

# The Clay Research Group

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## RESEARCH AREAS

Climate Change ♦ Data Analysis ♦ Electrical Resistivity Tomography  
Time Domain Reflectometry ♦ BioSciences ♦ Ground Movement  
Soil Testing Techniques ♦ Telemetry ♦ Numerical Modelling  
Ground Remediation Techniques ♦ Risk Analysis  
Mapping ♦ Software Analysis Tools



**The Clay Research Group**

December 2013

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Research News

## Tree Records Update

This month we look at the updated tree file containing in excess of 40,000 records to graph ownership, height and H/D distribution by species.

The rank order of risk remains unchanged, and the H/D ratio demonstrates greater uniformity than anticipated.

## Is there a Link between Deprivation and Repudiations?

Research by academics suggests that deprivation is an indicator of crime. The poorer the area, the higher the incidence of burglary etc.

If that is so, do we see more repudiations in deprived areas? How do we measure deprivation?

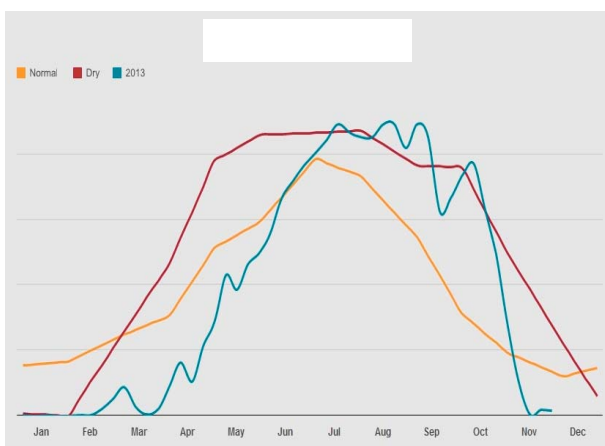
Our study reveals no link between subsidence and deprivation, which may not be surprising. Subsidence is characterised by evidence in the form of cracks etc., and in any event, one of the indicators of deprivation is the absence of home ownership.

What is interesting in terms of general perils (theft etc.) is the correlation between recent work at UCL and that undertaken at Huddersfield over ten years ago by Professor Ken Pease and his team, which suggests little has changed in terms of demographics.

## The UK Claims Experience and Risk

This month we refer back to the base graph of risk, adding repudiations to valid claims. Both are plotted by postcode and divided into geology. The graph captures the risk of subsidence in the UK in one image.

## SMD Graph for 2013

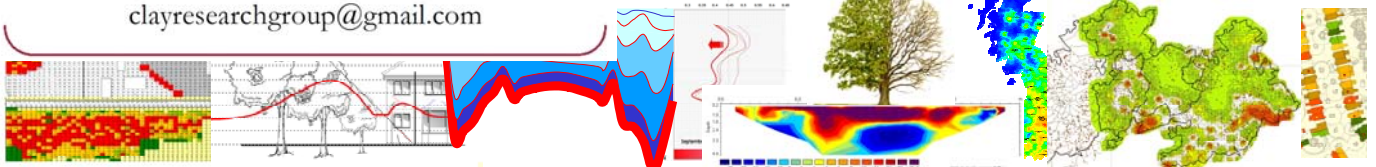


SMD Data Courtesy the Met Office

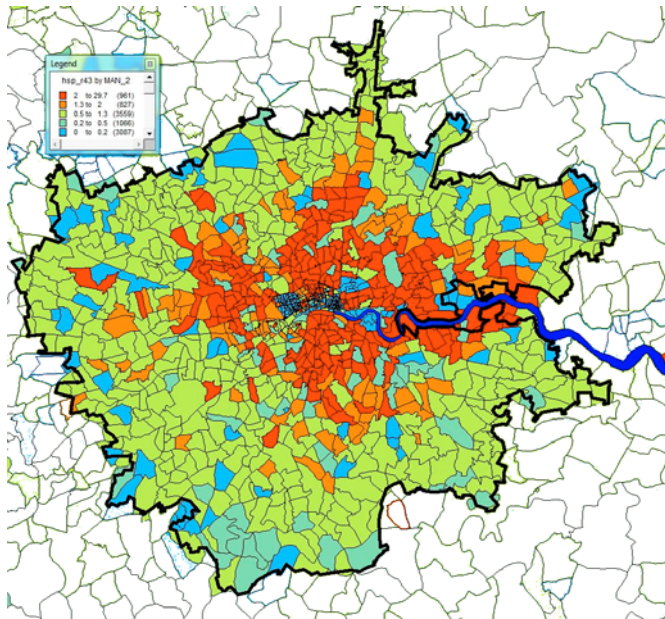
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*The above map plots deprivation at postcode sector level and was produced by Andromachie and Prof. Ken Pease from Huddersfield University. We found no link with repudiation rates relating to subsidence claims, although we understand there is a strong link with crime.*

## Crime, Deprivation and Subsidence Repudiations. Is there a Link?

Research by academics over the years has suggests a strong correlation between deprivation and crime. Areas with high densities of low income families, with high unemployment rates apparently suffer a higher incidence of crime.

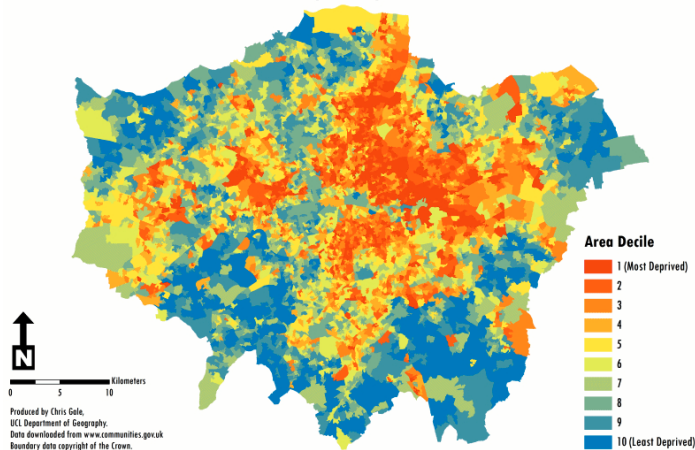
Some 15 years ago we part funded research at Huddersfield University by Professor Ken Pease and his team on this topic, and we continued by examining the link between deprivation and repudiated subsidence claims. Was there a connection? Were some claims that were repudiated being presented for financial gain?

Deprivation was measured using a range of factors including employment, tenure, Housing Association densities and so forth.

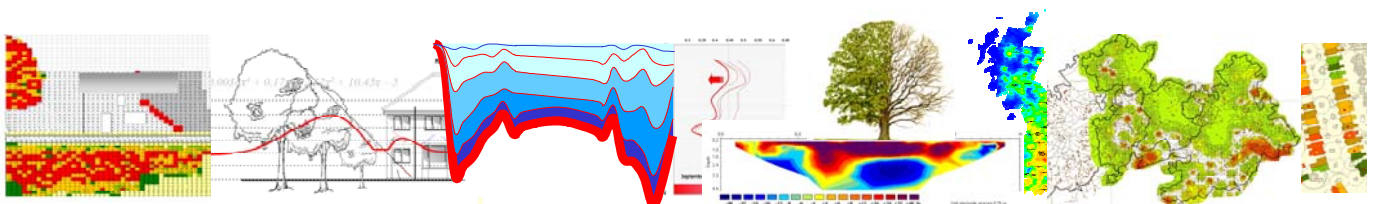
There was no correlation between deprivation and frequency of repudiations in the case of subsidence. No doubt this is because subsidence is evidenced by hard fact and can be measured and verified fairly easily.

More recently Chris Gale of University College, London, has produced this updated map of deprivation at unit level. It is interesting to see the comparison with our own base map, plotted at sector level (top of the page), which tells a similar story.

**The Overall Index of Multiple Deprivation for London**



*The above map plots deprivation at postcode unit level and was produced by Chris Gale of UCL, Department of Geography.*

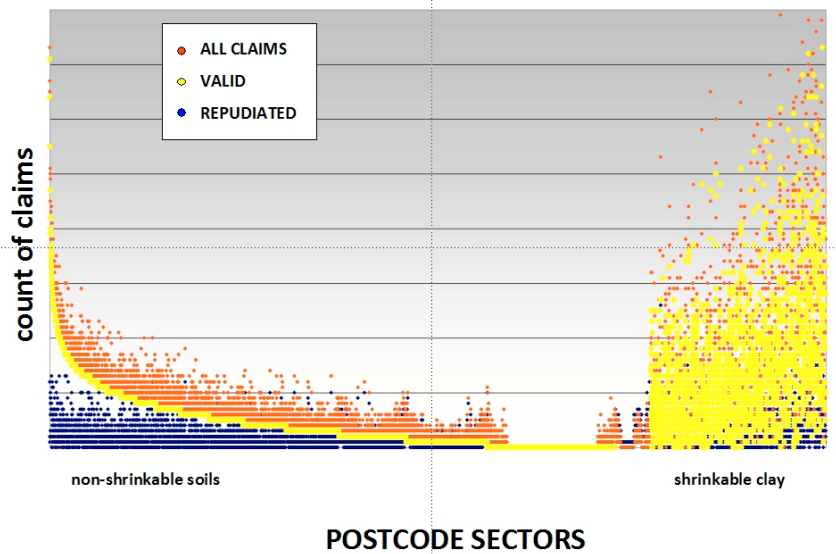


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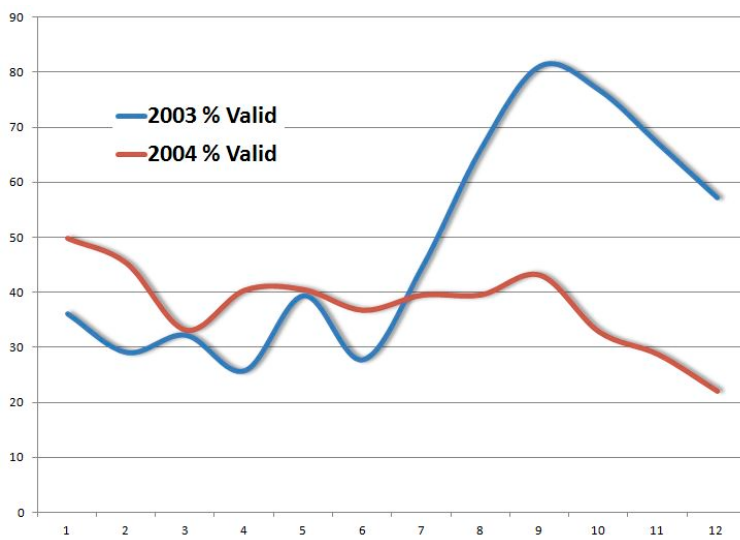
The graph, right, has appeared in previous editions and forms the basis of the work we do in terms of UK claims analysis. This version plots five years claims experience and includes both valid claims (yellow dots) and repudiations (blue dots).

The 'x' axis plots claims by postcode, divided into shrinkable clay soils (to the right of the graph and accounting for just over 20% of the UK), and non-shrinkable sands, gravels etc., to the left. The 'y' axis plots the number of claims.

**The UK Claims Experience in a Graph.**  
Valid and Repudiated Claims. Distribution by Postcode Sector and Soil Type.



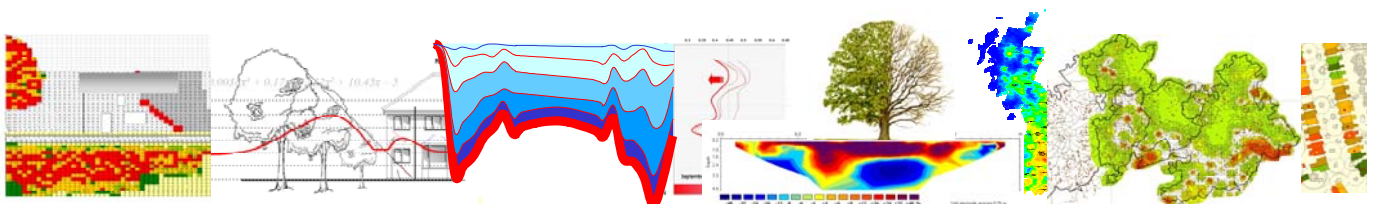
**The Business Cost of Surge**  
More Claims = Higher Percentage of Valid Claims.



What sort of strain does a surge year impose on staff handling subsidence claims?

Left we have plotted the number of valid claims received in 2003 (a surge year) and 2004 (a normal year). It can be seen that in 2003, slightly over 80% of claims received in September were valid. Not only were there more claims, but more of those entailed more work. In the same month in 2004, only 40% of claims were valid.

As the increase relates to root induced clay shrinkage, there are more site investigations, trial holes, soil tests, monitoring and arboricultural reports to be obtained and assessed.



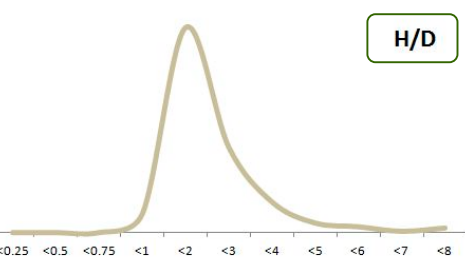
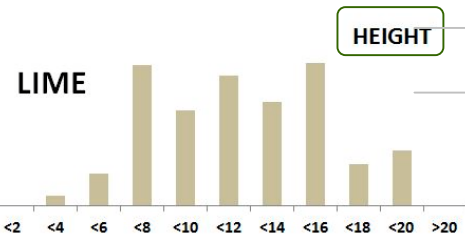
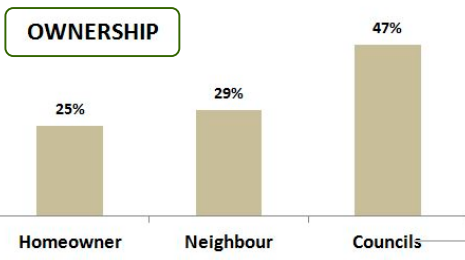
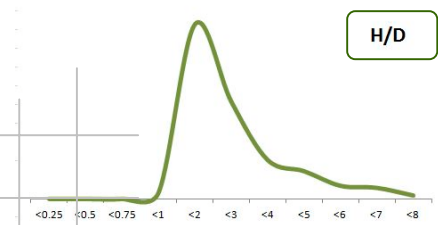
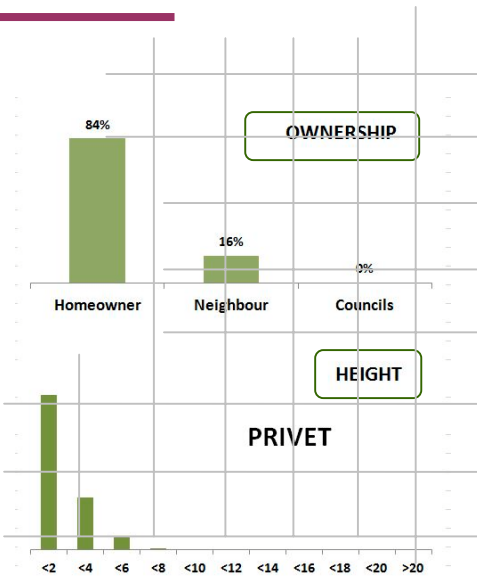
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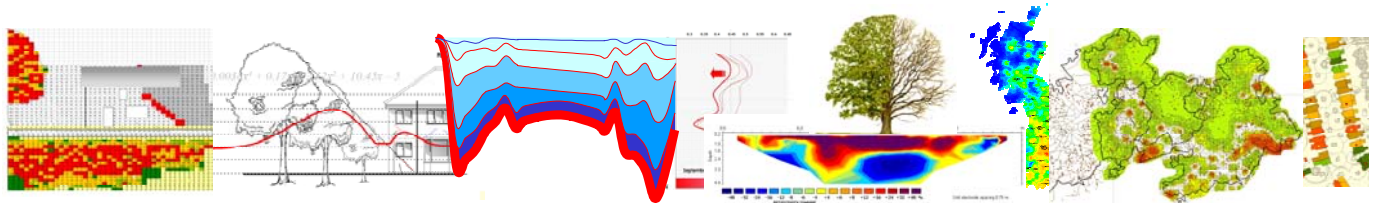
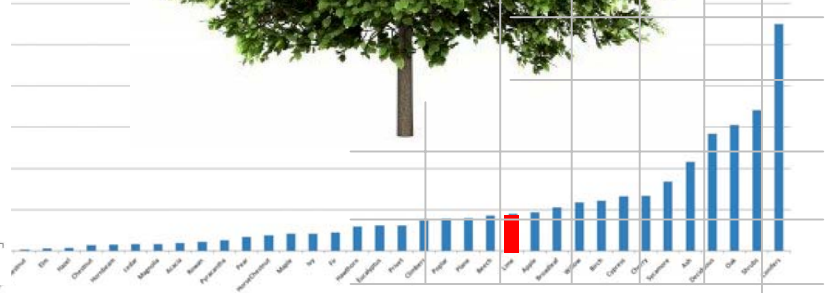
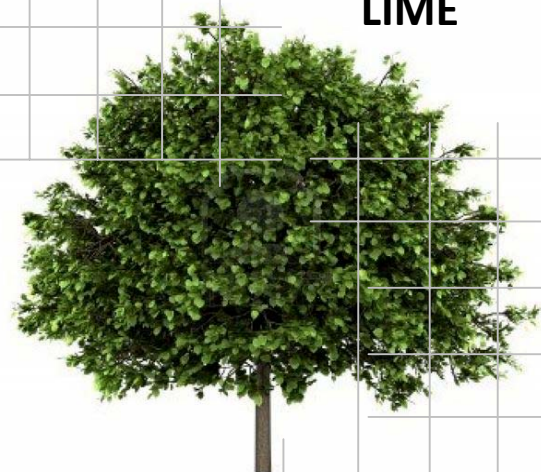
## PRIVET

Privet hedges that cause damage to domestic properties as a result of root induced clay shrinkage are usually less than 2mtrs tall, and predominantly in the ownership of the homeowner.

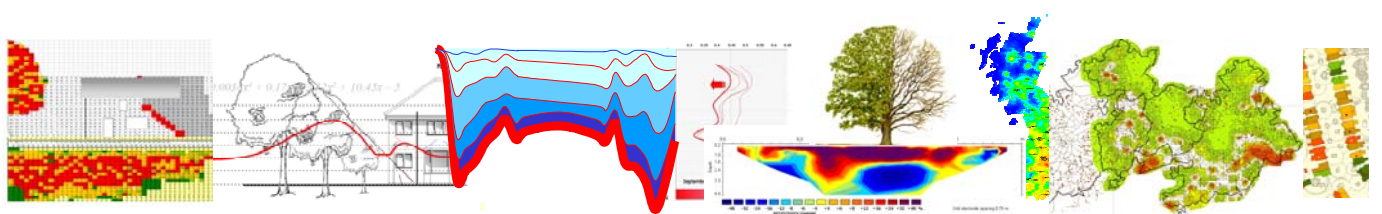
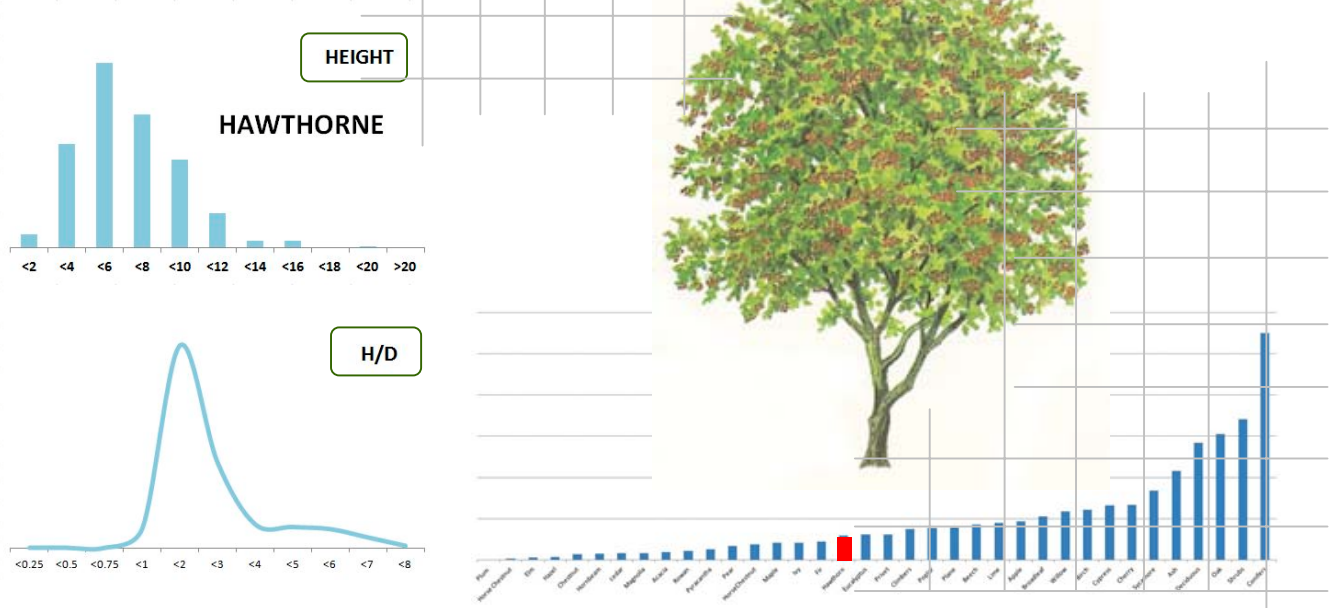
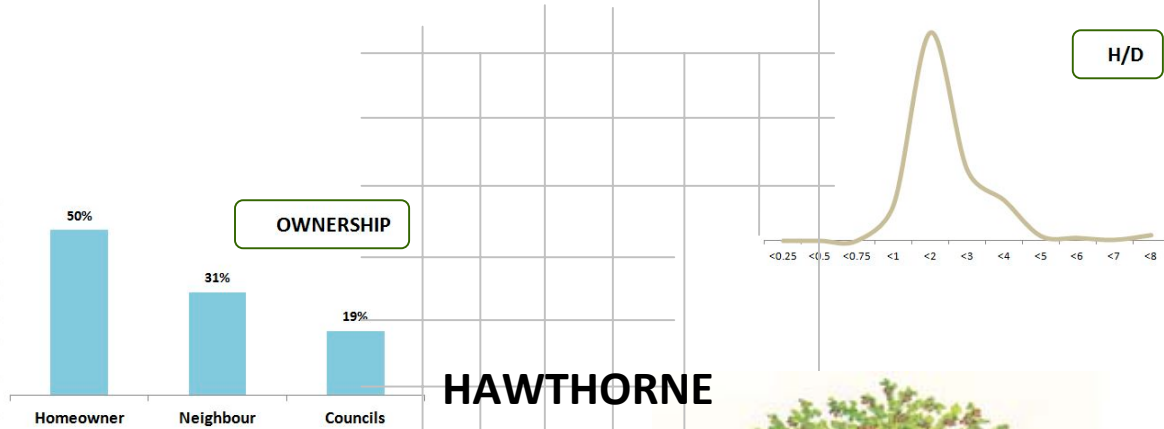
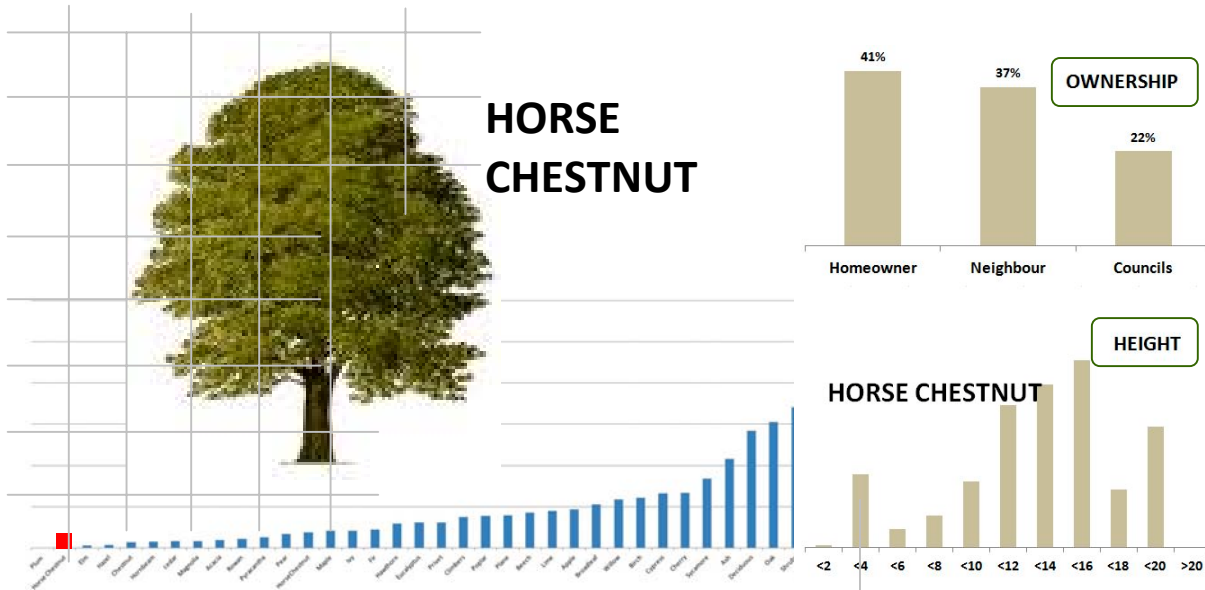
The H/D distribution peaks at 2. In other words, most privet hedges are situated around 1mtr away from the building they damage.



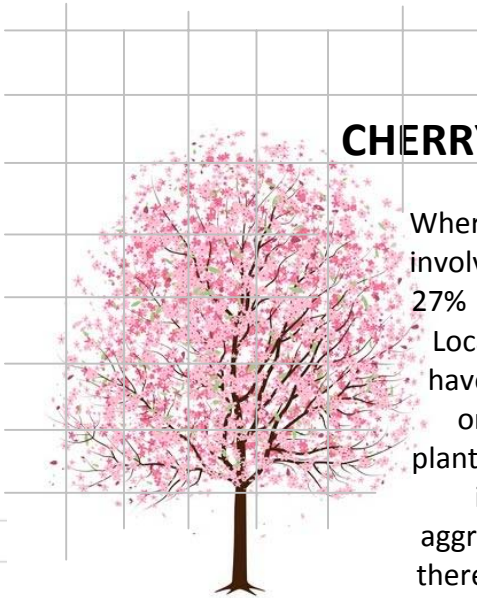
## LIME



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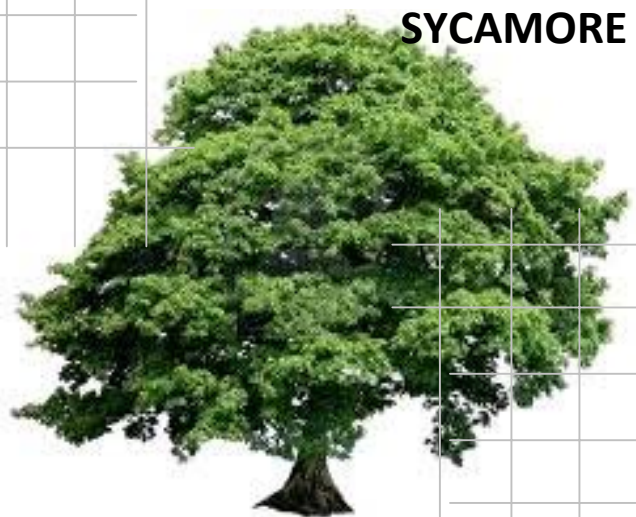
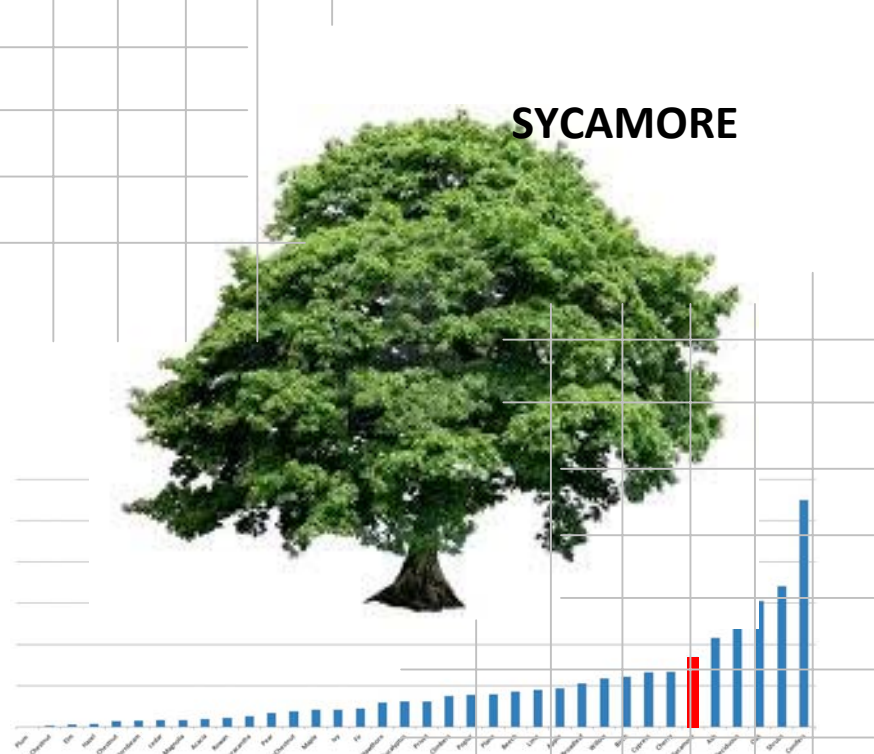
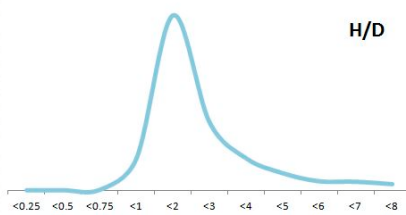
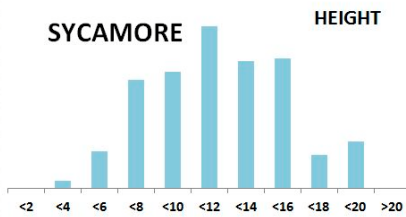
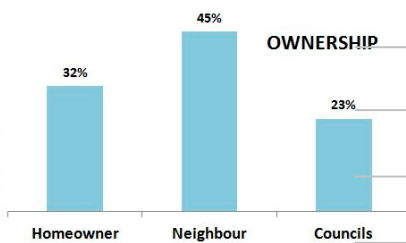
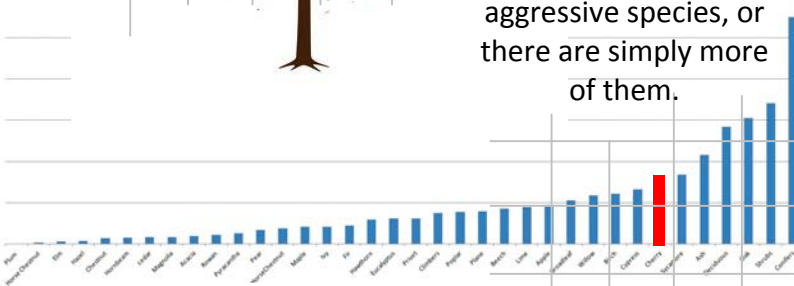
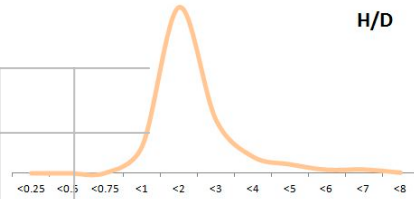
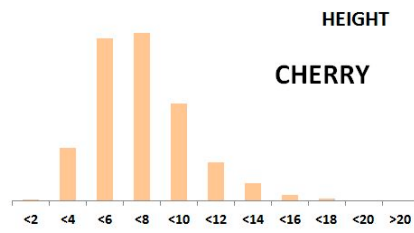
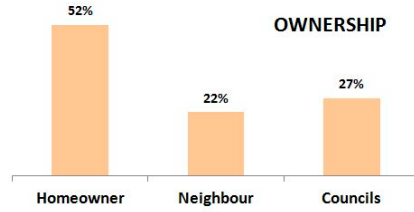


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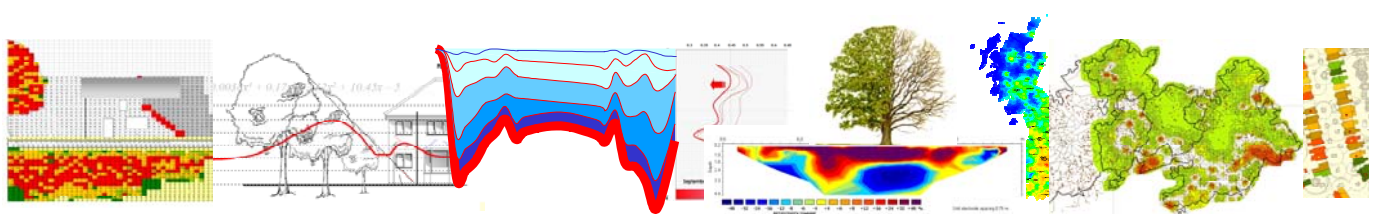


## CHERRY

Where cherry trees are involved in subsidence, 27% are owned by the Local Authority. We have no information on frequency of planting to understand if they are an aggressive species, or there are simply more of them.



## SYCAMORE

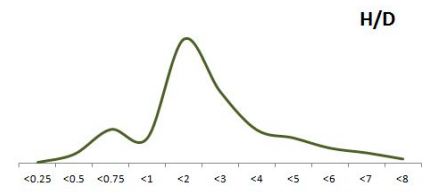
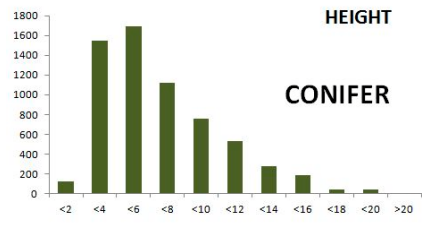
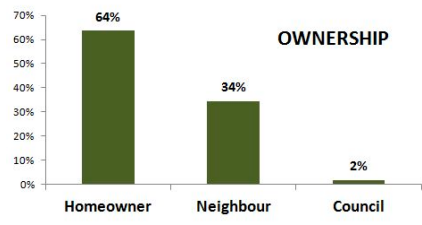
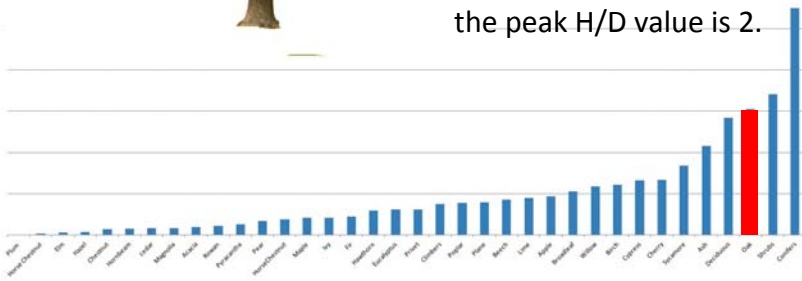
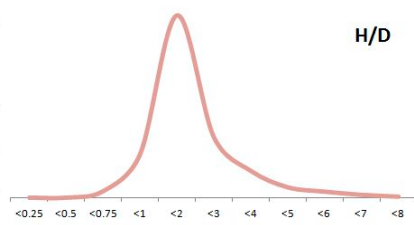
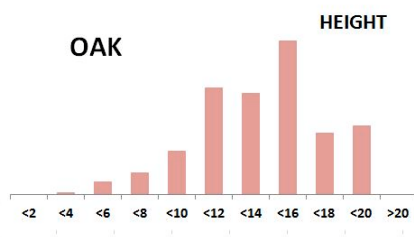
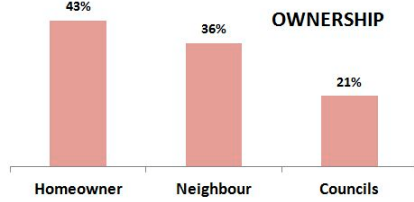


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## OAK



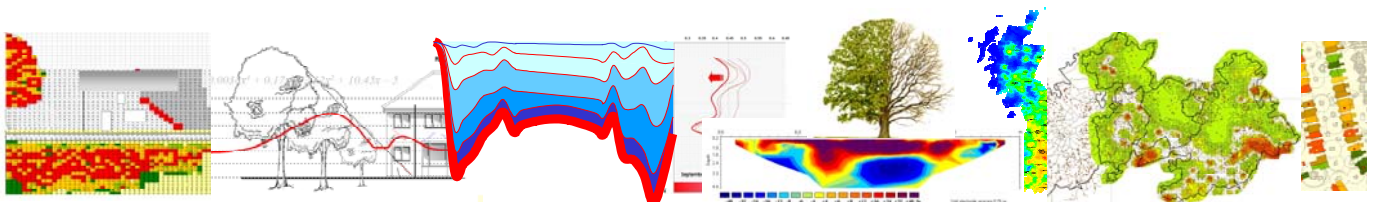
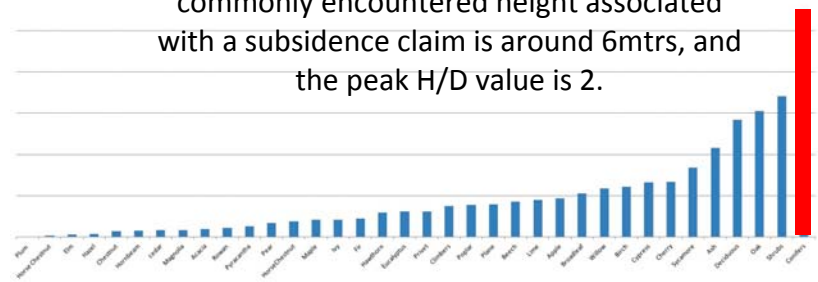
Given the size of the oak, the number under the control of the homeowner is a little surprising. The spread of the roots would account for so many in the ownership of adjoining parties. The distribution plots indicate the most commonly encountered height associated with a subsidence claim is around 16mtrs, and the peak H/D value is 2.



## CONIFER

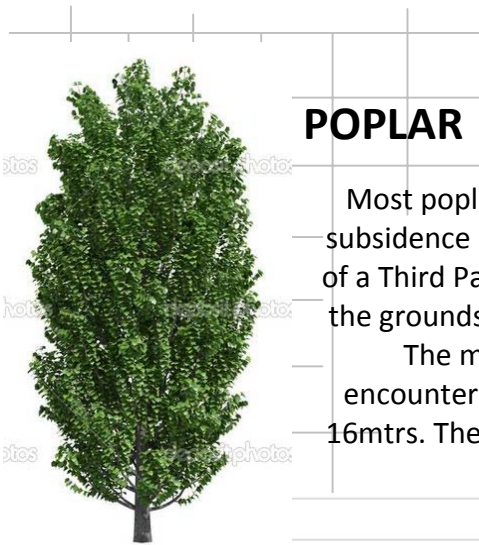
Like the privet, conifers are often planted close to buildings, forming a screen from adjoining properties. Most are under the control of the homeowner and very few belong to the Local Authority. The homeowners own conifer is twice as likely to be the cause of damage as the neighbours.

The distribution plots indicate the most commonly encountered height associated with a subsidence claim is around 6mtrs, and the peak H/D value is 2.





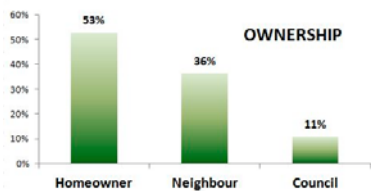
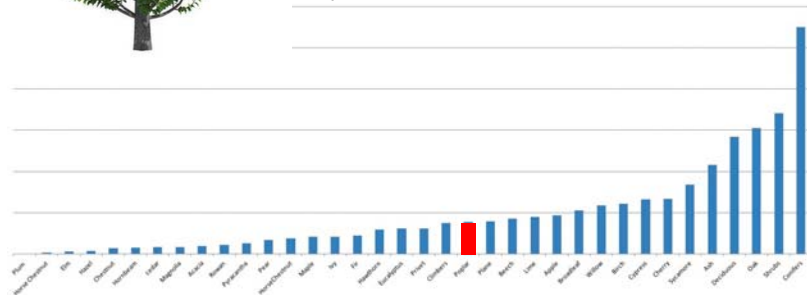
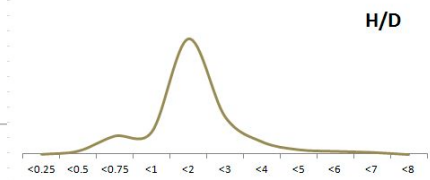
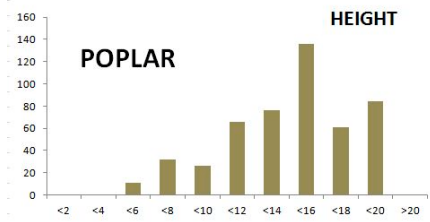
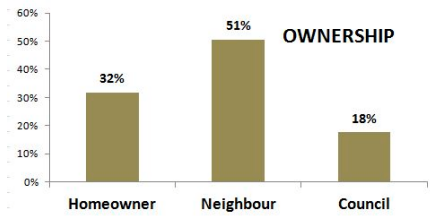
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## POPLAR

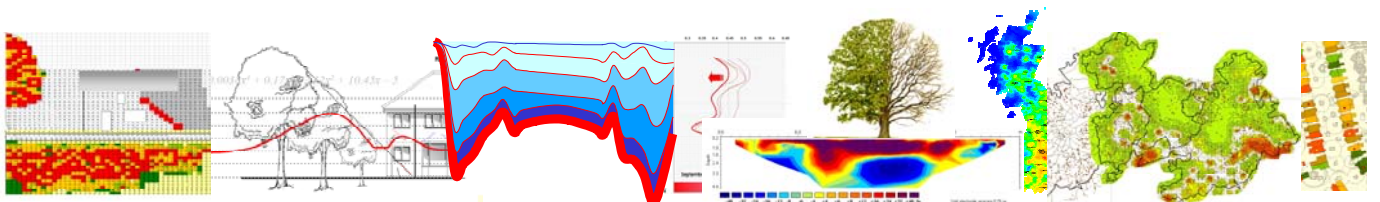
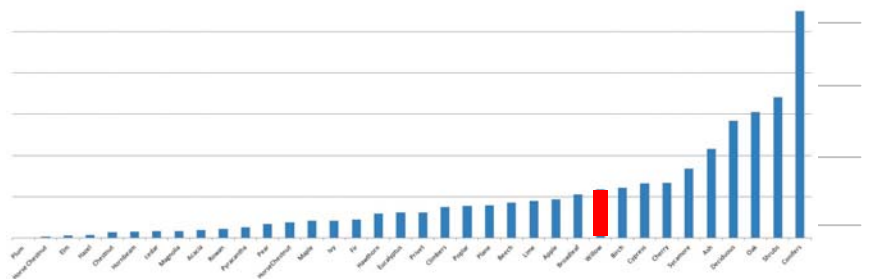
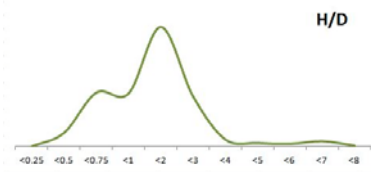
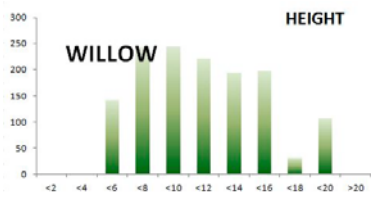
Most poplars associated with subsidence are in the ownership of a Third Party – only 32% are in the grounds of the homeowner.

The most commonly encountered height is around 16mtrs. The peak H/D value is 2.

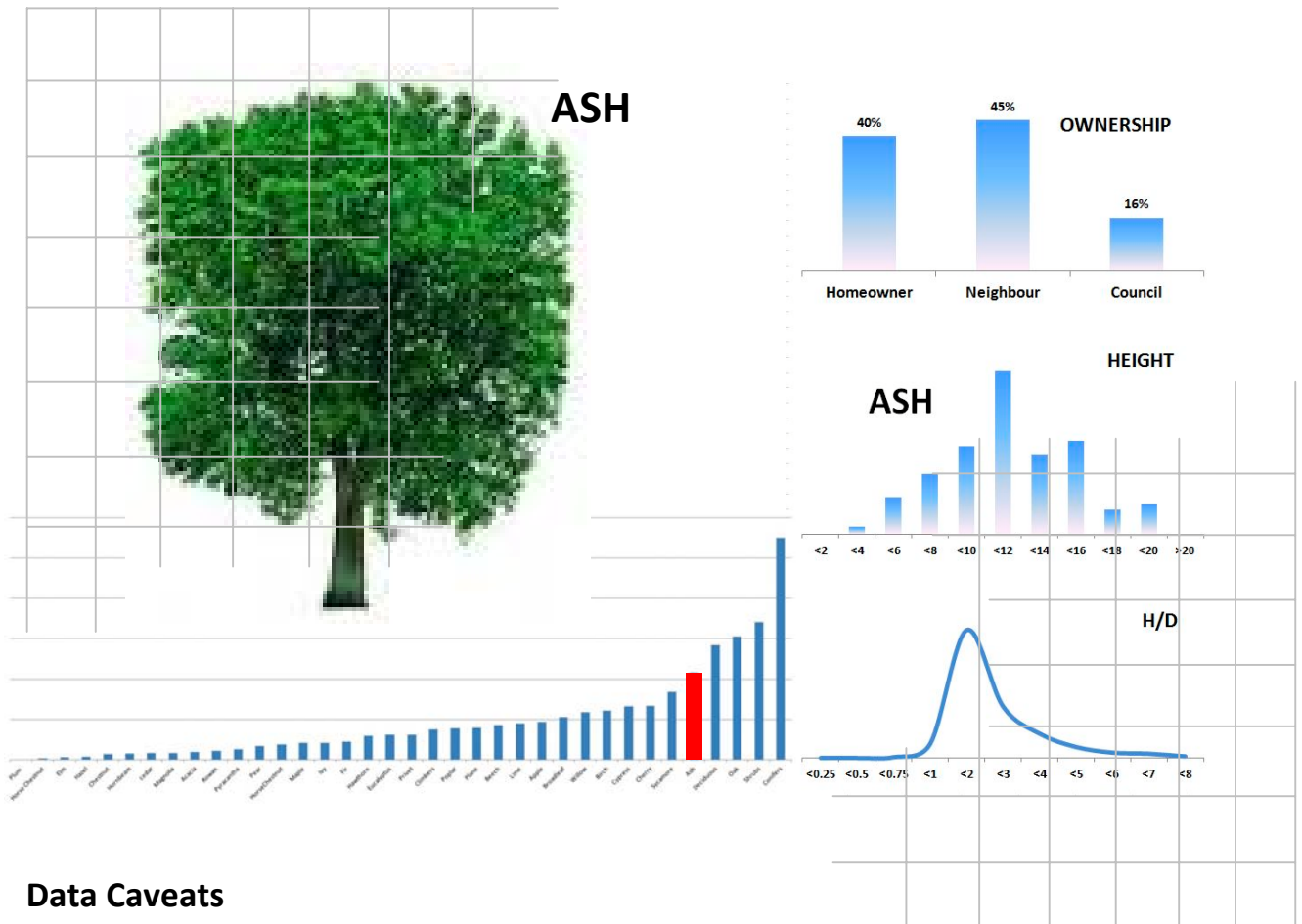


## WILLOW

36% of willows are under the control of the homeowner, and 11% by the Council. The most commonly encountered height is between 10 –



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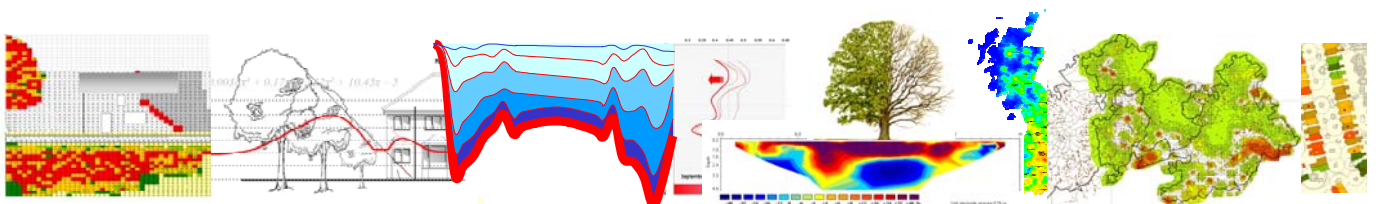
## Data Caveats

The dataset consists of 43,314 records. Editing has involved removing bad data – ‘0m height’ entries and the use of incorrect units of measure – trees 13000m tall and 8000mtrs away from the building etc.

In the main (probably around 80% of the records), trees have been identified by the surveyor/engineer handling the claim, or the homeowner or some other interested party – a gardener or neighbour for example. Not an arboriculturalist. Species and so forth could be suspect in some instances. Arborists are far more likely to have made the identification when Council trees are involved. They account for somewhere around 20% of records.

Height is always rounded to the nearest metre. We rarely if ever have trees identified as being ‘11.25mtrs tall’ for example, and we suspect distances are sometimes, by necessity (when situated on neighbours land) estimates.

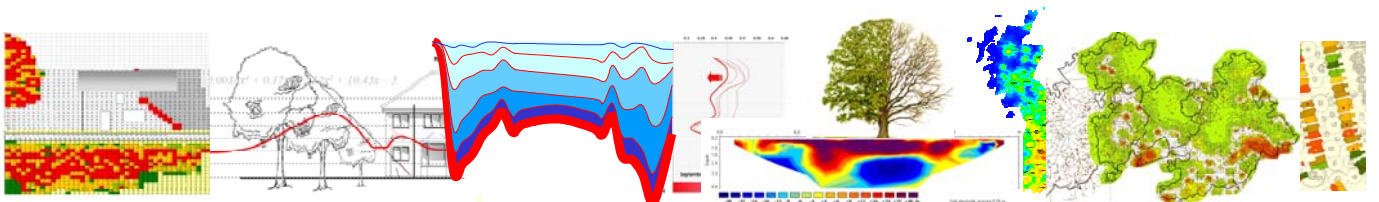
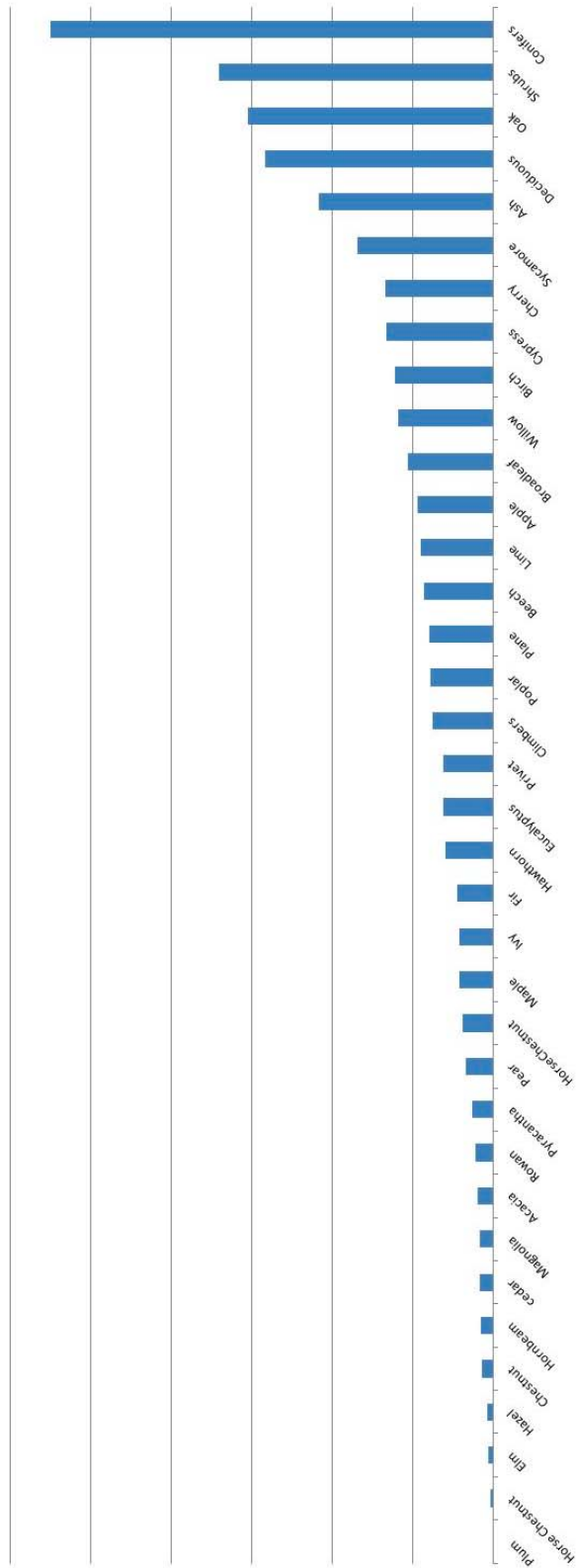
On the plus side, the database is large and averages will tend to reduce the errors introduced by the above factors.



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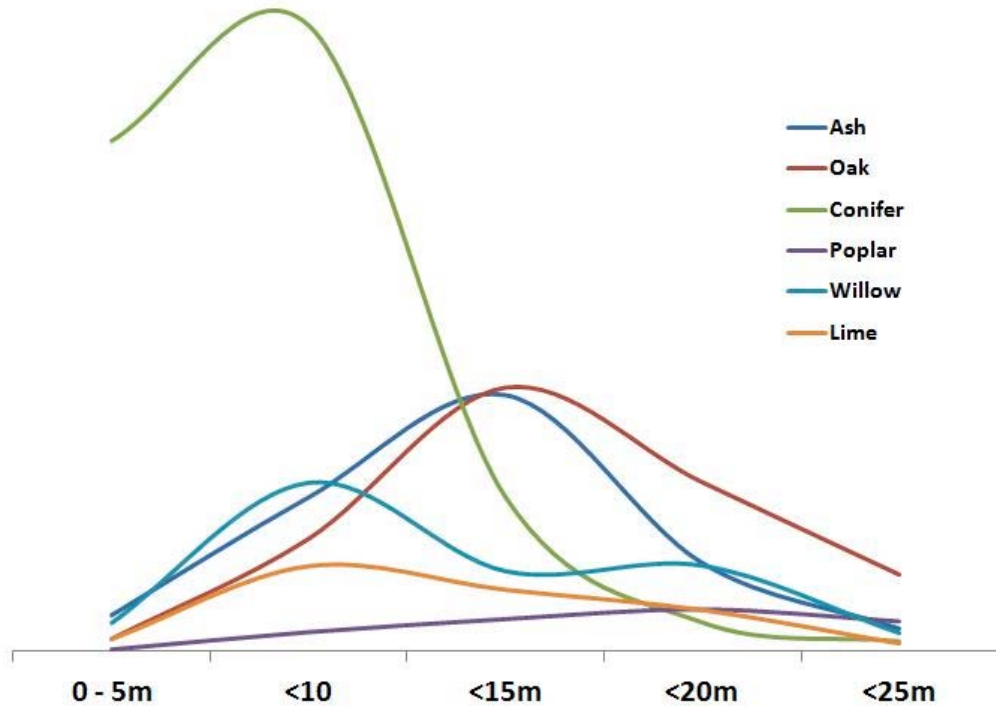
Tree Risk Table – Count of Trees Involved with Subsidence from a Sample of over 40,000 Claims



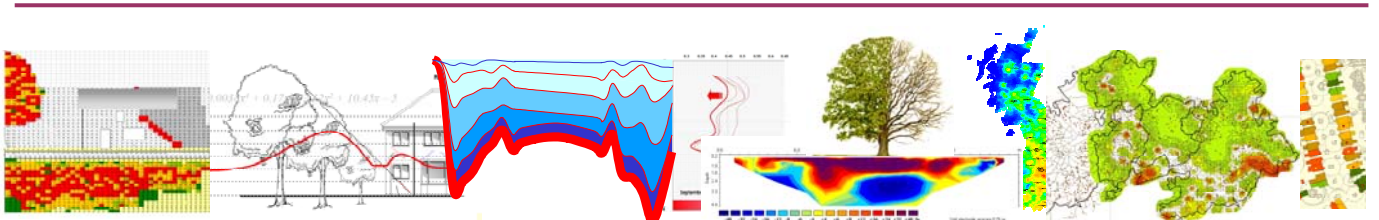
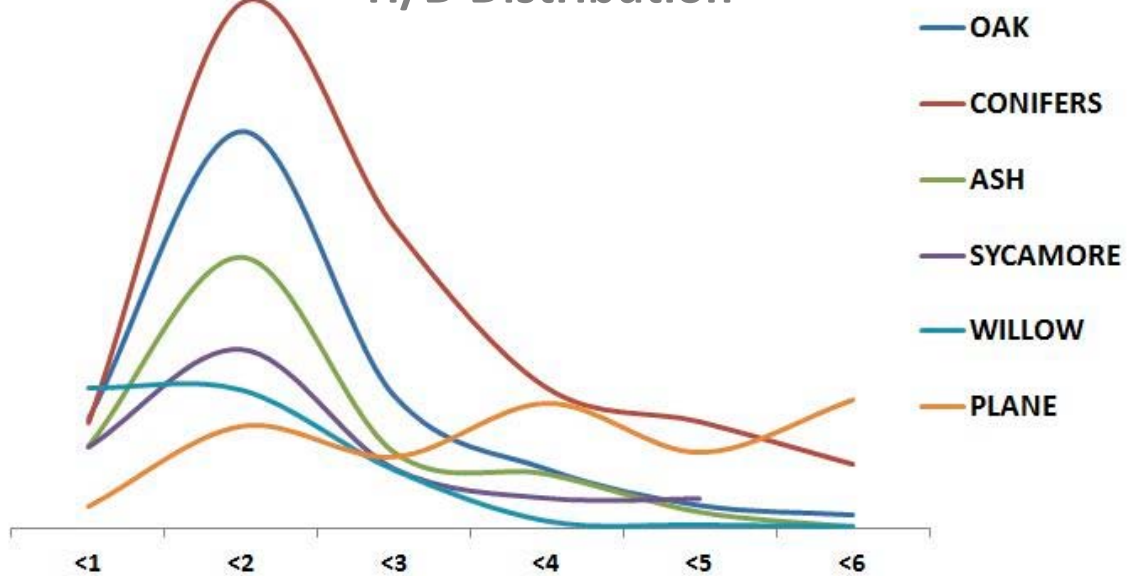
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## Tree Height Distribution by Species Listed



## H/D Distribution



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## In the Press

Extracts from Journals on topics related to Climate, Subsidence and Plant Physiology.

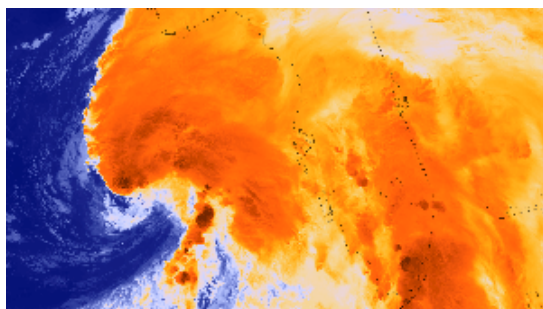
### Slow Atlantic Hurricane Season Coming to a Close.

No major hurricanes formed in the Atlantic basin - first time since 1994

NOAA : November 25, 2013



The 2013 Atlantic hurricane season, which officially ends on Saturday, Nov. 30, had the fewest number of hurricanes since 1982, thanks in large part to persistent, unfavourable atmospheric conditions over the Gulf of Mexico, Caribbean Sea, and tropical Atlantic Ocean. This year is expected to rank as the sixth-least-active Atlantic hurricane season since 1950, in terms of the collective strength and duration of named storms and hurricanes.



*NPP satellite peers into Tropical Storm Andrea, the first storm of the season.*

### A Simple Explanation for the Sensitivity of the Hydrologic Cycle to Global Climate Change.

*Kleidon, M. Renner.*

Earth System Dynamics, Discussions.

December 2013

Kleidon and his team from Max Planck Institute for Biogeochemistry in Germany suggest that reducing the amount of sunlight reaching the planet's surface by geoengineering may not undo climate change after all. This is a counter to the proposal put forward by some scientists to spray sulphur into the atmosphere to reflect solar radiation.

### Structure and Composition of the Plate-Boundary Slip Zone for the 2011 Tohoku-Oki Earthquake.

*Chester et al,*

Science, December 2013

A team of international experts investigating the cause of the devastating tsunami that struck Japan's Tohoku region in March 2011 discovered it was triggered by a submarine earthquake far greater than anything geologists had expected in that zone.

Prof. Chris Rowe explained "the fault, itself is very thin - less than five metres thick in the area sampled. To our knowledge, it's the thinnest plate boundary on Earth,"

The scientists also discovered that the clay deposits that fill the narrow fault are made of extremely fine sediment. "It's the slipperiest clay you can imagine," says Rowe. "If you rub it between your fingers, it feels like a lubricant."

