Newsletter

Number 60

Winter 2018

Stipa

Native Grasses Association Inc

Australian Government

Australian Charities and Not-for-profits Commission

REGISTERED CHARITY · acnc.gov.au/charityregister

Stipa is now registered as a charity

Spreading panic grass (*Paspalidium distans*) - highly palatable summer growing (C4) native perennial grass growing in southern Victoria

GOULBURN BROKEN CATCHMENT MANAGEMENT AUTHORITY

www.stipa.com.au

CONTENTS

STIPA is not an acronym. The association was named after the *Stipa* genus of grasses, now *Austrostipa*. One of the *Stipas* is commonly known as spear grass. At its inception in 1997, the association aimed to spearhead a change in attitude to native grasses. As that change is occurring, Stipa continues to promote the use of native grasses to achieve profit from a healthy landscape.

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From the Chair

Michael Gooden

As I sit down to right this message in the winter newsletter several things cross my mind. Firstly, I had hoped to have this done a few days ago but have been very busy with the eternal juggling act between family, farm and community service. I am watching my 2 year old daughter stack blocks as I write.

Here in the Riverina the season is slowly turning from bad to worse, the facts are we are consuming more grass than we have been growing for about 90 days now, this is coming to a head with calving just begun. Despite getting to this point without any hand feeding, in the short term our only real option will be to supplement cow's intake, until we can sell some animals post calving. This is a frustrating position to be in, because from our grazing plan I could see this happening 120-90 days ago but did not have the courage to make the tough decisions. I hope that many of you have managed this dry period better than me. The major downside to running a seed stock enterprise, is the lack of flexibility in managing animal numbers, as seasonal conditions dramatically change.

We have some great news that through Graeme's good work, Stipa is now a registered charity. This means that we can receive donations that can be put towards the running of the association or courses. This will be of great benefit especially in the current lean funding period. Furthermore, it opens the opportunities to potential crowd funding or the like if the opportunity arises. With little external funding in the pipeline due to the current funding cycle, our on ground activities will limited. Potential will be able to apply for some funding from the National Landcare Program 2 announcement in October 2018.

Please take the time during this challenging period to look after you own physical and mental health and that of your family, neighbours and friends, for they are far more important than any amount of land, livestock or money. My family remind me every day.

Michael J Gooden
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From the CEO

Graeme Hand

Photo By Lucy Hand

In this report

- Charity Registration
- Regenerating native perennial summer grasses
- Simplified grazing management
- Perennial grass recovery and animal impact

Charity Registration

Stipa has been successfully registered as a charity with the purpose of advancing the natural environment. This idea was suggested by a Stipa member at a workshop. We are still waiting to see if we qualify for deductible gift recipient status.

Regenerating native perennial summer grasses

There are great benefits in native summer growing perennial grasslands (see following article). It is great to see that many members are regenerating large areas through thoughtful grazing management and pasture cropping. If you have any photos of areas that have been regenerated and if you are happy to have them posted I will collate and put into a report.

Simplified Grazing Management

I may have overdone the articles on grazing management but I was trying to highlight the growing trend to simplification made possible through many paddocks and longer recoveries. This management which increases resilience is also favouring native perennial grasses as it produces fungal dominant soils that provide nutrients to native grasses.

Perennial grass recovery and animal impact

This article, written with Stephanie, is an attempt to provide an explanation of how these tools interact. Let me know if not clear

Regenerating summer growing (C4) native perennial grasslands

Graeme Hand

Introduction:

There is growing understanding that much of southern Australia was dominated by summer growing (C4) native perennial grasslands. European style agriculture has shifted a lot of these areas to winter growing (C3) annual and perennial plants. For example, the Victorian volcanic plain stretching from Melbourne through to South Australia was a Kangaroo grass (*Themeda triandra*) dominated grassland. These grasslands are some of the most critically endangered communities. Summer growing grasslands provide biodiversity, fire suppression and water cycle/ cooling benefits. Grazing management that includes long recoveries and high utilisation is successfully regenerating these grasses.

Key points:

- Regenerating summer growing (C4) native perennial grasslands is important in restore landscape function and biodiversity.
- Stipa members are restoring large areas of summer growing native perennial grasslands.

Discussion:

Summer growing native perennial grasslands provided the basis for indigenous food production for thousands of years. This has been clearly explained in books such as Dark Emu, Bruce Pascoe and The Greatest Estate on Earth, Bill Gamage.

The introduction of European style agriculture has resulted in many of these grasslands becoming critically endangered. Profitable regeneration can restore the large areas required to stabilise our landscape and restore the large and small water cycles.

Recently I was farm sitting while the owners were on holidays at a property near Araluen, New South Wales. Having visited this property regularly over the last 15 years it was great to see that there had been a massive shift to summer growing (C4) native perennial grasses. See photos below and YouTube video https://www.youtube.com/watch?v=GF0QT08WkFM

Species that have regenerated included kangaroo grass (Themeda triandra) and spreading panic grass (Paspalidium distans) as well as winter growing species such as wallaby grass and weeping grass. This species mix was providing a more even feed supply throughout the year as well as outcompeting annual forb type weeds.

I can remember when the owners showed me a few box grass plants and now there is around 100 -200 ha.

The management being used to regenerate these perennial grasses is outlined in the following articles but is basically longish recoveries (6-9 months) followed by high utilisation and high animal impact. Multiple paddock subdivisions are used to achieve animal performance from cows selected for performance under this management.

Simplified Grazing Management

Graeme Hand

Grazing management is complex and because of this complexity, there are no right answers[1]. Many people tell me that they are frustrated because “the experts” disagree. This disagreement is important and needs to be welcomed as it will keep advancing farmer success[1].

In the last Stipa newsletter[2] it was discussed that “safe to fail” practice areas[1] are required to understand grazing management. Practice areas are always required but another approach we used while working out what worked for us was to simplify planned grazing so that we could work out what was going on and get repeatable, consistent results. This allowed us to increase animal performance, increase landscape function, lower feed cost, lower cost of production, and lower rainfall risk.

The stimulus for this change (late 1990’s) was discussions and emails with Patrick Francis who has a property near Romsey[3]. Patrick had by necessity developed a very simply plan as he was working as a journalist during the week (Australian Farm Journal and Australian Landcare Magazine) and only went to the farm on the week end. From memory he was shifting the animals on a Saturday and had around 20 paddocks. This simple planning was producing better results than our very complicated planning. I then started to simplify the grazing planning and implement practice areas and found that good results were obtained from a combination of longer recoveries and high animal impact/ stock density and adopted simplified planned grazing.

Some of the most successful graziers I know (Anna & Michael Coughlan[4], Gabe Brown, etc) have independently ended up simplifying their planned grazing management and dropped many of the ‘rules’ we were taught. They enjoy the benefits offered by very cheap grass, low rainfall risk and the lowered cost of production this produces[4]. For these farmers failure is not an option and their focus is constant improvement.

Simplified Grazing Management (cont)

Simplification carries risks as we quickly fall into routines and habits[5] and can only be used where it is getting repeatable results and a consistent relationship between cause and effect[1]. If you feel like you are out of control, or problems such as animal performance, weeds or not moving towards your described future landscape then you quickly shift back to the full planned grazing process using safe to fail practice areas[1] to determine the thresholds for recovery and animal impact.

Table 1 Simplified design

Grazing Planning	Range from simple paddock plan through to grazing charts and apps.
Paddock numbers	180 - 1000
Paddock design	From strips to rectangle paddocks – moving away from cell design.
Mobs	One - usually breeders to select for performance with high stock density, lower protein and energy higher fibre i.e. locally adapted
Recovery	One long recovery usually >180 days. Stocking rate adjusted (reduced) to maintain long recovery.
Fencing	Mostly electric some conventional fencing
Water	Mostly fixed some dams – few with portable water
When in doubt	Reduce stocking rate and increase perennial grass recovery and animal impact/ stock density

This simple design has a lower risk (linking up rainfalls and temperatures to grow enough grass) and allows time to adjust stocking rate. Recoveries are longer than required for perennial grasses and soils to recover from the previous grazing with the benefit being lower rainfall risk and allows time to gather ourselves to reduce stocking rate. This lower risk design is also providing a higher profit over time while regenerating perennial grasslands than the current conventional advice and more complicated methods.

Table 2 Comparing simplified actions to different observations

Observation	Rotational grazing action	Simplified action
Low rainfall	Destock when grass runs out	Increase recovery further by tweaking stocking rate early. Long recovery provides time to adjust
Fast grass growth	Fast moves	No change or slow down to maintain high utilisation. Lots of paddocks means grazing periods are short enough to not deplete grass root reserves.
Less desirable perennial grass species increasing	Focus on stopping seeding and shorten recovery to keep it palatable.	Put in practice areas to determine combination of recovery and animal impact to promote better perennial grasses.
Annual weeds/ forbs	Shorten recovery to stop weeds shading and invading	Increase recovery to strengthen perennial grass root systems and promote healthy growth to eliminate space for the weeds below ground.
Animal performance poor	Shorten recovery to increase energy, protein and decrease fibre	Select animals that perform on lower energy, protein and higher fibre.

References:

1. Dave Snowden www.cognitiveedge.com
2. Stipa Newsletter No.59 February 2018
3. http://www.moffittsfarm.com.au/about-us/
4. https://www.bordermail.com.au/story/5461757/holistic-farming-brings-benefits-for-stock-and-the-land/
5. Holistic Management, A Commonsense Revolution to Restore Our Environment, Allan Savory, Jody Butterfield

Perennial grass recovery and animal impact

Graeme Hand & Stephanie Orive , B Biomed Sc (Hons), M Agr Sc (Animal Science)

Introduction:

It is with some reluctance that we write this article as this is a hotly contested area with many passionate advisors who all believe they are correct. This is an attempt to take a dispassionate, evidence-based view of the outcomes over time. As this is a complex area there is more than one answer so please check if the ideas work on your place before adopting.

Key Points:

- Only management that increases landscape function and perennial grass quality/succession and diversity can be considered regenerative and reversing biodiversity loss[1,2].
- Majority of grazing advice does not include leaf emergence rate/ perennial grass physiology[3] and therefore fails over time.
- Research on animal impact/stock density thresholds that regenerate perennial grasslands[4] is required on each farm.

Landscape Function and perennial grass quality:

Grazing management has gone through many stages and cycles. This article is based on shifting to a highly dense, high successional, high landscape function predominantly perennial-based grassland. The management levels discussed are based on their ability to achieve this outcome at low risk and consistent profit.

The Stipa Action on the Ground Project in partnership with Sydney University proved that focusing on the above landscape description and using leaf emergence rate in the definition of perennial grass recovery massively increased landscape function in two years. We have found no research anywhere that shows that level 1 and levels 2 & 2A in Table 1 Grazing Descriptions, consistently increase landscape function, soil

health while lowering rainfall risk.

Very little advice is trying to achieve high landscape function with the consequence being that external inputs in the form of feeding, fertilisers, herbicides and pasture re-sowing are eventually required[5,6].

What is poorly understood is that light grazing or only grazing 50% or top third etc. results in loss of the more palatable perennial grasses over time,[2,6,7,8]. The mechanism is that the better grasses are preferentially grazed and have more leaf removed than the average. When the animals return these plants are not recovered and are overgrazed, eventually to extinction. The basis of this incorrect advice is that removing more leaf reduces root mass and increases recovery as researched by Crider[9]. This is true but is in isolation to what happens across a paddock and of little value in a diverse pasture[4]. To maintain and increase higher successional perennial and diverse grasses requires high utilisation and long recoveries. I have attempted to explain this in a presentation (see references).

Leaf emergence rate of perennial grass

Perennial grasses can only maintain a maximum number of green growing leaves per tiller. The number varies by species, but the key is to go past this point, before adding stock so that you produce enough litter to cover the ground between the perennial grasses i.e. increase landscape function.

For perennial rye grass, this means grazing when 4+ leaves have emerged. Raw litter increases stability and water infiltration[10]. When this litter is actively decomposing a large increase in nutrient cycling is produced. Livestock at high stock density press raw litter onto the soil surface so that it can be colonised by the soil biota to allow this decomposition to occur[11].

Please note the dairy industry worries that this litter is wasted feed and therefore provides advice to graze at the 2 ½ to 3 leaf stage. The unintended consequences of this advice are that animal health and fertility

Perennial grass recovery and animal impact (cont)

is poor due to excess non-protein nitrogen in young leaves[12]. These pastures require large inputs and re-sowing on a short, regular basis as the perennial grasses have not replaced their root reserves before the next graze even though Figure 1 suggests they have.

Figure 1 Diagram of leaf emergence and replacement of root reserves

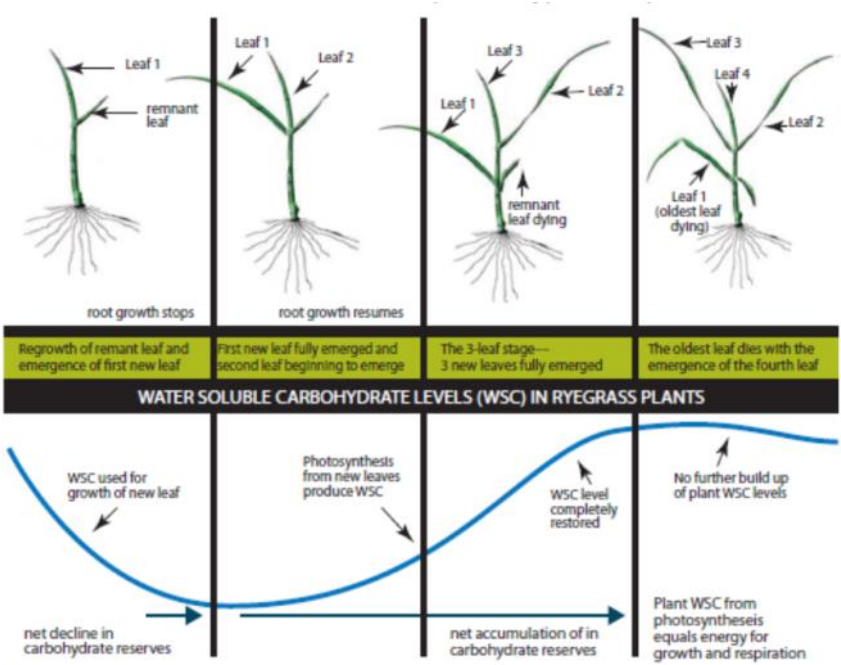


Figure 1. Leaf regrowth and water soluble carbohydrate levels of a ryegrass tiller following defoliation (adapted from Donaghy, 1998).

Source: https://www.dairyaustralia.com.au/farm/feedbase-and-animal-nutrition/pasture/perennial-ryegrass-management

Please note following dairy grazing advice will reduce animal health, animal fertility, landscape function, waterway health[4,5] and profit.

Animal impact/stock density thresholds

Animal impact as a tool (as described by Allan Savory and Jody Butterworth[1]) is poorly understood and I will use some of Stipa's work, Johan Zietsman's book[4] and Jaime Elizondo's recent Facebook post to try and explain how this tool works and how to determine what your land needs. The Facebook post by Jamie Elizondo shows clearly that just providing recovery does not produce dense perennial grassland. Only after high animal impact and significant recovery did this landscape shift to a dense perennial grassland with high landscape function (please see below).

The amount of stock density required to create animal impact is high and can be very inconvenient and tiring[13]. Automating the movement of stock with Batt Latches or similar is how a few are using this tool. A few are using herding or attractants to overcome the need for fencing to achieve high stock density.

Thresholds for land regeneration

"Non selective or severe grazing has so many advantages over grazing selectively which demands coming back faster. On the left grazed selectively 2-3 times per year for over 12 years. On the right, after only one severe grazing followed by a full growing season rest. Same paddock, change of grazing type which leads to a much better succession and desirable plants recruitment. This type of grazing sequesters MUCH MORE carbon and benefits the WHOLE". Source: Jaime Elizondo https://www.facebook.com/search/top/?q=jaime%20elizondo%20braun

Perennial grass recovery and animal impact (cont)

The best way (first heard from Allan Savory) to demonstrate the stock density required to change behaviour and stimulate massive germination of perennial grasses is to get a group of people in a room and keep shifting them into ever smaller halves of the room until they are within each other's personal space and then they get noisy (laughing and giggling) as they are uncomfortable.

Usually takes about 4-5 halving's in most situations. This may help give you the idea of what is required to push livestock into each other's space. The stock density threshold is determined though small practice areas as each land type, rainfall amount and pattern are different. We have found a step change increase in perennial grass germination between 500 – 1000 cattle/ ha or 5000 – 10,000 DSE/ha stock density and use similar fencing design to Gabe & Paul Brown see photo below.

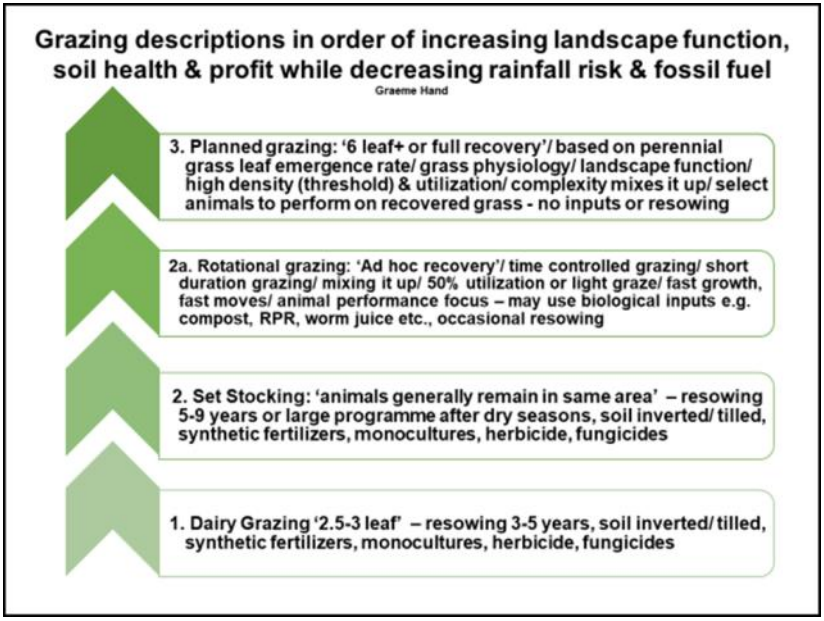
Source: Gabe Brown, Livestock Integration presentation

Perennial grass recovery and animal impact (cont)

Comparison of different grazing practices

Table 1 is an attempt to explain the differences in grazing practices. It is difficult to describe and represent the difference between the different grazing practices as there can be a fair bit of overlap. For example, good set stocking can produce more profits and a better environmental outcome than poor rotational grazing. Dairy grazing relying on nitrogen fertiliser has surprisingly come out lower than set stocking because in general it uses massive amounts of nitrogen fertiliser that reduces soil carbon and leaches nitrates into groundwater[5] and waterways while not producing decomposing litter. The easy example is to think of what is happening in dairy areas in Australia and New Zealand. Most of the rivers in dairy areas are now unfit for human consumption/ drinking due to nitrate load[14].

Table 1 Grazing Descriptions



Perennial grass recovery and animal impact (cont)

Both set stocking and rotational grazing have little link to perennial grass recovery (based on leaf emergence) and therefore fail over time. Dairy grazing uses leaf emergence rate but due to not wanting to 'waste' any feed it does not increase landscape function. This focus on short term 'waste' means that dairy farmers waste fortunes feeding, resowing pastures, fertilizing, battling weeds, bulk high milk cell counts, low cow fertility etc.

The large Caring for Country project, Communities in Landscape's, regenerating the grassy box woodlands in New South Wales that Stipa was a partner in showed that thoughtful, low stocking rate, set stocking resulted in good biodiversity outcomes (many of the properties had no debt and were comfortable with lower stocking rates and lower risk producing regular consistent profit).

Full recovery planned grazing increases landscape function and perennial grass succession[15]. Ecology research has long acknowledged the importance of perennial grass litter for nutrient cycling and soil stability[16]. However, such works frequently demonise the presence of livestock and the productive use of these 'natural landscapes'. As such, most of this research has been poorly integrated and utilised by agricultural scientists.

Conversely, top-tier agricultural research, typically funded by government organisations is still centred around a 'productivity at all costs' mentality, where production units indicate soil health[17]. Landholders and the public are confused (and for good reason!) with resulting conflicting and incongruous land management advice. Adopting leaf emergence rate as a no-nonsense and unfakable grazing indicator for the wider pastoral sector may be the way forward.

Perennial grass recovery and animal impact (cont)

The dairy community have shown this is an easy to use measure of pasture development stage, albeit to their own detriment, as we have previously described.

Grazing perennial ryegrass at the 4+ leaf stage (rather than 2.5-3) allows for the growth of litter, thereby enabling more effective nutrient cycling, replenishment of root reserves and long-term plant resilience[7].

Treatment and control area prior to treatment (control in back ground)

Treatment area 2 years later

Control area soil after 2 years

Treatment area soil after 2 years

Perennial grass recovery and animal impact (cont)

Conclusion:

Research and experience suggest that perennial grasses are recovered when they look like an ungrazed plant and contain fresh litter[18]. This definition has been shown to rapidly increase landscape function on 12 farms within 2 years in the high rainfall zone (average seasons). This definition has proven to be a good early warning during dry seasons. On farm practice areas with a range of stock density and recoveries are required to determine the stock density that will be over the animal impact threshold that rapidly increases perennial grass density and diversity.

References:

1. Savory, Allan. Holistic Management, Third Edition: A Commonsense Revolution to Restore Our Environment (p. 333). Island Press. Kindle Edition.
2. Huffaker, R & Cooper, K 1995, 'Plant succession as a natural range restoration factor in private livestock enterprises', American Journal of Agricultural Economics, vol. 77, no. 4, pp. 901-13.
3. https://www.dairyaustralia.com.au/farm/feedbase-and-animal-nutrition/pasture/perennial-ryegrass-management
4. Man, Cattle and Veld, Zietsman, Johann
5. Wang, SJ, Fox, DG, Cherney, DJ, Klausner SD, Bouldin DR. 1999, 'Impact of dairy farming on well water nitrate level and soil content of phosphorus and potassium', *Journal of Dairy Science*, vol. 10, pp. 2164-9.
6. De Bruijn, SL & Bork, EW 2006, 'Biological control of Canada thistle in temperate pastures using high density rotational cattle grazing', Biological Control, vol. 36, no. 3, pp. 305-15.
7. Wang, T, Teague, RW, Park, SC & Bevers, S 2018, 'Evaluating long-term economic and ecological consequences of continuous and multi-paddock grazing - a modeling approach', Agricultural Systems, vol. 165, pp. 197-207.

Perennial grass recovery and animal impact (cont)

8. Grass Productivity, Voisin, Andre
9. Root Growth Stoppage, Resulting from defoliation of grass, Crider, Franklin J., USDA Soil Conservation Service, Technical Bulletin No. 1102, February 1955
10. Weltz, N, Wood, M.K., Parker, E.E. 1989, 'Flash grazing and trampling effects on infiltration rates and sediment yield on a selected New Mexico range site', Journal of Arid Environments, vol. 16, pp. 95-100.
11. Wang, Z, Yuan, X, Wang, D, Zhang, Y, Zhong, Z, Guo, Q & Feng, C 2018, 'Large herbivores influence plant litter decomposition by altering soil properties and plant quality in a meadow steppe', Scientific Reports, vol. 8, no. 1.
12. https://extension.psu.edu/protein-in-pastures-can-it-be-too-high
13. Chaplot, V, Dlamini, P & Chivenge, P 2016, 'Potential of grassland rehabilitation through high density-short duration grazing to sequester atmospheric carbon', Geoderma, vol. 271, pp. 10-7.
14. http://www.stuff.co.nz/national/8978223/Many-NZ-rivers-unsafe-for-swimming
15. Taylor, CA, Brooks, TD, Garza NE. 1993, 'Effects of short duration and high-intensity, low-frequency grazing systems on forage production and composition', Journal of Range Management, vol. 46, no. 2.
16. Boeken, B & Orenstein, D 2001, 'The effect of plant litter on ecosystem properties in a Mediterranean semi-arid shrubland', Journal of Vegetation Science, vol. 12, no. 6, pp. 825-32.
17. Arshad, MA & Martin, S 2002, 'Identifying critical limits for soil quality indicators in agro-ecosystems', Agriculture, Ecosystems and Environment, vol. 88, no. 2, pp. 153-60.
18. To What Height Should Grass be Grazed, Hand, Graeme, 2017, https://www.youtube.com/watch?v=APPPeGsJoZU

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Membership renewals

Please note

Stipa is changing the way they renew memberships. We will endeavour to mail/ email out your renewal tax invoice one month prior to your expiry date. If you would like to renew please mail us a cheque or EFT your membership.

Please remember to make reference on all EFTs and return cheques your INVOICE NUMBER (found on the top of your Stipa tax invoice).

Attention all members

To ensure that you continue to receive Stipa newsletters and updates, please remember to advise us of any change of email address.

Also if you wish to receive emails about forthcoming events and other matters of interest, it is important that we have your correct email address.

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