



One of these involves the release of allelopathic chemicals into the soil. These are antagonistic molecules that discourage other plant species from taking root and may remain in the soil long after the bracken has been removed.

Allelopathic chemicals, together with the dense shading canopy produced by the fronds and deep litter on the surface from several years of decaying bracken, will make it difficult for other vegetation to get established again even after total loss of cover by fire damage.

Looking at some of the positive

characteristics of this plant, it has provided man with a source of food - the immature fronds have been eaten as a delicacy after thorough cooking to remove toxins.

The deeper rhizomes that contain stores of starch were used in baking by some cultures in remote parts of the world and both fronds and rhizomes have been used to brew beer.

However, medical authorities and toxicologists advise against consuming any part of the bracken plant as it is known to contain substances toxic to humans and

**“Once established in a new area, bracken will dominate and squeeze out the existing vegetation by a combination of tactics”**

animals. Today bracken is still harvested in parts of the UK to make commercial composts.

Bracken can offer the right conditions of shading and humidity to support several plants normally found in woodland areas such as wood anemone, bluebell,

chickweed-wintergreen and common dog violet. The presence of dog violets and bracken on south-facing hillsides provides a valuable habitat for the pearl-bordered fritillary – a rare butterfly listed in the UK Biodiversity Action Plan. This is also an important habitat for reptiles, such as adders.

Two British birds, the whinchat and nightjar, have adopted bracken as their preferred habitat as it provides good cover and a degree of protection for their young.

Some other birds such as the skylark, lapwing and yellowhammer use thick bracken as a protected feeding site.

However, where bracken has invaded moorland it then excludes many bird species that are common to this habitat.

Apart from the invasive characteristics of bracken the main negative aspects of this plant are its poisonous properties when consumed by man and other animals.

Bracken may poison some grazing animals although they will normally avoid it when alternative food

## “Apart from the invasive characteristics of bracken the main negative aspects of this plant are its poisonous properties when consumed by man and other animals”

is plentiful. It is in times of hardship that sheep may suffer blindness and cattle can get severe stomach ulceration from consuming significant quantities of the plant.

Raw bracken contains the enzyme thiaminase, which can cause a vitamin deficiency in horses, leading to a condition known as ‘staggers’. The young emerging fronds contain the most toxins with levels decreasing as the plant matures through the season.

The discovery of carcinogenic substances in the spores and in the plant tissues of bracken is a major concern.

The microscopic spores are readily spread by wind that might blow them towards nearby human habi-

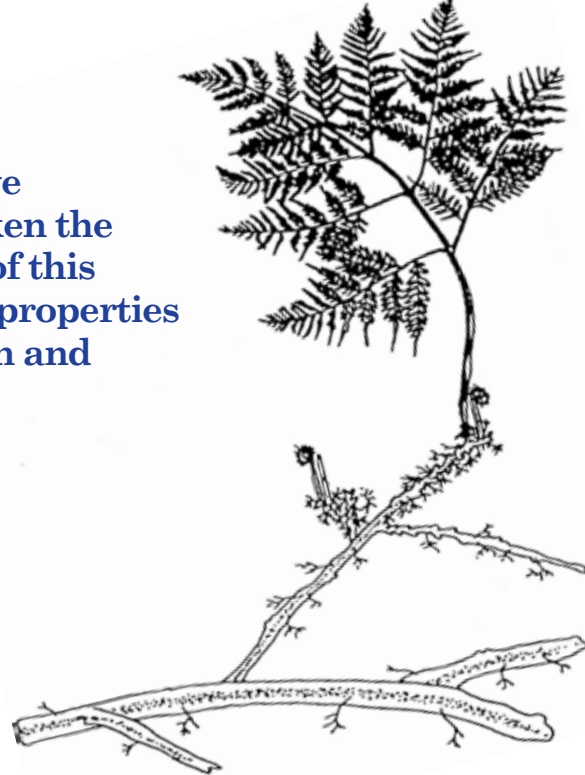


Figure 1

Bracken at the crozier stage



### SELF ASSESSMENT

Use the questions below to check your understanding of this topic. Readers can claim BASIS points if the questions are answered correctly!

- 1) According to the fossil records, how long has bracken been on this earth?
  - a) 12 million years
  - b) 300 million years
  - c) 55 million years
  - d) 350 million years
- 2) What is the approximate altitude limit for bracken in the UK?
  - a) 600 feet
  - b) 12000 feet
  - c) 1000 metres
  - d) 600 metres
- 3) What is the name given to the structure on the bracken frond that bears spores?
  - a) sori
  - b) sporangia
  - c) acervulus
  - d) sporoglyph
- 4) What is the name given to the carcinogen that has been isolated from bracken?
  - a) Cyclosporine
  - b) Phenacetin
  - c) ptaquiloside
  - d) Etoposide
- 5) How long will the emergency approval of ‘Asulox’ last?
  - a) 12 months
  - b) 120 days
  - c) 2 years
  - d) 6 months



Bracken *Pteridium aquilinum*  
early stag

tations, whilst decaying bracken can release a carcinogen known as 'ptaquiloside' that can leach into water supplies. Factors that are now being linked to the high incidences of oesophageal and stomach cancer in many areas of the world where bracken is abundant.

### Control measures

Ecologically, a small amount of bracken can be a benefit to the biodiversity of an area. However, the other side of the argument suggests that the careful removal of bracken will encourage displaced species to return, which is ultimately more beneficial to man and to wildlife. Mechanical methods of control include:

- Damaging the fronds by partially cutting or bruising each stem several times. This can be repeated through the summer as the fronds grow back and if such treatments are maintained for several years, it can have the effect of reducing the reserves of the underground rhizome system causing a gradual weakening of the growth.

- Use of livestock to trample down the fronds. The animals must be provided with sufficient food (hay/silage) to prevent them from grazing the bracken. This can open up the ground and allow frost to penetrate the soil and damage the rhizomes. This method is not usually applicable to amenity situations.

### Chemical control

- Glyphosate – e.g. 'Roundup ProBactive 450' Bracken should be treated after the frond tips are fully

unfurled, but before senescence. Apply using a suitable sprayer depending on the situation and take care to avoid treating desirable vegetation.

A knapsack sprayer or weed-wiper may be most suited to difficult and remote sites. Before choosing glyphosate for bracken control, the user should make sure there are no valuable plants or wildlife sheltering under the cover of the fronds.

- Asulam e.g. 'Asulox' is probably the best chemical treatment for bracken control as it is selective for ferns.

General use of this active ingredient was withdrawn completely in 2012 by the EEC.

However, UK emergency approval was granted to come into force on 20 May 2013 when it will last for 120 days. It will allow 'Asulox' to be advertised, sold and used solely for the control of bracken and will have a new label putting restrictions on the methods of application and dose rate.

Full label details will not be available until the approval start date but some details have been released by the Chemical Regulations Directorate in a special briefing. For details see [www.brackencontrol.co.uk/Documents](http://www.brackencontrol.co.uk/Documents).

Application through weed-wipers and drift sprayers will not be allowed under this emergency approval.

The Bracken Control Group intend to make further requests to the CRD for subsequent years bracken control, until a decision can be made on a more permanent approval.



GREENOR\* is the result of more than five years research into micro-emulsions. It's unique technology increases herbicide activity, resulting in a more thorough kill with lesser amounts of active ingredient.

There's more...

The micro-emulsion of GREENOR has a low odour.

Weeds do not exhibit that burnt appearance as GREENOR will not scorch the leaves.

It has a unique safety to fine turfgrasses, even on worn patches that have been recently re-seeded.

# Greenor

SELECTIVE SYSTEMIC  
WEED CONTROL



\*GREENOR is a trade mark of Dow AgroSciences LLC. Greenor contains 40g fluroxypyr, 20g clopyralid, 200g MCPA per litre. Use plant protection products safely. Always read the label and product information before use. For further information including warning phrases and symbols please refer to the product label.

# At the grindstone

**BERNHARD**  
grinders

Have you ever wanted to know the benefits of grinding but were too afraid to ask? Ben Taylor, Technical Training Manager from Bernhard Grinders, gives you a guide to the practice and answers key questions



**What is grinding? Do we need it? How can blade sharpness affect the health of turf? These are just some of the key questions many turf professionals ask about grinding – read on for the answers!**

Any agronomist or Master Greenkeeper will tell you that a sharp blade cuts cleaner. In fact you don't have to be an agronomist to know that. We have all used a blunt knife at some time or another, and we know how it hacks and tears at whatever we are cutting, be it bread, hair or grass. The simple fact is a clean cut is just that. Clean.

Surgically sharp mowers slice cleanly through grass blades, severing the tissue cleanly and with minimal damage. Because all the grass blades are the same height and uniform in their appear-

**BERNHARD**  
grinders

ance, the overall definition of the turf is improved and the ball roll is smoother, more consistent and often faster.

## How a grinder works

To help you understand the process let's look at the two different components of the cutting unit: the bedknife and the cylinder (reel)

## Spin or relief?

Spin grinding puts the cutting edge on the leading (front) edge of the cylinder blade and makes the reel cylindrical and even.

Relief from friction between the bedknife and cylinder is also essential. A 'no-contact' set up gives relief from this friction, whereas a relief grind (or blade thinning) removes metal from the back of the cylinder blade so there is less metal to come into contact with the bedknife, also reducing friction.

## The bedknife

The bedknife is the most important part of any cutting unit and although it looks simple, is actually a very complex piece of steel. When you have your hair cut (if you have any!) the hairdresser doesn't just take the scissors and cut randomly away at your hair.

What they do is use one hand to hold on to the hair, at equal height and present the hair into the scissors.

The bedknife in a cutting unit is the hairdresser's hand. It gathers the grass and holds it in to position until the reel blade comes around to cut the grass evenly.

The bedknife is not just a flat piece of steel that needs to be sharp to cut grass. In fact, the bedknife is only sharp as a by-product of why you actually grind it. The main

reason for grinding a bedknife, is to create or maintain two angled faces on it, which make the difference as to whether the grass is cut or not.

The first of these, the "top face" angle, is ground on the top of the bedknife as its name suggests. It is a negative angle which slopes backwards, away from the actual point of cut on the unit.

This is ground to allow the grass to eject away from the point of cut and clear from the grass coming into the mower. The degree of angle required varies, depending on the size and condition of the grass being cut.

Obviously the clippings from a golf green are tiny and only require a very small angle. Once this angle becomes worn and therefore creates a narrower gap, the grass isn't ejected correctly and hangs around the cutting area, clogging the point of cut and therefore not allowing the incoming grass to be cut cleanly and leaving a bad finish.

This is the point at which the untrained operator would "tighten" the cutting unit down, bringing the reel and bedknife closer together to try and improve the cut. What they are actually doing is wearing the bedknife angle even more, closing the ejection gap even more and making the whole process worse.

The second angle is known as the front face angle. If the bedknife is the most important part of the mower, then the front face is the most important part of the bedknife, so good maintenance of this is critical.

The front face is simply a ground level even face on the front of the bedknife. It's there simply to push the grass up evenly and stand it up in front of the reel blades as the cutting unit moves forward. This is the 'hairstresser's hand'.

The front face needs to be flat and even. If the face becomes worn or rounded, which it will do over time because grass and especially top-dressing are very abrasive, then grass which is designed to grow horizontally rather than vertically such as creeping bentgrass will not be presented evenly toward the cutting blades of the reel.

It is essential that this front face is maintained so it can carry out its job correctly. This can be done with a file, a facing tool or with a precision grinder while renewing the angle on the top face.

### The cylinder

Often overlooked are the reasons we spin grind the reel. Yes it is to make each blade sharp, but it is

also to make it cylindrical and even. There is no point having all the blades sharp, if only every third blade cuts because they are not of even height.

### The importance of an even reel

We are often asked, when do you know a reel is finished grinding? The answer is not when it's sharp, but when it's even.

A reel that is maintained and ground more regularly is going to be easier and quicker to grind than one that is only ground once a year because it is going to be more even. The actual sharpening of a blade only takes seconds.

Sharpening is an essential process that has to be done regularly in order to guarantee golfers who judge the course the playability they demand today, so these machines have to be very simple to use, and fast and accurate in order to deliver such high standards and save the course money.

Let's look at what happens if you cut grass with blades that are not sharp enough.

Your cutting machine will tear at the grass leaving uneven and poorly cut blade tips.

These ripped and ragged blades of grass will bleed losing plant moisture and nutrient.

This also leaves the tips open and vulnerable to disease from spores such as Fusarium and other leaf-spot diseases.

The moisture lost through damaged tips has to be replaced. Repairing and regenerating plant health requires accelerated growth and that means a greater demand for food, which often means more fertiliser and water too.

Both these are very costly to supply and to deliver.

"I don't have the budget" is the cry we hear constantly, but sharpening need not cost the course money.

Savings come from two main areas – agronomic and mechanical.

Agronomically speaking, clearly a reduction in the use of water, fertiliser, fungicide and top dressing can be a massive gain for the club.

Not only are these expensive consumables reduced but also the labour costs of handling the materials, electricity to pump the water and places to store the chemicals – can all be dramatically reduced.

Mechanically, trials at several training colleges have demonstrated fuel consumption reductions of between 17% and 21% – massive in today's competitive climate.



### BERNHARD GRINDERS - Who are we?

**BERNHARD**  
grinders

Our business dates back over 150 years. We are an unusual company insofar as we are horticulturalists.

We don't just sell grinders, we believe strongly in education, working alongside turf professionals, course and club managers, associations and technical colleges in an ongoing programme of education and development.

We give presentations and seminars all over the world, and we have a dedicated training centre at our new factory in the UK where we welcome visitors from across the globe.

We are involved with many turf associations and support the IGCEMA Certificate Programme and GTC as Quality Assured trainer Providers.

Translate fuel reduction into mower life, engine wear, fewer parts to be replaced and so on – and it soon becomes clear that the benefits are very attractive to the bottom line profits of the course. Also, of course, if you burn less fuel, you create fewer emissions.

Now add the improved appearance and better playability factor into the mix and you have customer appeal and satisfaction. And that affects revenue.

Finally you have to think about 'cost of ownership'.

Bernhard Grinders are well known for their build quality and long life. Always evaluate the speed, ease of use and accuracy provided by our machines, but now add the life expectancy of fifteen years of trouble free use and a warranty of ten years and you can see the cost of owning Bernhard grinders can be less than £300 per month.



Panasonic CF-U1

TOUGHBOOK

Windows 7 desktop environment showing a GIS application window. The application displays a map of a golf course with green and yellow data layers overlaid on a satellite-style background. The interface includes a menu bar, a toolbar, and a sidebar with various tool icons. The taskbar at the bottom shows several open applications and the system tray.

Full QWERTY keyboard with function keys (F1-F12), arrow keys, and a numeric keypad. The keyboard is integrated into the laptop's chassis and features a rugged design with visible screws and a textured surface.

# A helping hand

Golf Course Consultant Ian Phythian explains how a Geographic Information System (GIS) can assist many aspects of day to day greenkeeping, from irrigation to health and safety

**Have you ever wondered where your drains, irrigation, utilities actually are? You should know their correct locations - virtually everything else at a golf club is documented so why not everything on and under the golf course itself?**

When contractors have left your golf course has the work been accurately documented? Technology can be a huge turn-off for some but it can make a big difference at your club even with the minimum of time and effort.

There has never been a better time to use technology as a helping hand out on the course - and in any weather. GIS (Geographic Information System) is software that belongs out on the golf course where it matters. When set up correctly you will be amazed what can be achieved when combined with GPS (Ground Positioning System).

GPS uses satellite technology to fix a position anywhere on earth. There are many software systems for greenkeepers that help with many aspects of modern golf course management, but there are few



The Glamorganshire Golf Club

## “GIS offers a central hub of golf course information that outlasts any greenkeeper or committee”

that focus in on the most important asset - the physical golf course.

What differs with GIS is when combined with a rugged GPS tablet it offers a true field-to-base solution for greenkeepers to tackle head on many problems and tasks out on the course. When it rains you go out with it and plot surface water GUR. When you install that drain or irrigation go out and get dirty with it and plot the trench. When you re-contour that cutting template go out and plot it because it now has a different area value! Ask your golf

club for any old paper maps, plans or data that can be imported into the GIS, turning paper to data.

There are many instances where GIS can be a very practical tool for the modern greenkeeper. What your golf club will like about GIS is that it offers them a central hub of golf course information that outlasts any greenkeeper or committee, therefore offering consistency for your golf club's sustainable future.

For example your trade contacts, course guide companies, drainage and construction contractors and architects may already be using

### about the author



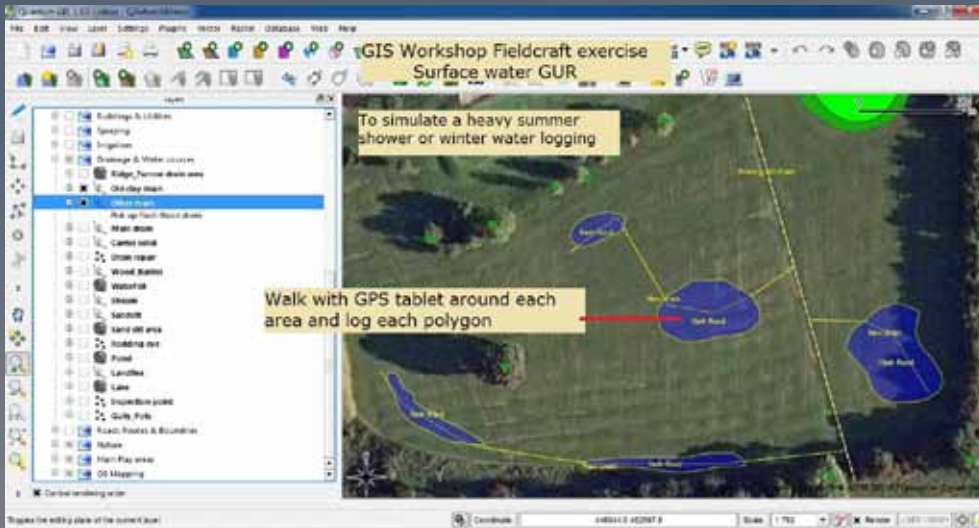
Ian Phythian has worked in greenkeeping for 15 years and golf course construction for five years. He has worked abroad as a greenkeeper and more recently has been involved in promoting awareness of GIS technology for the golf course industry.

For a free consultancy you can contact Ian Phythian golf course GIS Analyst on 01482 669913 or 07983 815671 [gipsystem@gmail.com](mailto:gipsystem@gmail.com)

### GIS at Glamorganshire

Following last year's heavy rainfall, The Glamorganshire Golf Club (above) explored GIS to help them document their course, and plan their extensive drainage extension and upgrade programme. Course Manager Mike Williams said:

“We began by installing the freeware system which mapped the contours of the course, and then approached a surveyor with this data to discuss the location of drainage solutions. We're likely to take it to the next stage which involves plotting drainage sites using

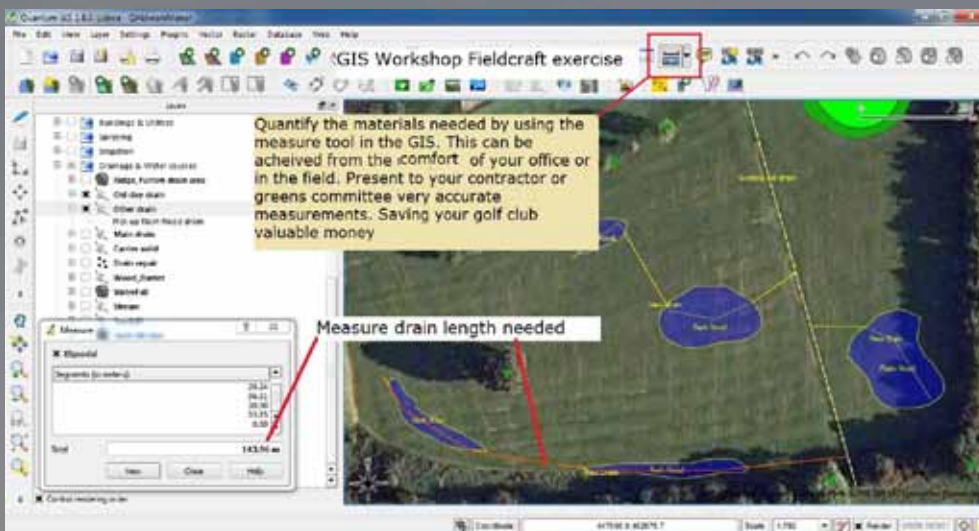


**Find it –**

With ‘GIS fieldcraft’ you can log all the surface water in real time to all your cutting templates even the greens. You can even geo-tag the problem area with the built in cameras or your geo-tag function on your mobile phone. Either option will show the location of the image in your GIS. Saved as a layer in your GIS you have exposed and documented important intelligence of your golf course.

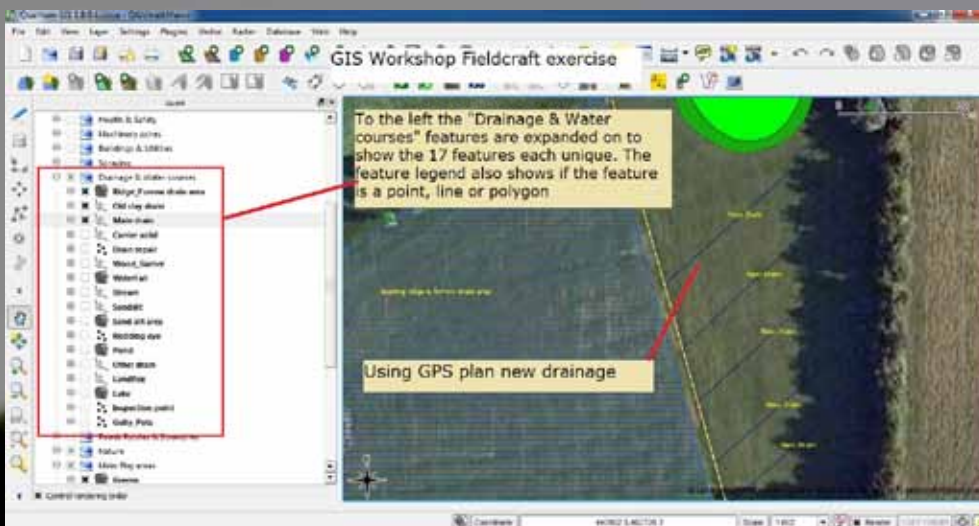
**Measure it –**

You can use the measure function to accurately measure distance and area in metric.



**Fix it -**

This will empower you to quantify materials and look at tapping into existing drainage nearby that is in the GIS for your team or a contractor to look at.



The GIS is very good at organising the various feature groups I like to call modules. I have named up to 25 other modules to cover every aspect of greenkeeping using GIS - importantly they are GPS active.



GIS and GPS and may welcome the opportunity to offer your golf club extra by sharing data - reading off the same hymn sheet if you like. This could open up all sorts of data transparency and sharing opportunities. This can only be beneficial for you and your golf club. The result - using GIS will equate to saved time and money in the future for your golf club. Here are some of the key benefits of GIS:

#### Adaptable

GIS can be set up for 9-45 holes.

#### Health & Safety

Locate all your risk assessment areas like using GIS to plot wet and dry routes for your machinery fleet.

#### Professionalism

Using GIS you have your golf course literally in your hand, take it to your meetings.

#### Accurate

Updated area values for all your cutting templates. *Geo tag* photographs (fixing the image to a location) then display them in their correct location on the GIS screen.

#### Output

Produce a detailed print out of your entire course. Useful for Golf club owners, secretaries, greens chairman, course managers, greenkeepers and trainees.

#### Do you have a course policy document?

Golf club officials are considering GIS as part of a course policy document so the GIS can be the central hub to all activities present and future regarding the golf course infrastructure and an archive source.

#### Smooth transition of office

Imagine your course manager leaves, if not documented much information about the course goes too. Using GIS this results in a smoother transition of office saving valuable time.

#### Central hub of information

Now is your chance to collect old paper to data maps, install them into the GIS system, and start to move forward with all the previous data viewable in one safe place! GIS will become your single most important data map over time.

#### Total field-to-base solution

Plot surface water, find it, log it, measure it, and drain it, save money.

#### Professional integrity

Accepts industry standard survey grade data. GIS has the integrity to handle your golf club's future.

#### Environmental benefits

We are experiencing frequent extremes in the weather. The golf course infrastructure is expected to cope at both ends of the spectrum. Irrigation needs to be documented for repairs and maintenance. Drainage needs to be located for maintenance and for adding new drainage too. GIS with GPS enables you to do this.

The Environment Agency have a DataShare scheme which is GIS friendly enabling you to access various datasets such as gas, water, electric grids and up to date flood risk areas for the whole of the UK.

This information could be critical for your golf club, especially if your location is near water.



#### Ordnance Survey Open Data free Mapping

Ordnance Survey Open Data is free of charge to order by post or to download from their website. This mapping data covers the UK and provides the background mapping layers including, every lake, stream, building, forest, road vector layers as well as the familiar OS street level maps in different scales.

Rob Andrews from Ordnance Survey said: "OS OpenData allows free access to a range of detailed Ordnance Survey datasets.

The accurate and up to date products provide an ideal mapping backdrop for users to plot additional features, including drains, greens, bunkers, tee positions and access points.

Through OS OpenData users can also access a new terrain dataset which accurately displays the 3D landscape of the land."

#### Quantum GIS

There are many GIS to choose from ranging from expensive professional systems to low cost and even 'freeware' systems that have the same professional integrity to accept survey grade data.

One such freeware is Quantum GIS.

With no download and licence issues to worry about this is the perfect introduction into GIS.



## Section Notes

Please email your notes to  
[steve.castle@bigga.co.uk](mailto:steve.castle@bigga.co.uk)  
by the 10th  
of the month

All the latest news from your Section,  
in your new-look notes pages...



# Around the green

## Scotland

Contact your Section correspondent with news,  
events or anything else for Around the green...



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## Events Coming Up

**Central** - Next educational event is at Elmwood on 23 July where John Kaminski of Penn State will be giving a talk on the recent US Open at Merion GC. A flyer will be sent out shortly and details are on [www.biggacentralsection.org.uk](http://www.biggacentralsection.org.uk). The recent talk by Mike Jouson on communication skills unfortunately was poorly attended with only 9 people present, thanks to those who did come along. We appreciate that Elmwood isn't the best venue for everyone but it's difficult to get a golf club with a private room on an evening during the golfing season.

**East** - The Willie Woods Trophy will be played at Mortonhall GC on 21 August, this tournament is played in a Fourball better ball format.

**North** - The next event is the Norrie Whytock Trophy at Auchterarder on the 15 August so if you had a good round at Duff House Royal you might get a call. Robert is unable to make the event so he has asked myself Dale Robertson to Captain the team. I will be in touch with the other three members in due course to see if we can get a winning team together.

## News

**Central** - Earth moving is well underway on the new course at Feddinch by St Andrews which is calling itself the St Andrews International Golf Club. It will be interesting to see how the planning application for a new Links course between Elie and Leven materialises over the coming months.

Congratulations to Paul Teviotdale on his recent hole in one at Arbroath GC. Paul hit a spanking 3 iron at the 154 yard 16th on his way to scoring 69 in the Links Championship qualifying. Good job it was downwind Paul, well done.

Congratulations also to Gary Tough from Letham Grange on winning the Angus County championships at the 30th time of trying. Okay, I know Gary's a North section member but he works and plays most of his golf in the Central section area. Unfortunately, neither Paul or Gary did so well in the Scottish Greenkeepers Championships at Largs where Kenny Mitchell was the only winner over a very enjoyable course which was in superb condition.

Good luck to everyone who has events coming up, the teams at Muirfield for the Open, Castle Stuart for the Scottish, St Andrews for the Womens and everywhere in between, whether is your Pro Am, Club championship or Captains day. Let's hope the weather is kind to everyone and we see some great examples of well-prepared golf courses.

**East** - Major drainage work in the form of a newly constructed burn/ditch is coming along nicely at Bathgate GC, this has been installed to improve drainage and to enhance a couple of golf holes.

**North** - An Educational Seminar was held at Dornoch Golf Club and this was attended by over 15 people mainly from the Dornoch, Tain and Brora area. I'm sure they all enjoyed the day and hopefully we could have more in the future.

It was good to see section members making the long journey to the Scottish National Tournament at Largs Golf Club. Thanks to Billy Craig, Jim McCormack, Gary Tough and Pat Allan for their company. I would also like to say a big thanks to Course Manager Ian Barr and his team for a really well presented golf course with superb greens.

**West** - Best wishes to David Carson who was going in for a knee operation recently so I hope all went well. David Gall Junior has been unwell recently and I would like to pass on my best wishes from myself and all on the committee hoping he gets better and his treatment is a success.

Ryan at Nairn Brown I hope your knee is better quickly after all the work on it, no more footy for you, and I hope Mike Dooners wife is allowed back in the country after getting her passport stolen while on holiday in Greece.

Section outing was held at Buchanan Castle GC the first time I've played it and I think a first for an outing which is excellent, I just wish more clubs could volunteer their services. The course was in great condition for the time of year although the recent rains had caused a few soft areas like us all.

Ronnie Mills and his staff are to be congratulated for their efforts unfortunately Ronnie could not attend but Mark his assistant filled in handsomely, the welcome and service was first class and the club are to thanked for all their assistance.

The results (which you can see in the 'Results' section) have been on the blog for a few weeks now along with other information and I would encourage all members to keep up to date by visiting the site regularly, congratulations to our Chairman for his hard work in posting the information.

The outing was attended by 43 people - only 35 played but this is good and I would encourage more members to come along and