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the Bunting

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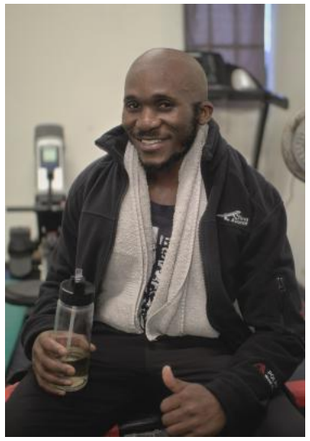


* FEATURE

Nkosi Madama staying fit on island, **p18**

PHOTO BY ROELF

Prince Phillip of Gonydale.
The hut skua

Moonrise over the eastern seaboard

Cover photo by Roelf Daling

Shot with Olympus E-M1MarkII
@ 12mm; f5.6; 30s
Live Composite

Editorial

Greetings from the G67 team, alive and well on Gough Island! We are now well past the halfway-mark of our expedition here and have truly made Gough our home. The team has gotten into a steady rhythm, from our Monday morning base cleaning skivvy to the braais each Saturday, we all do our part to keep everything running smoothly with a spirit of unity.

It has been incredible to witness and experience the changes that the seasons bring to this paradise. A glorious Spring and Summer saw lush green vegetation bustling with activity as shearwaters, prions, albatross, buntings and more, enjoyed a hugely successful breeding season. With many hikes and the occasional trip to Swemgat, we all made the most of the blue skies and warm weather. In no time at all, Autumn and now Winter followed, bringing colder temperatures, stronger winds and more rain. Large portions of the green landscape have transitioned to various shades of brown and the number of birds is dwindling rapidly after the fledging of all the chicks.

We are looking to see what Gough still has in store for us! In the meantime, though, I hope you enjoy this edition of the Bunting as we hear what the team has been up to!

– James and Roelf

LETTER FROM THE LEADER

We are more than halfway through our adventure, or perhaps I should call it our extended quarantine, on Gough Island. It has been a relief knowing that people won't think you are infected with Coronavirus (COVID19) every time you cough or sneeze. Here, we cough and sneeze freely! It is now only a few months before we go back home and everyone has begun the silent count down. The reality is kicking in and, for many, it's a cause for excitement to be going home soon. For those who have come to love the island though, it is sad to think that our time here is coming to an end.

It has been an exciting, peaceful, unusual yet enjoyable experience to be on this island so far. A few highlights from recent months have been the birthday celebrations, both for Kim on the 31st January and Peter on the 24th March. The creativity shown with the Gough-made birthday cakes is always amazing! We took adventurous outings to Gonydale, several times to Swemgat and other places around the island. Every member of G67 has gotten out of the base at least once by now. We also enjoyed some fishing until the rain and wind stopped us recently. The latest highlight was the spiritual upliftment from our Easter church service on the 15th April.

The uniqueness, past experiences and diverse backgrounds of each member of G67 are what make our team stronger; largely contributing to the success of this expedition. Of course, I must give recognition to those who always put in the extra effort to ensure that we have a memorable stay in this place and to those who take into consideration the smallest things that make it possible for us to live in harmony, a healthy environment and as a united team. I believe that continued mutual respect and self-discipline will pull us through.

At this time I must say thank you to the Almighty for bringing us to this stage where things are exactly the way they are meant to be. To our beloved ones, we are coming home soon!

– Sandile Nkebe

The 67th Gough Island Expedition Team Items

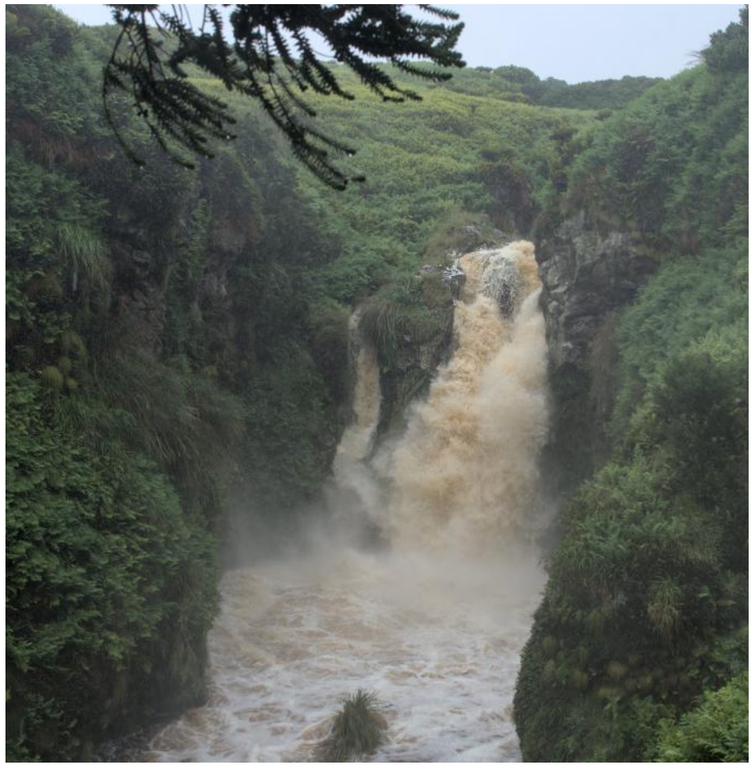
Logo designed by **Jan Solms**
Badge made by **Mad Monkey Branding**
Sabanas made by **Needlehead**
Stamp made by **Mark Boekstein**
Produced by **Roelf Daling** and **James Burns**

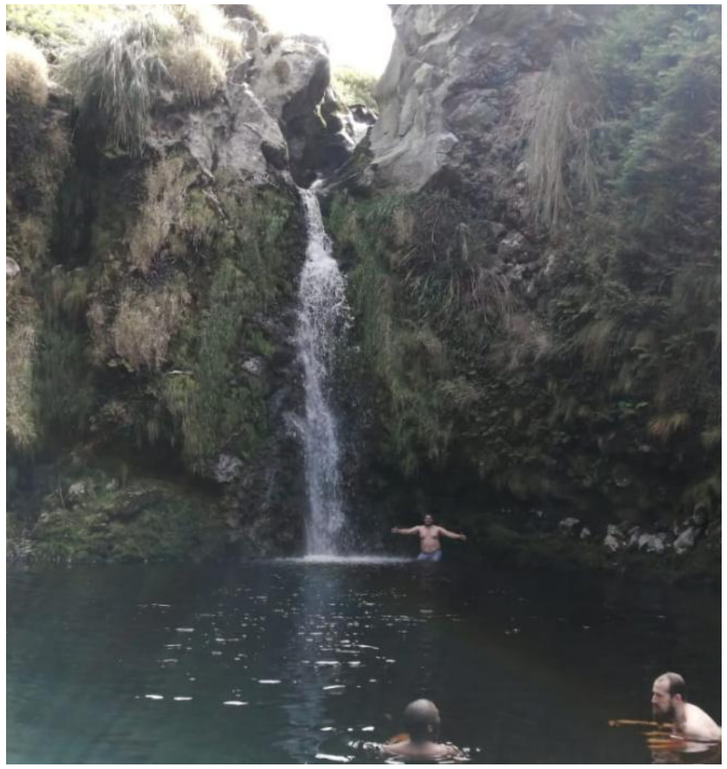
SWEMGAT

Gough Island's most popular swimming spot

ARTICLE BY SELVIN VAN WYK. PHOTOS BY SELVIN AND ROELF

"elements of this ancient volcanic island combines to form a soothing balm, that removes the many stresses and irritations..."





Swemgat can get thuderous after some heavy rains, but most of the time she is pleasant. Like the time when Selvin, Nkosi and James enjoyed a summer swim.

Though it may not get very hot here on Gough in the South Atlantic, there are still some days when all we want to do is go for a nice, refreshing swim at the beach. Unfortunately for us, there are no beaches here (at least not sandy ones) and the island is, for the most part, surrounded by sheer cliffs or very dangerous rocky coastline often crowded with fur seals. Besides having a mostly inaccessible coastal shoreline, departmental rules also prohibit swimming in the ocean.

Luckily, for the very keen swimmers, there is another option. On a nice sunny day, a group of two or three of us would put on our swimming costumes and take a 500m walk in a south-westerly direction from base. Wandering through a landscape that brings to mind the Jurassic Park movies, the route takes us past a number of Yellow-Nose Albatross nests and curious Skuas which we try hard not to disturb (this is, after all, their habitat which we're invading!) As the path curves over the first ridge, you can't help but stop to enjoy the view of the river, with its waterfalls and our very own Swemgat (literally 'swimming hole')!

A little further along the path, there is a steep descent of maybe 100m through the vegetation and down a couple of ladders into the kloof. In the middle of this sub-Antarctic wilderness we find ourselves look across a beautiful and serene, icy rock pool at the bottom of a high waterfall. Some of the island's largest catchments, with at least two rivers, converge here and the waterfall often thunders down hard into the pool below, particularly after heavy rain.

Swemgat, along with its waterfall, is surrounded by high dark cliffs and the entire pool is usually cast into shadow which undoubtedly contributes to the frigid temperatures. At what feels like 10° C or less, the water temperature is well below that of the standard swimming pool. Whether entering tentatively as some prefer, inching slowly deeper and deeper, or quickly taking the plunge which others find easier, the shock is breathtaking.

Once the gasps and shivers subside and after a few seconds to adjust to the water temperature the magic starts! It seems to me that the icy water and the, perhaps mystical, elements of this ancient volcanic island combines to form a soothing balm, that removes the many stresses and irritations which comes from living on a remote island—with only 9 other people. A nice refreshing dip in Swemgat is sometimes just the thing you need to put your mind and body at ease.

Although you can never stay in for more than 20-30 minutes, it is always reenergizing, rejuvenating and revitalizing! After swimming to and from the waterfall once or twice, perhaps getting a nice massage while you sit on the rock ledge under the falls, it is properly relaxing to float on your back and look at the sky as your worries seem to melt away. It's impossible to keep the smile off your face as you drift to the sound of the rushing water and appreciate the beauty of this oasis in the middle of the South Atlantic expanse.

To launch or not to launch

Deciding whether or not to release a weather balloon

ARTICLE BY TSHILILO KHARIVHA. PHOTOS BY JAMES

Upper air ascents, the launching of weather balloons, are done twice daily for 365 days of the year on Gough Island (at 00Z, midnight, and 12Z, mid-day). A successful launch is mostly dependent on two weather parameters i.e., the current wind speed and direction.

When the conditions are calm, low wind speeds with a favourable wind direction, it is not challenging to prepare the balloon and complete a successful launch. When the wind is very gusty however, this is where meteorological technicians – metkassies – experience the biggest challenge when launching the weather balloon.

The weather balloon is pumped / filled with a certain amount of hydrogen gas, which is not a particularly complex process (it becomes second nature after the first few months). The challenging part is most often when you have to exit the room through a large, heavy door in order to launch the balloon from the platform just outside. From the moment of release, the weather balloon rises steadily to the upper atmosphere. While it ascends aloft, atmospheric data is collected by the radiosonde which is suspended underneath the weather balloon. During gusty wind conditions, the balloon often starts to spin around in the air before you let go. Because the hydrogen-filled balloon is very light, it is very difficult to control the weather balloon when there is strong or gusty wind. It is necessary to be a safe distance from the building before releasing because you don't want it to hit or get stuck on any of the structures after you let go. Under extreme wind conditions, the balloon can be horizontally or even downwards into the nearby vegetation or objects which can lead to an early burst incident. This is one of the most challenging experiences for a metkassie. If this happens, a second radiosonde and balloon need to be prepared and released but only if there is chance it could be successful given the current weather conditions. If a second attempt is likely to fail, a decision can be made to abort and then inform the head office of the reasons.

Once in a while, when the weather conditions are good (calm winds, no rain, etc.) the metkassie on duty can set up the radiosonde and prepare the weather balloon and give other expedition team members the chance to come and launch a weather balloon into the

"exposed to temperatures reaching below -50"

Tshililo attaching the radiosonde after confirming GPS and radio connectivity.

atmosphere themselves. It is a unique and exciting experience for a non-metkassie and there is enough time to pose for snaps before releasing. While the other team members are not permitted to work with the hydrogen gas or radiosonde settings, they still enjoy the experience of handling and letting go of the balloon. It is a very interesting moment to release the weather balloon and stare at it as it ascends, becoming a small speck of white against the blue sky or watch it disappear through the lower-level clouds in the troposphere!

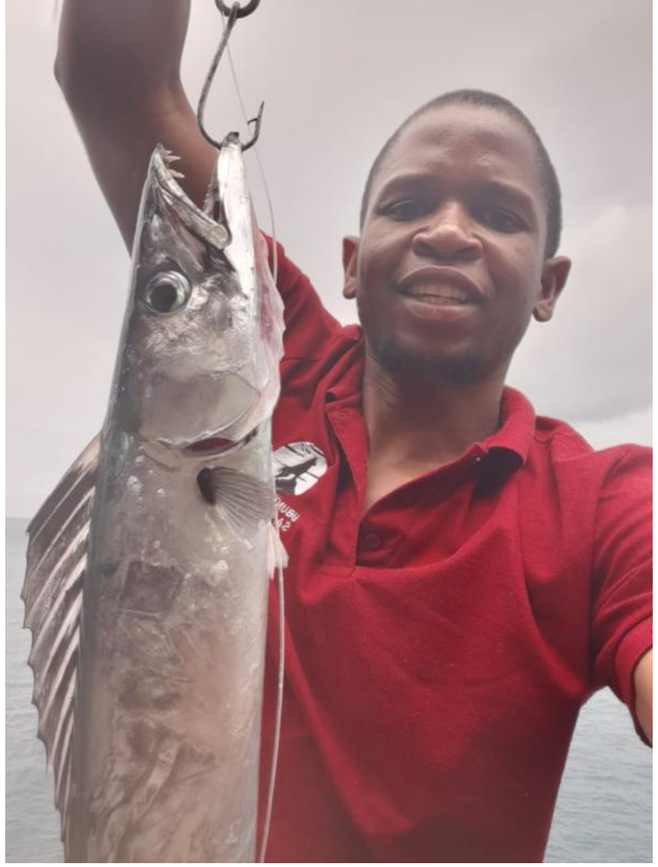
UPPER AIR FACTS

The balloon is approximately 1.5m in diameter and it expands as it rises (with the outside pressure decreasing) and it bursts when it reaches a diameter of between 6 and 8 meters. The radiosonde is suspended 25 to 30 meters below the balloon on a string (this is to minimize the contamination of temperature measurements from the heat shedding off the balloon skin). The weather balloon sounding can ascend for up to 1 hour 30 minutes, to heights of over 27km where the atmospheric pressure is below 20hPa. The horizontal drift can be more than 300km from the launching point if there are strong wind currents. The balloons can be exposed to temperatures reaching below -50 degrees Celsius.

GONE FISHING

"it's not **just** 'fishing' ... I was revived and relearned the importance of patience and dedication"

ARTICLE BY SANDILE NKEBE.
PHOTOS BY SELVIN



Sandile caught a snoek measuring a wopping 1.4m.

Fishing at Gough Island is more than just 'fishing'. Spending hours at a time and going some days without catching a thing will, without a doubt, teach you one of the most important qualities of life: patience, to a point where you truly realize that days are never the same.

In addition just being regular fishing, I could define fishing on Gough as a type of therapeutic exercise and one of the better survival techniques for someone missing home dearly; someone who at times wishes there was a button to fast forward time to a stage of being reunited with his family as soon as tomorrow (if not today).

Our fishing adventures on the island began with just watching members of the previous team as they cast their well-practiced lines. However, this was without understanding the physics or science behind what they were doing; as was evidenced by our lack of success, going months without catching one. We wondered amongst ourselves if, for some reason, the fish had migrated from the island; perhaps their season was over, or could it be possible that they were being chased away by the increased number of seals? We did all we could to find out what the problem was and concluded that the type of lures we were using were simply not shiny enough to attract fish.

We appointed ourselves into some sort of fishing engineers, designing a variety of shiny lures that we hoped would prove more attractive for the fish. After this, we were never in any doubt about the presence of snoek on the island; we haven't run out of snoek so far!

Through fishing, I was revived and relearned the importance of patience and dedication. I knew that anyone who might want to try their hand at fishing should first seek to possess

those two qualities. Not everyone would be able to spend hours, or even a whole day, fishing without catching a thing. For me however, a day lost to fishing on Gough (successful or not) is by no means a loss; fishing seems to fast-forward time, reducing the number of days ahead before getting home. I am not a psychologist or physiologist, but I can tell that after each day spent fishing, I always come back to base in a different mood. There is a feeling of euphoria and an instant adrenaline rush in the moment you realize you have caught something; you can literally feel the dopamine rush from neuron to neuron as it cancels out all the depressing thoughts of being away from home for a short while.

It has become a custom to prepare some snoek for dinner on most Sundays. Although I am certainly not an expert when it comes to pots and cooking, I never need to worry; Peter and Selvin are both very good in the kitchen and even Karabo at times, and I rely on them to prepare our catch of the day. We have eaten our snoek in a variety of ways: grilled / braai'd, baked in the oven or fried in butter. However prepared, it is always delicious, and fortunately we aren't planning to run out of snoek any time soon!

Sandile use custom made lures, casting them from *Diesel Cove* using a strong handline.

THE MACGILLIVRAY'S PRIONS HAVE FLEDGED!

PHOTO BY ROELF

This year the Macgillivary's Prions enjoyed a 82% breeding success rate. Up from 0% !

All Ferns

bog and small

Kim writes about her interest in one of the island's oldest plants.

ARTICLE BY KIM STEVENS. PHOTOS BY KIM AND ROELF

Above left: Bootlace fern
Above right: Dryopteris wallichiana

From the moment I stepped onto Gough I was immediately impressed by the dense vegetation. It felt like I had travelled back in time to a place where dinosaurs roamed and might suddenly appear. Thankfully we haven't encountered any dinosaurs (yet), but that feeling remains, especially when the eerie mist rolls about the landscape.

Much of this prehistoric atmosphere can be attributed to the ferns that dominate the landscape. At first glance it might seem that it is only Bracken and Bog ferns, but in fact there are many species of ferns on Gough. I'm not a botanist and can

by no means claim to identify them all, but a few species have stood out during my time here.

The Bog ferns (Blechnum palmiforme) were the first to draw me in, especially after walking past some that were taller than me. They seem like they have been around for centuries, with one rosette of leaves replacing the last, year after year, and their colours changing from golden to a darker green through the season, before eventually being shed to the leaf litter. Not only are the Bog ferns themselves interesting but if you look closely, they usually have a whole host of other ferns and plants growing on their stems.

A few species have captured my imagination. One of these I dubbed the Christmas tree fern when I first came across it (actually the Seven Week fern Rumohra adiantiforme) because they pop out of the moss in what looks like a miniature forest of Christmas trees . Another, Dryopteris wallichiana, to me looks like a giant shuttlecock, the ball used in the sport badminton. And the Bootlace fern (Vittaria vittaroides) I would have never guessed was a fern at all because it looks exactly as its name describes—like a collection of shoelaces.

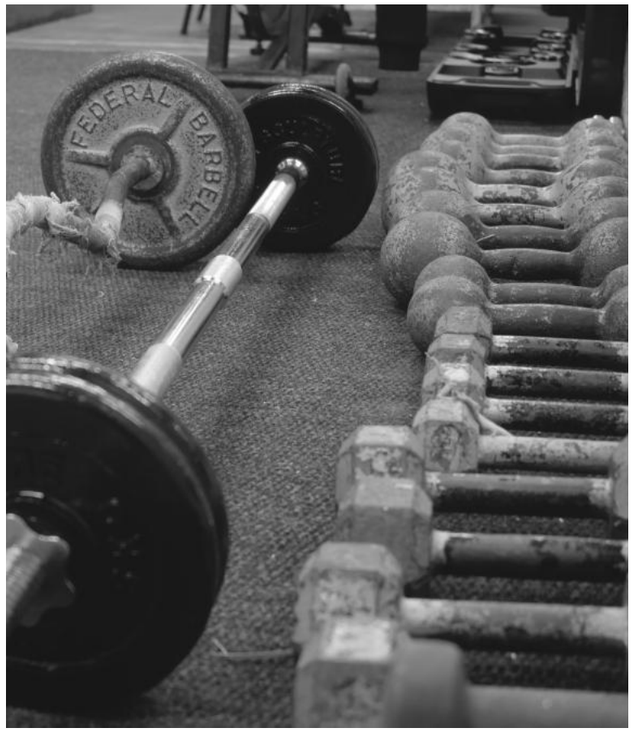
There is one species which I had heard about, but it eluded me until a recent round island trip to the north side of the island. Following a very helpful hint from a previous Gough Islander to look out for this fern at Triple Peak, I had the pleasure of seeing Ophioglossum opacum—a tiny fern which grows to just 6.5cm tall with one rounded leaf and a single stem. It is only found above 600m elevation on certain slopes in spring and early summer. And once I had the good fortune of spotting one, I could not stop scanning the ground for more and felt the need to tread very carefully.

The diversity of ferns on Gough is tremendous—from the towering Bog fern to the tiniest Triple Peak fern. I certainly still have a lot to learn about them, but they are one of my favourite things about Gough and why I am so grateful that our G67 team buff has this much deserving group of plants incorporated into its design.

Far right top: Ophioglossum opacum.
Right top: Seven Week Fern.
Right: Bracken.

KEEPING FIT ON A REMOTE ISLAND

ARTICLE BY NKOSI MADAMA. PHOTOS BY ROELF



You can find some classic equipment, with a real history behind it.

"...improves the way we think and the attitude we bring to each day."

Many people go to the gym for a number of reasons but exercise is the priority of course. The average town in South Africa has at least one or two, with a large number of members who visit routinely. With over a thousand kilometres to the nearest Virgin Active, we are very fortunate to have our very own private gym right here on Gough Island. Although small, our gym is reasonably well equipped with exercise machines, weights, etc., which we can use to strengthen our muscles and achieve our fitness goals if we are disciplined enough.

It is recommended that at least 30 minutes of moderate exercise sessions be done regularly to improve both your physical and mental health. We often have quite a bit of down time here on Gough and spending some of it at the gym can be very productive.

The physical benefits are most obvious. When one exercises, the heart becomes stronger and more efficient at pumping blood through the body, thus also keeping the other vital organs healthy and in order. A strong, healthy heart will, for example help to maintain a stable blood pressure and prevent spikes. Cholesterol

Karabo does not hold back with the weights.

and triglyceride levels are also controlled and thus may keep heart disease at bay. Regular exercise (along with a balanced diet and other stuff) significantly reduces your risk of having a heart attack, stroke and many cardiovascular diseases.

Combining aerobic exercise with other kinds of exercises (like strength training with weights or stretching) keeps your muscles, ligaments, joints and tendons healthy, flexible and strong. As we become older, we will thus be stronger and have less risk of being unbalanced and falling causing fractures or other injuries.

Exercise can also fight against excessive weight gain, or maintain your weight. On Gough where we have enough food but are not always given the chance to use the energy it gives use, exercise becomes all the more important. When you engage in physical activity, you burn calories. The more intense the activity, the more calories you burn.

For some people who don't like to work with the typical gym exercise machines, there are still other ways to enjoy exercising. Our gym has a stationary bicycle, rowing machine, treadmill, and space to do martial arts exercises like body combat, boxing, etc.

Just as important as exercise is for your physical health is the benefits for your mental wellbeing too. I have noticed that one sleeps better also when the body gets good exercise. When you sleep well, you wake up with more energy to face the day and go about your work better and in high spirits. Your overall mood improves and you are not as grouchy to the people around you. This is very important here on Gough Island because we are a small team and we need to work together at all times.

Very often when we need an emotional lift or to relax after a stressful day (for example, after working on a generator that doesn't run properly), a gym session can help.

Physical activity stimulates various brain chemicals that may leave you feeling happier, more relaxed and less anxious. You may also feel better about your appearance and yourself when you exercise regularly, which can boost your confidence and improve your self-esteem. Exercise delivers oxygen and nutrients to your tissues and helps your cardiovascular system work more efficiently. And when your heart and lung health improve, you have more energy to tackle daily chores.

One of my favourite exercise machines here on Gough is the treadmill. Using a treadmill only, you can reduce the risk of heart disease, diabetes, and joint related health problems. You can increase your muscle strength and stamina, plus you can increase the strength of your bones too. Treadmills are quite safe, private, convenient, and really easy to use as well.

While you may think that running is only good for your cardio and stamina, this is definitely not the case; it does so much more. Of course, when running, you do use your leg muscles and thus build and strengthen them. Depending on how you run though, say with your abdominal muscles flexed, you can help increase your core strength too. Running can even build up your arm muscles simply due to the fact that you swing them while you run.

Running on a treadmill truly does have endless benefits even for the mind. It helps you think better, be healthier, and feel much happier. Running and aerobic exercises like cycling causes the release of more endorphins which are a chemical compound found in your brain that makes you feel happy. The use of a treadmill here at Gough Island can consequently help relieve symptoms of depression and anxiety.

There is a phenomenon called the runner's high, which occurs when you have run a long distance and temporarily feel a joyful sensation of delight and happiness. Some people claim that running acts as a happy pill, but it's the endorphins naturally emitted due to your exercise. In addition, a naturally occurring brain chemical called endocannabinoids can also be produced during exercise.

Running regularly may be one of the best things you can do for your cardiovascular health, or your heart health, in other words. It improves the circulation of oxygen through your body which also improves the way we think and the attitude we bring to each day. I am very grateful for the gym here on Gough and particularly the treadmill for helping to keep my mind and body in good shape.

"It helps you think better, be healthier, and feel much happier."

PHOTO BY ROELF

Kim doing a Tristan Albatross incubation count over *Albatross Plain.*

PHOTO BY ROELF

Vonica crossing over *Expedition Peak*—on her way back from camping at *West Point*—with *Edinburgh Peak* at 911m, the island's highest peak, in the background.

All puzzles have a varying degree of difficulty—changing in size, shape and visual composition.

Puzzling

What to do on a rainy Gough afternoon

So, you think building a puzzle is quite simple, or even a children's activity...think again.

ARTICLE BY JAMES BURNS. PHOTOS BY JAMES

It is true that Gough is a spectacular island with the most incredible landscapes and wildlife. You can easily lose track of time; spending hours watching birds gliding to and fro through a pair of binoculars or just listening to the wash of tides competing with the cries of seals echoing along the rugged coastline. Spending time outside is undoubtedly a great way to spend your leisure time on a warm, sunny Gough day!

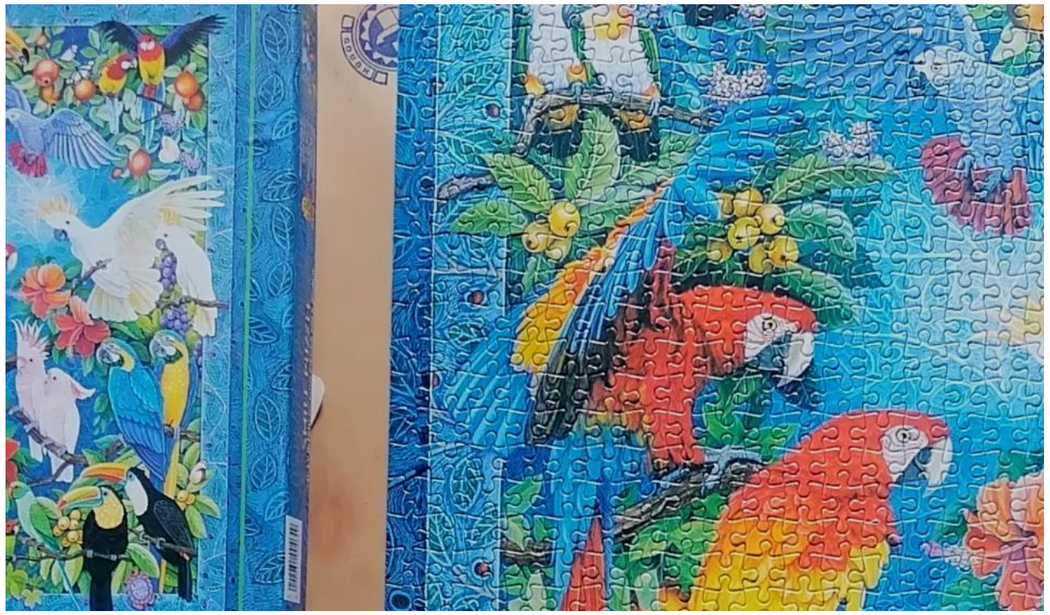
As I am sure you are aware, however, the weather on Gough is (more often than not) quite the opposite of warm and sunny. Being forced, or strongly encouraged by icy temperatures, biting winds and persistent rainfall, to spend a lot of time indoors is something that members of the overwintering team on Gough have to deal with on a regular basis. Each of us has a number of activities that we prefer to occupy ourselves with, of course, and many of these activities are solitary by nature (free time does not always overlap between the various duties that need to be performed around base).

I could spend a long time listing and describing many of the things that the members of G67 do for fun on a daily basis (and I may still in the future) but for now we'll look at one particular answer to the question: what do you do for fun on a remote island like Gough?

Puzzling! The building of jigsaw puzzles has long been one of my personal hobbies, even back home, and I have loved them since I was a child. There is something immensely satisfying about piecing together something broken to make a complete picture. Building puzzles is not a complex task and there are no rules to explain, no scoring or points to award and no winners or losers. There are, however, a few general guidelines and etiquette that people should take note of to ensure that everything goes smoothly, especially when there are multiple builders.

Disclaimer: for the experienced puzzler, the following article will not be at all helpful or interesting. As I have learned from being in this culturally diverse team however, there are some who have never built or even heard of jigsaw puzzles before.

The first, and arguably the most crucial, step is choosing your puzzle. It is a good idea to take some time to consider your options; a wrong decision here can lead to hours of frustration. The picture and colours are obviously the first thing you see when browsing potential puzzles. It is important to select a picture that you find pleasant or interesting (you will be looking at it alot!) and depending on how challenging you'd like it to be, you may want to choose one with a wide range of bright and contrasting colours or a picture with many different shades of the same colour. The next thing to consider is the number of pieces; the most common being the 500, 1000 and 1500 piece puzzles. An important

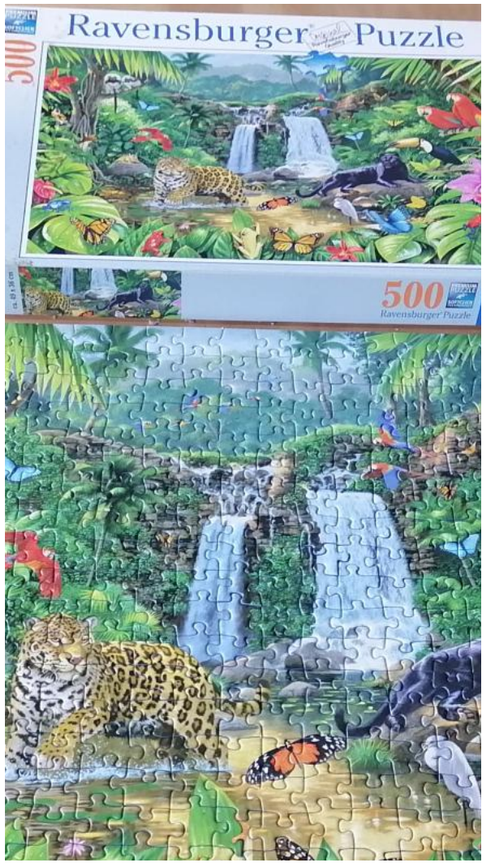


observation here is that fewer pieces does not necessarily equate to easier puzzles. It is the size and shape of the pieces that largely determines how difficult a puzzle will be. On Gough, we have a few shelves stacked with a variety of puzzles of different shapes, sizes, colours, etc, that have been brought and left here by the very generous members of previous expeditions to the island. The quality of the puzzles (strength and thickness of the pieces) can also influence one's decision but to a lesser extent, particularly when you have already completed all the best ones.

Now that you have made your choice, the real fun begins! Once again, there are no rules; this is just the way some people tend to proceed. Tipping out all the pieces and start sorting! My first priority is the border; finding the edge pieces is usually quite easy and once you compete the frame, you'll know how big the puzzle will be. The most efficient way to sort is by colour; separating like colours into shallow containers where you can find them easily. Apart from colour, there are patterns in the picture—objects in the image which span multiple pieces—and also the shape of the pieces themselves. Some puzzles only have the standard shaped pieces but others have more interesting and unusual pieces.

Once the sorting is (mostly) done, you can begin to build; using the picture on the box as a reference, it's possible to 'fill in the blanks' so to speak. Either by choosing objects in the image (e.g. a car, person, animal, tree, etc.) to focus on or by building from the frame inwards, the puzzle will now start to form. Each piece is unique and there is only one solution. It is therefore not possible to force or squeeze the wrong pieces together, however tempted or frustrated you may get. Building puzzles requires patience and perseverance, one needs to be in the right frame of mind and ideally not distracted. It has been described by many as therapeutic and calming. In G67, I have been joined on occasion by most of the team who have either stopped by briefly or spent a few hours working on a puzzle with me.

It often takes many days,



or even weeks, to complete a puzzle; depending on its difficulty and the enthusiasm of the builders. As such, it is important to have an appropriate, flat surface to build on. Large tables are, naturally, the best places to work but Gough base has a limited number of surface space, not to mention undisturbed surface space where the puzzle can stay until it is completed. As a solution to this problem, we have created a wooden puzzle board (a large flat, sanded and treated surface) which can be moved easily with the semi-completed puzzle safely on top.

As I have mentioned, puzzling can be a social activity, with many people working together on different parts of the puzzle. There is a certain unspoken etiquette that exists when two or more people are working together on a puzzle. The first is obviously the understanding that you are there to focus on the puzzle; minimising distractions is key and the volume of conversation and/or music is therefore usually kept low. It is good to respect each other's building process too; assist by passing them pieces they may be looking for and work on separate sections of the puzzle. When a puzzle is nearing completion, with only a handful of pieces left, non-builders passing by are much more inclined to stop and help. Maturity comes into play with the exciting rush as the last pieces are fitted and hiding a piece until the end is frowned upon.

One of the most difficult parts of puzzling (for me) is having to break up the completed picture afterwards. I always dream of framing the more interesting puzzles I work on, but this is just impractical. Instead, as another bit of good etiquette, we place all the pieces of the finished puzzle into a zip-lock plastic bag and leave a note to future builders; warning of the level of difficulty, the enjoyment of the build and a confirmation of whether or not there are any missing pieces.

"...requires patience and perseverance, one needs to be in the right frame of mind..."

Radio Communications on Gough Island

An important primer on radio technology and theory.

ARTICLE BY PETER CHUKU. PHOTOS AND ILLUSTRATIONS BY PETER AND WIKIPEDIA

Radio is the technology for communicating and signaling using radio waves. Furthermore, 'radio' often refers to sound or voice communication by radio waves, such as the transmission of news, information, and other forms of messages using a single broadcast station to an unlimited number of listeners who have radio receivers. Radio waves are electromagnetic waves that have a frequency range of 30 Hz to 300 GHz. These waves are generated by a device known as a transmitter.

The transmitter is connected to an antenna that emits the waves, and it is then received by another antenna connected to a device called the receiver or in this case, a radio receiver.

As these waves travel farther from the transmitting antenna, they spread out thereby decreasing the signal strength. Therefore, the range of radio transmissions is affected by the following factors: the strength of the transmitter, the radiation power of the antenna in use, the noise level, the receiver's sensitivity, and the presence of obstacles or hindrances between the transmitter and receiver.

In radio transmissions, two major types of antennae are used: omnidirectional antennas and directional or high-gain antennae. Omnidirectional antennae transmit or receive radio waves in all directions whereas directional antennae transmit and receive radio waves or beams only in one direction. When radio waves travel through a vacuum, they do so at the speed of light; while they travel in the air at a speed close to that of the speed of light. The wavelength of a radio wave (which is the distance between adjacent crests of the wave and is measured in meters) is inversely proportional to its frequency.

Different radio systems utilize different methods of modulation:

1. Amplitude modulation (AM) – the amplitude (strength) of the carrier wave of the radio is varied by the modulated signal in an AM transmitter.

2. Frequency Modulation (FM) – the frequency of the carrier wave of the radio is varied by the modulated signal in an FM transmitter.

There exist other methods of modulation like frequency-shift keying (FSK) and orthogonal frequency-division multiplexing (OFDM), etc. However, due to the central focus of this publication (Gough Island), it wouldn't be important to learn more about the FSK and OFDM.

Broadcasting is the one-way communication of information from a transmitter to receivers that belong to a public audience. Depending on the signal type transmitted and the expected target audience, broadcasting utilizes some parts of the radio spectrum to accomplish this transmission. Longwave and mediumwave signals can give good quality coverage to distant locations several hundred kilometers away. These signals however have a more limited information-carrying capacity which is why they are best used in audio signals like music and speech. Moreover, the sound quality can be reduced by radio noise coming from natural and or artificial sources. Shortwave bands have a better range of communication but are usually affected by interference coming from distant stations. Varying atmospheric conditions might also affect the quality of the signals. The very high frequency (VHF) band has more than 30 MHz and these frequencies provide the large bandwidth necessary for television broadcasting. It should also be noted that the Earth's atmosphere does not have so much effect on the range of signals; hence, line-of-sight (LOS) propagation is usually the principal mode. Seeing that artificial and natural noise sources do not exist in the VHF range, it is possible to have a high-quality audio transmission using frequency modulation (FM). Broadcasting has two major parts, namely: audio and video. However, this article is only focused on audio broadcasting. Radio broadcasting is the transmission of audio (sound) to radio receivers in the public domain. Analog audio is the earliest form of radio broadcasting. There are five types of radio broadcasting namely, AM, FM, Digital audio broadcasting (DAB), Digital Radio Mondiale

(DRM), and satellite radio. However, for our publication, we would only be discussing AM, FM, and DAB types of radio broadcasting.

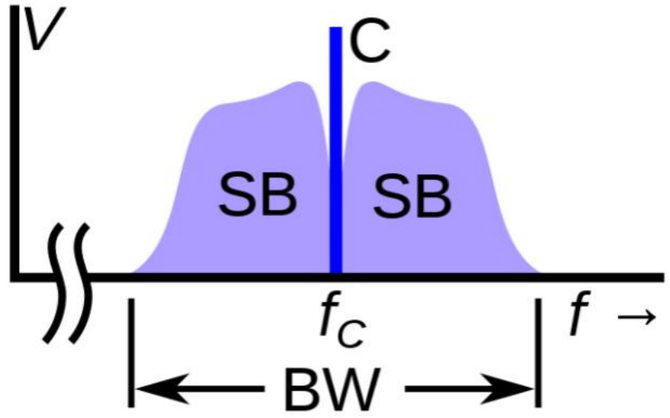
1. AM – The amplitude or strength of the radio carrier wave is varied by the audio signal in AM broadcasting. AM broadcasting is the oldest broadcasting technology which started around 1920 and it is permitted in the AM broadcast bands. These bands are between 148 kHz and 283 kHz in the low frequency (LF) band and between 526 kHz and 1706 kHz in the medium frequency (MF) band. AM radio stations are received beyond the horizon at a distance span of hundreds of kilometers because the waves in the LF/ MF bands travel as ground waves. AM transmission is less reliable than FM transmission.

2. FM – The frequency of the radio carrier signal is slightly varied by the audio signal in FM broadcasting. FM broadcasting is allowed within the FM broadcast bands between 65 MHz and 108 MHz of the VHF range. Radio waves in the VHF range travel through LOS hence, FM broadcast is limited by the visual horizon to about 48 – 64 kilometers and can be obstructed by mountains, hills, and high buildings. However, the FM is less susceptible to interference from radio noise and is more reliable than the AM broadcast. It also has a better frequency response and less audio distortion than AM.

DAB was first used in 1998. The DAB transmits audio as a digital signal rather than an audio signal as seen with AM and FM. It can provide higher sound quality than FM (even though many radio stations do not choose to transmit at such high quality), is more immune to radio noise and interference, better utilizes the almost depleted radio spectrum bandwidth, and provides advanced features for its users like electronic program guides. DAB is not compatible with other radios however and a new DAB receiver is required whenever it is used. Most countries plan to eventually switch over from FM to DAB. A single DAB station transmits a 1500 kHz bandwidth signal that can carry between 9 and 12 channels of digital and audio modulated by OFDM; providing its listeners a wide variety of options.

Bandwidth. A modulated radio wave that carries information usually occupies a range of frequencies. The diagram below clearly illustrates bandwidth. The information (usually referred to as modulation) in a radio signal is often concentrated in narrow frequency bands known as sidebands (SB) and the SB are located above and below the carrier frequency . The width (in hertz) of the frequency range that the radio signal occupies that comprises the difference between the highest frequency and the lowest frequency is called its bandwidth (BW).

In a specific signal-to-noise ratio (SNR), an amount of BW can carry the same amount of information (data rate in bits per second) not minding the location of the radio frequency spectrum. Hence, BW is a measure of the information-carrying capacity. The required bandwidth for a radio transmission depends on the data rate of the information (modulation signal) being sent, the spectral efficiency of the modulation technique utilized, and the quantity of data it can transmit within each kilometer of bandwidth. Data rates vary for the different types of information signals carried by radios. For instance, a television (video) signal has a greater data rate than an audio signal.



Bandwidth figure showing the carrier frequency

One of the VHF antennas mounted just outside the radio room

In recent times, the radio spectrum which is the total range of allowable radio frequencies for communication in a given area is limited. Every radio transmission uses a portion of the entire bandwidth available, hence, the radio bandwidth is now regarded as an economic good that has financial costs, and its demand is greatly increasing. There are ongoing research and studies aimed at creating technologies that can help minimize the bandwidth utilized by radio services. There has recently been a transition from analog to digital radio technologies. One of the reasons for this transition is that digital modulation can transmit more information within a given bandwidth than AM, through the use of data compression algorithms. These algorithms help to reduce redundancy in the data desired to be sent, and they have a more efficient modulation. Another reason for this transition is because digital modulation has a higher degree of noise immunity than the AM, digital signal processing (DSP) chips have more flexibility and power than analog circuits, and various types of information can be transmitted using digital modulation.

Band name	Abbreviation	frequency	wavelength
high frequency	HF	3 - 30 MHz	100-10 m
very high frequency	VHF	30 – 300 MHz	10-1 m
ultra-high frequency	UHF	300 – 3000 MHz	100-10 cm
super high frequency	SHF	3 – 30 GHz	10-1 cm
extremely high frequency	EHF	30 300 GHz	10-1 mm
tremendously high frequency	THF	300 – 3000 GHz	1-0.1 mm

Table 1. Radio Frequency

ITU Frequency Bands. ITU stands for international telecommunication union and they allocate frequency bands in the radio spectrum for various uses. Regulatory bodies like the ITU are created to prevent interference between different users within the radio frequency spectrum. On Gough Island, we utilize frequency bands ranging from the High frequency (HF) to the Ultra high frequency (UHF). The table below (Table 1) highlights the details of all the high frequencies and their respective wavelengths.

Details of the table show that the higher the frequency, the lesser the wavelength. Hence, HF radios transmit further than UHF radios. On Gough, our HF radios are used for very far communications that are usually hundreds of miles apart. A picture of our HF radio transmitter and antenna is displayed.

Two-way Voice Communication. A two-way radio is comprised of an audio transceiver, a receiver, and a transmitter all coupled into the same device. It is used for bidirectional person-to-person voice communication with other users having similar radios. This mode of communication was formerly known as radiotelephony. The radio link might sometimes be half-duplex, like in the case of a walkie-talkie where only one radio can transmit at a time. Therefore, different users using the same channel, take turns to speak, having to press / hold a “push to talk” button on their radio which turns off the receiver and enables the transmitter. The radio link can also be full-duplex, having a bidirectional link that uses two radio channels which enables two users to speak at the same time. It is similar to using a cell phone.

On Gough Island, we make use of half-duplex radios for all our radio (HF and VHF) communications. A typical radio device used in Gough communication is displayed in the picture below. These radios are usually set to specific radio frequencies and allocated channels for easier communication. Specific channels are assigned for different purposes like for the field team, technical team, marine channels, etc. The reason for this is to avoid unwanted interference and jamming.

Our radio signal quality is usually affected by certain factors like the distance between users and poor line-of-sight. When the distance between the radio users increases, the signal quality is reduced. However, the loss of signal quality due to distance between users is observed when they are hundreds of kilometers apart. The most prominent challenge experienced in Gough’s radio communication is the LOS. Seeing that the island is quite mountainous, the radio signals from one user is often obstructed by mountains or hills when transmitting to another user. Repeaters can be used to solve this challenge.

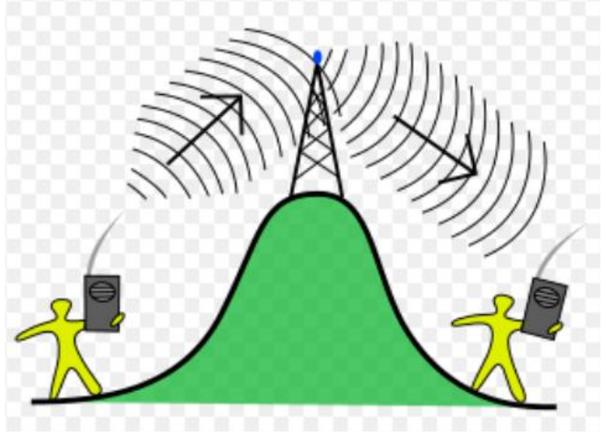
Above left: HF Transmitter. *Above right:* VHF Handset.

"radio signal quality is usually affected by certain factors like the distance between users and poor line-of-sight"

A repeater is an electronic device used as a communication channel that helps to increase the power of a signal and retransmits it so that the signal can travel further. Receivers also help signals to be received on the other side of an obstruction or obstacle. The picture below illustrates how a repeater can be used to overcome obstacles in radio communication.

Radio transmitters are also used to transmit at further distances and mostly overcome obstacles because they are usually connected to an outdoor antenna installed at the top of buildings. These transmitters enhance our radio communication on the island. Pictures of our radio transmitter and antenna are shown below.

Below left: HF Antennna. *Below right:* Repeater Illustration.



✗ EXTRA

THE VINSON OF ANTACTICA

The Vinson of Antarctica is a polar expedition vessel designed and built to sail in high latitudes. She came past Gough on her way to Cape Town.

Length: **77ft**
Capacity: **10 passengers and 4 crew**
Designer: **Tony Castro (in collaboration with Skip Novak)**
Builder: **KM Yachtbuilders, Netherlands**
Cost: **€3.8M in 2021**

THE CATTLE EGRET

The Cattle Egret is a reasonably common vagrant from South America and sometimes Africa. Tristan can receive flocks of up to ten, that stay for the winter and survive on the lowland pastures.

UNEXPECTED VISITORS

PHOTOS BY ROELF

THE SILVER EXPLORER

Silver Explorer is an expedition ship operated by Silversea Cruises. The ship typically hosts cruises to Norway, the South Pacific, and Antarctica. She came past Gough on her way to Cape Town.

Length: **354ft**
Capacity: **144 passengers and 118 crew**
Builder: **Rauma-Repolo, Finland**
Age & Cost: **$50M in 1989**

PHOTO BY ROELF

Karabo, a.k.a. DJ Vonk shaving his first customer.

THE GOUGH BARBER

SURPRISINGLY THE INFAMOUS GOUGH BARBER WASN'T ALWAYS A BARBER, HE WAS ONCE THE GREATEST PARTY DJ THE ISLAND HAS EVER KNOWN, AFTER HIS EQUIPMENT SUFFERED CATASTROPHIC MALFUNCTION LAST YEAR, IT ONLY MADE LOGICAL SENSE TO CONSIDER A CAREER CHANGE. LITTLE DID HE KNOW HE HAD BEEN MISSING HIS TRUE CALLING ALL ALONG.

PETER CHUKU TURNS THE RIPE OLD AGE OF ZORRO

HORSE BY VONICA. PHOTOS BY KARABO

ISLAND WEATHER

DATA FROM THE SOUTH AFRICAN WEATHER SERVICE
COLLECTED BY OUR METEOROLOGISTS

JANUARY

Temperature	MIN	8.6°C
	MAX	25.3°C
	AVG	15.6°C
Humidity	MIN	27%
	MAX	96%
	AVG	75%
Wind	MAX	116km/h (NW on 16th)
Rain	MAX	51.6mm (on 16th)
	TOTAL	185.6mm
Sun	TOTAL	208.7h

FEBRUARY

Temperature	MIN	9.3°C
	MAX	22.9°C
	AVG	15.0°C
Humidity	MIN	18%
	MAX	96%
	AVG	78%
Wind	MAX	125km/h (NNW on 7th)
Rain	MAX	67mm (on 24th)
	TOTAL	164.6mm
Sun	TOTAL	127.4h

MARCH

Temperature	MIN	7.9°C
	MAX	22.6°C
	AVG	14.9°C
Humidity	MIN	49%
	MAX	96%
	AVG	79%
Wind	MAX	120km/h (NNW on 13th)
Rain	MAX	29.8mm (on 13th)
	TOTAL	224.2mm
Sun	TOTAL	122.5h

PHOTO BY ROELF

False Peak Panorama

Shot with Olympus E-M1MarkII @ 12mm; f8; 1/160s

5 photos stitched with Hugin.

the Bunting

ISSUE 2 | APRIL 2022

THE FINE PRINT

THIS DOCUMENT AND IT'S CONTENT

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DFFE = The South African Department of Forestry, Fisheries and the Environment
RSPB = Royal Society for the Protection of Birds

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