

Where water meets land: Ecological values and conservation management of driftwood

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Summary

This is a brief examination of the ecological role and conservation management of driftwood. It is intended to stimulate thought and discussion on the topic. In essence, the conclusion is that driftwood is a distinctive and valuable conservation resource that deserves thoughtful management.

1. Introduction

Everyone knows what driftwood is. We stumble over it, use it to sit on, burn it, throw it for the dog, build with it or use it for decoration. But how important is it ecologically? Can we take it for granted? What do we lose when we destroy it?

These questions have arisen from a proposal by a local authority in the eastern Bay of Plenty to burn and firebreak areas of coastal driftwood apparently posing a fire risk and an impediment to human recreation.

A rapid search of accessible literature has produced snippets of information on the subject, but no in-depth analysis. I have therefore approached the question from ecological first principles, by asking some further questions:

- does driftwood have a structural role in the landscape?
- do any animals or plants use driftwood at all?
- do people attach any significance to driftwood?

The following notes are a fairly generalised response to these questions, largely to address the Bay of Plenty situation. The principles though, and even some of the specific values, apply elsewhere on the coast and also in other driftwood places such as riverbanks and lake shores. They may begin to form the basis of a departmental stance on the management of driftwood zones.

2. Driftwood as an ecological feature

Driftwood is an ubiquitous feature of almost every place where water meets land. Wood floats. It is cast ashore by winds, waves and currents. Here is a unique zone: extraordinarily long and thin, largely terrestrial but partly aquatic, greatly exposed to the elements, highly saline if on the coast, but very low in organic nutrients, and radically unstable physically.

Driftwood tells us about the flood and ebb of tides, and about currents and storms. It tells us of the journeys that have resulted in the arrival of each piece of wood. It has a physical presence and a definite structure. But it is still more: it provides a living for numerous creatures, some of which are found nowhere else.

It is, therefore, an ecological feature, an ecosystem in its own right.

3. Stability, erosion control, dynamics

In a medium of fine material moved about by wind, water and gravity, anything larger will provide an impediment to that movement. Thus driftwood catches material, usually on its uphill or upstream side, or facing the prevailing wind. On the other side it may form a hollow. The net effect is an accumulation of sand, silt, shingle, shells, seaweed or leaves.

Driftwood therefore provides a natural basis and reinforcing structure for foredunes and low bars, and shapes beaches and shores accordingly. Its importance in this regard is probably generally underrated, although people who live on the coast know it well and frequently use it to their advantage. With judicious placement of driftwood, eroding portions of beach systems can be stabilised: there are many such examples around the country. There are similar examples of riverbank erosion control using logs and branches.

The quantity of driftwood at any site and its rate of arrival, departure and decay depend on many things. Storm events are probably the main provider. Ferocious storms with high-intensity rainfalls like Cyclone Bola (eastern North Island, March 1988) send masses of wood into waterways for a while. Smaller storms contribute less, but more often. Current patterns, winds and coastal configuration determine where this wood ends up. Most of the driftwood on the shore probably arrives en masse rather than as a trickle. Storms can take it away again, if there is a combination of high tides, strong wave action and off-shore winds.

The climate, the type of wood and its degree of burial determine decay rates. Wood exposed to air and sun endures longest, while that buried in sand or silt can disappear surprisingly quickly, the best conditions for the microorganisms of decay being damp and dark.

Deliberate and accidental fires can remove driftwood in bulk. So too does harvesting for firewood. There is usually little wood on beaches near cities and towns.

There may be more driftwood on our beaches now than in the past, due to catchment disturbance and modification associated with forestry and farming. A huge volume of driftwood appeared on beaches and shores during and

following the large-scale deforestation throughout the country last century and in the first decades of this one. The effects of this on our coasts probably remain.

4. Habitats for small animals

Anyone who has ever turned over pieces of driftwood will know the wealth of small animal life they harbour.

These are some of the animals found in driftwood:

- centipedes and millipedes
- amphipods (sand hoppers)
- isopods (sea lice)
- beetles, including the great grubs of the sand scarab
- earwigs
- snails
- burrowing bivalves
- spiders, including our endemic katipo
- pseudoscorpions
- crabs
- geckos (at least two species)
- skinks (several species)

In estuaries and rivers, where driftwood is partly submerged, it furnishes sites for fish, barnacles, marine worms and other aquatic or semi-aquatic small animals.

For all of these creatures, the driftwood is providing shelter: from the elements, from predators. Even on an arid beach there is usually moisture under driftwood, and the conditions of such microsites must be relatively stable.

The driftwood also provides nutrients: either from its own substance or because of other material that accumulates around it. For feeders on decaying wood, the best place to be on the beach is in the driftwood. For hunters of the animals that eat driftwood or just use it for shelter, it is also the best place to be.

Most of the animals that live in driftwood breed there, taking advantage of its shelter. It is possible that others seek it out for that purpose, even though they spend most of their lives elsewhere.

5. Habitat for birds

Birds use driftwood for shelter, feeding, roosting or nesting.

Pipits, starlings, weka and kingfishers can be seen catching small animals among driftwood. Among the birds that use driftwood as roosting or lookout sites are kingfishers, starlings, shags, gulls, terns, dotterels, oystercatchers, herons and pipits: most of the birds of the shore.

A smaller number of birds routinely or occasionally seek out driftwood for nesting: black-backed gulls, black-billed gulls, oystercatchers, caspian terns, white-fronted terns, pied stilts (Figure 1), banded dotterels, black-fronted dotterels, New Zealand dotterels (which may nest alongside a piece of driftwood either for shelter or as a landmark) and blue penguins.

It is possible that in the past more birds made use of the driftwood zone for roosting and breeding, but that the presence of mammalian predators and humans has made it much less safe for them.

6. Sites for plants

For some plants of the shore, the stability, shelter, nutrients and moisture provided by driftwood may play key roles in their survival, by providing sites for their establishment.

Three such plants are both endemic and on the national checklist of threatened plants: sand milkweed (*Euphorbia glauca*), sand daphne (*Pimelea arenaria*) and shore tussock (*Austrofestuca littoralis*). Pingao (*Desmoschoenus spiralis*) is not quite so threatened, but has nevertheless declined alarmingly. It holds great significance in traditional Maori arts and crafts.

Other plants that probably derive similar benefits from driftwood include spinifex (*Spinifex sericeus*), *Carex pumila*, shore bindweed (*Calystegia soldanella*), sea rocket (*Cakile edentula*), pohuehue (*Muehlenbeckia complexa*) sea spinach (*Tetragonia trigyna*) and *Coprosma acerosa*. Pohutukawa (*Metrosideros excelsa*) and the speargrass *Aciphylla squarrosa* have even been recorded becoming established in driftwood. So too have mangroves (*Avicennia resinifera*).

7. Human values

Driftwood, if we think about it, tells us of other places. Every piece of wood has come from somewhere else! This is part of the fascination of being on the coast. To wonder about the origins and journeys of the wood is a pleasure and inspiration in itself. It also helps develop a sense of context: of a place in a wider setting.

Driftwood is symbolic of the action of water, wind and sun. And of life, death and decay. The bleached remains of trees, smoothly rounded or wrought into contorted shapes, remind us of living creatures or of skeletons. There are many photos and paintings of driftwood and far many more pieces of driftwood taken home to decorate the garden or the mantelpiece.

Apart from these aesthetic and symbolic values, driftwood has purely functional values to people. The most obvious of these is as firewood: people burn driftwood, either on the spot or at home. They also use it for fencing, building, furniture, wood-working and sculpture.

8. Driftwood management

The buildup of quantities of driftwood can cause real problems. One is of access: heaps of storm-deposited logs and branches may simply block pathways and vehicle tracks. They may form dams and rafts at the mouths of streams, rivers, lagoons and estuaries. Unblocking the access ways and waterways is the obvious answer, but a degree of sensitivity is required to avoid undue damage to the animals, plants and natural processes of the shore. What machinery is used (if any) and where the driftwood is relocated should be determined by principles of minimal impact and of taking cues from nature.

Fire is the other main problem. Natural fires in driftwood are probably extremely rare, but who among us has never had a fire on the beach? The bulk of driftwood is composed of dead bits of trees: hard, dry and very burnable. The escape of little fires, abandoned after a picnic or fishing expedition, into nearby drifts of wood is common on our beaches and sometimes serious. Whole shore drifts may go up in flames, destroying all the life they contain. Smaller branches and logs are consumed in a rapid inferno, while large logs may smoulder for weeks. At risk too are nearby vegetation and buildings. Many is the seaside crib or hillside of forest, scrub or fernland that has been incinerated by fires that have raced through driftwood or started from wind-fanned embers.

Education of people is one answer. Provision of fireplaces for their use is another. If beach fires are in designated fireplaces, are thoroughly doused or are below high tide level, the risk of flareups is minimised. Lighting fires against logs should be outlawed. So too should leaving beach fires unextinguished.

Where there are bulky and extensive accumulations of driftwood and high human use, clear firebreak strips in the driftwood would prevent fires becoming large and sweeping through the whole system. Creation of them, whether by hand or using machinery, should be designed for minimal disruption to the animals, plants, patterns and processes of the shore.

9. Conclusion

Driftwood has a significant ecological role, both as an ecosystem in its own right and as a component of other systems where land meets water. It provides habitats for a surprising range of animals and plants, and may be crucial in the life cycles of several. It is valuable in coastal stability and can be used as a cheap effective erosion control material. People use it in numerous other practical ways, and find fascination in its shapes and textures and in what it evokes.

For all these reasons, we must seriously consider what we are doing when we contemplate radical modification of the driftwood zone, and use sensitivity and understanding in its management.

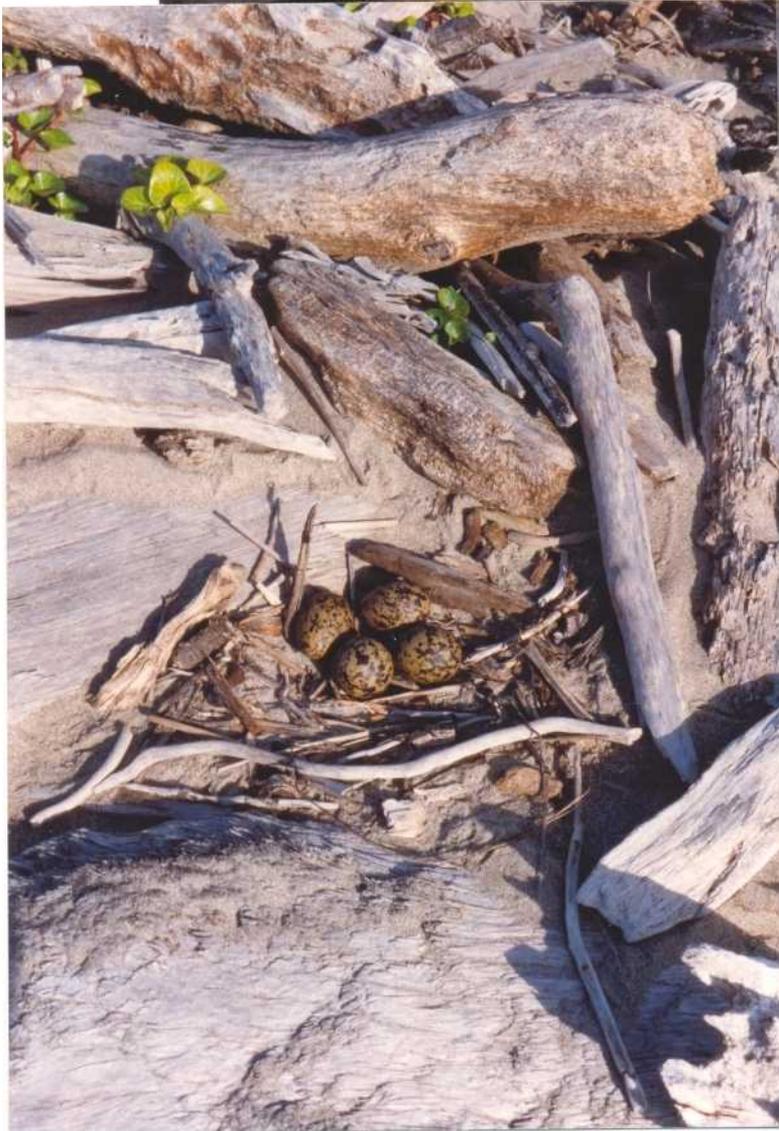


FIGURE 1

Top: driftwood at Whangaparaoa, East Cape

Left: pied stilt nest and shore bindweed

Above: larva of sand scarab (75mm long) found under a log