



## Welcome to the Fungis newsletter

In brief:

- Reuben, though busy as always, provides a Fungis update from the Chair
- Caroline Bruce focuses in on the activities of our Executive Committee
- On the 13th and 14th of August, over 60 people took part in the Fungis annual event - the 'Boot Camp'.
- The Spatial Technologies in Schools (STiS) Expo took place on September 6 & 7 at the ICT Learning Innovation Centre on the Sunshine Coast.
- The Livingstone Shire saw the need for a Geographical Information System
- News from the Fitzroy Basin Association Inc.
- Can habitat quality of riparian rainforest vegetation be rapidly assessed using GIS and remote sensing techniques?

## Report from the Chair

Dear members,

As with previous years, Fungis has aimed high and at times many of us have felt overwhelmed. However, we have achieved as much, if not more than in any previous year of activity. The members of Fungis can be proud that with 20 years or so of effort you have had a fair go at advancing a technology that is much more than a technology, and that your efforts continue to contribute to the use and awareness of GIS in the wider community of FNQ.

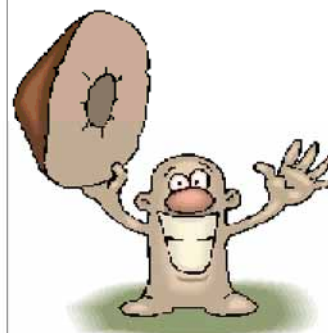
Many of the benefits from your contributions are yet to be realised by the wider community. The application of GIS is gaining momentum. The integration of information to enable sound decision making is a lot more than a technology and offers a better way of managing our future. Quality spatial information and systems are no longer treated as nice-to-have 'fancy' ideas but have become mainstream applications in our day-to-day lives.

I sincerely thank the Exec and members for their personal contributions to the Fungis mission and I hope you're all fired up for another big year ahead. It is relevant to acknowledge that the Exec team of 06/07 has been in operation only since November 2006. That's only 8 months, which in the world we work in is only a very short time! It is therefore during only the last several months that this Exec has begun to move things along at a faster pace.

In that time, we've managed to deliver a bumper newsletter, and make valuable website progress including the creation of online accounting and a data access portal. We now have flashy Fungis banner stands and with the GIS Boot Camp we have made a decisive move in providing learning opportunities for our membership and the wider community.

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## Report from the Chair

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Such learning opportunities have always been a key need identified by members in past 'directions forums'. The Continuing Professional Development (CPD) Task Group is progressing our professional development opportunities to new levels. I have no doubt the GIS Boot Camp is only the beginning of much bigger things to come. With fickle resources, it was a big effort to get our first of potentially many Boot Camps off the ground and I thank those of you who rallied to the cause, helping bring another of Bob's innovative ideas to fruition.

One of the many good things about being an active member of Fungis is getting to know the human side of your colleagues and counterparts in the spatial industry. The past and continued contribution to the spatial industry from Fungis life member, Mr Bob Peever, with the support of his beautiful wife Anne should be acknowledged, supported and definitely not underestimated. I for one could not have achieved what I have in the past seven years without Bob's effort as a frontiersman.

The Task Group structure at the business end of the Exec appears to be settling in and with continued progress on our website and communication tools, we hope to achieve increased hands-on involvement in Fungis activities from our far flung membership. Check out the 'Executive Focus' section of this edition for one way you can contribute...

We currently have six Fungis Task Groups in action. These are as follows; Communications, Continued Professional Development, Annual Conference, Data Access, Education and SSI Liaison. There has been progress in all areas and I encourage further participation from members to help us move things along.

Those members who are involved in the provision of spatial information and systems for emergency management have made progress in remedying the problems experienced by the many spatial information users involved with the Cyclone Larry response and recovery. Those who attended last year's annual Fungis event, the 'Sandbag and Sandals Emergency Spatial Information Management Forum', contributed and took away valuable lessons that can only improve our response to future disasters.

It would be good to see the current Exec remain largely the same for the year ahead to ensure stability and continuity. I believe we have a good mix of representation which can however be improved with increasing involvement from the natural resource management organisations and education sector.

With a little effort from all of us we can look forward to a bountiful year ahead.

Cheers  
Reuben Sinclair  
Chairperson, Fungis

"One of the many good things about being an active member of Fungis is getting to know the human side of your colleagues and counterparts in the spatial industry."





## The Executive Focus

You may recall that in the last edition, we started up a new section, 'The Executive Focus', which takes a look at some of the happenings in the Fungis Exec. The focus of this edition is one of the Exec Task Groups - Communications.

But first ... many thanks to those of you who joined us for the Fungis AGM, held during dinner on August 13 at Genazzano. The AGM coincided neatly with the Boot Camp and we had a good representation of members new and old. Many thanks to Lisa Newton, who kindly stepped in to chair the AGM. Beyond Reuben's Chair report (first page, this edition), a resume of Fungis directions of the past year and dishing out of a few prizes, we also farewelled the old Exec Committee and ushered in the new. There are very few changes to last year's lineup.

Who is on the 2007 - 2008 Executive Committee?

### Management Team

Chairperson- Reuben Sinclair  
Deputy Chair- Alistair Hart  
Treasurer & Secretariat- Meagan Smith

Executive Committee – [exec@fungis.org](mailto:exec@fungis.org)

Caroline Bruce-	<a href="mailto:Caroline.Bruce@csiro.au">Caroline.Bruce@csiro.au</a>	Alistair Hart-	<a href="mailto:alistairh@fungis.org">alistairh@fungis.org</a>
Reuben Sinclair -	<a href="mailto:reubens@fungis.org">reubens@fungis.org</a>	Bob Peever -	<a href="mailto:bpeever@bordnet.com.au">bpeever@bordnet.com.au</a>
Geoff Mills -	<a href="mailto:geoff.mills@nrw.qld.gov.au">geoff.mills@nrw.qld.gov.au</a>	Liesl Harrold -	<a href="mailto:Liesl.Harrold@treasury.qld.gov.au">Liesl.Harrold@treasury.qld.gov.au</a>
Sharlene Blakeney -	<a href="mailto:sharlene.blakeney@fba.org.au">sharlene.blakeney@fba.org.au</a>	Narelle Barton -	<a href="mailto:n.barton@cairns.qld.gov.au">n.barton@cairns.qld.gov.au</a>
Adella Edwards -	<a href="mailto:adella.edwards@jcu.edu.au">adella.edwards@jcu.edu.au</a>	Anne Stapledon -	<a href="mailto:anne@clearwater.com.au">anne@clearwater.com.au</a>
Rod Neilson -	<a href="mailto:GIS@girringun.com.au">GIS@girringun.com.au</a>	Meagan Smith -	<a href="mailto:admin@fungis.org.au">admin@fungis.org.au</a>
James Humphrey -	<a href="mailto:james.humphrey@deta.qld.gov.au">james.humphrey@deta.qld.gov.au</a>		

### What is the Communications Task Group and who is in it?

The Communications Task Group is one of the 6 working groups formed by the Exec to help advance Fungis's objectives as previously defined by the Fungis membership at gatherings and conferences. The other Task Groups are: Professional Development/Workshops, SSI Liaison, Data Access, Education and Conference.

In the Communications Task Group, we currently have 7 members - Alistair Hart, Jason Allen, Reuben Sinclair, Guy Carpenter, Caroline Bruce, Andrew Mitchell and Lisa Newton.

### What does the Communications Task Group do?

Our mission is to advance and promote communication within and beyond Fungis. We do this mainly through coordination and publication of the Fungis newsletter (Fungis News), promotion and use of the website as a key communication tool within Fungis, and assistance with promotion of Fungis events.

To encourage use by the membership of <http://www.fungis.org> and to make its content more relevant to you, we have recently created and uploaded 'Webpage for Dummies'.

<http://www.fungis.org/images/stories/fungis%20webpage%20for%20dummies.doc>

This document is accessible from the 'home' or 'news' section of the website AFTER logging in and allows you, the membership, to upload jobs, news articles, date claimers, links to useful data sites ... whatever you think may be of interest or use to visitors of the Fungis website.

The document provides easy-to-follow steps on how to:

- add your content to either the 'news' or 'links' section
- edit existing uploaded articles
- submit for publishing.

**Easy! Download the document and give it a go!**

We're always on the lookout for fresh faces and new ideas at the Communications Task Group. If you have some suggestions and you'd like to be a part of the Communications Task Group, please contact us at: [communication@fungis.org](mailto:communication@fungis.org)



## Fungis Boot Camp

On the 13th and 14th of August, over 60 people took part in the Fungis annual event - the 'Boot Camp'. The event took place at the picturesque Genazzano Tinaroo Conference Centre on Lake Tinaroo, at the Eastern edge of the Atherton Tablelands. The focus was both theoretical and hands-on spatial with training in Geographical Information Systems (GIS), Global Positioning Systems (GPS) and navigation.

### What was taught?

Fungis, through a previous training needs survey, had identified three key areas where people felt they would benefit from 'spatial training', these were;

- Map reading and navigation, using both conventional methods and GPS
- Cartography
- Data Collection

These three areas became the focus of the Boot Camp, with consecutive training offered at introductory, intermediate and advanced levels and using a variety of technologies. Training was carried out by suitably qualified, experienced and enthusiastic Fungis members who volunteered their time to prepare and present training of a nationally accredited standard. We particularly acknowledge and thank training and assistance by Bob Peever, Dustin Edge, Rod Neilson, Lisa Newton, Jason Allen, Adella Edwards and James Humphrey. Behind the scenes work of Caroline Bruce, Guy Carpenter, Georgie Pitt and Seonaid Philip was greatly appreciated.

### Who participated?

Participants came from a variety of backgrounds and experience, many with no opportunity for such training elsewhere. Fungis was also pleased to be able to cater for four international researchers from Melanesia who successfully completed the course, and have now taken those skills home to use in their communities.

### Accreditation through TAFE or SSI

Those participants seeking formal recognition of participation were assessed and the results of those assessments will be recognised by Tropical North Queensland TAFE (TNQT), which was represented at the event. Accreditation will be awarded against subjects in either the Certificate 3 or Diploma in Spatial Information Services. Contact Bob Peever at [bpeever@bordnet.com.au](mailto:bpeever@bordnet.com.au) for more information on how to become accredited for the course you undertook. For those seeking recognition towards Continued Professional Development (CPD), the Spatial Sciences Institute (SSI) allocated substantial CPD points for the Boot Camp training. Points allocated in this way by the lead Spatial professional body are often recognised by other bodies as well.

### Subject details

The Boot Camp was a very intensive two days with participants responding well to the rigorous training programme while also making the most of the social and networking opportunities. In order to achieve the required outputs within the timeframe, groups came together for training in common elements such as safety, organisational requirements, datums and projections, legal requirements, quality assurance, and metadata. Yes! Metadata was not forgotten, with participants learning of the added value metadata bestows upon any dataset. For instruction on legal requirements and metadata, we appreciate the attendance of representatives from the Queensland Spatial Information Council (QSIC) in Brisbane.

"The focus was both theoretical and hands-on with spatial training in Geographical Information Systems (GIS) Global Positioning Systems (GPS) and navigation."





## Fungis Boot Camp

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With any short term event such as this, it is difficult to quantify for assessment the communication and team work elements. So, to demonstrate these and the skills of all participants in an innovative, fun and very 'spatial' way, instructors and mentors took part in the construction of the world's largest temporal North Point.

This exercise incorporated;

- Uploading GPS points
- Navigating to a point considering positional tolerance of a hand held GPS
- Communications
- Quality assurance
- Time management - the whole event, from the masses coming over the hill, to roll up of those very long strips of plastic tablecloth, was achieved in just 30 minutes!

This is how the final result looked from the air, as photographed by David Keough from his micro-light craft. This monster arrow was in excess of 35 metres long and Fungis will be seeking recognition of this potential world record through the Guinness Book of Records.



### Boot Camp feedback

Fungis Executive and members were excited by the involvement and enthusiasm of the Boot Camp participants. Evaluation feedback has been positive with a request for more events of this nature.

If you have further feedback, comments or suggestions about the Boot Camp which you'd like us to know, please send directly to [carolineb@fungis.org](mailto:carolineb@fungis.org).

If you haven't already checked them out, log on to [www.fungis.org](http://www.fungis.org) to see more photos from the event and relive the occasion!

Bob Peever  
Fungis 2007 Boot Camp Convener





## Fungis Boot Camp

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### Boot Camp lucky winners!

As well as conversation and liquor, prizes were a-flowing at the Boot Camp, for everything from who first picked the spelling mistake in the Safety Plan (an ESRI CD holder to be split between Bob Pettit and Mike Stott (both WTMA) for that one!), to who produced the best-looking map labels in the Map Reading and Navigation course (a pat on the back for this lucky winner!)

The big prize-winners of the two lucky-door prizes were:

- Craig Harriss (Main Roads).

Who won a Cape Tribulation camping and sea kayaking holiday for two, including a day on the Great Barrier Reef. Thanks to Cape Tribulation Camping ([www.capetribcamping.com.au](http://www.capetribcamping.com.au)) and Rum Runner Dive and Sail Cape Tribulation ([www.rumrunner.com.au](http://www.rumrunner.com.au)) for this fantastic prize. Contact us here at Fungis if you're on the hunt for that second person, Craig ...!

- Ben Jones (Cape York Peninsula Development Association).

Who is entitled to free registration for the upcoming SSI Charters Towers conference.

Thanks to Fungis and SSI Northern Group for their equal donation to this corker of a prize ...

our only stipulation is that you provide us with an article on the event for inclusion in the next edition of Fungis News, Ben.





### Teachers come together to put their schools on the map

The Spatial Technologies in Schools (STiS) Expo took place on September 6 & 7 at the ICT Learning Innovation Centre on the Sunshine Coast. This annual event for teachers brought together teachers from across Queensland, including a FNQ contingent, to learn about and implement GIS, GPS and online spatial resources in their classrooms.

The 2007 event attracted teachers from nearly every state in Australia, as it is the only professional development experience of its kind directly aimed at classroom teachers. The 2-day conference included presentations, demonstrations, hands-on workshops and field activities delivered by industry and teaching leaders.

Video-conference keynote presentations were delivered from Harvard University in the US and the Ordnance Survey in the UK. A computer workshop was co-presented by a local Sunshine Coast teacher in partnership with a teacher in Belgium representing the European Space Agency, who contributed via videoconference.

After the fantastic response by teachers who attended the Fungis Boot Camp, it may be time to bring such innovative opportunities to all in the future. The 2008 STiS Expo will again be held in September at the ICT Learning Innovation Centre on the Sunshine Coast, in collaboration with the biennial AGTA (Australian Geography Teachers Association) Conference. After that, perhaps a 2009 STiS Expo / joint GIS Boot Camp in Cairns is on the cards??? if you would like to volunteer to be involved in this activity contact [education@fungis.org](mailto:education@fungis.org)

Thanks to all the sponsors and supporters of the 2007 STiS Expo, DETA, Information Queensland, QSI, ESRI Australia, Johnny Appleseed GPS, UQ, ABS, the Asia Education Foundation (AEF) and the SSI Young Professionals. The sessions captured live will be streamed via the web shortly.

Meegan Maguire  
Spatial Technologies in Schools Project Officer  
Sunshine Coast







## GIS ASSET MAPPING IN THE LIVINGSTONE SHIRE

The Livingstone Shire saw the need for a Geographical Information System back in about 1996 and initial attempts to get the system operational were very slow, cumbersome and uncoordinated as there was no-one who really knew much about GIS or how to utilise its capabilities within the organisation. Things have changed dramatically since then and the GIS system within LSC has progressed to become a corporate-wide system available to everyone in the organisation who has a computer. It now has in-house customised functionality for most organisational units for almost all aspects of Council operations.

The general function of the GIS is to provide a one-stop information application for anything Council-related that has a spatial relationship. As almost all of our spatial relationships involve Cadastral boundaries, the DCDB is the underlying base for our entire mapping. It is well known that the DCDB as supplied by the Qld DNRW was never meant to be utilised at the levels for which we require it. In our Shire, we had positional errors of several hundreds of metres in some areas, so its accuracy could never be relied upon for our requirements.

In 2005, a two-year, two-stage DCDB correction process was finally completed for the whole of Livingstone Shire at considerable expense. The process used in the correction process involved entry of metes and bounds rectified to a tight ground control network. Varying levels of tolerances and accuracies were applied and allowed for in the process. In the urban and areas immediately adjacent, a very high level of positional accuracy was called for and in the more rural areas lower tolerances were acceptable. Relative and absolute accuracies in our immediate and planned future urban areas are within 100mm. In the urban perimeter areas, the accuracies are within 300mm and in the more remote rural areas of the Shire, within 1 metre.

Having a DCDB with known and definable levels of accuracies gives us a very good base over which we can map other positionally correct data sets and have reliable relative and absolute positional relationships. Various attempts at mapping Council assets such as stormwater, sewerage, and water reticulation networks had always been hampered by the inaccuracies and continual shifting of the DCDB. This meant that relative spatial accuracy of datasets was always a problem. For a number of years, we had the sewerage and water reticulation system mapped in the GIS but it had absolutely no definable object integrity as it was just basically a heads-up digitised version with very little data attached.

Numerous types of problems arose through the use of the data sets, due to issues of unreliability and varied accuracy relative to the DCDB. With the completion of the 'new and improved' DCDB, we could now work on mapping assets precisely and accurately and know their relative accuracies. Various legislative requirements coming into force also meant that we needed to have all of our assets recorded more precisely and accurately.

The last two and a half years have seen a dramatic change in the amount, type and accuracies of the data available through the LSC GIS. In respect to Council assets, we now have our entire sewerage, water, stormwater, roads network, pathways, kerbs and channels, bridges, culverts, and medians mapped to definable levels of accuracy and an extremely comprehensive attribute data set attached to all objects. Unfortunately, while we can't say that everything is mapped to the 100mm tolerance of the DCDB, it is possible to determine to what degree of accuracy individual objects are mapped and also to what degree the attribute data can be relied upon.

Economics, coupled with lack of available personnel and time, would never allow us to go out and do a fully accurate field pick up of all assets, to get the high degree of accuracies that we would ultimately like to have. Other options were therefore investigated to derive the most comprehensive, complete, accurate and detailed asset mapping possible given the extent and availability of resources.

The main requirement for the process to work efficiently and expeditiously was personnel. The GIS Assets mapping team was bolstered up to 4 personnel, after which followed intensive training in the GIS Software and techniques.





## GIS ASSET MAPPING IN THE LIVINGSTONE SHIRE

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### Map Objects

Because a lot of the Council's assets such as water, sewerage, and stormwater reticulation were already mapped in AutoCAD as "As Constructed", it was decided to convert these drawings to GIS format. This would give us a reasonably good base for our asset mapping. During the conversion process, the DCDB contained in the CAD drawings was also converted to GIS format. We then used rubber sheeting software within the GIS application to apply the shift made from the cadastre in the CAD drawings to the accurate GIS cadastre and to the asset layers.

The next step was to determine the absolute accuracy of the newly mapped objects as it was accepted that some older areas were inherently more inaccurate than other newer areas. A few different methods are in place to check and correct the positional accuracies of mapped asset objects. One ongoing method involves surveyors picking up any existing assets within a survey area each time an engineering survey is carried out. These new locations are then used to either replace the existing mapped objects or to apply some sort of adjustment process to associated objects.

Another checking and adjustment process undertaken utilises high-resolution, accurately georeferenced aerial imagery to check and adjust the mapped objects. In wider areas where there are known problems with object positional accuracies, a real-time kinematic (RTK) GPS pickup is sometimes carried out to create a control network and then all similar assets are rubber-sheeted to fit this control.

The above processes were generally used to generate the sewer, water and stormwater networks. A different process was used to map the roads, pathways, kurbs and channels, bridges and culverts. The roads, kurbs and channels, and pathways in the urban areas were digitised from very high-resolution aerial photography while all the rural roads were generated from GPS pickup. Stormwater culverts and bridges were also picked up using GPS.

The newly implemented "Submission of Digital As Constructed Information" requirements now ensure that all new construction works, whether internal or external, can now be integrated into the GIS easily and efficiently and ensure that all new assets are mapped and associated attribute data is to the highest accuracy and standards possible.

### Object Integrity

The integrity of the mapped objects is recorded in a data field within the associated data table. Object integrity levels indicate the absolute positional accuracy that users can expect from the mapped objects. Level 1 is the best positional accuracy obtainable while level 5 is either known to have very dubious positional integrity or has not been checked at all.

An asset map object with an integrity of level 1 indicates that it has been positioned either from a field survey by RTK GPS, conventional survey methods or digitised from very high-resolution aerial photography. Integrity of level 2 indicates that the object has been obtained from submitted digital 'as constructed' information plans or picked up using DGPS. Level 3 integrity indicates that the object has been translated from AutoCAD plans, while level 4 indicates that the object has been digitised from paper plans or large-scale/low-resolution aerial photography. Level 5 indicates provenance from an unconfirmed or unreliable source.

Work on enhancing the integrity level of all mapped objects to the highest possible is a continual ongoing process aided by the fact that we record and monitor the integrity of all mapped asset objects.

### Attribute Data

During the process of mapping asset objects, a comprehensive attribute data set is also collected and recorded. Obviously, the integrity of the data is paramount, so only data obtained from the most reliable source is used. As with the mapped objects, the attribute integrity is recorded against each object.

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## GIS ASSET MAPPING IN THE LIVINGSTONE SHIRE

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### Attribute Data (continued)

Attribute data can be derived from a number of different sources. Unfortunately, in many cases, the only data available is not always correct, but as it is the only data it has to be used until it can be confirmed to be correct or otherwise. Data can come from older hard copy or digital plans, which often don't reflect the real 'as constructed' details. Unfortunately, some of the older 'as constructed' engineering plans don't reflect the real details either. Newer digital 'as constructed' data tends to be a lot more reliable.

The checking of attribute data in the field is often carried out by our Design Staff as a part of their survey work, or by Asset Staff. Other field staff also often advise of anomalies in data as they notice them while working with the data.

### Data Integrity

As with mapped object integrity, the integrity of attribute data needs to be able to be relied upon and users need to know to what degree of certainty this can be done. Recording the attribute's integrity against each object allows this to be done.

Attribute data integrity levels recorded against each object reflect the reliability of the data. Attribute data with level 1 integrity has been collected in the field by LSC Staff, while level 2 data has been obtained from submitted digital 'as constructed' information or from confirmed reliable personal knowledge. Attribute data with level 3 integrity has been obtained from CAD or paper plans, or information confirmed 'as constructed'. Data obtained from other hard-copy construction or design plans is allocated an integrity of 4 while any unconfirmed or unreliable data is allocated an integrity of 5.

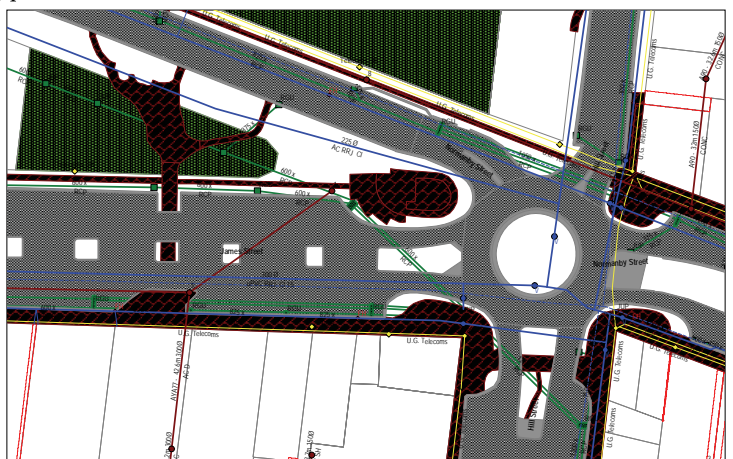
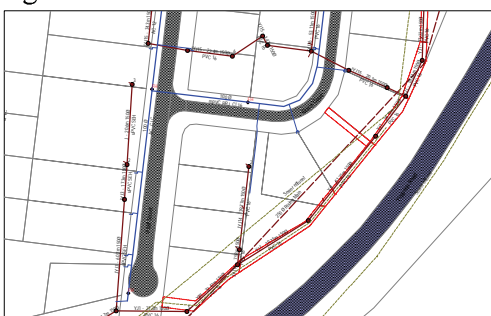
### The Future of Asset Mapping

With such exemplary progress having been made into detailed and accurate asset mapping, measures have been implemented to ensure that all new assets generated are recorded and mapped to the highest possible standards. One of the most important and major implementations affecting asset mapping is the "Submission of Digital As Constructed Information" process. This process is a very detailed and intricate submission requirement and process that has recently been implemented and has totally changed the way 'as constructed' information is required to be submitted by developers and how it is processed internally. This requirement makes the entire process more accurate, efficient, and more easily implemented into the system.

It is designed, documented and implemented in such a way that upon receipt, the data is in a predetermined, precise and accurate format and no editing is required to be undertaken before, during or after the translation process into GIS format. This process controls both mapped objects and attribute data. Procedures, checks and measures are in place to ensure that 'as constructed' submissions are not accepted until all requirements are met.

This process will ensure that all new assets are recorded as accurately as possible along with meaningful and useful attribute data. Any existing map objects and data will continually be checked and revised where necessary as a matter of course, to elevate them to the highest standards until we have the best Asset mapping possible.

Doug Pease  
GIS Officer  
Livingstone Shire Council





## News from the Fitzroy Basin Association Inc. GIS Unit, Rockhampton

### Who's new in the FBA GIS Unit?

Anthony Vize, our newest member in the GIS Unit, joined us in September 2006. Anthony previously worked for the Queensland Department of Natural Resources and Water in Rockhampton and brings with him several years of experience in the Cartography/GIS fields. Since starting with FBA, Anthony has been handling all the Property Mapping for the landholders in the Central Queensland Region, utilising Spot 5 imagery and assisting with GIS support for FBA staff.

### FBA GIS team spreads the word

GIS staff at the Fitzroy Basin Association (FBA) celebrated annual GIS Day on 13 June 2007. FBA's GIS Coordinator Kristian Smith led an information sharing session with a lively and enthusiastic 'class' of FBA staff and guests from Queensland Government Departments (NRW & EPA) and Fitzroy River Coastal Catchment. Participants were challenged with a short quiz and other exercises including satellite imagery interpretation where features such as ponded pastures, fence lines and crops were identified from SPOT5 scenes. The information sharing session was followed by a sausage sizzle on the bank of the Fitzroy River.

### GIS Unit Contact Details

Kristian Smith, GIS Coordinator - 07 49992807

Sharlene Blakeney, GIS Support Officer - 07 49992810 or 0439924605

Anthony Vize, GIS / Cartographic Officer - 07 49992826

Remember, if you are ever in our neck of the woods, feel free to drop in and say hello.

Sharlene Blakeney  
Fitzroy Basin Association Inc.  
Rockhampton







Can habitat quality of riparian rainforest vegetation be rapidly assessed using GIS and remote sensing techniques? Riparian zones are the interface between the aquatic and terrestrial worlds. They generally have nutrient rich soils, access to water, greater plant diversity (than nearby areas) and thus greater animal diversity. They are commonly referred to as one of the most dynamic systems in a landscape.

In today's society, where much of the natural vegetation has been cleared for agricultural purposes, the role of riparian vegetation as both conduits and resident habitat for native animals is vital. This is particularly true for areas such as those in far north Queensland where the riparian rainforest vegetation forms much of the remaining natural vegetation on the coastal lowlands.

Many factors influence the quality of a riparian zone and thus its effectiveness to act as either a conduit or resident habitat to both flora and fauna. These factors include: the time since clearing, the size and shape of the vegetation (width, length, etc), the amount of other rainforest present in the area and the spatial and temporal context of the riparian forest in terms of linkages to other patches or forest in the landscape. Sites can be considered of high habitat quality if riparian vegetation is similar to intact natural rainforest, as they are more likely to be used by rainforest fauna. Conversely, sites can be considered of lower habitat quality if riparian vegetation is less similar to intact natural rainforest, as they are less likely to be used by rainforest fauna. For the purpose of this study, 'vegetation quality' was defined as relative intactness of the vegetation and similarity to undisturbed rainforest, ie. condition relative to the natural vegetation of the study area prior to clearing.

The objectives of this study were to:

- 1) Determine if GIS and aerial photographic analysis can be used as a less field-intensive method of determining the 'quality' of riparian vegetation, and;
- 2) Determine if there is a relationship between riparian vegetation quality and avian diversity and thus habitat value.

The study was undertaken in the riparian vegetation on the coastal lowlands around the town of Mossman in far north Queensland. Specifically, the riparian vegetation along the Mossman River, South Mossman River and Cassowary Creek were assessed using both a 'desktop' and 'field' method.

'Quality components' refer to canopy cover and width of woody vegetation. 'Desk vegetation quality' refers to the combination of canopy cover and width of woody vegetation. These were assessed using GIS and remote sensing techniques. Canopy cover was recorded into the following classes (0) 0 - 20%; (1) 21 - 40%; (2) 41 - 60%; (3) 61 - 80%; and (4) 81 - 100% by stereoscope analysis then digitised on screen. Riparian vegetation width classes included: (0) <5m wide or any site consisting of no woody vegetation; (1) 5 - 25m; (2) 26 - 50m; (3) 51 - 100m; and (4) >100m. Vegetation was measured using aerial photography from the stream to the outer edge of woody vegetation. Desk vegetation quality was calculated by the addition of the scores for canopy cover and width of vegetation. Quality classes were very poor (score 0), poor (1-2), good (3-4), high (5-6), excellent (7-8).

Thirty-seven field sites were chosen to undertake a field assessment of the vegetation. This included six control sites which were located in continuous tracts of intact rainforests that represented source habitat for surrounding flora and fauna. A detailed assessment scored quality attributes including canopy cover, width of riparian vegetation, weed abundance, human disturbance, debris and the percentage of canopy and ground cover that comprised native plants. Highest scores were given to attributes that represent natural riparian vegetation. 'Field vegetation quality' refers to all quality attributes measured in the field.

To determine if there was a relationship between riparian vegetation quality and avian diversity and thus habitat value a bird survey was conducted in which all sites were visited one morning and one evening for 20 minutes each and all birds were identified by either call or visual observations.



(continued from page 12)

### Can habitat quality of riparian rainforest vegetation be rapidly assessed using GIS and remote sensing techniques?

Comparisons of both desktop 'vegetation quality' components (i.e. canopy cover and width of woody vegetation) and their field equivalents showed an overall desktop accuracy of 68% for canopy cover and 78% for width of riparian vegetation. The majority of the anomalies for canopy cover (23%) and riparian woody vegetation width (16%) could be attributed to two factors:

a) relatively recent tree falls; or b) thickening of the undergrowth. In the remainder of anomalies (9% for canopy cover and 6% for riparian width), reasons for inaccuracies were unclear. Overall, when the accuracy of desk quality assessment was compared to field quality assessment, 24 out of 31 sites or 78 % of sites had the same desk quality assigned as they did field quality. Changes in a further 4 sites or 13% were attributable to the factors described above, leaving the reasons for anomalies in 9% or 3 sites unclear.

Species richness ranged from zero to 27 bird species, a total of 59 species were identified across all 37 study sites. Control, excellent or high quality areas contained over 80% of all species identified. The community of birds comprised mostly rainforest-dependent species and rainforest users in control and higher quality areas; more generalists in mid-quality areas while very poor quality areas contained mainly open forest species. The proportions of rainforest-dependent species ( $\chi^2 = 78.745$ ,  $df = 5$ ,  $P = 0.000$ ) and species that use a variety of habitats including rainforests ( $\chi^2 = 48.965$ ,  $df = 5$ ,  $P = 0.000$ ) differed significantly between quality classes. However, bird species that occupy a variety of open habitats but not rainforests did not differ significantly between quality classes ( $\chi^2 = 9.429$ ,  $df = 5$ ,  $P = 0.093$ ).

Total bird species richness was positively correlated with both components of 'vegetation quality' (canopy cover: Spearman's  $\rho = 0.860$ ,  $P = 0.000$ ; riparian woody vegetation width: Spearman's  $\rho = 0.837$ ,  $P = 0.000$ ) and with 'vegetation quality' (Spearman's  $\rho = 0.904$ ,  $P = 0.000$ ).

When quality classes for the total bird community were compared for bird species diversity, high and excellent quality classes were similar to the control sites (Tukey's  $P > 0.2$ ) while poor quality classes had fewer species than classes of high quality and above (Tukey's  $P < 0.01$ ). Very poor quality habitat had significantly fewer bird species than all classes above poor (Tukey's multiple comparisons,  $P = 0.000$ ). Therefore, as riparian strip quality decreases the number of different bird species and the mean number of birds per site found in that strip also decrease.

From this study we can conclude that yes, GIS and aerial photography analysis can be used as a less field-intensive method of riparian quality assessment. There is also a positive relationship between riparian quality and avian diversity - the better the quality the greater diversity and numbers of birds. Thus riparian quality may be used as a surrogate for habitat value.

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