Coastal chameleons: good or bad grasses?

Ron Taylor, Simpson Avenue, Victor Harbor, South Australia 5211, Australia.

Introduction

Our urban and peri-urban coastlines are highly valued for recreation and amenity. These values are now extending to the coastal perimeters of regional centres. Little relevance is paid to the condition of this prized land. As long as it is stable and either fronts the coast or is within short walking access, it will be some of the most valuable real estate in South Australia (SA). Most purchasers would be indifferent to the weedy condition of much of these valuable coastal dunes.

Increasing awareness

With the advent of Coastcare (and the formation of community groups to enhance and care for their coast) came education about the biodiversity and the dynamics of these fragile systems that form the interface between land and the eroding actions of the sea. Environmental groups began to look more closely at what species they were using to revegetate and stabilize the dunes. Which ones were native and which ones were not? What were their attributes and functions within the system and what were their needs to survive and thrive? It was not difficult to identify most of the exotics such as marram grass (*Ammophila arenaria* (L.) Link), coastal teatree (*Leptospermum laevigatum* (Sol. ex Gaertn.) F.Muell.), and iceplant (*Mesembryanthemum crystallinum* L.) as they are quite well known. However, there are a number of widespread exotics that have escaped attention. They are seen to be either introduced as beneficial or have slipped in almost unnoticed, cunningly disguised as something akin to one of our own natives. When discovered they are too well entrenched to consider either containment or treatment.

Widespread dune grass weeds

Perennial veldgrass

Perennial veldgrass (*Ehrharta calycina* Sm.) is widespread in peri-urban and near pasture coastal systems. It is not considered a strong species if grazed, but if unmanaged, becomes invasive. The species is drought tolerant and a fire hazard in dunal systems that hold considerably less dry grass fuel load when only natives are present. It also masks the presence of native spear grasses and once established, the dunal system becomes dependent on its stabilizing qualities. It is seen mostly in the low salt areas of the swales and the hind and mid dunes. Its introduction to dunal systems came via both pastoral and mining use as a sand binder.

Hare's tail grass

Hare's tail grass (*Lagurus ovatus* L.) is the most common grass weed on South Australian coasts. *L. ovatus* appeared in 324 quadrats (20.6% of all quadrats surveyed) in the South Australian Coastal Dune and Clifftop Vegetation survey (Oppermann n.d.). Even the ubiquitous African boxthorn (*Lycium ferocissimum* Miers) was only found in 15.3% of all surveyed quadrats. *L. ovatus* is an annual, however the dehisced inflorescence remains for so long that it appears to be perennial.

Pyp grass and sea wheatgrass

Pyp grass (*Ehrharta villosa* (L.f.) Schult.f. ex Schult. & Schult.f.) and sea wheatgrass (*Thinopyrum junceiforme* (Á. & D.Löve) Á.Löve) are well established in most of their known locations. They are poorly recognized as exotic or a danger to ecosystems. The nature of their physiology and the difficulty of ensuring that off-target damage does not occur to many extremely useful native species dispels the idea of a quick fix. To the casual observer *T. junceiforme* has a very similar appearance to hairy spinifex (*Spinifex sericeus* R.Br.), a native dune grass. Isolated examples or a dense mat of *T. junceiforme* can establish quickly on a beach without being noticed by anybody but a trained field botanist (Figure 1). Similarly, *E. villosa* emerges initially as individual canes spaced well apart and is not all that noticeable if other vegetation is present (Figure 2). To the untrained observer it might pass for the native knobbly clubrush (*Isolepis nodosa* (Rottb.) R.Br.).

Both these perennial grass species fit the definition of weediness within the soil types they populate. They are invasive because they will spread into intact coastal dune systems (where present). They are suppressive because they form closed areas under mats of deep creeping rhizomes once they have invaded. *E. villosa* is oppressive when it matures because it forms canopies of thick suffocating thatches through which very little can penetrate.

***Ehrharta villosa* introduction and impacts** *Ehrharta villosa* was first collected in Australia in 1912. Heavy infestations are found in dune areas north and south of Perth, Western Australia, west of Portland, Victoria, and in the southern Fleurieu Peninsula and Lake Alexandria dunal systems, SA.

The latter was a largely mobile dunal system with scattered trees and shrubs until barrages were built in 1938 and stability was needed to protect the shoreline infrastructure and prevent sand drifts into the River Murray. *E. villosa* was introduced as a stabilizer of these dunes. The 70 year old plantings have spread from the rear dune areas to the rear face of the fore dune. Old 2 m high *E. villosa* canes have formed thick thatching over the dunes in most places, preventing germination of ephemerals and small and medium native shrubs. This stability does not represent the natural dune dynamics in South Australia and inhibits growth of some primary dunal species that rely on a degree of sand mobility to stimulate natural growth. The locking up of sand also decreases the natural accreting and depleting actions of the dunes causing subtle changes to the availability of sand to replenish beach sand washed out by storm surges.

Hilton and Harvey (2002) suggest that the impacts of *E. villosa* are greater than the declines in biodiversity recorded within this system. They suggest that *E. villosa* is preventing sand drift to a point which threatens the natural character of the region, including the adjacent Coorong National Park.

***Thinopyrum junceiforme* introduction and impacts** *Thinopyrum junceiforme* was first collected in Port Phillip Bay in 1933. It can now be found across much of southern Victoria's coastal dunes. It was test planted as an aid for dune stability in Port Fairy, Victoria in the 1950s and 1960s. *T. junceiforme* is also found in coastal regions on the Fleurieu Peninsula and coastal locations near Adelaide, SA. Ocean currents and shoreline drift disperse *T. junceiforme* seed and disturbed rhizomes.

It is deposited wherever and whenever currents have a tendency to accrete sand, at creek or river mouths and along beaches, points and spits. It has a long and vigorous root system that retains sand better than our own species and its ideal conditions exist in a niche area on the beach front between storm surge and normal high tide levels. It quickly establishes a new incipient dune with a steep face further forward on the beach than our normal dune dynamics allow. This steep incline creates turbulence and sand removal at its face, causing beach erosion and steeper beaches. This has implications for sea birds using the high tide line for food gathering or nesting, particularly the threatened Hooded Plover (*Thinornis rubricollis*). Together with *E. villosa*, it further

Figure 1. Early warning of *Thinopyrum junceiforme*.

Figure 2. *Ehrharta villosa* before forming a thatch.

increases the threat to the natural character and dynamics of the Coorong dune systems.

Conclusion

There is little value in arguing that planners should forgo protection of infrastructure for improvements in biodiversity in this instance, because *E. villosa* and *T. junceiforme* are beyond any practical remedial action. However, there should be decisions about where the boundaries of infrastructure protection stop and where biodiversity protection begins. Long-term consideration needs to be given to the implications for coastal topography in instances where a weed interferes with natural sand movements and forces. Current coastal planning is too narrow and short-term.

References

Hilton, M. and Harvey, N. (2002). Management implications of exotic dune grasses on the Sir Richard Peninsula, South Australia. Proceedings of Coast to Coast 2002, 4–8 November, Tweed Heads, New South Wales, Australia.

Oppermann, A. (n.d.) 'A Biological survey of the South Australian coastal dune and clifftop vegetation'. (South Australian Department for Environment and Heritage, Adelaide).