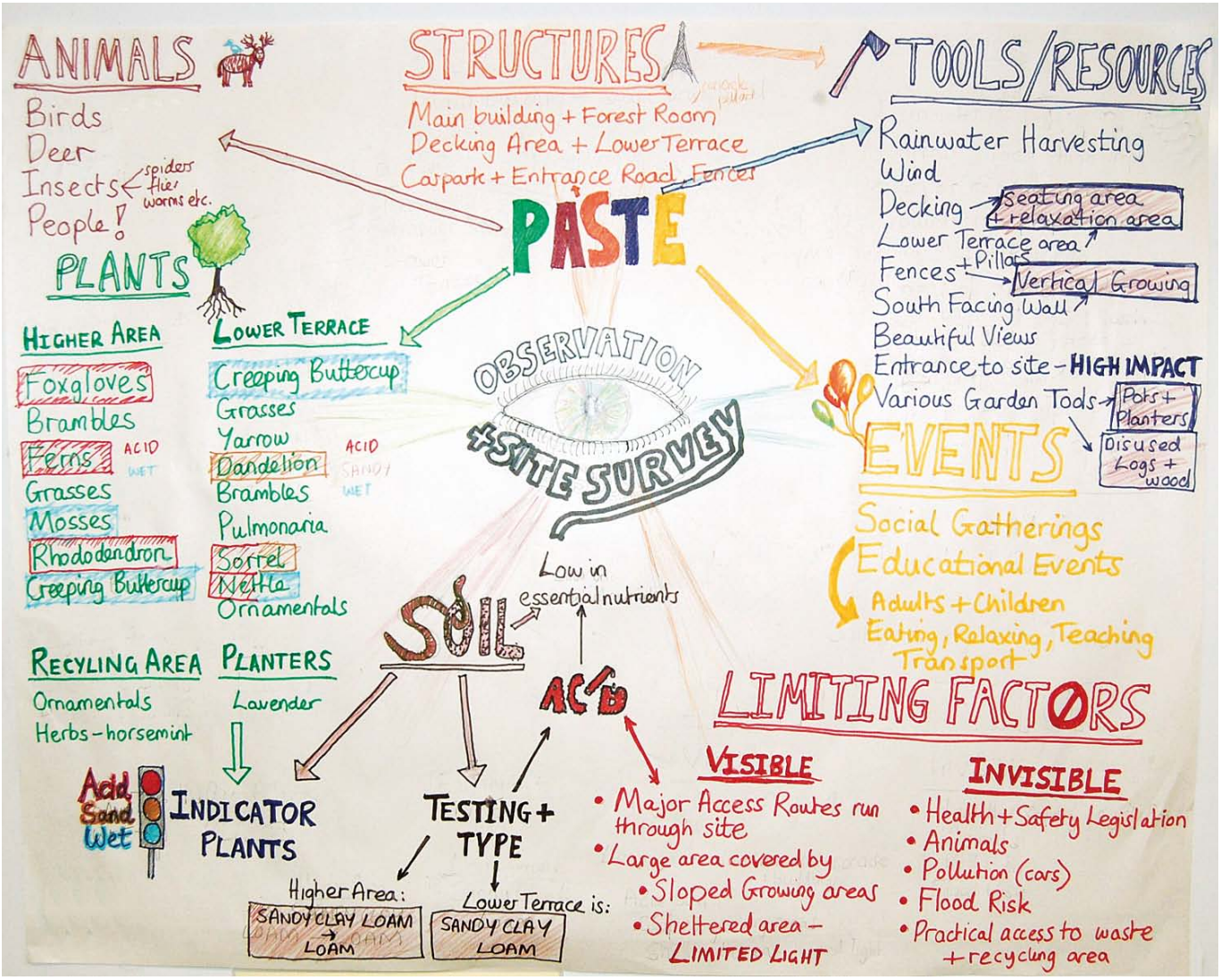


Whether it is a plot of land, a business, or social enterprise, Aranya describes the critical process of surveying to produce an effective design

How To Survey A Site

Having looked at the value of a clear design process in *PM*72, we'll move on to the process of effectively surveying a site. Of course, there are many things we might design using permaculture and that site might be a physical one like an area of land or it could be organisational like a business. In either case we'd essentially be studying relationships and their current level of effectiveness, in order to figure out some improvements.

The greatest challenge for most of us is to give this survey stage sufficient time. We live in a society where we're encouraged to have everything as soon as possible, so it can be difficult to find the patience to simply observe and record

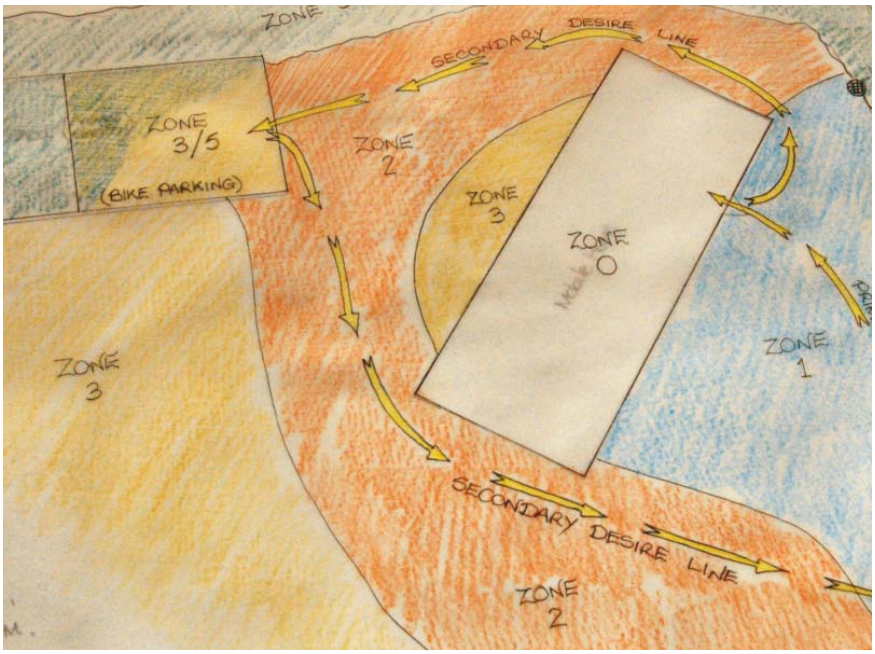
without immediately having lots of ideas to make things better. Some of these ideas might be good ones, but we often completely overlook possibilities that we haven't encountered before. So one of the most important things I do now is to help people to slow down...

By taking the time to observe, we begin to notice things that weren't immediately apparent. These things are often the key to plugging energy and resource leaks that others have overlooked.

You'll need some way of recording the things you observe and a map often fits the bill well. A map is simply a representation of the relationships between things, so as well as land maps we also have mind maps, flow charts, photographs, video and so on. Maps are really good for storing information for your future self (more reliable than memory I often find), but they are also good for communicating ideas to others. Obtaining a good base map can save you a lot of surveying time and as such can be worth paying for, but being able to make your own maps is a valuable skill to develop too. This article isn't about that though, it's about what you might record on them.

Speaking of which, many maps are already cluttered with a lot of information, much of which won't be as important to you as it was to the people who made the map. I like to make base maps that have just the fixed elements on them; those things that are already working well or would be too much work or too costly to move. Then I record all the other information onto overlays, sheets of tracing paper if you work on paper, or layers if working with software. By doing this I can just pull out the information I need at any one time and see it much more clearly than if the map was cluttered up with everything.

Remember too that maps can be out-of-date or just plain wrong, but most importantly, the map is not the territory, so even if you obtain a good one, you still need to get out there on the site and start using all your senses, ideally year-round. There's so much you'll miss if you don't do this yourself. So what kind of things do we need to look for? Let's consider a few...



Top left: **A typical PASTE chart.** *Top right*: **Zones and desire lines.** *Above*: **Observe natural effects over time.** *Right*: **Animal tracks are easy to spot in snow.**

Site Systems & Elements

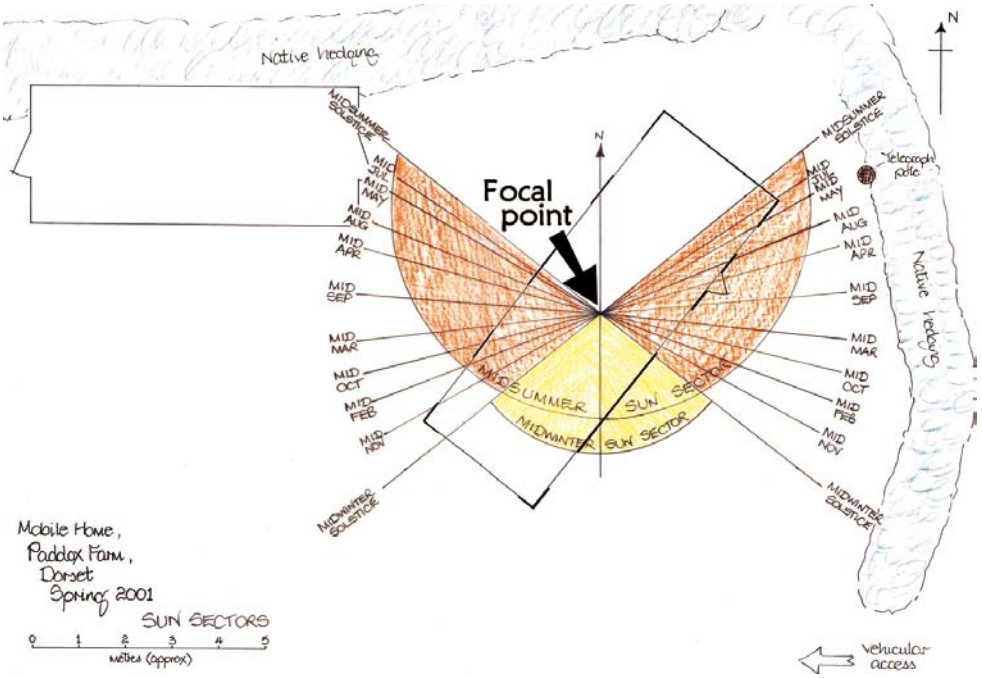
What do you find currently on site? A useful acronym to help remember the main things to look for is **PASTE**, which stands for: **P**lants (and trees), **A**nimals (and insects, birds etc.), **S**tructures (anything constructed, e.g. ponds, paths, buildings, earthworks), **T**ools (anything there to do a job, e.g. solar panel, water pump etc.), **E**vents (human social, but can also include natural events).

There's no letter in this acronym for fungi, which fall in evolutionary terms between plants and animals. So I guess this should really be **PFASTE**. Of course, the plant life you'll see in one season may be very different from another. You'll also find a lot of some species and only a few of others.

A simple plant list wouldn't record this, so we can use the **DAFOR** grading system to help us. Rather than having to count every plant, we can simply decide if we consider it to be **D**ominant, **A**bundant, **F**requent, **O**ccasional, or **R**are on the site.

As far as animals go, you're more often likely to see the evidence of their passing than the creatures themselves and even this may take some patience to cultivate. Conversely, we humans and the evidence we leave behind are rarely hard to spot, but still important information to note. While many of these things can be easily mapped as we find them in a particular place, other things may come and go and so be recorded on a calendar or simply in a list.

Desire lines (pathways worn by human and animals passing regularly along the same routes) tell us where they like to move across a site. We humans tend to



make gateways, whereas animals will seek out the path of least resistance through hedges and across streams. Each of those humans and animals are passing through for a reason – can you figure that out and how can that information help us later?

Zoning is familiar to anyone with a little permaculture training... How is the site currently being used? Pathways can also be considered zone 1 areas, so include the desire lines you noticed in the process. Later we will compare what we see now with our optimised layout, but for the moment we're still just observing.

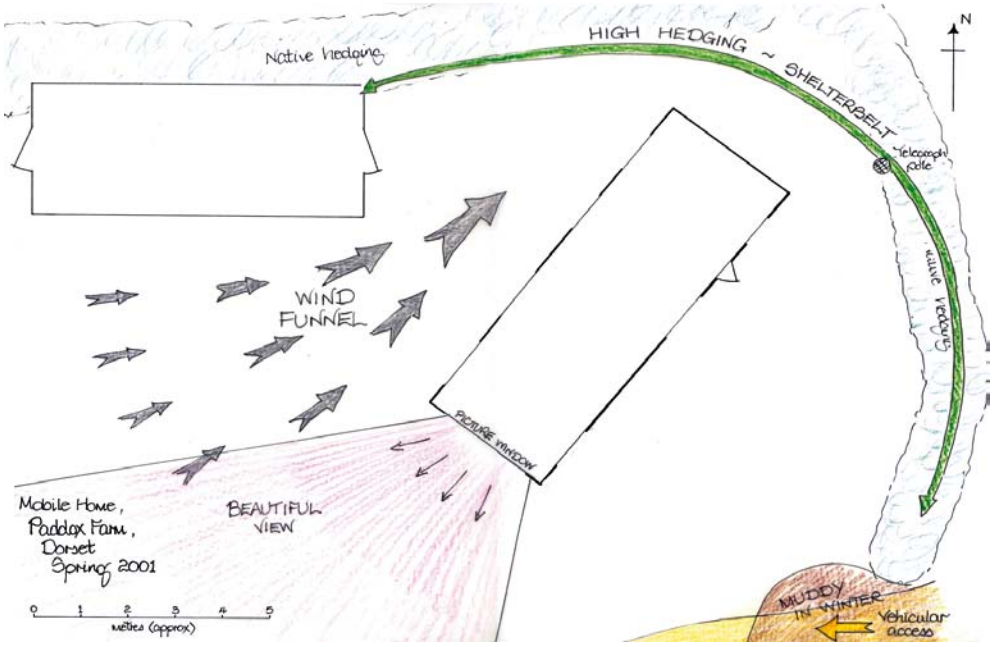
Sectors are about the 'wild' energies coming into a site, whether we are considering the sun, the wind, or a piece of government legislation, these are things that are generally beyond the ability of those on the site to significantly influence. They are energies that might in some places be harvested and in others protected from. What are the significant sectors on this site? I've come to realise that on land designs there are three main kinds of sector: those that are directional, those that are topographical and those that arise from a combination of the two. The former are energies that come from a specific direction, such as the sun or the wind. Regardless of where you stand on a site these are essentially the same, so we can make an overlay like a sun compass and as long as we have a north arrow to align it, we can focus it anywhere on our base map to show us the effects felt there. Better still, for the sun sector overlay, once we've made one, we can use it at any similar latitude anywhere in the world.

Topographical sectors are instead those that are created by the landscape itself, frost and flooding being two main examples. Wherever you stand on the site, the effect of these energies remains in the same place. Both cold air and water flow downhill and frost and flooding are caused where the inflow is temporarily greater than the outflow. Where the topography interacts in combination with directional influences like wind and sun we find shade, rain shadows, wind tunnels and so on. These are the microclimates we work with as designers.

Because topographical and combination sectors are firmly fixed to the landscape, any overlays need to be 'located' onto your base map by tracing over a few corners of buildings, boundaries or even the map scale and north arrow. This allows you to always put it back in the right place. So, if I'm looking to save paper and combine different sector information on overlays, I'll put directional sectors on one sheet and the topographical and combination ones on another.

Get Out in the Wind & Rain...

Whenever it's wet or cold or windy, we usually go indoors as soon as we can. However, it's just that kind of uncomfortable weather that can give us the most important information about a site. One permaculture approach is to design for disasters, and it's important for us to become aware of seasonal weather extremes and their patterns so we can plan for them. Unusual weather events can provide us with insights into these potential issues as they reveal a whole collection of things that we don't normally see, such as:

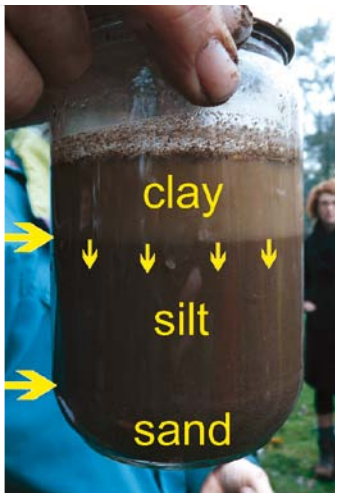


Heavy rain: Where is water being focussed? How does it flow down slopes? Are there signs of erosion where water is flowing quickly? How does rain flow off roofs? Are there any leaking or missing gutters? Does water infiltrate any buildings? Are there any overflowing drains? Where does water puddle (this can also be a clue to soil compaction)? Are watercourses coloured brown by soil being washed off fields? By the time you've learned the answers to these questions you're likely to be quite wet, but you'll have learned a lot about your site.

Strong winds: Where are the windiest areas? Are there any places where litter is blown in circles? Or never settles on the ground? Where are the most sheltered spots? Poles with simple flags (e.g. carrier bags) placed around a site can enable you to observe wind patterns across a large area from a distance.

Frost: Where does frost settle? Is cold air trapped and unable to move down-slope, by hedges, walls or buildings? Could this be remedied? Are there frost-free areas around trees, under hedges, or around buildings? Go out early in the morning to view this – a few hours later the remaining frost may no longer remain in the really cold places, only where shade prevents the morning sun from melting it.

Snow: When it snows we can see desire lines more easily and see where snow melts more quickly or slowly.



***Top left*: Annual sun angle sector map. *Bottom left*: Combination sectors. *Above left*: Animal track or water run-off? *Above right*: Soil sample analysis. *Below*: Frost trapped by the slope and the buildings shadow.**

Drought: Times of drought are when we learn the most about water in the landscape. Where wildfire is an issue, learning these lessons can literally be a matter of life or death.

Soil & Water

You'll need to test the soil across the site to determine what might best grow there and any remedial strategies needed to reduce erosion and build quality and depth. Some indicator plants immediately give us clues to the soil below, but digging at least one test pit will tell us even more. Get familiar with the feel of different soil types between your fingers; sandy soils are pretty obvious, but sometimes people confuse silty and sandy textures. Using a jar we can do a simple settlement test to more accurately determine the percentages of sand, silt and clay in a sample (sand, being the heaviest, falls out first, followed by silt and eventually the clays).

How does water move through the site? Are there any open bodies of water such as ponds or lakes? Any signs of areas that temporarily flood that could be more permanent storages? What about earthworks such as dams and ditches? Is there a well or borehole? How does water drain off buildings and how much of it is stored? How long does this last in times of drought? How well are water systems connected together? Is water being treated or reused before leaving the site?

Where are the Leaks?

You may have already identified some of the site's key limiting factors: perhaps excessively shady or boggy areas, very heavy or light soil, or crops regularly grazed off by insects or wild animals? Some of these factors we may seek to modify, others such as altitude we are going to have to accept and seek to discover the gifts they offer. Our role as designer is to identify key limiting factors, and then to design strategies to overcome them. Sometimes, by removing one limitation, the landscape will change dramatically, like removing grazing animals to permit the regrowth of forest. An effective strategy might be as simple as plugging some of those wasteful leaks. A quick look around many sites will quickly identify the tragic loss of energy and resources such as:

- Heat escaping from buildings.
- Fertility being washed out of the soil.
- Water leaving the site before being fully utilised.
- Crops being left to rot (most commonly under trees).
- High maintenance, low output systems (e.g. most lawns).
- Vandalism.

You may also identify other opportunities being wasted like workers having insufficient to do, or being wasted on low value tasks. In addition there may be other 'non-physical' limiting factors to consider, such as legislation, ownership or cultural issues (including the reactions of neighbours).

Map Utilities & Resources

Don't forget to map utilities such as gas, electricity, sewage, water, phone etc.) already being supplied to the site. Utility company maps can help identify the routes of buried pipes and cables to avoid accidentally damaging any during excavations.

What valuable resources are available on or close to the site? These might include many things currently considered waste, like tyres, old baths, pallets etc. When travelling to and from the site, make a note of any local businesses that may be throwing away useful items. Where can they be obtained for site development (e.g. building materials)? Where are the nearest shops for food? Where can medical help be found in an emergency?

Observe Over Time & Keep a Diary

Where you have the chance, make sure you record your observations over time to get the bigger picture. Keep a diary. It doesn't really matter how you do this, as long as you do something. Any record is better than relying on memory, something I've discovered the hard way when examining unlabelled packets of seed each spring! Yet there's no point in setting yourself up to document lots of information every day if it soon feels like a chore. Just record what interests you (presumably what you're designing) and make it easy to do or you won't bother.

A simple diary format might consist of a grid of boxes into which we record physical conditions like temperature, rainfall, perhaps even river levels etc. – any factors that relate to what you might be designing for on your site. I keep a simple weather log, which has columns for three years of observations, allowing me to notice any long-term patterns. And because it's a simple format, I rarely fail to fill it in.

Photos are of course a great way of recording visual information and can save us plenty of time that would once have been spent drawing or writing notes (though the latter tends to make us more observant). Recording shade patterns across a garden through the seasons is particularly well suited to this technique.

***Above*: Shade mapping – left March, right November.**

Make a note on your calendar to take a photograph from say an upstairs window early morning, noon and evening at the beginning of each month (when the sun is out of course). The resulting set of photos you'll find to be very revealing about microclimates through the year.

Above all, have fun with all this. I hope you learn lots about your site along the way

Aranya is a permaculture teacher and designer. His new book Permaculture Design – A Step by Step Guide, *is available from Green Shopping. See advertisement below.*