera spp. is somewhat slower, in the order of 1-2 years. By contrast, Posidonia australis may never recover following damage. In Botany Bay, beds of Posidonia damaged in the 1950s and 1960s have still not recovered some 50 years later. In general, recovery will be most rapid when runners from adjacent patches of intact seagrass can clonally expand into the areas of bare sediment. Recovery will be slowest where it is dependent on growth from seeds and seedlings. Mature beds of Posidonia have very few actively spreading roots and the species is much more dependent on sexual reproduction for recovery of damaged areas than either Halophila spp. or Zostera spp. The rate at which scars are recolonised by seagrass is, in many cases, much slower than the rate at which new scars are introduced to the habitat.

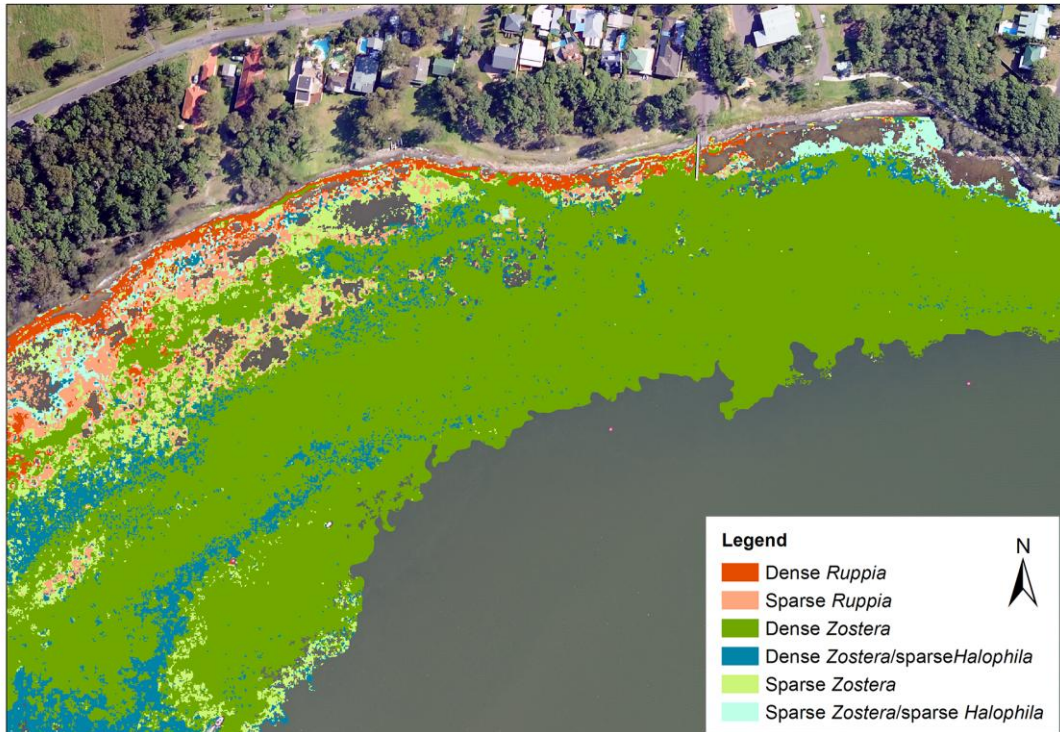
Seagrasses and Commercial Fishing

Information is available about the commercial fishing operating in estuarine waters and this paper does not cover this. It is noted through that some fishing techniques have damaging effects on seagrass when hauling in these areas. Further by-catch (fish and marine animals discarded) is high and all interested in estuarine sustainability should be aware of what is occurring with fish habitat and fish / prawn stocks and not leave it just to those dedicated to be responsible for this as part of their job.

Fishing groups including commercial fishers are a key group to get inspired into protecting estuarine plants for the long-term success of their fishing.

Seagrass mapping is now available at a fine scale in many major estuaries. This is a great to effective management. A Chapter in teh Estuary Plants book is dedicated these mapping projects by West et al

(2010).



From the Estuary Book chapter on Seagrasses and Seagrass Mapping.



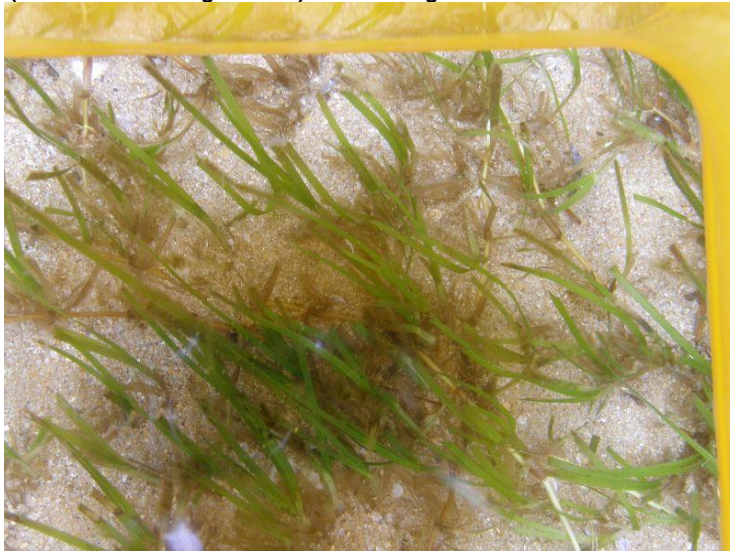
Macleans Heart-Jessica Birk

Bring the People so they can See and Know the Seagrass

The benefits of seagrass are generally known and they are not really being covered in this talk. Except to say it's a wonderful area to get more eco-tours happening as in low and mid tides you can get more people having a look at seagrass. Any age group can do this and the locations are generally in gentle environments. So a great place to go and look.



Using Bathyscope (underwater looking devices) to view seagrasses and underwater life including seahorses.



View through a Bathyscope

How to get to know the details about Seagrass

The book includes a detailed section of seagrasses including a key and high resolution, close up, photographs of the various seagrass species and varieties.

Seagrass Wrack and Its Management

This paper has no detail on wrack but it is well covered elsewhere. Key references are Chapman and Roberts. A key point here is the acknowledgement that much determination and positive materials and interactions are needed to get a critical mass of residents onboard in knowing the high environmental benefits of seagrass wrack in estuarine systems and

how it benefits other ecosystems such as Saltmarsh. See Community engagement section in this paper.

MUDFLATS

Iconic creatures are typically used as a lure to catch attention, then awe, then appreciation, then care from the intended audience. With mudflats so much of the exciting processes are occurring by unseen creatures within the mud. Not everyone sees the lime green, many legged, (polychaete) worm as marvellous so lucky we have birds.

Intertidal mudflats are key habitat for local and migratory wading and shore birds. Much published information exists on their huge round-the-world migrations and the factors that disturb their feeding and roosting.

Here I'm including pictures provided by Phil Straw and one of his diagrams regarding the requirements of migratory birds for a long and uninterrupted field of view. The birds picture are to inspire and the sight-line chart to assist with management of areas with migratory and shore bird habitat.

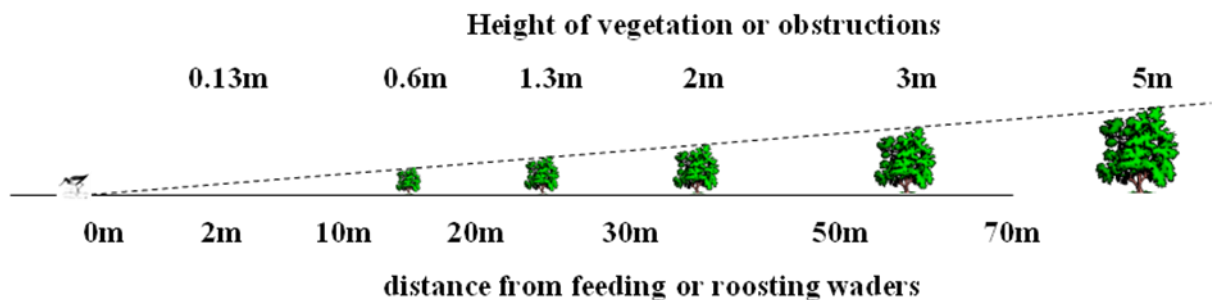






One of the important characteristics of estuarine habitats sought by migratory waders in the open aspect allowing a clear view of approaching avian or terrestrial predators. Phil Straw (2011).

Clearance required between a wader roost and visual obstructions (after Lawler)



Maximum height tolerance of vegetation

MANGROVES

We know that in some places these have expanded their area considerably including taking over the zone that is traditionally Saltmarsh. So again we live, especially in these urbanised estuaries catchments, we live in areas with a high level of influence from the urban nature of the catchments. One argument that it is nature doing what it does or we look at the different vegetation types ecosystems functions and there may be a recognition that Saltmarsh is of such

importance that we need to retain it (and Mangroves just minimise the area of expansion into Saltmarsh) hence there is the need to manage mangroves. IN some places we need Mangroves to be replaced in other they need management to retain Saltmarsh areas.

The impacts on Mangroves are not being covered here. The outcomes of clearing is that many urban estuarine waterfront areas have lost the mangrove fringe for a variety of reasons including reclamation and creation of water views from properties. The latter is still occurring and can lead to bank destabilisation and loss of key habitat for estuary fauna.

Case Study - Getting Mangroves Seedlings to Grow Well.

Mangrove seedlings will grow in fresh and salt water – but they won't just take off if there is nothing for the propagules to wedge against and start growing. So we did an 'observation' of different techniques. Not an experiment as it was not replicate on-site or between sites. We did know what we were testing and that was: did different treatments result in different rates of survival and rates of growth.

Mangrove seedlings planted straight into the ground. That worked OK but plants were very slow growing.

Seeds from GM planted directly into the mud didn't grow well – 100% disappeared within 4 weeks of being planted.

Another planting technique was placing seeds lightly on the mud and kept in place by a metal grate, found in the Mangroves.



Another technique was placing Mangrove seeds into the fibrous middle of Coir Logs.

Seeds in Coir Logs grew about 3 times faster. Even though put in 12 months after that are taller with more leaf pairs than those transplanted as seedlings a year earlier.

The Coir logs were partly decomposed, having been on-site for 6 months prior to use. Coir logs were within the tidal zone as part of low-key protection from stormwater erosion. Coir logs held moisture at all times but also have a very large surface area to volume with many gaps between the fibres and these were exposed to the air (at low tide).



So to date this is an observation however it would be great to see the result of this via a replicated experiment with proper controls.

Maximising Mangrove Seed Germination and Growth – A project to do

Conduct a replicated experiment investigating the question: do different substrate conditions result in different rates of survival and rates of growth in propagules of the Grey Mangrove.

With a null hypothesis that Mangrove seed survival and growth would be 'not significantly different' between treatments.

SALTMARSH

Past the Mangroves is the area of infrequently (or monthly inundation) this is the zone of the Saltmarsh.

WHAT IS COASTAL SALTMARSH?

Saltmarsh is the low growing, salt tolerant vegetation that grows between mangroves and the terrestrial zone. Tidal inundation occurs about once per month and sometimes less often.

WHY IS SALTMARSH IMPORTANT?

Original People of Australia have known the importance of Saltmarsh for thousands of years, particularly coastal peoples who have harvested foods and medicines from Saltmarsh areas.

Saltmarsh is the supermarket of the estuary turning organic matter over at a high rate, being habitat for crab species that release millions of larva back to the estuary (larvae are food for fish) and providing a water cleaning service. Coastal Saltmarsh is listed as an Endangered Ecological Community under the New South Wales Threatened Species Conservation Act 1995.

CAN WE RECREATE ESTUARINE VEGETATION COMMUNITIES?

While this paper refers to estuarine vegetation creation and rehabilitation in general it cannot be said, with any guarantee, that one has restored ecosystems functions.

Ecosystem functions are complex and often not fully understood. Preliminary investigations show that ecosystems functions, if they come, back may take decades or centuries to be as effective as natural equivalent areas. This long-time frame combined with sea-level rise results a lower predictability of outcomes.

Plants can grow, natural regeneration can occur and some animals like crabs and epi-fauna (invertebrates that live on the Saltmarsh and surrounding substrate) do re-establish.

In the Book *Estuary Plants* there are case studies on a variety of Saltmarsh rehabilitation and creation projects.

Enough information is available for managers to know what has to be done to grow the plants and get the appropriate tidal regime for Saltmarsh.

What is required is an understanding of the site specifics and the Ideal Scene to reach at the end of the project.

Saltmarsh management, rehabilitation or creation projects each have unique considerations relating to the physical environment, the interrelationships between Saltmarsh, Mangroves, Mudflats and Seagrasses plus People/industry etc!

Attaining long-term success comes not so much from prohibition but from methods where the people know the estuarine vegetation communities, value them and feel connected to them. When People love a place they are more likely to take actions that support and enhance the long-term sustainability of these estuarine communities.

The 2010 paper presented the Saltmarsh Creation Works at Port Botany "*Largest Planted Saltmarsh in The World*" (2010). This featured translocation and planting methods. Three other cases studies were include of successful saltmarsh rehabilitation techniques including:

- i) planting saltmarsh,
- ii) translocating saltmarsh and
- iii) natural regeneration.

Detailed information can be found in Additional projects are profiled in the book.

A key message from this paper is: **there are a range of techniques and depending on your budget, location and the factors that have resulted in the damage, or absents of Saltmarsh, there is a technique that will result in Saltmarsh growing.** *NB the term work refers to getting Saltmarsh Plants to grow. Plant growth along, however, does not mean the ecosystem functions of the Saltmarsh have been or will be restored to match that of a 'natural Saltmarsh*

Saltmarsh Creation – Gough Whitlam Park – Sydney. Before, during and after..





Saltmarsh Translocation in progress – Port Botany.



Saltmarsh and Mudflats being created – Penrhyn Estuary.





A case study not yet written is the creation of Saltmarsh by filling an area with daily inundation so that is less frequently inundated. Saltmarsh creation is usually done by removing fill (or dropping levels so they are tidally inundated). Creation can also be by building up levels to the appropriate tidal inundation range. A current example of building up is planned as a trial. Works will commence after meeting all approvals. Even though this is potentially environmentally positive the actual works trigger “land reclamation” and hence there are rightly many approvals to satisfy.

COMMUNITY KNOWLEDGE AND STEWARDSHIP

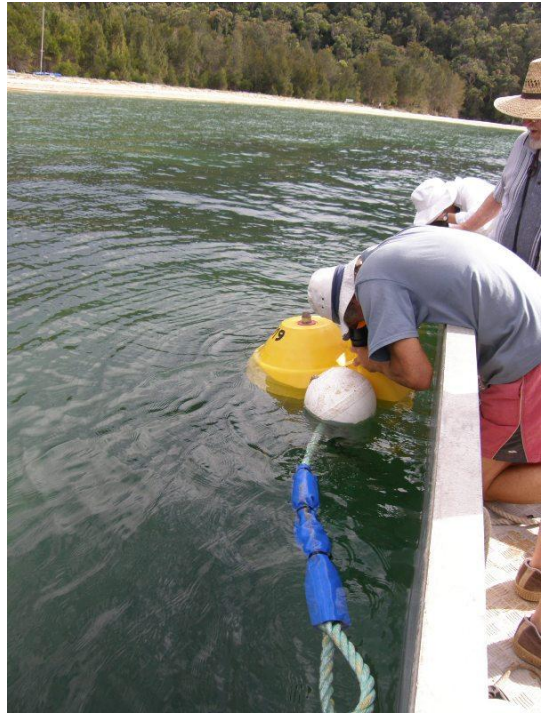
Retaining natural areas relies on people’s connection to the place and their care. How do people come to appreciate something they do not know?

Following are images from successful community days where the focus has been estuarine vegetation. No captions have been included to enable you to come to your own conclusion about what is working. Following the images are dot points of suggestions for successfully community days.











Tips for successful community engagement in the estuarine and coastal zones:

- Introduce estuaries to people by relating it to something they already know like: fish, crabs and clean water.
- Link new information with positive experiences such as an eco-cruise or a guided walk.
- Avoid using words that may not be understood—cut the scientific jargon.
- Create places for Indigenous People to share their stories of Connecting to Place and their knowledge of natural systems and how they work.
- Get role models from the community, for example, a fisher person to thank the community for care of key fish habitat.
- Provide good looking signage, posters, cross sections and aerials of estuaries in the local area. Aerial images are popular with residents adjoining estuaries as they allow the person to identify where their property is in relation to the estuaries. Aerials provided to local people also tend to result in the people showing others and sharing information about estuaries.
- Create opportunities for multi-age group participation.
- Celebrate the wins!! Tell people about the things that went well – plus what you learnt.
- Use different media – art, poetry, video, and yes all the social networking sites!!



STROLL ALONG ESTUARY

stroll along estuary
see ducks, herons, ibis
clear-sighted souls
surrounded by nimbus

breeze blows in marshes
bright glint on water
companions in nature
sun, moon-disc daughter

cross-legged on shore
observe tiny birds
skimming salt surface
no call for words

warm, late afternoon
surrounds and embraces
timeless contentment
relaxes tanned faces.

by Lee Emmett, Australia



You can also go to where the People are. Rather than bringing them to you.



Provision of short facts of interest also aid discussion. Some examples for Saltmarsh are:

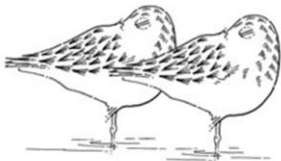
1. Saltmarsh is a supermarket for estuaries providing abundant food for fish.
2. Saltmarshes provide a steady release of organic material into the estuary and this supports a variety of estuary life.
3. Saltmarsh is habitat for crab species that only live in saltmarsh.
4. Saltmarsh is used by migratory birds.
5. Saltmarshes contribute to improved water quality in the estuary by filtering water that comes off the land before it reaches the open water.

SALCOMBE'S ESTUARY ORCHESTRA

In and out, to and fro
Rise and fall, high and low
Flood tide, ebb tide, spring tide, and neap tide
Riverside, seaside, creek side, and boat side
All dance to the waters' refrain
As cormorants line up to conduct
And the estuary orchestra plays again

Ferries crossing, visitors jostling
Lights blinking, prawns winking
Sails bracing, dinghies racing
Bobcats leaping, seadogs sleeping
Boatmen waving, lifeboat saving

Finally, the conductors dry
Immodestly on a prow
And, as the sun turns off the rain
The estuary orchestra takes a bow
Before playing a tidal encore
Over and over and over again



Working in Estuarine Areas and Areas that Flow to the Coast.

Providing practical, in-field, information to those working in or around estuarine vegetation (with the aim of getting that person / or people to be able to see and understand the values of the communities) will assist in increased Care and appropriate work actions. The need for the practical, on-ground, understanding generally increases the further a person is from the estuary or the vegetation.



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Acknowledgement

We acknowledge the Clients whose projects have been used as case studies for this section, and the Hawkesbury Nepean Catchment Management Authority for funding many Saltmarsh restoration projects. Acknowledgement to community members who continue to care for estuarine environments.

Seagrass friendly moorings on new inventors

http://www.abc.net.au/tv/newinventors/video/default.htm?program=newinventors&pres=20070606_2000&story=3

Seagrass friendly moorings website

<http://www.seagrassmooring.com.au/id69.html>

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Geoff Sainty is the principal of Sainty and Associates and is considered a national and international authority on waterplants and aquatic weeds and has been involved in a number of research projects regarding aquatic weed control and macrophyte establishment. Key Author of *Waterplants of NSW* and author and publisher of *Waterplants in Australia*, and *Burnum Burnums Wildthings*.

Mia Dalby-Ball

Mia Dalby-Ball is a well-respected and recognised Saltmarsh and Wetland Expert and a key player in Saltmarsh re-creation and restoration. Mia's is an expert in community engagement and has over eight years local government experience as former Manager of Environment and Education at Pittwater Council. Mia was a Technical Advisor, on the Saltmarsh Technical Committee for Hawkesbury Nepean Catchment Management Authority (HNCMA). Mia is a joint author on the popular book *Burnum Burnum's Wildthings* published by Sainty and Associates.

Appendix I – Jessica Birk

Throughout this paper are art works by Jessica Birk. I choose Jessica’s work as it really speaks of these places where Rivers meet the Sea, coasts and estuaries and expresses the connection to these wonderful places. Jessica describes connection and the importance of connection to place in her Bibliography. See below and (<http://www.jessicabirk.com/about.html>)

Jessica Birk

Artist, Painter, Printmaker

A young Indigenous artist who grew up and lives on the Northern Beaches of Sydney. A descendant of the Yaegl people, from the Northern Rivers of NSW, The Clarence Valley. Through my art I am able to assert myself as a contemporary storyteller of the Yaegl people. My art-making practice allows me to explore; to what extent I can imprint my identity and personal experiences upon the imagery, the colours, the patterns and the forms as well as the notion of belonging and familial lineage.



The body of work I am currently engaged with looks at two areas of the East coast of NSW to which I have a strong connection, the Northern Beaches and the Northern Rivers. Focussing on these places, I hope to articulate the feeling of belonging.

Both of these places present to me, a different feeling of belonging to country. Having been born on the Northern Beaches, I have grown to know and respect the place over time. In contrast I also feel I belong to the areas of the Northern Rivers, of which I know through my mother’s family, a right and gift given to me as a descendant of that land.

The notion of belonging is an abstract one; I aim to develop a visual language that enables my audience to grasp the implicitly rich understanding of a landscape, which is belonging. Belonging is knowing your country intimately. “Country is home, and peace; nourishment for body mind and spirit; heart’s ease,”Country is ‘known, sung, danced, painted, loved, harvested and cared for
“(Essay “Nourishing Terrains” Deborah Bird Rose, Australian Aboriginal Views of Landscape and Wilderness)

This understanding of country allows for a two-way communication to evolve, between those belonging and the country to which they belong. Country is spoken to, sung to, loved and mourned, just as if were a family member. This personification of the landscape allows a more personal interpretation of what lies in it; everything then has a purpose and a story to tell, from the colours of the landscape right down to the stones within it.

In saying this, I use imagery of, or relating to these places, my 'country'. Its recognition is dependant upon colour, texture and form as well as that of river stones themselves.

My audience needs to understand that every component of the image has a meaning. The colours, the patterns and the forms, these all combine to visually articulate the 'holistic' experience of the landscapes, which is this feeling of belonging. The imagery I use serves as a metaphor for the strength and enduring quality of the ancestral presence within the landscape. By doing so I want to show that in order to tap into this collective wisdom and knowledge of the place you need to be from and love and look after this living entity, which is 'country'.

I am able to make a more 'abstract' landscape become more intrinsically literal through my artistic practice. As this is a 'holistic' representation of a place which includes its aesthetic qualities, its colours textures and representational forms, but also its past, its future and its stories. Belonging is knowing country. Knowing it as a living entity, a place that gives, nourishes and receives life.