

COUL LINKS, SUTHERLAND

exploring a Scottish sand dune site
in words and art

Ben Averis and Audrey Verma
2022



Picture: Juniper and grasses at Coul Links

COUL LINKS

On the east coast of Scotland is Coul Links. A low, lumpy land with little hillocks everywhere. Made of sand shaped by sea and moving air. A place where nature thrives. “Coul” is pronounced to rhyme with “cool” (and “links” pronounced just as you’d expect.)



TECHNICAL SUMMARY. **Location:** 57.920N 4.000W; OS grid ref. NH 813 945; 0-2.4 km N of Embo, Sutherland, N Scotland; adjacent to North Sea. Area: 182 hectares. **Altitude:** 0-18.88 m a.s.l. **Terrain:** hillocks and hollows. **Materials:** sand and water. **Habitats:** grasslands (acid, neutral and calcareous), heaths (wet and dry), wetlands (acid to calcareous), woodlands (wet and dry), scrub, tall herb vegetation, bracken, saltmarsh, shingle/strandline, ponds (permanent and seasonal), bare sand. **Habitat distribution patterns:** complex mosaics. **Plant communities:** >40 types. Species: >1200 recorded in total (plants, fungi, birds, mammals, insects, etc). **Rare/scarse species:** many, including Fonseca's seed fly, Scotch annulet (moth), Small Blue (butterfly), Coralroot orchid, Baltic Rush, Dutch Rush, the lichens *Peltigera malacea*, *P. neckeri* and *Cladonia mitis*, and St Kilda hook moss *Sanionia orthothecides*. **Ecological designations** (n = national; i = international): Site of Special Scientific Interest (n); Special Protection Area (i); Ramsar site (i).

HABITATS

On the knolls of grass and heath we feel the cold when gales blow. We may be unaware that not far beneath our feet lies water, some of which flows quietly from these sandy mounds down into marshy hollows coloured cream in summer by the massed frothy flowers of Meadowsweet.

Here and there are heathy flushes on waterlogged ground. Creeping Willow, grasses, rushes, Cross-leaved Heath, Tormentil and Sphagnum moss make an interesting species mix that indicates acid soil. Acid wetland is an unusual feature among British dunes.

Nearby, on drier sand, heather grows thick and tall. In summer these heaths are a wonderland of a pinkish purple colour. It's like upland moor relocated to the coast and featuring maritime species such as Marram and Sand Sedge.

Flowering Gorse adds splashes of yellow; at other times patches of dark green. Juniper is dark green too, and rare on British sand dunes. Lichens form a creamy-white frosting among heathers and grass: extraordinary things – a symbiosis of fungus and alga.

Grasslands, so extensive at Coul, come in various textures and tones reflecting the varied species composition. For example tall tufts of Marram, whose leaves sway in the breeze, dominate many of the dune hillocks. Shorter swards are seen in damper hollows and some drier ground, and in places they are incredibly diverse (see next page).

There are many other types of habitat here at Coul Links, including birch woodland, swamp, saltmarsh, bracken, patches of tall herbs... There are few other places along the British coast that can boast as rich a mix of ecological interest within an area of this size. This really is sand dune at its very best.



▲ When we add all of the many species and habitat types at Coul Links together, the adage "the whole is greater than the sum of its parts" comes to mind.

DOES “SPECIES-RICH” RING A BELL FOR YOU?

When we say that some vegetation is “species-rich”, this might not convey the richness effectively to most of us. This is why imagery is used here, based on a view looking down and close into species-rich grassland at Coul Links. The original view was a photo taken by another ecologist in August 2016. It is drawn here as a sort of map with a different colour for each plant species, to amplify the small scale high density of species.

A couple of trial sketches led to the idea of focusing down onto just a very small area the size of something easy to visualise. A postcard? Maybe. But postcards might actually be unfamiliar to some people these days. When did you last send or receive a postcard?... So, what else? How about... a mobile phone! The image was then cropped down to what was carefully worked out to be a 7 x 12 cm rectangle of this vegetation: about the size of an average smartphone screen. From this, a species map was drawn of that little area, within which close study of this part of the photo revealed a total of 20 species: 17 flowering plants, two mosses and one fungus. The thin lines are grass and sedge leaves. The fungus is Scabious leaf spot *Septoria scabiosicola* and was spotted by a botanist from Liverpool when the photo was posted on Twitter earlier this year. Scabious leaf spot forms small dark dots on the leaves of devil's-bit scabious and is seen here in the top left and top right corners of this picture.

There's a lot going in that small rectangle. And that's just the plants (or, more correctly, plants and a fungus, because fungi are not plants). There will be other things there too, such as insects, miniature fungi and tiny microorganisms, all of these in the vegetation itself and also down in the soil beneath. And something similar in the next rectangle, and the next and the next... one 'species-rich mobile screenshot' after another (no two are exactly the same, of course), throughout this area of species-rich grassland at Coul Links.



EVERYTHING IS CONNECTED

Everything is connected in the complex web of life at Coul Links, as it is everywhere. These interconnections, occurring at all scales and among and between all groups of species and the physical environment, are fundamentals of the ecosystem. This includes small ecosystems within larger ones.

Is everything going to be alright? We don't know. We cannot see the future. But we can make predictions to some degree. To knowingly disrupt the links within and between the ecosystems is damaging and arrogant. Everything might be alright if we understand and appreciate the significance of interconnectedness in ecosystems, in society, and between people and the rest of nature.



► You might have noticed this already – I've drawn inspiration here from Martin Creed's thought-provoking art installation pieces titled "EVERYTHING IS GOING TO BE ALRIGHT".

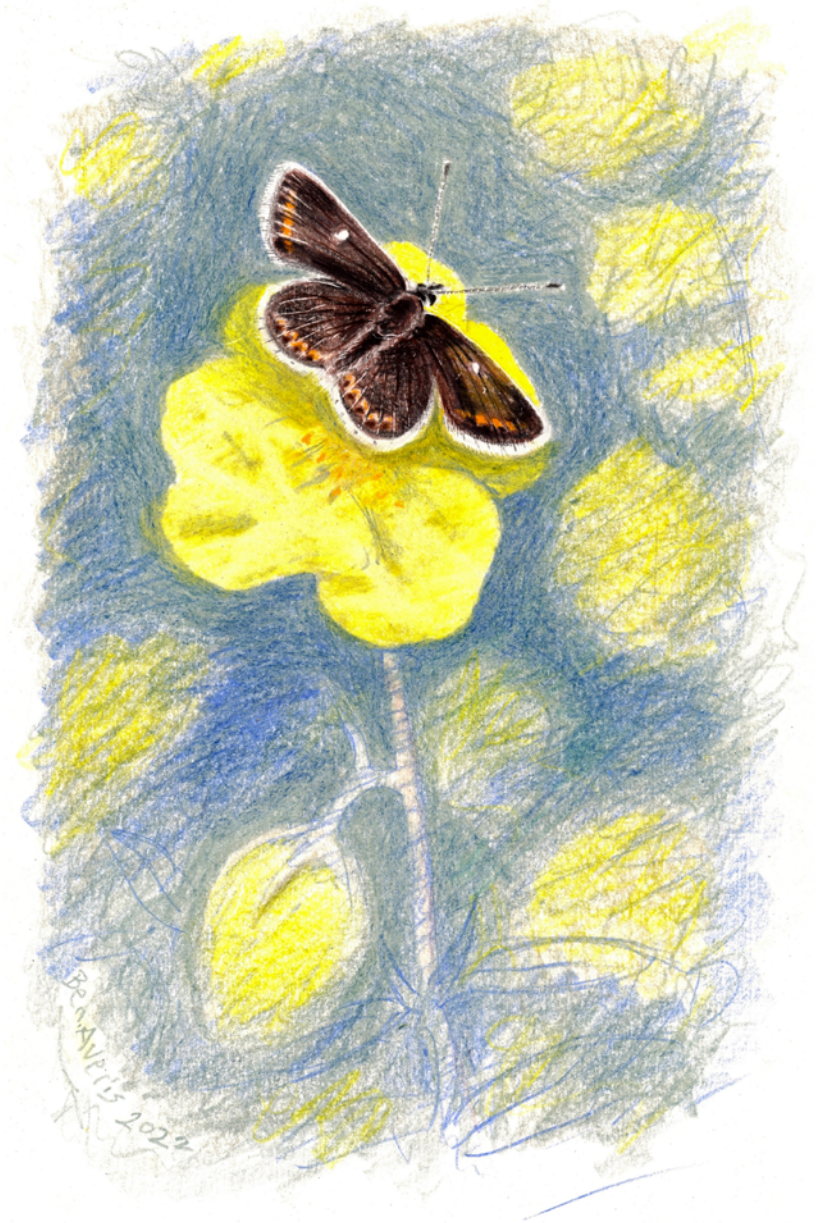
ROCKROSE TOWN

An interest in nature doesn't preclude a fascination for urban places, and indeed one can find parallels in the exploration of both environments: for example finding different plant species in grassland and looking nosily into shop windows. That's why, for current purposes, the name 'Rockrose Town' is given to the grassland at Coul Links that is dotted with the bright yellow flowers of Rockrose in summer.

Rockrose is a small plant that can't compete well in tall, dense vegetation. It needs space. Something such as grazing or a very shallow, patchy or nutrient-poor soil helps to limit the growth of other plants in the vicinity; at Coul a combination of grazing and nutrient-poor soil appears likely. In Britain, Rockrose is commonest on calcareous soils, in vegetation that can be very species-rich. Coul's 'Rockrose Town' is the habitat of the Northern Brown Argus. This butterfly is small and not very easy to identify, but if we happen to get a decent view we see its dark brown colour, like the Brown Argus (not found this far north in Britain) and the Scotch Argus (bigger, and different in other ways too). Coul Links is close to the northern edge of the British range of the Northern Brown Argus.

In summer the butterflies lay their tiny, round, white eggs on the small evergreen Rockrose leaves. The caterpillars hatch and feed on these leaves through most of the year. The adult butterflies take nectar from various plant species.

As with other butterflies in the Blue family, ants have evolved to be associated with the life cycle of the Northern Brown Argus. They drink a liquid secreted from the caterpillars' glands. The caterpillars benefit from this in that the presence of the ants deters predators. Just one example of a life support transaction in the ecosystem's webs of interaction. The butterfly needs a combination of Rockrose, the right climate and soil/ grazing conditions, and the ants. And probably other things we don't yet know about.



very A [✓]YELLOW FLOWER and a ^{not so} [✓]BLUE BUTTERFLY



The Small Blue, which comes in various shades of blue and brown, is the UK's smallest resident butterfly. It is rare in Scotland. We see it at Coul in the places where Kidney Vetch grows – along the seaward edge of the dunes, where exposure to frequent winds and occasional storms means that there are always some areas with a lot of bare sand and not much plant cover. This is good news for Kidney Vetch, which is a small biennial or short-lived perennial plant unable to compete well against tall, thick swards of more vigorous plant species.

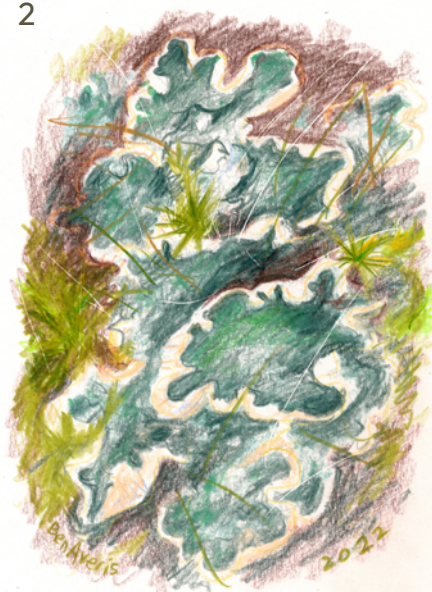
The Small Blue lays its eggs in the flower heads of Kidney Vetch, and the caterpillars feed on the developing seeds. Adult butterflies take nectar from flowers of this plant and also Bird's-foot Trefoil (another small plant of short or sparse vegetation). They don't confine themselves to the short and sparse vegetation with Kidney Vetch; they also use taller vegetation nearby for perching and roosting. Ants are probably involved in the life cycle of the Small Blue, as with the Northern Brown Argus.

NEW DISCOVERIES!

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- ▼ 1. Restharrow *Ononis repens* (found here in 2016)
- 2. Green felt lichen *Peltigera malacea* (2017)
- 3. Northern Bedstraw *Galium boreale* (2021)
- 4. St Kilda hook-moss *Sanionia orthohecioides* (2021)

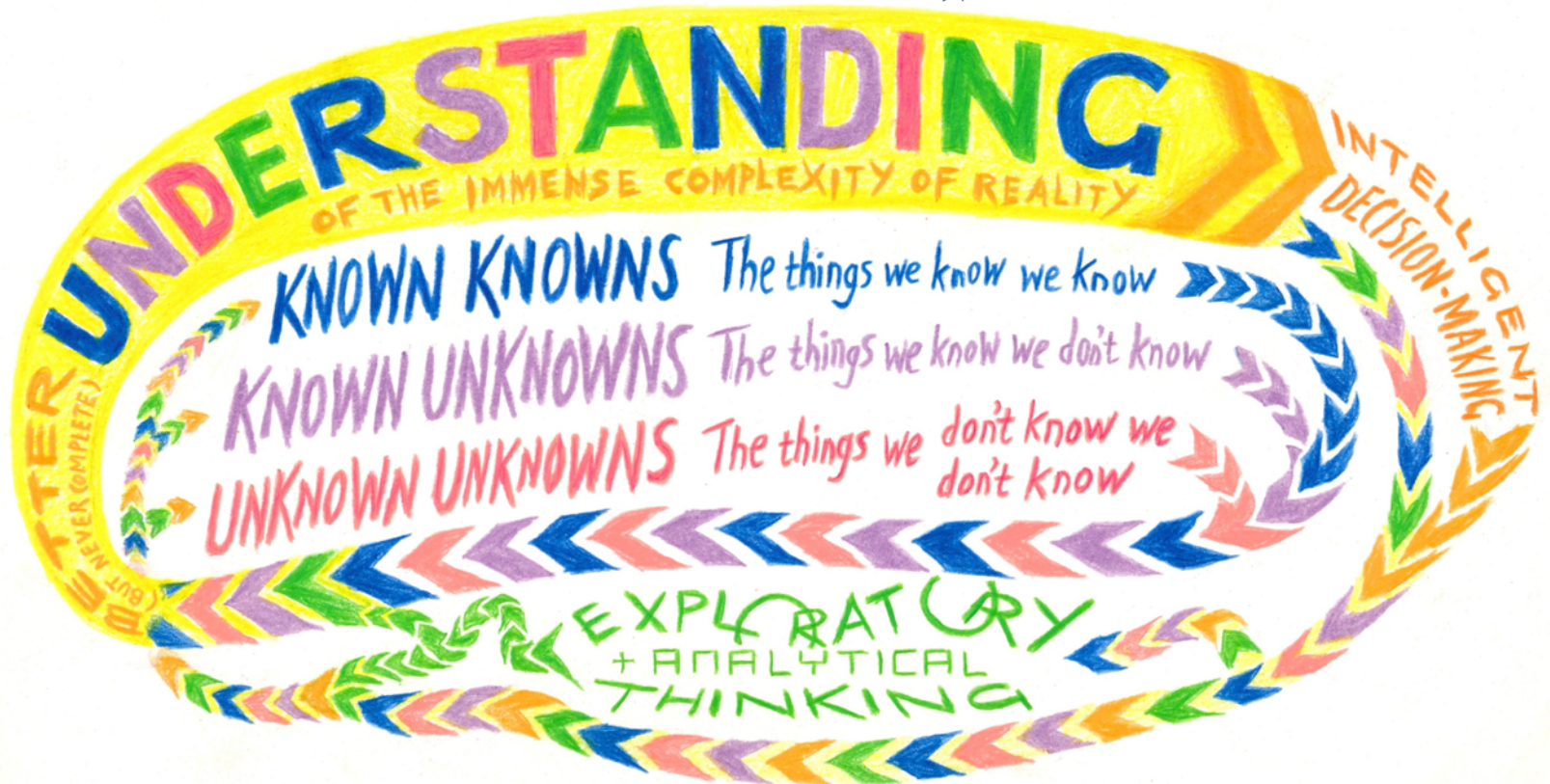
We go somewhere and see a species of plant, insect or whatever and then find that the species had never been seen here before. This happens in all sorts of places – even some that people have studied for many years. It can happen for any of a number of reasons. 1. The species has been there for a long time, but no-one has looked closely in the exact place where it lives. This is most likely on a large and complex site, but it also happens on some surprisingly small sites. 2. No-one had previously been there who knew how to find and identify the species in question. This is especially likely for species groups studied by only a very small number of people. Slime moulds, for example. 3. The species was not there before and has just arrived, so it is a new record. It's not always clear which of 1, 2 or 3 applies to the finding of a 'new' species. If we're sure it is 3 we might be able to identify a likely reason for its new arrival, such as climate change, habitat change or an accidental introduction.

On the other side of the coin, we sometimes fail to re-find a species where it was previously known. When this happens we can't always be sure if the species really is gone or if it's still around somewhere; further search might clarify this. Another thing that can happen is that a species disappears from a site without anyone knowing, at least not straight away; its absence might be noticed in time. And, while we're considering all possibilities, a species could arrive at a site, be there for a while, and then disappear, all without anyone knowing. What species was that? Impossible to know. This leads us to the knowns and the unknowns ...

KNOWNs, UNKNOWNs, & UNDERSTANDING

The immense complexity of nature is a wonderful thing to behold. The more we study it, the more we realise that our knowledge is incomplete and always will be. There is always more waiting to be discovered. The idea around known knowns, known unknowns and unknown unknowns can be applied to everything in nature, including Coul Links. It could have been written for ecologists.

Consideration of the existence and significance of unknowns, together with the knowns and some exploratory and analytical thinking, can lead to better understanding (including recognition of what have been described as unknown knowns – things we know but don't know we know) and better decision-making. In ecology and nature conservation this can usefully lead us to the precautionary principle: to avoid artificial development where it has potential to cause ecological harm and its effects cannot be fully predicted.

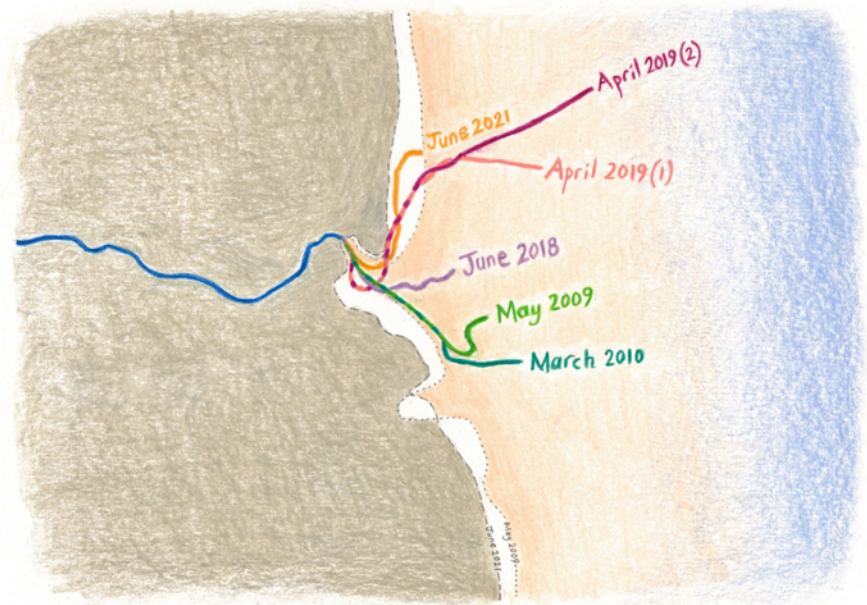


ONGOING CHANGE

One of the reasons for never knowing everything about a place such as Coul Links and its nature is that everything is continually changing. As if the immense complexity weren't enough of a challenge, we've got to incorporate change into our understanding too! Rather inconvenient. But nature isn't about convenience. Or inconvenience. It just is, in all its innumerable parts and ways. A feeling of inconvenience is a human response to the challenges of understanding an ever-changing nature. We can respond with other feelings too: of appreciation, inspiration and curiosity.

Ongoing changes of all sorts, and at all scales of space and time, are taking place at Coul Links. There are short term changes such as the twice-daily ebb and flow of the tide, day to day changes in weather affecting ground wetness and movements of wind-blown sand, storms affecting the shaping of the sea-facing front edge of the dunes... There are seasonal changes: plants flowering in summer (heather colouring whole areas of heath pink-purple, and areas of wetland looking creamy-white with Meadowsweet flowers), birch leaves turning gold in autumn before they fall, Whinchats and terns arriving for spring and summer, geese here for the winter... and Juniper looking much the same all year round. Then there are changes over years, such as the shaping of the sand dunes and the route of the Cluain Burn snaking its way across the beach. Those last two are large scale changes, contrasting with much smaller scale changes such as patterns of plant species in vegetation: for example, the pattern in the species map on page 3 will change from one year to the next on that same phone-sized piece of ground. Some changes are hard to see; for example those involving microorganisms hidden away in the vegetation or underground – less visible but probably no less significant.

To acknowledge that there is so much ongoing change doesn't mean that any aspect of our understanding of a place won't apply next year or even tomorrow. Our understandings of any ecosystem include acknowledgement of ongoing change and of the fact that the reality is more complex than our model. And, of course, we continually modify our understandings as we find out more.



This illustration shows the changing course of the Cluain Burn across the beach at Coul Links between May 2009 and June 2021. It is based on aerial photography on Google Earth. Background colours: dull greenish-brown = vegetated dunes; pale orange = bare sand (beach); blue = sea (beach/sea boundary obviously varies depending on tide); white = mostly vegetated dune in 2009 but bare sand in 2021. Dark blue line = course of Cluain Burn through the dunes; unchanged between 2009 and 2021. Other coloured lines = course of the burn across the beach at different times during this 12 year period. The course varied a lot over time. So did the length of burn visible across the beach in the aerial photos. An additional aerial photo from September 2020 showed no burn on the beach at all; it appeared to end just downstream of the end of the dark blue line.

KEEP COUL^{un}TIDY

People talk about a British obsession with tidiness, and you can understand why when you see gardens where nature is heavily suppressed or even eradicated. People 'tidy up' parts of their neighbourhoods too, such as streets and roadsides. We don't mean removing litter that people have left on the ground – that's something different and we wish people wouldn't make that kind of mess. No, we mean removing 'weeds', brambles, dead wood and other things they think look messy, and we wish people would just let this kind of mess remain – it's part of nature. There's a large-scale equivalent of this through much of the British landscape, at least in the lowlands: intensification of agriculture. Since the mid-20th century, so much hedgerow, woodland, scrub and other 'messy' or 'unproductive' habitat has been cleared, leading to a decline in overall biodiversity and pollution of much of the remaining semi-natural habitat. With gardens and (sub) urban neighbourhoods, the push for tidiness seems to be associated with a desire to control. With agriculture it is more for financial profit. In all cases, nature loses out. In the words of the late eminent ecologist Oliver Rackham: "tidiness is the enemy of biodiversity".

Some people have said that Coul Links is too messy. Coul Links is messy – it's full of nature! But 'messy' and 'tidy' are human concepts that mean nothing to, say, a breeding pair of Whinchats. If all the Whinchats, Stonechats, Whitethroats, Willow Warblers, Grasshopper Warblers, Chaffinches, Yellowhammers, Reed Buntings, Wrens, Meadow Pipits, Curlew, Snipe and all other birds and mammals and butterflies and plants and fungi and so on at Coul Links present us with a consensus that they would prefer this place to be tidier in the human sense, then maybe there would be a case for a bit of tidying up because, after all, it's their place at least as much as ours. But until such a request is made, may Coul Links stay messy and free of neatly mown lawns and other kinds of sterile artificial tidiness. It's an obvious priority, especially in the light of the current global climate and biodiversity crises, that we should all look after nature, everywhere. Damage nature's links: the ecosystem sinks. It's cool to keep Coul.



ACKNOWLEDGEMENTS

We sincerely thank:

The Leverhulme Trust and Newcastle University.

Not Coul, including Andrew Mackay, and their local support, for providing us with ecological background information, for accompanying us in person on visits to Coul Links, and for feedback on text drafts. Their detailed understanding of Coul has been invaluable for this project.

Alison Averis for accompanying Ben on his visit to Coul Links in July 2021, and Alison Averis and Tony James for feedback on earlier drafts of this document.

Book design by Griselda Gabriele. www.grisgabriele.com

▼ Some kind of forest? No – it's a view looking up from within some of the many little bushes of Burnet Rose at Coul Links. There's a bit of Bracken in there too, at the lower left.

AUTHORS

Ben Averis is a botanist and artist living near Edinburgh.
www.benaverisart.co.uk / www.benandalisonaveris.co.uk / ben.averis@gmail.com

Dr Audrey Verma is a social researcher whose current work revolves around environmental justice and citizenship in the digital anthropocene.
www.audreyverma.com / audrey.vermajames@gmail.com

For more information on Coul Links, please get in touch with Ben or Audrey.
Or visit: www.notcoul.org

To cite this publication: Averis, Ben, and Verma, Audrey. 2022. Coul Links, Sutherland: Exploring a Scottish sand dune site in words and art.
Available at: www.notcoul.org

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