

REPORT of the
SOUTH WEST CATCHMENTS COUNCIL
COMMUNITY ENGAGEMENT
for the
CLIMATE CHANGE PROJECT

Community consultation conducted
March - June 2014



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AUTHOR'S NOTE

The information presented in the following sections is my interpretation of what was presented across all workshops. Others may add different points as we may see things differently.

Participants wrote their own 'sticky notes' with components of the system, and there were a number of scribes for other parts of the workshops. In some cases the handwriting was difficult to interpret, so the best has been done to reflect what was written.

The names and details of participants and the associated evaluation information were undertaken by someone other than the author.

The intention of this report is to capture and express the range of ideas collected and to develop some suggestions for their use. Please read the report as a conversation of ideas, rather than technically precise collection of data. The information will be analysed over the coming months by SWCC staff.

Thank you

I feel very privileged to have been engaged in this project: to be able to hear how a range of dedicated and interested people see and interact with their environment. I thank all of those who took part for their time and willingness to discuss this important area of our lives. As I believe how we individually interact with our environment will impact on the lives of others whether we realise it or not.

Wendy Dymond

1 SOUTH WEST CATCHMENT COUNCIL CHANGING CLIMATE WORKSHOPS

1.1 INTRODUCTION

This report captures the information collected through a series of fourteen focused group workshops across the South West Catchments Council (SWCC) natural resource management (NRM) region conducted from March to June 2014. The workshops explored how community members and NRM professionals define their catchment; what changes they have noticed; and how they believe a changing climate will affect their lifestyle, livelihood and landscape.

The workshops had three main aims:

- To update the Regional Strategy to include the impacts of, and possible strategies to work with, climate change;
- To introduce the community, Regional Partners (Catchment Councils) and agencies to the Resilient Systems approach; and
- To listen to what the community outlined as being important to them.

1.2 REPORT OUTLINE

The report is structured in the following way:

- An outline of the process used
- Key findings or points of interest (general and specific)
- The benefits and challenges of integrating the Systems approach into NRM planning and activities
- Suggested opportunities identified from the information and discussions throughout the workshops.
- Specific: Information gathered from each workshop
 - A summary of the group membership
 - How that particular group described (or not) the system boundary
 - Highlights of discussions – key points
 - The participants responses to the questions asked
 - A diagram of the system drawn
 - The list of participants who attended
- Workshop evaluation
- Appendices containing supporting information.

1.3 BACKGROUND

The South West Catchments Council is one of the 57 regional NRM groups across Australia through which the Federal Government channels most of the funding for environmental activities. There are seven catchment councils in the SWCC region and the workshops were spread across these to ensure each council and their associated community had the opportunity to share their information and views.

The workshops were conducted from March to June 2014 as part of the Climate Change Project Update mandated by the Federal Government to include the implications of climate change into regional strategies. SWCC went further than this as they wanted to change the way they interact with their stakeholders and the broader community so began the 'systems approach'. (See Appendix 1)

The Resilient Systems approach is based on resilience thinking. Resilience thinking is a *multidisciplinary or integrated way of looking at natural resource systems and the way people use and manage these. 'Resilience thinking focuses on understanding the limits of change in natural resource systems, the consequences of crossing those limits and our capacity to manage within them. In other words, resilience thinking identifies a 'safe operating space' within which to manage natural resources'*. (Paul Ryan - See Appendix 1 for more information.)

1.4 PROCESS

While the process varied to meet the needs of the individual group; the following outline provides the structure for each group workshop.

1.4.1 Introduction

Mike, Nerilee or Leonie set the scene by outlining why the process is taking place, how people can have further input and what SWCC was hoping to achieve by using the systems approach.

1.4.2 The Systems approach

A video about the effects of the reintroduction of wolves into the Yellowstone National Park was played to demonstrate how components of an ecosystem can interact and impact on each other. It was noted that it is a simplification of a complex system and the science was not fully understood. This particular video about wolves in the Yellowstone National Park was chosen because it was not local – so while providing background information, it limited the chance of skewing on participants responses. The video worked well to set the scene and gave an understanding of the interactions across a system and between components in the landscape. It was interesting to see the reactions when a 'bad' component, the wolves, was required to maintain a balance for the system to function in a beneficial way. In almost every workshop it was referred to during the sessions (comments – like the change the wolves made).

1.4.3 Determining expectations of individuals

Participants were asked why they gave up an afternoon/evening to be involved. This helped facilitators gain an understanding of the expectations of the members and gave an insight into how best to engage or context the session. It was particularly useful in determining if people generally needed or wanted more specific climate change information.

1.4.4 Focused group workshop

While the approach outlined below formed the basis for the focused workshops, it was adapted to suit individual group needs.

1.4.5 Components of your system

Group participants were asked to identify the components of their system (yellow in the system diagrams). Most had not really thought about their system in a structured way, but gave it a go. When writing the components on to a yellow sticky note participants were asked to add an adjective to the component (e.g. water = pooling water for recreation, or birds; potable water for drinking etc.). It was interesting to see what people included as components of their system, and just as importantly what they left out. People worked on this task by themselves: to allow those who thought more slowly time to develop ideas; to encourage a wider range of suggestions; and to allow reflection time after the introduction and video as to how they perceived their own system.



Members of the Blackwood Basin Group identifying and writing system components

1.4.6 Combining individual components to develop a group diagram of their system

The participants then moved to combine the components on a large sheet of paper, where they were asked to group the components into similar areas or themes (green in the system diagrams) and if possible draw the linkages between the components and areas. Almost all groups put the components into themes, but only a few groups were able to articulate the linkages between the areas, although some of these linkages came out in the discussions later in the session. This is not surprising, as it takes time to think through the linkages and impacts across the system and many of the groups had not previously worked together, so they were also developing group dynamics throughout the process.

1.4.7 Impacts on the system (Positive, negative and points of change)

Group members were given pink stick-it notes and asked to identify negative impacts or risk/threats to the system they had developed (pink in the system diagrams). Some asked about tipping points. Then using blue stick-its notes they were asked to identify opportunities or positive outcomes. This process gave those group members, who are visual in nature a way to express their information, the quieter ones also, but mostly it created a feeling of being a member of a group as the system grew and people contributed their parts. As usual people started out with 'their' ideas but in almost every group, the information became commonly owned. Many groups had strong ownership and were proud of their diagram.



Cape to Cape participants identifying and discussing what impacts their system

1.4.8 Semi-structured interviews

From here the group was usually split into two to discuss the following questions:

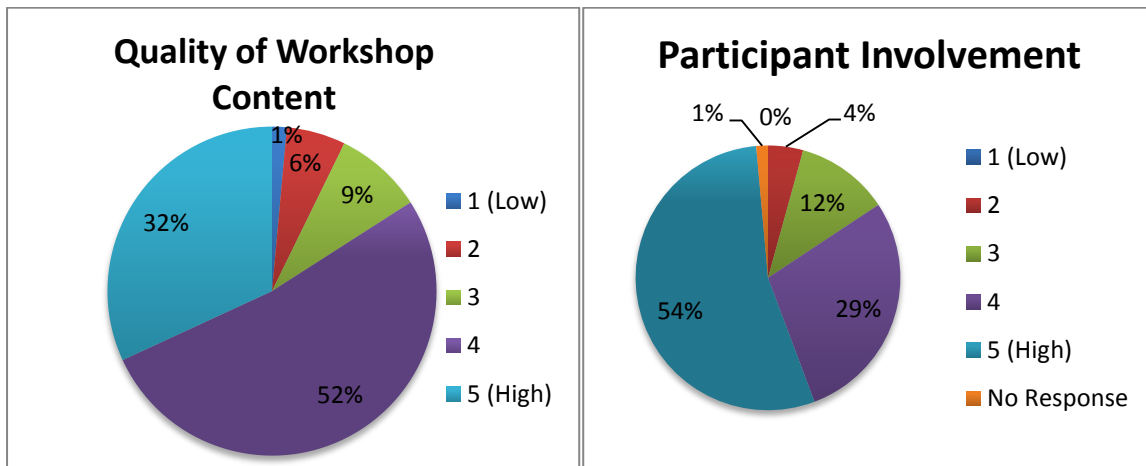
- What have you noticed is changing over the last 20 years or so (longer or shorter depending on the length of time people could relate to)?
- If the climate continues to change, how do you expect it will impact on your area?
- What opportunities are there for you, your community, SWCC and others to make a difference?
- Can you identify the key features/components which are important to where you live? Why do you choose to live here?
- What changes would make you consider moving away from the area?

The questions were intentionally broad to allow the groups to explore what they identify with. Not all groups explored all areas.

The reasons for dividing groups varied: in one situation there were clashing personalities; another, the agency personnel had to leave earlier; but in most cases it was so we could gather more information and ideas when the groups were smaller.

1.4.9 Workshop feedback

The workshop used very interactive techniques which drew out information from the participants. The information gained forms a valuable benchmark for SWCC and the semi-structured interviews allowed participants to explore a range of areas of importance to them. The success of this approach and how valuable the participants found it can be seen in the pie chart below – Quality of Workshop Content (see Appendix XIII for more details). While not all participants appreciated this approach, (any one workshop style will not appeal to everyone) the vast majority considered the workshop valuable.



There were a considerable number of participants who commented they enjoyed the opportunity to discuss the complex issue of climate change and how that interacts with their environment. Some even said they appreciated the opportunity to be 'heard'. This high level of involvement can be seen in the Participation Involvement chart above (taken from workshop evaluation information found in Appendix XIII).

Many people came expecting to be 'lectured at' with information about climate change and were pleasantly surprised to be able to participate and have 'their' There were a few requests for information about the Systems Approach especially from the Upper Blackwood, Cape to Cape and Peel Harvey Catchment Councils.

The complete findings from the workshop evaluation sheets can be found in Appendix XIII.

1.5 KEY POINTS RAISED

1.5.1 *Climate change*

With a few exceptions, participants accepted that the climate was/is changing. Many considered it had changed in the late 1960's to mid-1970 and most had adapted.

Changes noticed to date include:

- Drier start to the season (Upper Blackwood, Cape to Cape, PHCC)
- Less rainfall and rivers not running as they used to (Upper Blackwood, BBG, Leschenault, Geocatch, Cape to Cape, Warren)
- Irregular rainfall (Lower Blackwood, Upper Blackwood, Geocatch, Cape to Cape, Warren, PHCC)
- Increase in sea water temperature, leading to more sharks, less seals and more whales (Geocatch)
- Higher temperatures (Upper Blackwood, Cape to Cape, Leschenault, PHCC) Lower Blackwood said the temperature in the immediate region was lower not higher but this same region said 2013 was the hottest on record. Leschenault said the temperatures were one degree hotter during the day and a degree cooler at night.
- Boggy areas are not anymore in winter (BBG, Leschenault)
- Water tanks are running out with less rainfall, dams are drying out (BBG, Lower Blackwood)
- People moving south from Perth (Lower Blackwood, Leschenault)
- Quality and quantity of water availability (Lower Blackwood, Leschenault, Geocatch, PHCC)
- Water level in the region has dropped impacting on vegetation (Lower Blackwood, Leschenault, Geocatch, PHCC)
- Coastal erosion (Lower Blackwood, Geocatch, Leschenault)
- Cows now don't get winter coats (Lower Blackwood)

Expected changes with further climate change will be:

- Extreme weather events – changing people's decisions, risk and insurance (Upper Blackwood, Geocatch, Cape to Cape, PHCC)
- Increasing summer rainfall leading to more summer cropping opportunities (Upper Blackwood)
- Sea level rise leading to flooding and coastal erosion (Lower Blackwood, Geocatch, Leschenault, PHCC)
- Reduced productivity & desertification - Wheatbelt will be a dust bowl (Lower Blackwood, Upper Blackwood)
- Farming diversification (Upper Blackwood)
- More indoor activities because it is hotter (Upper Blackwood)
- Decline in habitat and bush unable to regenerate due to outdoor recreation leading to reduced wildlife (Lower Blackwood, Geocatch, Cape to Cape)
- Increased water sports (Lower Blackwood, Upper Blackwood)
- Increased impacts on wetlands (Lower Blackwood, Geocatch, Cape to Cape)

- Increased beach & dune erosion (Lower Blackwood, Lower Blackwood, Leschenault, PHCC)
- Weddings – angry brides due to poor and unpredictable weather (Upper Blackwood)
- Need to travel further for a nature experience (Upper Blackwood, Upper Blackwood)
- Depletion of fishing stocks (Lower Blackwood, PHCC)
- Increasing pests, diseases, weeds (Lower Blackwood, Geocatch, Lower Blackwood, Leschenault, Cape to Cape, PHCC)
- Increased water use (Geocatch, Lower Blackwood)

Warren Catchment participants were accepting or almost positive about climate change. One farmer noted there was a dramatic change (drop) in rainfall in the late 1960's to mid-1970's and was interested in the 'fuss' about climate change when he said they had been adapting to and dealing with climate change/variability for over 40 years. (Point supported by the Leschenault Catchment). Another participant outlined the changes already undertaken on their property, including more perennial pastures and different crop management. The perennials will make good use of summer rainfall and the changed cropping will better suit drier winters. In Geocatch rainfall has decreased by 5% overall but there is a 50% decrease in winter and more summer rainfall. The lower winter rainfall has made farming more productive because there is less flooding and waterlogging (Cape to Cape).

Climate change cynicism based on the fact that everything changes so people don't care and ask does it really matter? (BBG) Don't go into a frenzy over climate change; look at it in a workable manner (Lower Blackwood). Climate change is a distraction from the fundamentals of caring for the environment (PHCC). Stop saying "I can't make a difference" (BBG)

Man made changes are much greater than climate change (Leschenault).

1.5.2 Agriculture

Many participants identified the SWCC region as being the food bowl of Western Australia and that agriculture contributed to the 'feeling' and aesthetics of the landscape. Comments such as '*The South West is the land of milk and honey – organics, apples, biodiversity, forest and wildflowers*' (Warren) and, '*Without the country there is no city*' (Leschenault), show agriculture is valued. Agriculture was seen to be the underpinning industry and farmers held the largest areas of privately owned land in most shires. Many smaller landholders were attracted to the idea of having space and producing their own food.

However, there were comments expressing concern with changing community sentiment as to the value of farmers of the difficult times they were experiencing:

- Farmers not receiving a reasonable income (Cape to Cape, Leschenault, Warren, Lower Blackwood, BBG, Upper Blackwood)
- Dairy farmers going out of business (Geocatch)
- Farms are getting bigger (Warren, Lower Blackwood, Upper Blackwood)
- Average age of farmers is high and there is a lack of succession (Warren, Leschenault, Lower Blackwood, BBG) Katanning has a reasonable number of younger farmers (Upper Blackwood). Out of 32 farmers interviewed only two were sure a child was taking over the farm (BBG).

- Less farmers (Geocatch, Lower Blackwood, Upper Blackwood)
- Increasing rate of depression amongst farmers (Upper Blackwood)
- Farms being sold to Chinese interests (Warren, Lower Blackwood, BBG)
- Reducing R & D and agency (DAFWA) support (Lower Blackwood, Leschenault)
- Food distribution channels and food miles (Cape to Cape, Warren)
- Farmers produce what is really needed – food.
- Bureaucratic red tape or rules and the Right to Farm (Cape to Cape, Leschenault, Lower Blackwood, Upper Blackwood)
- Viticulturists say there was nothing here until the grapes came undermining the longer term land use and productivity – this undermined the value and input of many people (Lower Blackwood)
- There was a strong feeling from the intergenerational farmers that the community had gone and they said there was now a feeling of isolation. Examples given include: people do not come together to contribute their time and resources for community benefit; and there is now a need to lock houses and sheds (Lower Blackwood).
- Constantly we (farmers) are told we represent the past of the shire, not the future (Lower Blackwood).

1.5.3 Water

Increasing water use and decreasing supply and quality were mentioned in each group. In some areas the issues were related to reduced rainfall filling dams and rainwater tanks (because they do not have a piped town supply); while others along the coastal plain are concerned about the level of pumping from aquifers. The following comments represent some of the issues raised:

- Water tanks and dams drying out (BBG, Cape to Cape)
- Cattle and sheep moving from Wheatbelt to the SW due to lack of dams (Lower Blackwood)
- Water allocations & irrigation drawing too much water which may lead to a break down in the 'seal' between saline sea water and fresh water. Too many bores and too much water being drawn (Lower Blackwood, Leschenault, Cape to Cape, Leschenault, Geocatch)
- Water level has dropped (Lower Blackwood, Cape to Cape)
- More people = more water required – clash between volume of people and resources (Leschenault, Geocatch)
- The water quality in Manjimup is deteriorating (Lower Blackwood)
- Salt water intrusion is increasing and staying above the surface for longer periods (Leschenault)
- Dairy farms use a lot of high quality water – need to reallocate this and encourage more efficient use of water and land (Leschenault)
- Competition for limited water supply between local households, business and metropolitan demand. (Lower Blackwood, Leschenault, Warren)
- Instead of increasing water supplies – encourage people to use water more wisely (Leschenault)
- Cave system hydrology changing and unique fauna is being lost (Cape to Cape)

1.5.4 Fire risk and management

There was a real concern about risk of fire, especially wildfires. The threat of fire was the key reason why people would leave the Warren district. Geocatch identified fires, population pressures and climate as the biggest risks to the region. Other comments on fire included:

- Increase in fires especially wildfires (PHCC, Geocatch, Leschenault)
- Use to have slow cool trickle burns, now they are using hot burns in spring (Leschenault, Geocatch). Hot fires might help to get rid of dieback – a question (Lower Blackwood)
- More grass grows after burning, creating a higher fuel load and grass fires are more fast moving than general bush fires.
- The birds nest in spring when the burns take place. Autumn is the perfect time for burns not spring. Naturally lightning strikes occurred in autumn. Prescribed burning getting later – increasing the risk of fires especially wildfires.
- Inadequate planning rules and processes – exacerbates fire control issues.
- Need to keep the fuel load down
- There is slower regeneration of vegetation after fire
- Aging fire brigade members (PHCC)
- More people means more likely to have people lighting fires, intentionally or by accident.
- Suggest changing the building materials to be more fire retardant (PHCC)
- Fires regimes encourage some orchids and discourage others – leak orchids grow in rotting vegetation so decrease with fires, while fire promotes colourful orchids such as spider and cowslips (Lower Blackwood).

1.5.5 Recreation

The south west corner of WA is Perth's playground. Many people visit the area, especially in the summer months to enjoy the beaches, forests, waterways and tourist industries (wineries, artisans and recreational pursuits). Changes identified by participants include:

- Increasing recreation in and on the water and wetlands (BBG, Upper Blackwood (possibly more shark attacks))
- Increased interest/demand for outdoor recreation (Upper Blackwood)
- Concerns about risks for children in the 'wild' so do not engage outdoor activities (Upper Blackwood)
- Increased restriction in access (forest) or activities (camping and campfires) (Upper Blackwood)
- No true wilderness available to public (Upper Blackwood)
- More quad bikes and 4WD and rubbish (Upper Blackwood, Geocatch)
- Need better planning of recreational areas and access (Upper Blackwood, Leschenault)
- Lack of general awareness of how to interact or impacts on natural areas - Provide outdoor recreation training (Upper Blackwood, BBG, Lower Blackwood, Geocatch)
- Over fishing depleting fish stocks (Lower Blackwood leading to penguins not having sufficient food.
- More tourists on the coast and in towns; fewer in the forest (Geocatch)

1.6 SNIPPETS

The following points have been listed here to give a brief understanding of the ‘feelings’ expressed at the groups.

- Few defined their region or system by a physical line – in fact some thought WA-wide, some Australia-wide and some world-wide;
- The majority of participants accepted that the climate was changing;
- Rarely were individual assets identified of key importance (assets were more common in the staff workshops but not the community workshops);
- People generally thought in systems, but may not recognise that in themselves;
- Many general ‘media’ comments were made – these are the citing of word by word climate change or media statements without their own knowledge to support it. A classic one was declining rainfall when the person beside them had kept records for 60 years and 1999 and 2013 were the wettest years in his history, but people living nearby without records to support were saying it was hotter and drier or increase in the number of extreme weather events. Generally said in a parrot type fashion. Need to be careful of ‘general’ information.
- Generally people were adapting and accepting of change.
- Most people looked at opportunities that they were able to achieve, only a few did blanket – must be fixed by government or other broad brush approaches.
- Most were not negative about needing to change, although the way to change was not clear.
- There was a strong social component coming through.
- Key asset was the recreational component of the forest, beach, rivers etc. Here the ‘asset’ is a general not a specific place.
- Devaluing of farmers – e.g. Geocatch ‘Farmers used to be someone in the community – now they are nobody’, and in Augusta farmers and community were told publically ‘there was nothing there until the vineyards came’.
- Afternoon sessions were often ‘closed’ sessions by invitation only and that usually meant NRM officers, Council Management and staff. Evening sessions tended to have a wider range of community members.
- There were low numbers of participants at each group, but this does not translate to low interaction; in fact we may have gathered more and more detailed information from those who attended.
- Staff tended to say we ‘*have to get them to do....*’ This is not an inclusive comment; if it was a collaborative approach it would have been we would like to ‘*work with*’ them to achieve a better outcome.
- Most families need both partners to work – this reduces the opportunity for volunteering and NRM activities

1.7 SYSTEMS APPROACH

1.7.1 *Assets approach vs Systems Approach*

In over 2000 points noted throughout the workshops less than 30 referred to specific assets. (Most of these were during the staff workshop). It was particularly interesting at Peel Harvey where we discussed the challenges and opportunities presented by the systems approach, as opposed to the asset approach, and then developed the components of their system, not one asset was identified (N.B. one participant thought sapphire flats were a specific asset, but most in the group thought it related to a general area).

1.7.2 *Catchment area*

While Cape to Cape Management group and Peel Harvey Catchment Council clearly identified their catchment boundaries, most groups did not identify their catchment boundary by a discrete line for the following reasons:

- Some members related to social boundaries;
- Most related to areas of land use; and
- Many saw outside influences (such as state and federal government policies, increasing urban population or tourists) impacted on their region,

This did not mean the participants as a whole could not identify a system but that they saw interactions between systems and the components of the system. Generally participants were not thinking only NRM, but as requested, theirs and their community's interactions with the landscape, lifestyle and livelihoods. Most participants were quite territorial and protective of, or eager to enhance, 'their' region (sense of place). Like all marketing projects, the target audience will need to be identified for specific SWCC activities. The lack of definitive boundaries is potentially a benefit for SWCC activities as it allows for multi-scale and multi-purpose activities to be undertaken.

1.7.3 *Scale*

As Paul Ryan outlined in his meetings with SWCC the process works best, indeed needs to work at multiple levels. Some staff asked for the level to be set or defined but it is much like an organisation there will be

- High level
 - Organisation - upper management looking at overarching and strategic measures
 - System – looking a key over-riding drivers in the system linking larger areas and movement of fauna and say disease between the areas (say the SWCC region)
- Middle levels
 - Organisation - middle management program managers and some project managers
 - System - Complex and complicated systems and their interactions in a more defined area (say Cape to Cape)
- Operational level
 - Organisation – project officers carrying out on-ground works
 - System - A smaller area or part of a system stream (e.g. pond or an animal habitat)

The key thing with all of these levels in the system is that they will interact with the other levels (e.g. by improving the habitat of the hairy marron, it will have flow on benefits within the marron system, but also out into the larger systems in which it is situated). ALL levels are important.

Another example would be a farmer who works at many levels

- The farmer may treat an individual animal for a disease (low arguably simple system);
- that animal belongs to a flock or herd;
- who graze in a paddock;
- or multiple paddocks;
- who interact with the wider environment by bringing in fertilizer and water and selling out produce (some control over the input and outgo);
- this is further impacted upon government policy or consumer preferences (limited control through voting or marketing); and
- Then, overlay the effects of climate and weather (no control).

We all work at a range of levels in our homes and employment systems every day. This interaction of the levels of the system means SWCC can identify higher order approaches and encourage the Regional Partners to undertake work at the intermediate level with landholders and project officers working in more defined (and measureable) ways.

1.7.4 Differences in personality and styles

All good teams contain people with a mixture of styles. The Systems approach will appeal more to those who have conceptual thinking rather than those who are technically and data focused.

Technical people tend to focus on parts of a system / compartmentalise it / see fewer opportunities (in part because theirs is a 'closed system') and possibly see a very bleak future because the scientific papers tend to focus on the measured changes or modelled changes, whereas the inventions and enterprise comes from the entrepreneurs in the community. The whole system is too big, because it represents too many unknowns or unmeasurables for this style of person, who would prefer a research format where components are identified and measured. They have good quantitative observation skills.

Those with a more practical background do not have to define things as rigidly and their observations are instinctive, so their response tends to be more intuitive. It is an almost automatic response to the environmental change and certainly a greater acceptance of the variation (though they may not realise how much variation because it is not measured as closely). Generally this group is happy to look at the bigger picture and intuitively understand impacts, interactions and linkages but does not like to be constrained by protocols and procedures.

SWCC will need both of these types of thinkers in our catchment and at different levels in the organisation, especially at the planning stage. BUT they are not easily aligned. In fact the additional 'hard' knowledge presented by the technical people will usually make the practical people feel inferior as theirs is only 'anecdotal' information. Those with intuitive responses

will bring the new ideas to the table, and while others will be able to write this into the project with defined measurable outcomes.

1.7.5 Takes time

The Systems approach will take time and different observation skills. It makes sense to many who are or who have been working in the environment to take a more holistic approach and look at key points of impact or change. However this does not naturally fit with the short delivery times of projects, the length of contracts for staff, and often change is not measurable over the shorter term. Organisational change is usually painful and requires new skills, which often mean different employees. The change unsettles staff and upsets current relationships. However given SWCC is still determining clear roles with Regional Partners and changes in funding imposed by Federal Government, it may be a good time to clarify and organise roles and to rearrange staff to optimise their skills.

1.7.6 Information / data collection

The systems approach will generate a lot of information. The way this is to be generated, collected, stored and retrieved needs to be clearly thought through. How much and in what form do you want information and what is the currency of that information?

1.7.6.1 Collection: Because many on-ground NRM staff are new to their roles and the region the opportunities for collecting and understanding information is somewhat limited. (For example if a farmer said the soil has high levels of aluminium toxicity it may not then be investigated to find out if it is a low pH, high acidity situation for planting trees into.)

1.7.6.2 Dynamic and organic – Much of the information is dynamic and organic (grows on past knowledge) so be wary of capturing too much material in a 'hard' way. (E.g. If a baby cries the mother does not automatically run for a book in the library or plug in an iPad app; she usually investigates the situation and makes appropriate decisions often ringing a mentor.) It may be better to invest in mentor systems and community interaction than complex data bases.

1.7.6.3 Currency: There is a danger in collecting too much information and then it not being relevant when people come to use it. (For example if you are in a shop and found they were selling lots of stir fry material. You decided 6 months later to stock stir fry only to find people wanted roasts in winter).

1.7.6.4 Filing: How will anecdotal information (which while on one hand may not be 'proven', too local and biased; on the other hand may be more current, locally applicable than massed information and relevant to the individuals using it) be collected and stored? Many scientists in the organisation will say it has limited value while the extension practitioners will see it as important.

The answer may be to have better and more regular communication with a range of individuals and groups across the region to verbally update information or check currency and applicability. This does not replace, but rather supports, the scientific information and research available.

1.7.7 Ongoing engagement

SWCC might consider investigating the INDI approach used by Cathy McGowan during the last election to engage stakeholders. This is a 'kitchen table' approach meeting people on their terms and encouraging diversity amongst the group. It provides relevant information in a semi-structured way, is grass roots in nature and relatively cheap because the individuals organise both the venue (sport club, kitchen table, Scout Hall) and invite a range of people with different views.

1.8 OPPORTUNITIES FOR THE FUTURE

1.8.1 Policy and Planning

At least three of the workshops highlighted how government policies (Federal, State and local governments) impacted on NRM in their region:

- ***Tier 3 railway closures***

The Upper Blackwood Group participants pointed out that when the Tier 3 railway lines were closed it forced the grain to be carted by road. This resulted in an increase in large grain trucks on small to medium country roads in the east of the catchment. The roads were not designed for multiple large trucks on the road with school buses and cars and it was decided for safety reasons to widen the roads clearing the native vegetation in the process. These roadside strips of vegetation provided habitat, wildlife corridors, and seed collection opportunities and in some shires represent the last 5% of remnant vegetation in the shire.

The learning from this is NRM groups would be better undertaking an education, advocacy and policy role to save this vegetation than spending the time trying to establish new plantations.

- ***Rezoning of land from rural to conservation***

In the Lower Blackwood Group one member had a large portion of his farming property re-zoned from rural to conservation. This is in line with a State policy to protect land in sensitive areas of the South West of WA. It should be noted when the land was rezoned the farmer did not receive any compensation nor reduction in rates. I.e. he is required to continue stewardship of the land and to pay all associated costs but is not allowed to run any commercial enterprises on this significant part of his property. This appears to be grossly unfair for society to impose the cost on individuals and it will not encourage respect for conservation values within the community. It also appears to be at odds with the housing developments on bush land.

- ***Housing development***

Community perception suggests that property developers operate under very different rules to other land users. Why (example above) is rural land rezoned conservation when there is little or no chance of it returning to its original state but property developers are allowed to clear fell areas of remnant vegetation? Many concerns were raised at many groups (Leschenault, Geocatch, Warren, Cape to Cape, Lower Blackwood Basin) as to the extent and environmental cost of much of the housing development.

1.8.2 Encourage NRM to be an everyday activity

Landcare started when farmers in the Jerramungup region looking over the fence at their neighbours to see what they were doing to reduce wind erosion. This resulted in farmers forming groups to swap information. It was a true grass roots organisation. Then overtime it became a business and moved from sharing of local information to relying on external (usually Government funding) and 'experts' to advise on best practice. When *Landcare* started there was 'real farming' and there was *Landcare*. *Landcare* included activities such as tree planting, applying lime and gypsum, minimum tillage and deep ripping. Real men activities such as drains and earthworks were acceptable but the others were 'landcare'. Now these practices are considered normal – even best practice. NRM however is being treated by all parts of the industry as 'special'. This is exacerbated by some professional NRM officers who consider they have more knowledge about particular parts of the system so no one else is allowed to do that work. DEC has repeatedly stopped community and farmers from caring for forest areas (activities such as weeding or fighting wildfires were limited to DEC staff ONLY!). We all should be responsible for the environment in which we live and how much of a footprint (impact) we are making on the earth from our choices. The Systems approach is an opportunity for us to change the way we do NRM and to encourage all of us to take part in our own way.

Most broad community members would say they are not involved in NRM, yet the majority of them will directly use and impact on the environment on a daily, if not weekly basis (e.g. recreationally such as going to the beach, bushwalking, picnics). They will indirectly impact the environment every day with the decisions they make (e.g. how long they spend in the shower, what plants are chosen for the garden, the choice of walking, driving or riding to work).

SWCC has an opportunity to change NRM from being out there and someone else's responsibility to being an everyday responsible action. This means SWCC and similar bodies changing their business from being technical gurus who are the only ones with the proper background to undertake NRM activities -> coordinators and supporters of change across the region. As the Wagin workshop suggested, create a behaviour change environment for people to exist (encourage new behaviours through influential external environment) through Community empowerment and leadership to lead to changing attitudes

- Increase effectiveness – let us say there are 1000 people involved in RNRM in the region (including SWCC, sustainability people in Department of Agriculture and Food WA, catchment councils, Department of Water etc. and allowing that not all the staff are involved in NRM). These people work say 37.5 hours a week (once again not all on NRM) would mean 37500 hours per week. Whereas if the 120000 or so who live in the area spent 2 hours a week on activities there would be 240000 hours spent but more importantly the general public will also be more aware and take shorter showers, chose native plants for the garden, understand they need to keep to the tracks and not leave rubbish if they want their environment (and this usually means their business – farming or tourism) to support them.

- Community coordination - Of course you need specific projects undertaken but some of these are well able to be done by school groups, community service organisations, industry. For example many businesses encourage their staff to go on tree planting days or putting up nesting boxes. While this would take some coordination it means the general community is more aware and involved so their children will be trained. The businesses are then more likely to understand impacts and try to work with in planning rules not push them.
- Celebration of diversity of industries in the region – farming is being pressured in many ways and it has benefits not only in producing local food but farmers are usually good stewards of the land this gives rise to part of the tourism attraction for the area. If the majority of the farms were turned in to one industry, such as vineyards or trees, it would, over all, be less attractive for tourists.

While the Systems Approach might seem too big, or too hard, SWCC can identify some key community engaging activities which will result in beneficial changes. (E.g. PHCC has the 'save the blue crab' campaign which is well recognised and will have multiple benefits). By establishing some easy to identify with, everyday activities which will help the environment as whole SWCC can move to making NRM an everyday activity for most households.

1.8.3 Tourism

Tourism in the area is closely related to the environment but there are currently few apparent links or partnerships between the NRM and tourism industries. There is potential for SWCC to

- Engage closely with tourism operators for mutual protection of areas of coast, river or forest
- Work with tourism operators to educate people on limiting impacts on the environment both when they are visiting the area and in their everyday activities at home
- Link directly with tourists to increase awareness of the uniqueness of the biodiversity in the south west of WA.

There was a suggestion from the community workshops that a bed tax be levied on tourists who come to the area. Tourist attractions in the area include the beaches, forests, wineries, artisans, and events. Much of the attraction is based either directly or indirectly on the environment and while these visitors enjoy the pleasures of the region and purchase from local businesses they do not directly contribute to the maintenance or improvement of the environment.

1.8.4 Creating a sense of place

There was a strong sense of connection amongst the community members who attended the workshops. They clearly identified with the area in which they had chosen to live. Creating this sense of connection to the area in which people live will help encourage a desire to protect and enhance the environment and a potentially a shared responsibility.

Oral and pictorial histories are useful ways of capturing and transferring information to create a sense of place and a feeling of belonging which may lead to a duty to protect the environment.

1.8.5 A sense of history

Often to move forward we need to look back. People new to the region do not know what it was like for the last generations. For example Bunbury now has less than 19% remnant vegetation so if lose another 5% it would reduce the habitat by over 25% making it unviable for some species. Many people don't realise the impact that will have and so are happy to support further housing development partly because the change is not as obvious as it is for those who have seen the change from over 30% remnant vegetation cover. If they heard stories about what it was like to walk or play in the bush from local elders it may create a sense of what has been lost, and may lead to a desire to keep what is remaining.

1.8.6 Methods of engagement

Some suggestions for methods of engagement are:

- Working with schools to cultivate an understanding of the region and what choices and impact individuals have;
- Storing telling/ oral histories - using a process such as the one developed by Jessica Dart to capture stories relevant to the community have them prioritised by local and then regional communities for inclusion in local celebrations, books, schools or libraries. Most of stories included interactions with the environment and historical ones give meaning to changes which have occurred; or
- Photographic competitions to highlight explore and present special areas of interest (e.g. there could be categories such as wetlands, farmlands, coastlines, industry, tourism, fauna and flora). The trick is then to link these into another event or opportunity such as asking someone to sponsor a calendar.

1.8.7 Longevity

SWCC will have greater impact if many of their programs have longevity and this can be created through a strong 'sense of place' encouraging a feeling of pride and protection for 'their' environment. With a society increasingly based on consumerism the need for an understanding of how this increasing desire for goods impacts on the sustainability of our environment. Other businesses are selling us the opportunity to relieve us of our burden of impact (e.g. plant a tree and that will exonerate you from the greenhouse impact of your flight) rather than reducing the impact in the first place. The aim is for a change in thinking and a sense of place.

1.8.8 Schools

Working closely with schools, helps to disseminate information to the wider community. It is becoming harder with the tighter curriculum requirements but many teachers do appreciate the opportunity to participate in environmental learning activities for their students especially when it has been well prepared for them. Having children undertake activities such as measuring water quality with the associated discussion about what impacts water quality, simple actions people do or don't do make a difference (e.g. pouring paint into the drain following the storm water to the river and out to the ocean discussing the impacts on the way).

Children take information home to their parents. Often the information presented to children is in a simple form which can be easily related across the community.

2 COMMUNITY CONSULTATION

The following sections contain the information gathered during the staff and community workshops.

2.1 UPPER BLACKWOOD BASIN

2.1.1 UPPER BLACKWOOD BASIN GROUP (Afternoon)

Location: WAGIN

Date: March 14, 2014

Time: Afternoon 1:30pm to 4:30pm

Group

The group was a great mix of gender ages and professions, from an older male farmer to younger female farmers, an experienced male government agricultural officer to a new female landcare officer, bringing a mix of ideas and history to the process. Generally the approach to climate change was very accepting, in some instances almost positive when one participant said '(sic) bring it on – as the perennials on our farm is set up and ready for changing rainfall patterns'.

Process

The group engaged really quickly in developing a diagram from their individual systems components. There was strong ownership of the finished work. Some members wanted to see photos of diagrams from other groups and they thought theirs would be the best! From the flow diagram the group decided to expand information on two of the key themes. We kept the group together as they were working well as a cohesive unit; it was our first group for the SWCC team so we could learn each other's approaches during the session giving better continuity for future groups. Given the history in the room, many could identify changes happening over the last few years; articulate how climate change could impact on them and their businesses; and, identified options they could use to mitigate or accommodate changes. Because they were self-reliant, and the time was limited, the area not expanded on was that of what SWCC and others could do.

View of the Catchment

Because the group members on the whole worked closely with the land, the catchment discussed was largely an agricultural/NRM based one stretching across the lower Wheatbelt. It was a 'working' or rather 'working with' approach to the region.

Points of interest from the session

- Very accepting or almost positive about climate change. One farmer noted there was a dramatic change (drop) in rainfall in the late 1960's to mid-1970's and was interested in the 'fuss' about climate change when he said they had been adapting to and dealing with climate change/variability for over 40 years.
- One of the participants outlined the changes already undertaken on their property, including more perennial pastures and different crop management. The perennials will make good use of summer rainfall and the changed cropping will better suit drier winters.
- The group was the first community group (after the staff workshop); they understood the questions and related to the process quickly and easily.



Upper Blackwood Catchment group participants building a diagram of their system

Community responses

What is really important to you in your landscape/area/home?

The group identified key components of their system and then worked together to develop a themed diagram of their combined ideas.



A photograph of the system diagram developed by the group

The themes from the diagram were then developed looking at

- Changes noticed over the last 15 or so years
- What will happen if climate continues to change?
- What will it look like if we do nothing?
- What can we do?

PROFITABLE SUSTAINABLE AGRICULTURE

What have you noticed changing – over the last 15 or so years

- Cropping technologies are changing
- Salt land is productive
- Drier start to the season
- Less annual rainfall in the South west
- Higher temperatures
- Katanning has younger farmers
- More small landholders
- Increasing scale of operation (farming) & corporates buying properties
- Communication, internet technology

- Increasing mobility
- Increasing occurrence of depression
- Increasing debt
- Increasing awareness
- More animal welfare concerns
- Changing markets
- Greater external influences
 - based on limited information
- Diminishing returns
- Aging farmers
- Landcare is integrated into farming practices

What will happen if the climate continues to change?

- Increasing recreation → water sports
- Increasing summer rainfall → impact on wetlands
- Increase in summer cropping
- Desertification
- Reduced productivity
- Responding to a changing environment
- New technologies and R&D & E
- If farming systems adapts the community will adapt and vice versa
- Diversification

What will it look like if we do nothing?

- Erosion – degradation
- Hunger
- Weed invasion
- Note current farm practices will not necessarily result in disaster
- Today's farmers are adapting to variable climate

What can we do?

- Preparedness
- Adaptable
- Green landscape – perennial pastures
- Build resilience
- Diversify – on-farm add value
- Education – bridging rural / urban gaps
- Social opportunities
- Attracting younger people to the country

OUTDOOR RECREATION

What have you noticed changing – over the last 15 or so years

- More quad bikes
- Increasing restrictions (e.g. public liability)
- Increasing interest / demand for outdoor recreation
- Increase interest in healthy living

- Lazy people
- Never outdoor split with always outdoor
- Risks – children outdoors
- Unaware of environmental impacts
- Urbanisation taking over nature
- Where's the true scrub these days?
- Culture experience vs respect

What will happen if the climate continues to change?

- Increasing summer rain → changing water spots for recreation
- More indoor activities with increasing temperature (air-conditioning)
- Increased restrictions (bushfires and camping)
- Bush unable to regenerate due to outdoor recreation (→reduced wildlife)
- Decreasing nature in specific areas – more degradation
- Increased water sports (increased shark attacks)
- Fisheries – population changes
- Seasonal changes
- Beaches – erosion
- Harder to get to natural places – increased regulation
- No true wilderness available to public
- Increased insect population

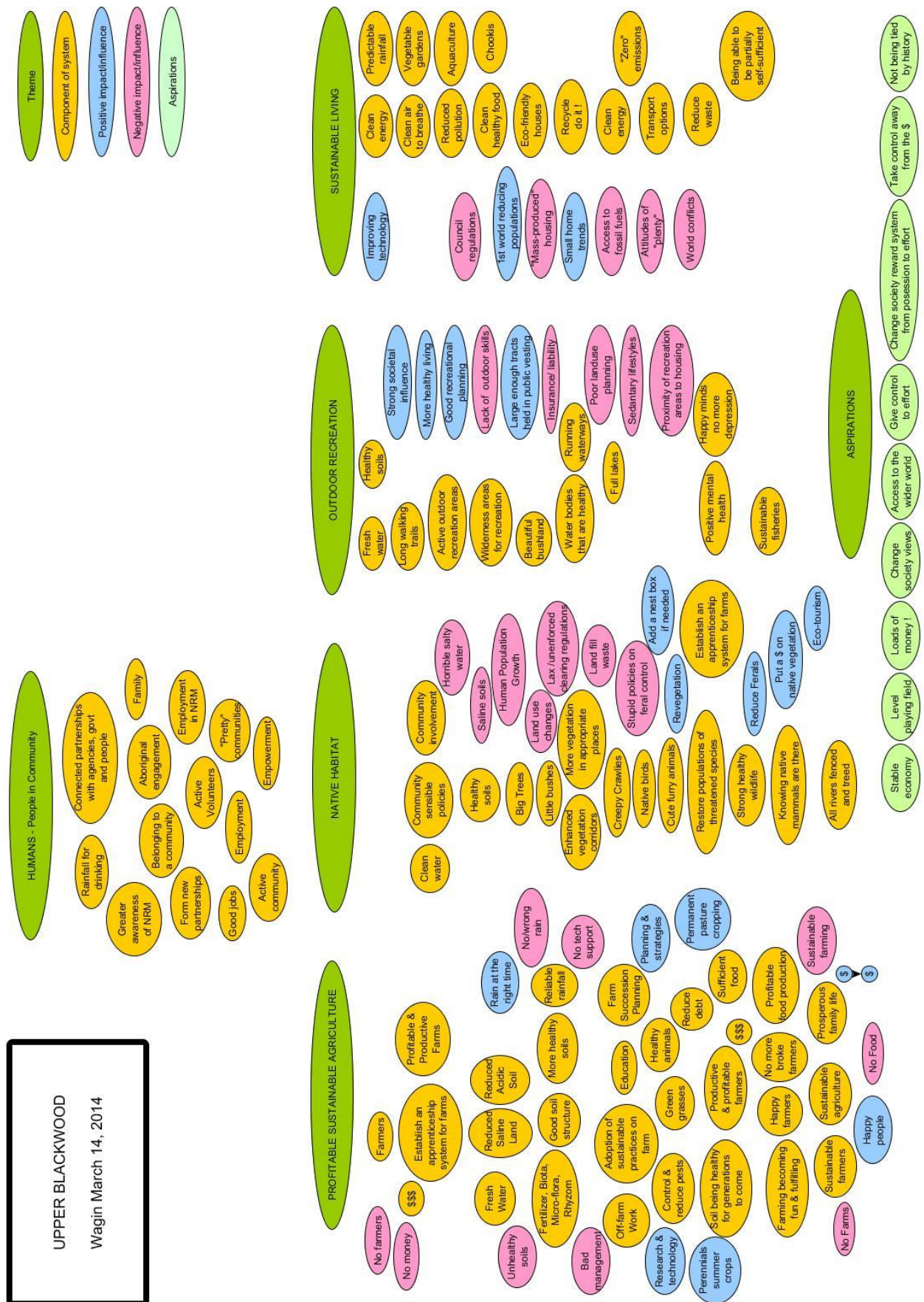
What will it look like if we do nothing?

- Travel further – will deter people from enjoying outdoor pursuits
- Increased beach and dune erosion
- Extreme weather events – changing people's decisions
- Weddings – angry brides (because of unpredictable poor weather)

What can we do?

- Targeted campaigns
- Behaviour change environment for people to exist (encourage new behaviours through influential external environment)
- Implement building restrictions/regulations
- Long term planning (systems approach)
- Community empowerment and leadership towards changing attitudes
- Provide outdoor educational training
- Recreational areas planned
public education
- Increase/enhance bushlands
- Change/protect beaches
- Encourage students in outdoor activities

FIGURE 6 UPPER BLACKWOOD SYSTEM DIAGRAM (Afternoon)



2.1.2 UPPER BLACKWOOD BASIN GROUP (Evening)

Location: WAGIN

Date: March 14, 2014

Time: Evening 6:00pm to 8:00pm

Group

Two very active local 'doers' arrived for the evening session. 'Lady Creswell and the Bishop' are obviously well informed and passionate about their area. They are used to lobbying both at the local level and through the political and government systems. Many of the ideas presented were well developed and integrated with current or planned activities. The strength of this group was the suggestions for opportunities for the region, many of which fit SWCCs mandate. Both were willing to assist with future work in the region.

Process

Being one of the first groups, we tried to stay with the process, however the mapping exercise was not effective because the members wanted to tell us about the opportunities available in the broader Wagin district, so we quickly moved on to those areas.

Because there were only two participants we could use more flexibility in the process and really explore the ideas they were presenting. For this reason the following notes are not necessarily in the same format as other groups.

View of the Catchment

Ideas were not limited to just the Wagin district and at times ranged to the Kimberley and other parts of Australia. This linkage came from a broad understanding of the working of political systems and various with traditional owners. For example there was concern about loss of native vegetation due to road side verge clearing, which is due to the closure of tier 3 railway lines forcing larger and more grain trucks onto the road meaning, the roads need widening and so remnant vegetation is lost because of a seemingly unrelated government policy.

Points of interest from the session

The cross policy linkages identified were really interesting. Examples of these are:

- The removal of road side vegetation due to changes in the Tier 3 rail policy;
- Less trees in the main street and other areas due to impacts on overhead power lines and road surfaces, leading to fewer people in the main street;
- The value of parks, trees, table & chairs, public transport;
- Then the impacts of both points above on community engagement, willingness to participate, opportunities for meeting each other.

Community responses

What is really important to you in your landscape/area/home?

- Trees – old ones – massive structures
 - Birdlife – listen and look at them
 - Sound of the wind in the trees
 - Wildlife – trees attract and provide homes
 - Keep salinity down
 - The light they capture silver to green
 - Strength – sense of power and influence
 - Protection/shade for birds, insects, diversity of birds, food

What have you noticed changing – over the last 15 or so years

- Trees are struggling due to lack of water and paving
- Destruction for farming and man-use (e.g. road verges – widening roads because of tier 3 closures → more grain trucks on the roads → pretence was road trauma risk)
- Destroy trees and the undergrowth reducing living space for animals
- More trees destroyed = weeds → fire risk
- Trees - neighbour complains

Where are we going? (Changing Climate)

- Increasing levels of dieback
- Increasingly erratic rainfall
- Increasing heat and variations in temperature
- Death of wildlife → to stock cattle → competing for food
- Changing habitats
- Lack of income → less productive → starvation of animals and people
- Adapt to different food and lifestyle – changing environment
- Towns reducing population
- Lose services – health, education, police, → mechanic → school children are fewer → less funding → sent to other areas like Katanning
- Farms mechanised → reduced labour → falls in town population → Elders, shops and maintenance closing/down
- Declining population like Dumbleyung → lose hospital → lose banks → etc.
- Jobs changing
 - Farming = less crops, less animals, → no farm hands, less shearers = we are already seeing these effects
 - Elders & other produce stores – depleted stocks – I can't get a pair of work boots (Elders used to stock them) getting harder to access supplies.
 - Some people buying on-line

What will happen if we had Climate Change?

- Create jobs that help (e.g. planting trees) – this would help reduce salinity and improve the landscape
- Councils funding for people to have rainfall tanks
- Wind farms
 - Jobs
 - power
- Cut down on waste

OPPORTUNITIES & IDEAS

Town

- Need to develop a green oasis in Wagin like in Narrogin.
- Narrogin has lots of cool shade, so people park their cars under shade and walk.
- Wagin has very few shaded places to go
- By 10am on warmer days the street is dead because it is too hot.
- This means people are home in air conditioning not taking part in community activities.
- People come to town for groceries, fuel, coffee & cake
-

Heritage town

- Buildings (e.g. Town Hall, Mitchell Hall & the main street)
- QR coding
- Historical village
- Heritage coding for building and preservation (the current code is too low) → heritage town
- Conservation code needs writing
- Link attractions Town → historical village → lake where land speed record was made
- Own currency in town

Aboriginal culture

- Recording their history – it needs documenting
- Wagin Shire Hall have an art gallery centre
- Katanning – Merribank – opportunity for tourism links (e.g. New York art with Curtin University in the country)
- Koja Place type setting would work well
- Native reserve in Wagin
 - Tourist attraction
 - Link Wait-jen trail and lakes
 - Traineeship for local indigenous to become guides & rangers to promote the region and the culture.
 - Outdoor audio-tour for tourists
 - Bush tucker

- Risk
 - Current generation – last custodians of culture
 - Needs to be collected/captured
- Art
 - Encourage them to have their own place to put their art. Get it out there and let the public see the beautiful work. They need to have things in this town to feel welcomed.

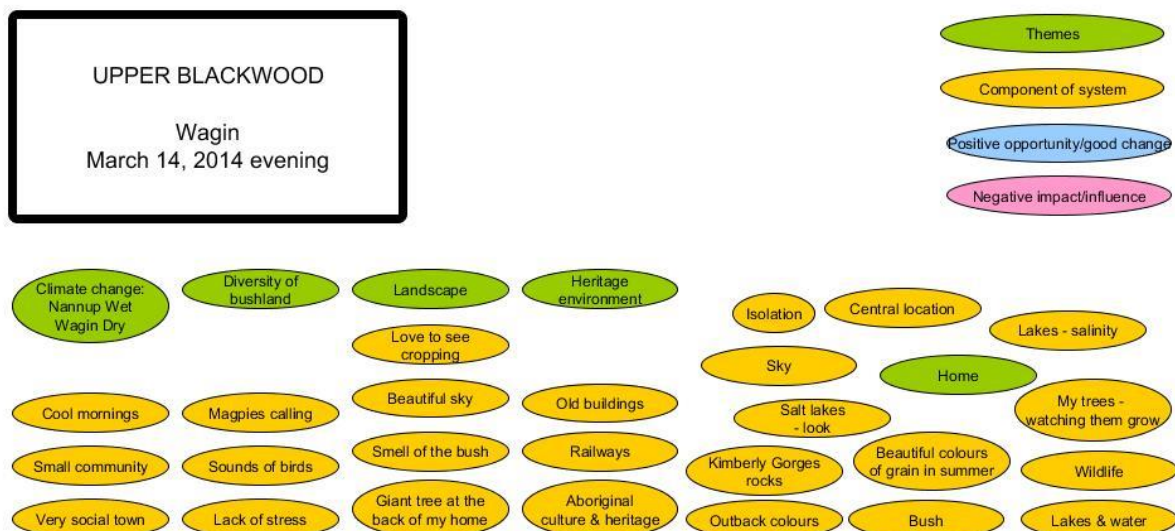
Parks

- Are dotted all over town
- Very important meeting places – especially the one opposite IGA where there are tables & chairs, a telephone box, bus stop providing a transport link and is a meeting place.
- People like to walk their dogs and feel safe in the green oasis within the barren dead landscape
- Like to watch the cricket on the oval
- Bring the community together - good for tourism, shade is attractive, the green is attractive
- Green the whole town – plant trees → cool down
- Bigger parks for young indigenous people to use as when it is hot they have nowhere to go.

Wagin in the future:

- Retirement town
- Full trucks due to logging
- People becoming more isolated

FIGURE 7 UPPER BLACKWOOD SYSTEM DIAGRAM (Evening)



2.2 MIDDLE BLACKWOOD BASIN GROUP

Location: Boyup Brook

Date: March 19, 2014

Time: Afternoon 1:30pm to 4:40pm

Group

To group was made up of a strong mix of local BBG staff, BBG members and interested parties. They were well informed and community focussed offering perspectives from a range of age brackets, experience and gender.

Process

After individually identifying the components that make up their system the group developed a comprehensive network of their area. Because of the dynamics and to get the most information from those present we split the group in two with a facilitator in each group. So while there is one system diagram below there are two groups of data, one from each group. The groups combined to share some of their key points and to discuss what BBG, SWCC and others could do.

View of the Catchment

The whole group did not have a clear catchment boundary and thought in terms of the BBG or wider local area systems (Collie to Bridgetown - around Boyup Brook). The NRM professionals tended to have a clearer boundary but this was probably more related to their work areas and did not limit their boundaries.

Points of interest from the session

- Members clearly stated that they did not need more information about climate change.
- At least two participants came to find out more about the systems approach.
- There was a strong group focus on recycling and reuse of materials.



Members of the Blackwood Basin Group -organising the components of their system in a meaningful way.

Community responses

GROUP A

Where are we now?

- Degraded
- Lack of people
- Weakened
- Lack of awareness of what is around them (i.e. Biodiversity hotspot – people don't know it is)
- Absentee landholdings (lack of management) → lots of vacant/unmanaged blocks
- Vibrant lifestyle
- Different population to the past – losing farming heritage and no succession on farm
- Some farming innovation
- Lots of opportunity, but people don't see it
- Big gap between 'haves' and 'have nots'
- Lack of enthusiasm for work and in general
- Things are not very accessible
- Complacency – get rich quick, rather than work
- Lack of long term commitment/vision more focussed on quick fix instant gratification
- Dusty! Dust everywhere
- In good condition in comparison to other areas physically
- Kids leaving town sooner
- Not a lot for teenagers (perception of teenagers)

What's changing?

- Traffic going through town is busier-more trucks and traffic in general
- Things in general happening faster/going faster
- Disregarding the little things, in order to get the newest, best, most recent stuff
- More throw-away society than we used to be
- Gone from producers to consumers
- Gone from quality to quantity
- More complicated and stressful lifestyle
- More dependent on technology
- Don't need to think to use common sense anymore – not allowed to and not given the opportunity given to follow
- Regulation is way more prevalent than it was (i.e. horse riding, swings etc.). It makes it harder to do things
- Trees being cut down for roads, development, and urban development
- People are more afraid of native vegetation than they used to be (i.e. fire) more so regulators than the community

Where are we going?

- Recycling depot at Boyup Brook transfer station is not working now and hasn't been for some time
- Crazy amounts of packaging → buying in bulk = less packaging
- Tip in Bridgetown is going downhill – can't afford to management
- BIG, BIG, BIGGER not necessarily better – sometimes it is though, (i.e. buy in bulk – less packaging)
- Awareness is growing - more people desiring to be healthy
- Climate change cynicism – based on the fact that everything changes. Human vs non-human. People don't care and does it really matter?
- Realising that it's good to have trees – as they bring rain, but oversimplifying by putting it under the 'catch-all' of 'climate change'

What are the points of change?

- Something drastic needs to happen
- Need to have the discussion about what the term climate change is
 - the term and associations can be red herrings
 - Is it the term 'climate change' that needs to change?
 - Is it more resource use?
 - Climate change fatigue and cynicism needs to be flipped
- Increase the value of small contributions
 - Stop saying 'I can't make a difference'
 - Attitude and ↑ value of own contribution; will lead to greater acceptance and increased contribution → snowball effect

GROUP B

What changes are you noticing?

- Boggy areas are not boggy anymore in winter
- Waterlogging through salty groundwater rise is increasing (about 1 metre a year)
- Water tanks have started running out = catchment rainwater off roof ↓ (the last two years the tanks have gone dry in early March and the backup tank is v low/ dry too)
- Explosions in population of certain species (e.g. Muir's corellas, kangaroos) due to stable food source = agriculture
- Grass trees being decimated by 28's parrots
- Plantations ↓
- Wetter summers may impact on dieback
- Tree stress from climatic conditions
- Farm size = get bigger or not be viable any more
- Farming communities are getting smaller
- City → rural relationship ↓ - not running as many initiatives anymore
- Locally produced food seems to be getting bigger /more awareness, but not making it back to the farm gate of most farmers.
 - → more people are reading labels
- How to value time and labour as a farmer?

- Combination of stresses leads to tipping point on natural populations
- Everyone's busy! It's effort to contribute to community or do extra 'environmental' work
- Hard to get voluntary input and participants
- Struggle to maintain viability of livelihood
- Farm succession Plan (not such a sure thing to have child to take on the farm)
 - There is young people farming → may not fill in surveys or take part in community activities due to work schedule

If the climate changes.....

- Expect more frosts → adaptation with technology and research
- Need to be prepared to change
- Opportunities with in a changed climate, but conditions need to be stable and predictable to inform agricultural decisions.
- Long-term weather forecast → something to bank on!
- Technology vital to future decisions and planning
- Opportunities for new crops – sandalwood, summer crops
- Natural areas/resources
 - Hard time adapting to rapid changes
 - Impacts of urbanisation = nowhere to adapt to
 - Less water, more desert?
 - Competition for natural resources – mining
 - Food security & foreign investment
- It may be the tipping point → one more stress on the natural environment

Tipping points or Change agents

- Stage in life (personal)
- Changes to agriculture and rise in markets (e.g. plantations in 1990's)
- Start losing icons through degradation – social and environmental impacts (e.g. marron in the river, swimming in the river, skiing at Lake Moodyarrup)
- Loss of remnant patches → insidious and over long periods
- Blackwood River
- Reduced water quality in surface water → dams on agricultural land.
- Agricultural viability
 - Foreign investment
 - Prices for commodities
 - Stable markets
 - →if it keeps going ↓ we won't have local produce or rural communities
 - Flows on to
 - Decline of small communities
 - Increased isolation → mental health issues?
 - Food security (no local produce) and biosecurity (weeds)
 - Decline in LGA services (e.g. recycling depot)
 - Decline in mass population to attract investment, technology, research? = not heard in Canberra!

BBG COMBINED GROUP

So what can we do?

- Each community has facilities to compost green waste and animal waste into green manure
 - ↓ Environmental damage with eutrophication, land fill or burning
 - ↑ value of compost leading to ↑ production of crops using the compost
 - ↓ transport of waste and fertilizer
 - ↓ Tasmanian blue gums – can use left overs
 - Lawn clippings
 - Suggest use a co-op approach for the facility
 - Need someone in the community to drive it
 - \$ needed to set up - maybe a grant
 - Bureaucratical impediments
 - Boyup Brook used to have a wood chipper at the tip – residents could take in green waste have it chipped and take it home or leave it for the shire use.
 - Current LGA thinking is divided between recycling and burning waste to create useable energy.
- Plant a tree today for a strainer post tomorrow
 - The difference between photos from 80 years ago and now is the horses have been replaced by machinery. Going forward the difference may well be there will be few if any trees in the landscape.
 - Don't need to plant huge areas and number of trees but put in small patches regularly.
 - Removing trees for fence posts so put in trees to replace them
 - Relate tree planting to a practical use (more acceptable)
- Environmental education
 - School opportunities – garden, vegetable patch, chooks and recycling
 - Tree planting by local groups (e.g. junior hockey club)
 - Hot Rocks – very successful NFP arrangement – metro schools propagate seedlings then come to a BBG farm to plant them out. This is a whole experience where the students have a camp out, camp fire, go spot lighting, mill grain to make pancakes in the morning, milk a cow for fresh milk etc. Has been very well received!
- Encourage everyone to do their bit and praise them for it
 - General motivation – everyone gets disheartened
 - Perceptions are powerful – need to fight common perceptions
 - Motivate people to make a difference and then praise when they do something
 - Small differences add up
 - Idea that small improvements are not important has been fed by NRM by focussing on large 'important' assets and saying little ones not worthwhile
 - Need a big vision like Gondwana Link – then look at the tiny steps needed to get there

- Break the big vision into smaller pieces so people can see where they fit – we can take the first step and break it down into little pieces for them
- Give praise for all the attempts and changes

Notes taken by the facilitator

- Everyone is getting busier – people do not have time to contribute
 - Town people less likely to contribute
 - Farmers tend to be the ones who usually ‘get things done’ but are getting too busy with farming activities
- Farm Succession
 - Adrian said when they did a survey of succession planning around Boyup Brook and found that of the 36 interviewed only 2 were sure a child was taking over the farm
- Marron
 - After the 1982 flood there was no marron in the Blackwood possibly due to flushing salt from outer regions like Dumbleyung into the lower fresher areas.
- Agricultural industry decline
 - The changing land use from agriculture to blue gums –
 - Before blue gums many small towns like Tonbridge, Jindalup? Channup? Had schools, town halls and a shop.
 - Now the families bus children and travel to shop about 40 to 45 minutes.
 - This increased distance has led to fatigue, isolation and increased mental illness.
 - The harvested areas now have limited value as the roots are difficult to remove, so the areas are growing weeds, and feeding roos, contract sprays do not care about spray drift onto neighbouring farms

FIGURE 8 MIDDLE BLACKWOOD SYSTEM DIAGRAM



2.3 LOWER BLACKWOOD BASIN GROUP

2.3.1 LOWER BLACKWOOD BASIN GROUP (Afternoon)

Location: Augusta

Date: April 1, 2014

Time: Afternoon 2:00pm to 5:00pm

Group

The group was much divided due to the risk that some strong personalities would derail the process. In fact, the group was so worried that Leonie was informed of this concern before we arrived. However, the process went well and we managed the members (partly by splitting into two groups) gaining a wide range of detailed information from the group. There were some very long term residents (the family has been in the area for generations) who provided good insight into the changes that have occurred over the last generation or two. The fact that farmers attended during the day gave an indication that NRM is seen as important (i.e. more important than the farm work on that day) and this was supported by the types of discussions had during the workshop.

We were very pleased to have two SWCC staff join us and participate in this workshop.

Process

The group was asked to identify their components and to write these onto sticky notes (yellow). I tried to get them to work through linkages but they really could only group the components. They did however then identify these groupings (orange), look at where there may be irreversible points of change (pink) and then what opportunities were there for the system (green)

The groups had noticed a wide range of changes occurring over the last few years and could go back to 60 years of change. They were generally very accepting of climate change and pointed out a range of ways in which they had already adapted or changed. There were concerns about the impact of an increasing population on their lifestyle (they did not want to be inundated with people) and livelihood (especially concerns over the long term availability of water and the change in zoning of land). The concerns for the environment were less clear, as they saw the environment had changed so much that maybe we should be accepting introduced weeds (such as arum lily which is now widely established even though it is on 'the' list with feral deer) now as a part of the changed system, a bit like the birds which have moved in or the foxes.

View of the Catchment

Group members came from or had clearly visited and been influenced by other nations, bringing a world view to the table. The catchment was not clearly defined but ranged from the ocean into the surrounding farm land taking in Augusta and smaller towns. It was an operating landscape rather than a watershed.

Points of interest from the session

- Acceptance that some introduced species have now naturalised as the system has changed to accommodate them. The example given was when an extensive rabbit baiting program was carried out recently the predators (such as birds of prey, foxes, cats) were hungry and there was a marked increase in attacks on sheep, chook yard fowl and other farm animals.
- Compulsory rezoning of land from rural to conservation without compensation
- See this areas as the food bowl of South West of Western Australia
- Viticulturists say there was nothing here until the grapes came undermining the longer term land use and productivity – this undermined the value and input of many people.
- There was a strong feeling from the intergenerational farmers that the community had gone and they said there was now a feeling of isolation. Examples given include: people do not come together to contribute their time and resources for community benefit; and there is now a need to lock houses and sheds.
- The LCDC sees an important role for the group and need to be involved in RM planning and action across the area. They would like to develop a business plan which incorporates a wide range of other funding sources and does not rely on Government funds.
- The safety concerns and negative changes in community expressed by afternoon group were repeated during the evening session.



The system diagram developed by the Lower Blackwood participants

Community responses

GROUP A

What is changing?

- Margaret River dead town – hospital
- State planning changed dimensions – development still going – no development down here
- Increasing red/green tape – legislation – increase in bureaucratic jobs but decrease in jobs on farm
- More pests and weeds – blackberries/cotton bush/ kangaroos, blue gum plantations, weeds imported on machinery
- Too many subdivisions
- Lost 200 000 in production because of government lands with no management of pests and weeds, emus and roos
- More snakes, more wild pigs, more emus
- For example baiting of rabbits
- Change in NRM, used to be more local community based, now more regional
- More of a focus on sustainable foods – pressure on farmers
- Government studies water ways, land use – increasing regulation but does not translate to money on the ground
- Shortage of skilled farmers and family farmers leading to farmers leaving the land
 - Need new to extend farming skills to the next generation
 - Increase in fire hazards – people, property (e.g. Margaret River Fire)
 - Resources – lose farmers, lose fire fighters, lose community
 - Not involved in landcare
 - Subtle changes
- Development – agricultural zone being rezoned non-agriculture in Margaret River
- Foreign ownership
- More intensive agriculture
- Government – lack of understanding of agriculture
- Planting of trees
- Increasing populations taking over productive land
- Increase in migration of urban population e.g. hobby farmers/large land owners
- Due to change in age population – lifestyle
- Climate change – moving from Perth to Augusta
- 40% dairy cows moved south
- Number of young farmers 7 out of 37 farms in Nannup have a succession person – decline in young farmer willing to take over
- 50% of all farmers will change hands as the farmers too old (10 years) who will be the new farmers?
- Change of ownership from Australian to Foreign
- Concern with changing climate and food security (Fly in Fly out)
- Huge amount of red tape – farmers can't cope, with workload
- Reduction in surface water flow due to reduction in rain

- Effects flushing of river
- Alarming rate of dieback and canker
- Existing knowledge of farming systems needs to be transferred
- Current dairy industry – big industry – larger companies moving in
- No social infrastructure outside of Margaret River
- Scott Plain – dairy industry moving – foreign employees no local employment as they don't want to.
- Shift from Agriculture to mining – people don't train in agriculture
- Lacks of skilled workers in agriculture – farmers employ unskilled workers.
- Paperwork, paperwork, paperwork!

What will climate change look like in the future?

- New energy sources e.g. methane from dairy effluent or wind
- Existence of local community group – proper administration and community group
 - Why do SWCC have staff doing similar projects? Use contact lists
 - Competing projects
 - Invitation to local
- R&D attached to local LCDC's
- We need funding at local level for projects
- Streamline process
- Impact – if we have a drying climate – look at the crops and pastures we grow – use new species.
- Agricultural shift – benefit
- More people in the region increase in effluent
- Need social infrastructure put in place
- Recharge – storage of water

What are the important points of change?

- Water availability and quality
- Thousands of head of cattle and sheep moving from Wheatbelt to this area due to lack of dams
- Water allocation for industry specific (e.g. horticulture, agriculture)
- R & D into water options
- Make local land more productive
- Increased temperature – locally much lower
- Grapes have moved south
- Decrease water logging – only some in winter
- Local inlet would be affected
- Native vegetation affected
- Tipping – evaporation rate which makes this are better for irrigated farming
- South west is the premium food bowl of the state. It has stable weather and more water.
- There is no strategic support for this (ag in the region – DAFWA is not helping and researching)

- Social infrastructure is critical
- Biodiversity Hotspot – SW region.

GROUP B

What changes have you noticed over the last 15 years or so?

- Pink and grey galahs are new to the region
- Sulphur crested cockatoos are increasing rapidly in the Margaret River and Busselton areas
- Long billed corellas are increasing in numbers and doing a lot of damage
- There has been a decrease in the number of orchids from when I grew up as a child going “orchiding”.
 - Fire regimes encourage some orchids and discourages others
 - The seasons are changing and this also changes the range and numbers of wildflowers (2013 was not such a good wildflower season as it was cold for so long)
 - Fires promote colourful orchids such as spider orchids and cowslips
 - Leak orchids grow in rotting vegetation so decrease with fires
- Increase in numbers of kangaroo
 - reduces the numbers of orchids
 - roos are really hammering the bush
 - more hobby farms are leading to more roos as they have feed available and low stock numbers and often encourage the roos
- Increasing numbers of emus
 - 20-25 years ago the emus were relatively rare
 - they started coming in after the severe drought in the eastern Wheatbelt and have stayed and increased in number
 - A suggestion was to shoot but farmers have to obtain a destruction permit to shoot the emu and they must leave it to rot.
 - Aboriginals could harvest them but there is not enough money to do so
- Massive loss of peppermint trees – at Gelorup the peppermint trees are dying. One landholder found if they cut the top half off the trees they could keep them alive
- The water level in this region has dropped 8 metres
- Peppermint trees did not exist in the Augusta area (further south than Gelorup)
 - so they are viewed as an introduced weed
 - not palatable to stock so they come up in grazing paddocks
 - They are a pioneer species like Bosia
- Arum lily is now naturalised – could be used as an export industry but one group member had been declined a harvesting licence because it is still a declared species.
- Land has been rezoned from agricultural to conservation WITHOUT COMPENSATION
 - The landholder is still liable for rates, and continued management of the land
 - But is not allowed to derive and income from the land
- Constantly told we represent the past of the shire not the future

- New weeds emerging – grape vines are spreading in to the creek lines
- Some plants come here and ‘niche’ in like three cornered jack, arum lily, doloscopy
- It is a bit like the 7 headed devil – control one weed and another takes its place.
- Weed control is reducing due to cuts in APB & DEC and because 24D effects on operations
- Grass fires more flammable than bushfires
 - More dangerous than bushfires
 - Grass fires fast moving
- Things happen with the best of intention but end up being a problem
 - E.g. rabbits – the system has now adjusted to them
 - Snakes, goannas, foxes and birds of prey control the rabbit numbers
 - Ferals are now part of the system
 - When calici virus came through and reduced the numbers of rabbits – the animals that preyed on rabbits began to break into chook yards and attacked sheep for food
- More tiger snakes than 15 years ago
- Manage to equilibrium NOT fixed systems
- When of number are controlled and reduced it leads to an increase in cat numbers
- 1980 when foxes were harvested for fur numbers were kept in check then when out of balance when the trade stopped
- Feral deer and pigs (most in Scott River area) – the deer came in over the last 10-15 years – they are mostly fallow deer but there are some red deer too.
 - France has an open season on pigs – maybe we could look at that
 - In US white tailed deer have a hunting season – of the 45000 they allow 10000 to be shot
 - Black market pig shoots
 - Shooters plan pigs in WA bush
- Large areas of forest in the area but none as it was
 - people go out there to dump garden rubbish – I have noticed fruit trees in the forest
 - cut fire wood
- Impact of tourism down here – they don’t understand and don’t know how to care for NRM
- Margaret River is a party town
- The district is Margaret River centric (but 80% on shire wages)
- Community funding goes to Margaret River then Augusta – leading to community disenfranchisement
- Next generation – attitudes are changing
- Very little farm succession because very few kids are coming back to the farm
- Feel isolated – especially youth (22-26 year old boys)
 - Don’t go out much because not into drugs or surfing
 - Sport is good but often clashes with farming operations
 - As farmers we think differently – sit back and observe instead of quick reactions
- Farmers are creating a vision of the landscape and future
- Few people really interested in what went on before

- Head of viticulture said public there was nothing at Margaret River until the vineyards started
- What the farmers produce is REALLY needed food – dairy and beef
- Area of farm land is reducing
- In reality we are only 20% developed on our farms – need money to develop further
 - Commonwealth and state funding for R&D
 - Could increase production on the land we already have and not get bigger
 - Support DAFWA
- Fruit farmers in the region are very progressive
 - they go to the US to get ideas
 - Not able to hand over the farm – no succession and no superannuation
- Open bushland is changing
- ORAL HISTORY could be got from Bill and Kitty Darnell (Bill senior come to area in 1922)
- Farmers are independent, risk takers and need to have the ability to move – government, large corporations and bureaucracy takes the mickey out of the next generation

HOW WILL A CHANGING CLIMATE IMPACT ON THIS REGION?

- Tourist fishing –
 - Depleting fish stocks and changing the types of fish
 - Collapse in sardine fishing at Penguin Island said penguins are looking for food
- Massive coastal erosion there were 4 storms in 2013 with over 8 m high swell events which is almost unheard of
 - Capel and Harvey shires have lost kilometres of fencing along protected dunes which have been washed into the ocean. Ocean coastal rehabilitation ended up in the ocean
 - Now working further back to protect areas – will need to think about where to do this in the future
 - Expect more frequent high energy storms
- Farming increasing risks because of erratic seasons start and finish of season causes increase risk
 - But rate of grass growth because it is warmer when it used to be cold and gloomy and raining now it is more productive
- Shortage of water in streams and creek lines
- Insect attack – black beetles have always been around but now they are impacting on production
- Fire risk to new arrivals with bush around
- Most change is a result of increased information and technology – proliferation of information
 - take stock of noticing photos
 - early settlers logging we would be horrified
 - climate change don't go into a frenzy – look at it with a workable manner

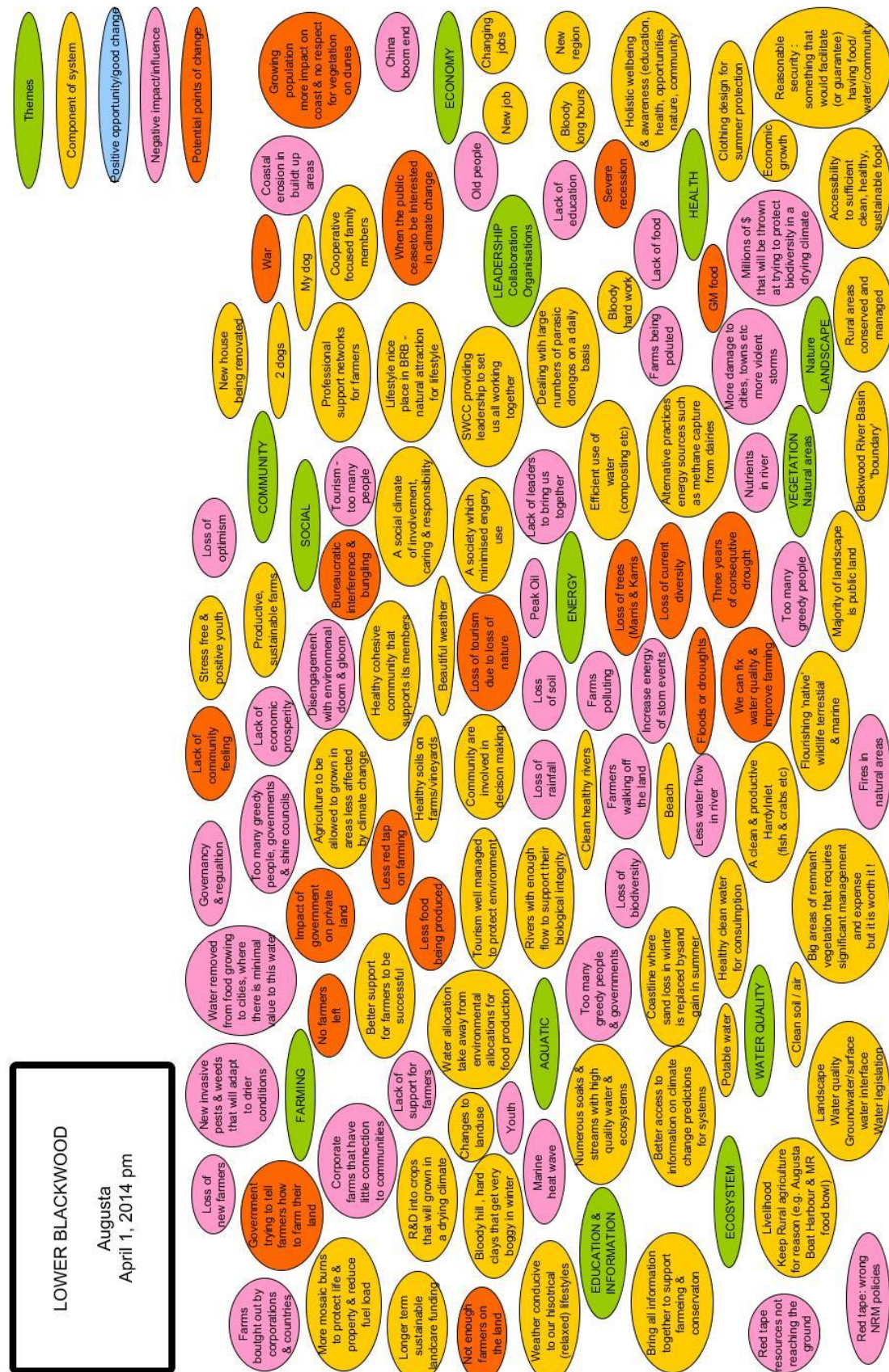
OPPORTUNITIES (Combined group)

- FARM
 - Grow as much grass on farm as possible
 - Affordable growth
 - Major problem hardpans – need realist advice
 - Need help from DAFWA and experts – we have been told we can rip the hardpans but they just close up
 - We used to have research stations but these have gone so there is no R&D
 - Robotic dairies
 - grazing (harvest grass and bring to stock)
 - irrigation
 - composting
 - methane harvesting
 - effluent as fertilizer
 - different species of plants and grasses for forage
- Off-farm
 - Marketing – fair price for fair work
 - Government wants cheap food for population (then they buy widescreen TVs and boats!!)



A photograph of the systems diagram developed by the participants at Augusta

FIGURE 9 LOWER BLACKWOOD SYSTEM DIAGRAM (Afternoon)



2.3.2 LOWER BLACKWOOD BASIN GROUP (Evening)

Location: Augusta

Date: April 1, 2014

Time: Afternoon 6:00pm to 8:00pm

Group

The group was a well-informed older group including a female farmer. A mix of established farmers from the region, two retirees who are shire councillors (including the shire president), and interested locals who have noticed the change over the last 20 years, and do not like the impact of increasing population and the changes they bring.

One member of the group had been exceedingly busy and said he would not stay long as he had just arrived back from meetings over east and would be at functions every evening this week. His needs were acknowledged and he was thanked for being there as long as he was able. He stayed for the entire process contributing key components and at the end said 'You did well to keep me here' showing the process was an engaging one for him.

Process

Drew a picture of their system there was a slightly different approach used this time as they were asked to pictorially draw their system. They easily identified the components they saw as important in their area. One gentleman jumped into drawing quickly while others were a little more reluctant and with the input from others the diagram developed reasonably well. We stayed as one group which worked well as the members fed off each other.

Engaged well in identifying what they saw as important or identified with. They were well aware of their environments and the changes which had occurred in the area over the last 20 years. The group then clearly outlined the changes they saw would come with a changing climate. They were quite detailed in what they had noticed and many of the changes identified were of concern.

View of the Catchment

This group did not have a clear outline of where the catchment went but it was reasonably local extending inland from the coast to the farming land and forest beyond and down to Scott River.

Points of interest from the session

- Cows are not growing winter coats as it is not getting as cold; not getting as many frosts in winter. The heat in summer (over 38°C) is killing cows.
- Changing tidal patterns in the river – dolphins are seen much further up the river, indicating the salt water is going further upstream.
- Concern over development in the region.

Community responses

What is important to you in your landscape/area/home?

- Lack of traffic – quiet near my home is important to me
- Soils – the alkaline soils mean we can produce Lucerne
- Love the bush – peppermint trees and orchids
- Land, ocean and trees
- Bush – uninterrupted, if mining was nearly – no or development (population)
- Conservation area decided that these areas were not suitable for agriculture and were rezoned so that agriculture could not be carried out on them
- Love the climate, forest and lifestyle – the pace of life is better
- Had enough of hot weather and humidity in Perth
- If we lost our South Easterly it would be very uncomfortable.
- Climate was the most significant reason for coming to this area - ground water was necessary (if we cannot produce food we will have starvation in 60 years)

What have you noticed changing – over the last 15 or so years

- Increased numbers of kangaroos and emus – farms providing water and food and the animals can hide in the blue gums
- Change in the birdlife – red wattle birds – November they disappear (usually they stay)
- Got white corellas and pink galahs – last 20 years
- Less rainbow bearded, top notch pigeons, chats
- Definite changes in bird populations
- Marron disappearing – since the flood in 1982 (flushed salt down the river)
- Dolphins and crabs are found further up the river
- Dolphins seen as far up as Alexander Bridge = salt water further up the river
- Less frosts
- Cows don't get winter coats – they used to be quite woolly but this has declined over the last 15 years – maybe they have adapted or might be change in diet (more grain feed leads to higher core temperatures)
- Sunnier coast – weather patterns changed – more sunshine
- Used to have gale force winds – 6 to 7 years without
- Warmer winters – changing direction of rain – west now N/W
- No frosts in winter anymore
- We used to have 60 inches of rain and now 45 inches – significant reduction in 20 years
- Other areas nearby are consistent
- Blue gum impacts – no water on ground – draining gets away so less water lying round
- Crazy rain patterns
- Heat and humidity are higher – Cows die at 38' – Jerseys are more tolerant – a few years ago lost a cow when temp got over 38', someone near Busselton lost 5 cows.
- Get evaporation from centre pivets and the irrigation increases humidity

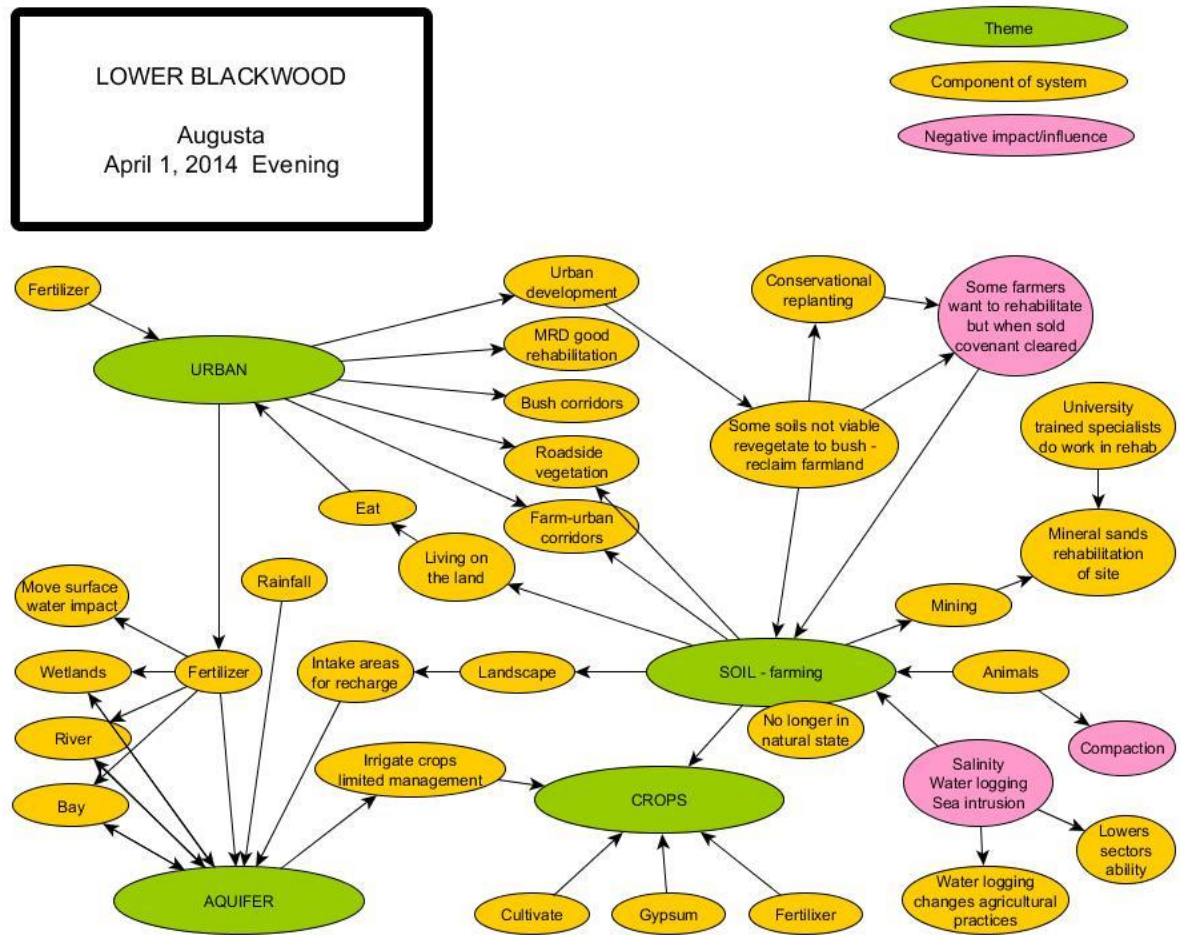
- There were possums and native cats – now just feral cats and foxes
- Less banksias than there used to be – the bush is changing – thicker now less burning
- Low risk fires that don't work – fierce fires more natural
- Cost of energy – sun and wind (talked about examples that didn't go ahead) (Government not supported)
- No incentive – link into grid to put in energy
- It affects the GRID – the GRID would lose money
- Hot fires might help get rid of dieback??
- Nature would have sent lightening fires in autumn
- The same would happen again if we get the right conditions
- Now DPAW light fires in spring and the birds fly out of nests in trees
- People used to light fires around Scott River as no one lived there but now areas have not been burned for 23 years
- Broad leaf grass/forb used to grow animals loved it – gone now
- 09 was a wet year – rainfall fairly consistent but the average temperatures are coming
- This last November was the hottest on record
- Moved from Boyup Brook because of rainfall
- Noticing similar things – no science but noticing
- Summer sun has more bite causing sun damage in fruit
- Putting up shade cloth to protect fruit & vegetables

What will happen if we had Climate Change?

- Population increase
- The Wheatbelt will be a dust bowl
- Maybe growing wheat at Scott River
- We will evolve – adapt to agriculture
- Increase in 3' will animals
- Super towns will move down the Coast – Busselton will have the biggest growth
- Water in Manjimup deteriorating
- Forecast that by 2020 Yaragadee water supply runs out for Manjimup
- Shire happy to have water supply into Augusta – comfortable it is not going to Perth
- In Margaret River waste water is utilised – water school and town ovals
- Roads – haven't got resources to upgrade and maintain – built up over 40 years ago
- Nannup do small strips beside their roads maybe MR shire could trip this
- Vehicles getting bigger, roads not build for it
- Planning – key areas – Local Planning Strategy
- Bypass road – Margaret River
- Blocks made smaller – but bigger blocks selling better 30% higher development
- Augusta – 950 lot subdivision and Ellis estate – not sustainable
- Future – high density housing
- Extensive Toad Network – most development infrastructure in place – Augusta
- Sea level rises leading to flooding

- East Augusta low (flooding)
- Population influx – retirement base
- Young people in Bunbury, Perth etc.
- If population comes so will jobs
- Population control – should be discussed
- Dependent on how extreme
- Fast travel – FIFO – Busselton
- Commuting – traffic now to Bunbury – use of fuel – driving for granted
- Developers – Leeuwin Naturaliste Plan
- Irrigation for farming will be needed
- Reduction in Climate extend our seasons – the warmth means we get more grass growing
- Increased sophistication in farming – trying to meet regulation - drive farmers out – because it is too hard
- Look after ground water – water for this area is important (food production, living etc.)
- Don't seem to be planning for water or power
- Population density increasing

FIGURE 10 LOWER BLACKWOOD SYSTEM DIAGRAM (Evening)



2.4 LESCHENAULT CATCHMENT COUNCIL

2.4.1 LESCHENAULT CATCHMENT COUNCIL (Afternoon)

Location: Bunbury – Management Committee

Date: March 18, 2014

Time: Afternoon 1:30pm to 4:40pm

Group

Well informed, community focussed people, with high level of technical skills. An all-male group, and with the exception of one the rest were older well established community elders.

Process

Being very technically focussed they moved quickly through identifying components of the system, did not work together to build a system instead it was more just putting items on a page. The group was split in two for most of the workshop. While they were small groups it allowed participants to give more of their ideas. They were also very powerful people and did not agree with each other's approach, partly because they arrived at their decision making quite differently.

View of the Catchment

The participants thought in terms of the whole of the Asian area, and battled to stay within the local region for a system as they saw influences and impacts from a much wider area. They automatically thought in systems not components. However when asked to draw connections between the components in the diagram they did not warm to describing a system, but jumped straight to change processes.

Points of interest from the session

- Do not need more information about climate change.
- Wish we had done this process two years ago
- Climate is a moving target – it changed after 1969 when our annual rainfall fell from 50" a year to 34" a year.



One of the Leschenault Management groups discussing how climate change could impact on their catchment

Community responses

GROUP A

LANDSCAPE

Where are we now?

- Inconsistency of government management of, and investment in, and value of the environment
- Key element of the whole system now is The Cut – it has failed and isn't doing what it is meant to do – need to be redesigned. This is a major issue for the natural landscape and natural system. Not flushing not doing its job.
- Rising sea levels and increased wave action impacting on landscape
- Ministers make decisions without consulting key people like DG's of departments – they used to consult.

What have you noticed changing?

- Environmental care has gradually become less of a government priority in a series of steps.
- One off grants, as opposed to sustained government investment in community projects
- Community value of the natural landscape

Where are we going?

- Need to better market out special places as tourist attractions, if done properly will drive more value of our natural capital
- Value in telling politicians what we really think – need to lobby for change
- Degradation
 - Salinity
 - Deforestation
 - Etc.
 - All well mapped
- Need to optimise soil health and build on what we currently have.

What are the important points of change?

- Government intervention / government change is needed
- Need a cultural shift to increase the value of natural landscape
- Looking at mining differently – needed value adding to generate jobs, and really to re-invest this in environmental management
- Competitiveness of mining needs to be value added to allow us to capitalise on this
- Integration of cultural and livelihood into natural landscape tourism

Fifty year scenarios – what does it look like?

What will climate change look like in the future if we do it well?

- Need local champions to best 'sell' their natural area and present them. Very much related to lifestyle
- Need to invest in our natural capital and be ready to sell its value and importance – i.e. how beautiful the South West is – i.e. tourism.
- Also sell and market local produce
- Need to consider lifestyle of the 'rich and famous' not just the locals
- Need to tie the natural landscape intrinsically into the dollar value of the South West – this will encourage better management in the face of climate change threats
- How?
 - Demonstration
 - Attraction
 - Knowledge
 - Knowing what's there
 - Knowing what's changing
 - Making decisions about whether it's vulnerability means intervention or not and how much is needed or not needed
 - Information will help make decision and undertake risk analysis
- Need very good analysis of risk = very accurate future predications for how to manage it (this relates very much to the landscape and not so much lifestyle directly – i.e. biodiversity)
- Then do cost-benefit analysis to compare 'do-nothing' to 'do-something' scenario
- Need to do this for the whole system, not just individual species

What will climate change look like in the future if we do nothing?

- Need to map well areas of vulnerability and resilience
- Can't just concentrate on the downstream end – need to consider the whole systems not just one bit.

LIFESTYLE

Where are we now?

- 'Head in the sand' - we are in denial
- Eco-education is a recognised need in schools, but it doesn't seem to go much higher. Tends to be less than is needed
- 'age thing' tends to be older generation currently driving the environmental initiatives, then there are the kindergarten kids, with big gap in the middle (reverse bell curve)
- Task orientated population – rather than long-term commitment orientation
- Salt water intrusion impacting on the heritage and recreation features of Bunbury i.e. Cathedral Ave
- Landscape impacts on lifestyle and species slumping into rivers – impacting on recreation and housing.

What have you noticed changing?

- Less connection to the environment, whether natural or social due to urbanisation
- Changing demographic (more 'Perthies' coming down)
- Workforce – FIFO using Busselton airport rather than Perth

- Population growth – going to double
- Increase in traffic movement
- Expansion in residential and industrial development
- A lot of investment in a future that may or may not happen, at the expense of considering the present “Devil’s halo”
- Increased absentee landholders
- The way that people ‘use’ ecosystems – change in the nature of recreation, -4WD’ers as opposed to bush walkers and bird watchers.

Where are we going?

- Busselton is 3 feet above sea level and protected by floodgates
- Prolonged periods of high sea levels and flooding
- Saltwater intrusion is increasing and staying above surface for longer periods
- Increased stress on agriculture and land forest (i.e. Wellington discovery forest) this will impact on water systems on which people depend (recharge aquifers for drinking water)
- Longer periods of continued stress and stress aren’t recovering
- Increased evapotranspiration
- People love lush forest, but will it be around?
- Impact on local amenity

What are the important points of change?

- May have already reached a point with our coastal forest – lack of connectivity of forest systems in the urban development areas of the coast (i.e. Banksia)
- regulation outside of regulations (i.e. Water Corp & DOW) too many bores, too close together
- not managing water treatment plants
- major ground water or surface water contamination event
- globalisation of food production – livelihoods in agriculture will become very dependent on brands → international ownership impacts
- legislation to protect agriculture

Fifty year scenarios – what does it look like?

What will climate change look like in the future if we do it well?

- Attract people to more of this good monitoring
- Need really good monitoring and research in to key indicator species and indicators
- Specified and well mapped areas identified as productive agricultural land, biodiversity and other pursuits (adaptation) – not the same way we do things now, but other ways of doing and conserving
- Deciding what to save – rather than what to hold back – survival of the fittest
- Dairy farms use a lot of high quality water – need to reallocate this and more efficient use of water and land
- Do some research on the land use capacity of the Scott C P – could be the next food bowl (opportunity)

- Need to do an analysis of what is needed
- * Can't do anything until you know what is there and what the tipping points are
- This could be why the data is so important

What will climate change look like in the future if we do nothing?

- Three options
 - Do nothing and hope for the best
 - Hope things work to intervene
 - Impose legislation
- Could see another major demographic change in foreign investment – it's starting to happen now.
- Adrian Egan – talk to him about R&D opportunities at the Wellington Discovery Forest

GROUP B

LANDSCAPE

What changes have you noticed in the last 15 years?

- People waking up to what happened in the 70's (the climate changed from 1969)
- Rainfall since 1970 only a few years over prior average
- Inconsistent
- The department has the gauging station in Collie further east so may have changed the local weather recording
- Temperate for Nov, Dec, Jan, Feb
 - 1 °C hotter each month
 - 1°C cooler at night
- Everyone has adapted – people learn how to farm
 - Knife points = no run off
 - Old fashioned farming – mayhem
 - West of Wagin couldn't crop before 1970 because too wet
- People will adapt to change
- On-going research needed - varietal improvements
- Many of those present had watched the land being cleared, farming systems developed and then modifications of the systems
- Dams don't fill now because cropping systems have changed reducing runoff now need roaded catchments
- Not spreading risk used to have pigs and cattle and sheep
- Drier → bush fires ↑
 - Community need to realise that you need to burn
 - Up to 7 tonnes per ha of stubble burns on terrible hot days out of control bushfires
- Rivers not running the same (not as much)
 - We have a river that ran every year July to November – it now has intermittent flow
- People sucking more water out of the systems

- Rainfall in Bunbury has dropped especially early in the season
- If burn block and take out undergrowth → weeds growing → ↑ weeds (controllable)
- Need to keep the fuel load down
- In nature not so intense now really hot fire → ↓ animals
- MANMADE changes are much greater than climate change.
- Climate has not change significantly in the last 40 years
 - Big changes in weather 1969 to 1975
 - Suggest they clear a roaded catchment into the Collie dam to get runoff
- City folk waking up to the effects of climate change in the last 20 years
- Too many people on the earth – too many sheep in the paddock

What is changing?

- This has all happened before – they are mining sea shells in inland sand
- Human impact greater than climate change
- More & more & more people in the world
- Pits in Collie – over the last 15 years there are more and more people coming for recreational activities
- P
- General public not terribly concerned about climate change – we are evolving our farming practices but people out near Westonia are getting worried because they are getting one good year in five. They used to get two good years in five.
- We changed 35 to 40 years ago – we had lots of rain. 2010 was a shocker almost as bad as 1969.
- We have got smarter
- If prices for livestock were to consistently go up then there would be a swing away from cropping.
- Loss of animal husbandry skills (esp. in younger generation)
- Clash between volume of people and resources
- Water for towns, environment & industry – four times more businesses working with less available water = will lead to problems
- Water use pre household is much greater today
- People don't get their own water in urban areas – they could have tanks and save water
- Cheaper to turn on the tap
- Landline – showed photographs same sized water pool now as it was 75 years or so ago.
- Drier and warmer
- Coastal areas – water level will rise
- Landscape – low ground inundated with water?
- Vegetation is drying – trees are dying (not sure if it is climate change but definitely noticing dying trees)
- Bunbury area is warming up.

What are the key drivers or tipping points?

- Population vs resources
- Irrigation only – where is the pressure – use water wisely
- Urbanisation
- Dardanup loam being built on
- Water?
 - Use of ocean water
 - People using water recreation and abusing it
 - Desalination plants – costly but effective
- When we get smarter and use solar
- Pressure on the environment, food and water
- Having a voice – country views
- Everyone wants instant results
- Using local community to make it happen
- Genetics where do we stop and start (breeding vs GMO)
- No spare cash to do fence lines etc.
- No good years in farming providing the ‘break’ since 1975 (usually about every 25 years)
- Farms need to get bigger to survive
- Get the message out SWCC & LCC

What could we do better?

- Key areas
 - Planning - good planning rules
 - Water use
 - Urbanisation – growth mentality (bigger is always better)
- Use of fracking – miss information out there – it could be really good for cheap energy
- Need cheap water for agriculture to produce food (water cost increased in city)
- Focus on a stable population (not increasing)
- Things are slowly happening – e.g. use of electric cars (even in race circuit docked for high fuel consumption)
- Humans adapting

Where are the key risks?

- Ill-informed pressure groups – what is realistic and what is miss-information
- Most farmers are conservationists
- Can't maintain lifestyles
 - Service – we expect services as a right
 - Access to recreation
 - Aging population and cost will encourage people to move
 - This could be good as it may lead to regionalisation of older people (e.g. Bridgetown and Hyden)
 - Need a big crash or depression for people to realise what is important and where food comes from

- Urbanisation may reduce the capacity to feed the people
- Swing to cropping has reduced labour costs
- Use of chemicals – what are the long term effects?

What could we do?

- Education
 - Could run a series in the West Australian – 8 page handout
 - Would get good backing
 - About salinity
 - Aware of farmers' needs
 - Bipartisan support
 - Overwhelming support for levy – but court said no to environmental levy
- Need to do this now – too many people not enough resources – degrading the environment
- If public wants something they should be prepared to pay for it
- City environment
 - Emphasis of what the farmers are doing
 - How animals are treated?
- How do we get out messages to them?
- Knowledge of the environment has come from education
- Everyone has a responsibility
- Conserve water
- Cost of farming sustainably
- Broad based discussions how we survive in the future
- Link of City to Country – without country there is no city
- Human's footprint on the environment
- Use the Fitzroy and the Ord
- People in north will move east
- Pressure from people moving south will affect the waterways and forests
- Darkan needs people so moving there will create a positive effect (I hope urbanisation will expand this community)
- You have to value the country
- Legislate land areas – right to farm
- Heaps of land and plenty of water to grow vegetables
- Water should be saved for high value crops
- We don't need a lot of water if it is used properly

Potential tipping points

- Population versus resources
- Irrigation only – where's the pressure
- Desalination plants – costly but effective
- Urbanisation
- Dardanup loam being built on
- People use water for recreation – the ones that abuse it

What could we do better?

- Planning
- Water use
- Urbanisation – growth mentality population increase → feeding the people
- Use of fracking – miss-information out there
- Need cheap water (but water cost increased in the city)
- Focus on stable population
- Things are slowly happening – sue of electric cars
- Humans adapt????
- Australian farming doesn't compete on a level playing field

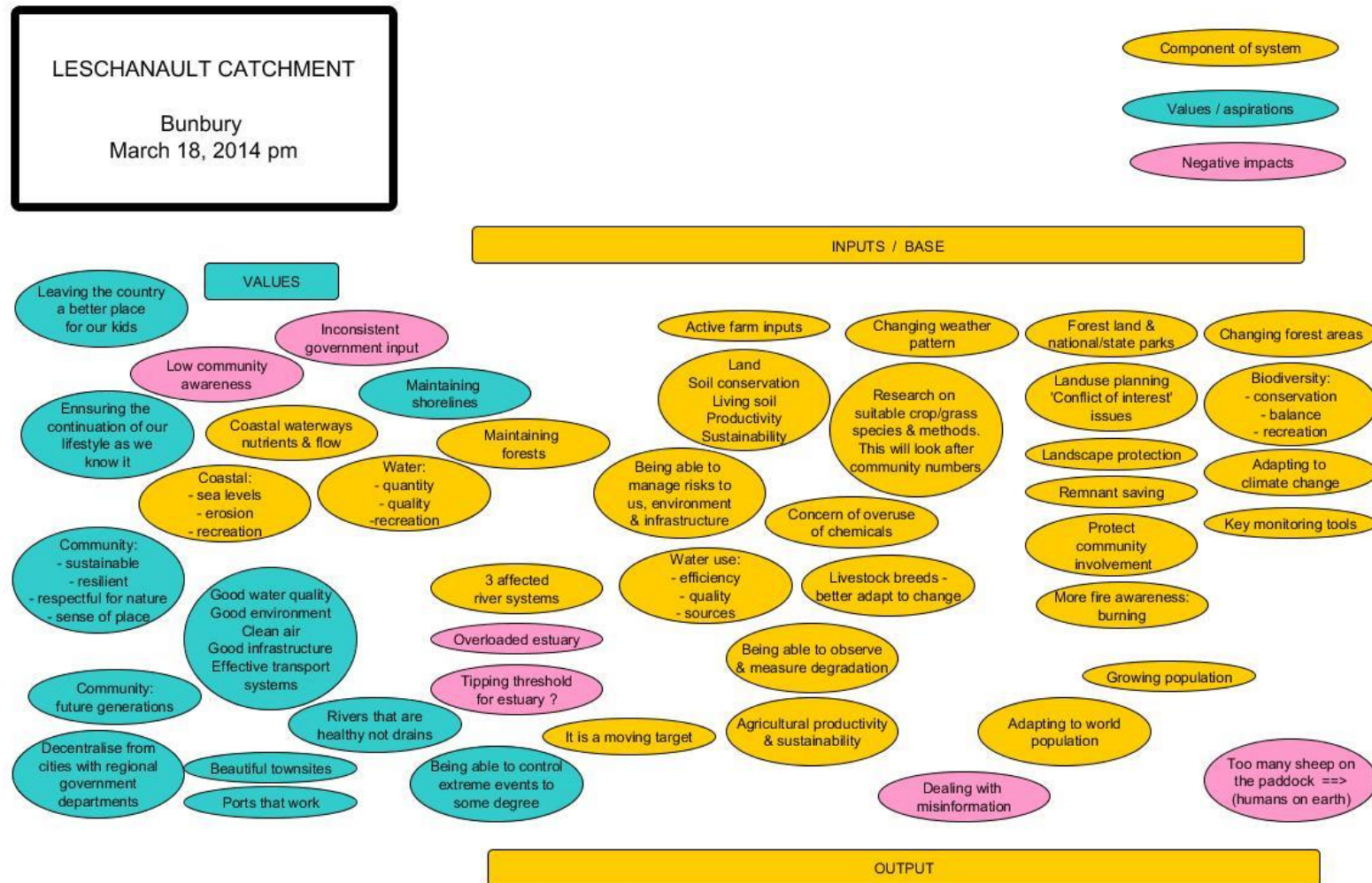
Where are the key risks?

- Ill-informed pressure groups – what's realistic/miss-information
- Most farmers are conservationists
- Can't maintain lifestyles (what part first)
- Service(we expect as of right)
- Access to recreation
- Aging population – cost will encourage people to move
- A big crash or depression
- Swing to cropping – labour costs
- If terms of trade pick up – return \$ to the town
- Use of chemicals – what is the long term affect?
- Where are the tipping points?
 - Water?
 - Use of ocean water
 - When we get smarter – solar
- Pressure on environment, food and water
- Have a voice – country views
- Everyone wants instant results

Who could help make the change?

- Getting a message out – LCC / SWCC
- Using local community to make it happen
- Genetics – where do we stop & start?
- No spare cash to do fence lines etc.
- Farmers – no spare cash to do the nice things
- Have more land to survive

FIGURE 11 LESCHENAULT SYSTEM DIAGRAM (Afternoon – Management committee)



2.4.2 LESCHENAULT CATCHMENT COUNCIL (Evening)

Location: Bunbury

Date: April 14, 2014

Time: Evening 6:00pm – 8:00pm

Group

This group was very politically aware and understood the impacts of government policy on the decisions made by people and businesses. For example why FIFO developed so quickly and the broader impacts on mining, the local community and the families involved. How government can use incentives (carrots) to drive change.

One participant arrived about 1.5 hours late just as we were on the rundown with the first participants. I took her aside to do a shorter session with her on her own. This was a really interesting experience as she immediately started telling me all her connections, such as she was an inaugural member of the Greens, that one of the senators used her house as an office and the protests she had taken part in. When discussing climate change all the 'commonly touted' information came to the fore with the 'correct terminology' such as increase in the severity and intensity of storm events.

Process

Being elders of the community it took a moment to warm up to the idea that we were there to listen as the participants came along thinking they would be 'told' what was happening. After a brief pause they began to draw their system around the farm, discussing the key external influences and implications as the diagram progressed. The following discussion was largely based on the structures under which people operate in the area (national, state and local council policies) and how these influence decision making.

View of the Catchment

While the catchment was local covering the City of Bunbury and the surrounding farm land but it was strongly influenced by the wider Western Australian and Australian economy.

Points of interest from the session

- The changes in fringe benefit taxes (FBT), the increasing power of mining worker unions and the cost of providing housing in the north of WA encouraged (forced) mining companies to implement the FIFO systems for workers. This has resulted in desirable areas like the South West of WA being targeted by cashed up FIFO workers. The impacts on the district are perceived to be mostly negative
 - Drives up the price of houses past the level at which local youth and those who would like to live in the community can afford.
 - Increasingly dysfunctional families in FIFO situations;
 - FIFO owners (and other weekenders) only in the area a short time and do not contribute to community activities
 - FIFO owners (and other weekenders) less aware of fire and other risks so put more pressure on locals. Issues with weeds, animal welfare and normal maintenance.

- There are of course benefits such as bringing in money to the area but generally the FIFO influx was seen as a negative.
- Government policies making farming difficult in the region (deregulation of the dairy industry, investment in wine causing a glut, increasing compliance rules, taking land for conservation, housing development on good farming land, rate increases) this leads to less income and interest by youth so there is little succession. Farming is a dying business.
- Could use policies to both regulate and encourage (carrots) better investment decisions, improved land use and more even distribution of community resources.
- Farmers are under financial pressure and many are choosing to subdivide a small area off the main farm block and sell to a lifestyle person:
 - The farmer then leases the main part of the small block back still making an operating income but does not have the asset cost.
 - These subdivisions drive up the price of farm land and limit the opportunities for young farmers to buy in.
 - In many cases the person buying the farmlet does not realise what living in amongst farming enterprises entails, and they put restrictions on normal farming activities (seeding creating dust, use of chemicals and spraying or noise). There has been an increase in the number of disputes in this area.
- Concerns over medium and longer term water use. In a drying climate people will want to /need to use more water for their business and personal use, as there is less rainfall this will mean increased draw from aquifers which in turn puts pressure on local vegetation and other industries.



Leschenault participants discussing the implications of climate change

Community responses

GROUP A

What have you noticed changing – over the last 15 or so years

- Rapid population expansion → faster than resources can service them
- Farming – lot of previously viable productive operations are now non-viable
- Lack of succession from one generation to the next
 - Lack of viability is why they are not coming back
 - Not attractive to young people
- Ag nearly becoming non-existent → deliberate government policy
- Increasing area of hobby farms → contamination through runoff, fertilizer from lawns and urbanisation problems
- Increasing number of FIFO workers in the region
- Urbanisation is having a greater effect than agriculture
- Urban growth but from mining industry
- As the mining boom goes up and comes down we get the fall out in this area
- FIFO driven by FBT – mining companies could not afford to buy houses and set up communities so if they are FIFO the airfares are not FBT
- Increasing social problems around the district
- Government concerned about the control of unions in the Pilbara → FIFO busted that- achieved an end to union issues and reduced FBT
- FIFO dysfunctional impact – leading to huge social issues
- High \$ so can afford lots and put onto HP but then cannot afford to leave
- Not as much going on in rural areas – more money made by subdivision
- Subdivision eating into agricultural land
- Subdivisions are pretty much uncontrolled
- Subdivide a small area off the main farm block and sell to a lifestyle person – then lease the main part of the small block back. These subdivisions drive up the price of farm land and limit the opportunities for young farmers to buy in.
- Suggest long term low interest loans (driven by treasury) needed for young farmers
- Review loan portfolio every ¼ - high debt in with 40 – 50% equity so the loan rate is increased to cover risk –but this is cyclic throughout the year for farmers.
- In New Zealand they have an average of \$7M of debt to \$12 M of assets – this is acceptable practice in NZ but not here.
- Hobby farmers put restrictions on surrounding farmers (e.g. noise, dust, chemical usage)
- Vineyards cause significant issues and more intensive development is causing problems. Getting a lot of build-up in Bridgetown, Manjimup and Boyup Brook
- People controlling law – DEC are not realistic – firstly Barnett red tape committee but they did not remove the choke points. Bureaucrats have a lot of power.
- Lots of ibis killing trees and in feed lot affecting beetles – the ibis are in the irrigated pastures all day picking food and then roost in the trees at night
- Birds are moving from the Wheatbelt to the to the coastal plain – as a kid I did not see pink & grey galahs or the white cockatoos

- Rainfall according to BoM is falling (1970 to 2000) getting less over the last 10 years dry
 - 40's & 50's were really wet years
 - 70's & 80' wettish
 - 2000-2010 more dry

What will happen if we had Climate Change?

- As rain water decreases → pump more out of the aquifer → lower aquifer → may mean salt water comes in
 - Shallow aquifer leaching of nitrates into the aquifer
 - Needs wet winter to recharge
 - Waste money on preparing Yaragadee – better to spend money on encouraging people in metro areas to be water savvy and put in rain water tanks
- Sea level rise – I go to the beach on a regular basis and enjoy the iconic cathedral of fresh water paper barks.
 - There have been saltwater flows over the road during king tides – so I realise sea water rise is happening
 - Perrin Naturalist Group estimate the sea water will rise 0.9m in 100 years
 - Sewers will go under water
 - Properties at Pelican Point will have boats tied at their back doors
 - Port Geographe will be flooded
 - Sea level rise will impact soft sandy coasts
 - Extra depth over off-shore reef
 - Won't break waves the same and may lose surfing
 - Sell over the top → tremendous damage to shore line
 - Sand will go because current will take it out
 - 2100 whole along the Peninsula will disappear
 - During Cyclone Albi there was water washing down the main street (Bunbury)
- Good for fishermen – plenty of water – more water rising sea level
- Good for people/animals/insects more to more suitable areas unlike plants
- Should have bought a block of land at Lake Kununurra
- don't need to put that much pressure on our future generations
- If climate is changing can politicians keep up – who can make the most money out of this?
 - It is common sense to manage the issue
 - Politicians listen to votes
 - Community has needs
 - Politician say newspapers want to hear → newspapers → people
 - We need knowledge of the debate → community takes responsibility
- Depends on carrots
 - Business primary objective is to return profit
 - Solar panels 150KW unit is a large investment and could fail (I like to be second runner – first runner sorts out the issues)

- Good government incentives – such as the solar panels on homes – but too many people subscribed so they cut it off instead of just reducing it to meet the market
- When we make an investment we want a return – but if policies are not well
- MIS schemes make blunders.
- Climate change will not change for me personally – summer hotter – great to have hotter winter
- Concerned about grandchildren – have had an increased standard of living – it is more than we can afford so maybe we should go back to what it was like in the 40's and 50's
- People not terribly engaged – came up very strongly tonight by not turning up

Opportunities

- Solar panels
 - Looking at a commercial solar system using current technology to convert to 240V
 - Currently pump water during off-peak power at night time – with direct solar power could pump during the day time for drawing water and irrigation
 - Effect the amount of water use and might lead to a bit more evaporation
- 100% depreciation for dams (e.g. in the Wheatbelt)
- Business will chase carrots
 - be very careful what you hang the carrot off
 - farmers have a funny psyche and don't want to pay tax so will buy a machine (investment incentive) to reduce that tax bill
- Conservative farmers don't get caught because don't have a lot of debt and only take on additional debt when needed. Some realise it is very expensive to buy second hand machinery and fix it – but now labour is very expensive so best buying new gear and reduce R&M costs
 - minimise tax – reduce R&M and reduce down time
 - interest is low but the dollar is high = able to buy new
- Carrots could be used to
 - Manage soil types
 - Grass specie choices and pasture renovation
 - Manage water ways
 - Bulldoze/clean out dams
 - Too much red tap now – need to jump through too many hoops
 - Wheatbelt should have integrated drainage system → but stopped by bureaucracy not allowing salt water to pass
 - 30 years control of natural drainage system – needs to be opened up to drain out saline water – needs some engineering skills
- Merry –go-round – deregulate everything but competition does not make it better – supermarkets have more power - \$25 M dairy industry deregulation of dairy's value went to retail
- Old folk put these structures in place for a reason – otherwise big guys gobble up the little ones.
- Politicians scared of the price of food increasing so try to keep cost of food low – if it goes up → CPI increases and politicians get the shakes.

- Soil is our basic resource and we have ruined it by running the country in a British system → impacts on farm viability so we need more and more inputs to get the same amount of production
- Soil degradation means that less rainfall is able to infiltrate and reduces the amount that sinks in.
 - Runoff stops sooner – need moisture to runoff to fill dam but also to remain in soil
 - Water resource and soil amelioration to increase water moisture retention
 - Leads to off-site benefits of ground water, surface water and biodiversity
- Government incentives work well and if properly targeted (e.g. Manjimup timber industry closed people affected had grossly exaggerated claims and local people did not get the benefits intended)
- LCC & SWCC make an impact – increasing chances of getting funding and people to make changes
- Community demand
 - Government incentives
 - Facilitation to get things to happen
 - (e.g. set up tree belts and plantation)
 - Could set up a rotary fund (initial person funded and then when trees fruit/nut/cut put a portion of that money back into the fund)
- Classic example of typical government cock-up – get out of old growth forest trees and into plantations. In the initial schemes the investors were limited to 20% of any one property planted to trees – not enough planted so moved to 100% planting → investments bought up wool belt farms because wool crashed and the tax incentives were available for planting tree. Poor use of tax incentives!
- Forest plant and wildlife have climate change will have an effect on them. Historically plants adapt but this is a much greater change so won't be able to adapt. – Pretty hardy Australian plants – they will adapt.

GROUP B

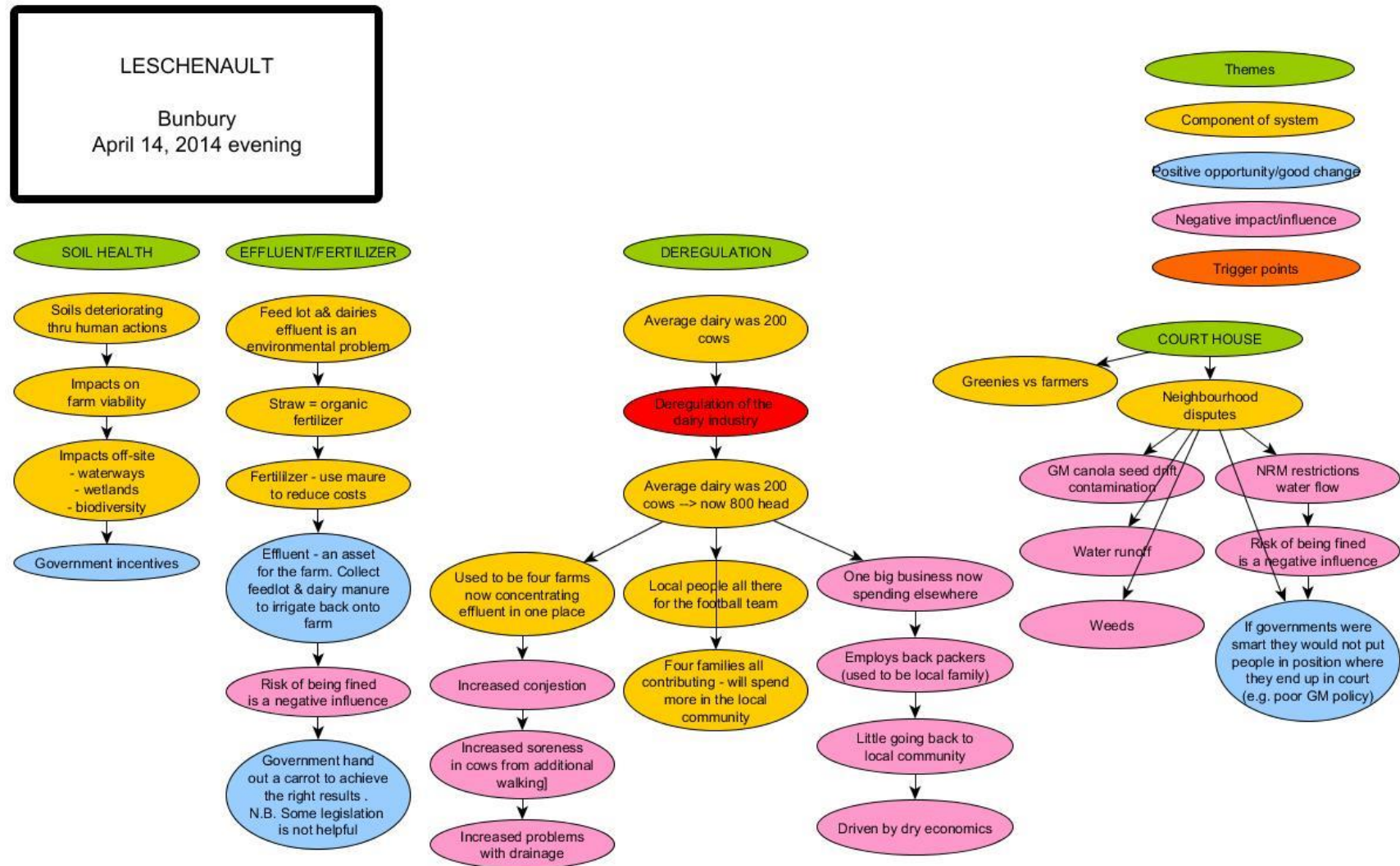
- I have just come from the forest alliance meeting with Beth Shultz
- Clear felling of the forest left earth such a mess after felling trees – seemed so illogical
- I used to take food to the activists
- City folk
 - Landscape of cities
 - Too much traffic → pollution
 - Huge amount of concrete increasing greenhouse gas emissions
 - Can't insulate them
 - Need huge air-conditioners
 - Building industry is a mess – huge buildings no charm (Geoff Kennett who came to SWDC for Critical Horizons said he had never stayed anywhere so totally devoid of charm in my life)
- Murdoch University workshop is measuring the effect of climate change on tree – and trees on climate change
- Almost nothing not affected and more than we understand
- Peppermint understory and fungi affected

- At the environmental conference all nations spoke top down except Africa who spoke bottom up
- Change is what most are concerned about but think
- It is too late
- Happening now in the Sahara
- Sea level will rise – an increase of 10cm will mean a rise in swell of over 1 metre. Islanders in the Pacific need to move
- 350 organisations are looking into this change

Opportunities

- Stop using fossil fuel – coal worse
- Use alternative energy – solar thermal
- Groups in town could supply their own power
- Wind and wave energy
- Be more frugal – most of the time I have only one light and the computer on so I have a very small account
- Use insulation and canvas blinds to reduce heat transfer

FIGURE 12 LESCHENAULT SYSTEM DIAGRAM (Evening)



2.5 GEOCATCH

2.5.1 GEOCATCH (Afternoon)

Location: Busselton

Date: April 3, 2014

Time: Afternoon 1:30pm to 4:30 pm

Group

The group naturally divided into two: the younger NRM professionals from government and NRM agencies and the community members.

Process

The group developed components of the system, grouped these components together then split into the two groups described above for the semi-structured interviews.

View of the Catchment

The view of the catchment was split between those who work in NRM and the agencies seeing it as where their job takes them outside of their home. It was almost limited to the projects on which they worked. The local farmer and those who had been in the area longer had a wider view of their area extending from the ocean inland to the farming areas.

Points of interest from the session

- The young NRM and agency professionals were new to the area, without this history it is hard to identify changes and therefore future direction. They were focussed on their jobs and the outcomes of those. This was not important and they had to leave before 4 pm (not the 4:30pm finish) because otherwise they would go into overtime. This is quite different to the approach of the unpaid community members.
- Concern about the rate, intensity and impacts of the rapid development of the region and how developers are getting more priority than the wishes of the council and long term locals for more moderate and less impactful developments. This is exacerbated as the development continues and those moving into the area do not understand the impacts leading to changes on council and more development.
- Comment 'Farmers used to be someone in the community – now they are a nobody'.



Geocatch participants identifying system components

Community responses

What is really important to you in your landscape/area/home?

What have you noticed changing – over the last 15 or so years

- Tree decline – marri & flooded gums & peppermint & tuarts
- Over the last 5 years
- Getting worse and not coming back
- Dieback – seeing it everywhere
- Used to be banksia now more species with dieback
- Foreshore bank erosion – more in urban areas – after storms and doesn't come back
- Spinifex disappearing
- Seagrasses covered in algae
- More prevalent now that it used to be
- One off storms events/autumn → severe, mini tornados, last ten years larger storms
- Less thunderstorms/ winter storms
- Drier, below average winters – 2000 was a 'lovely sunny winter'
- 2013 rivers were very high
- Farmers cutting hay earlier – changing farming practices
- Forested beach foreshore areas – canopy lighter, salt damage, system collapsing
- Weed encroachment, weeds entering areas where they weren't before
- People's bores don't last all summer any more
- Possums dropping dead in summer → less trees → less water and hotter
- Less wildlife
 - Less roos
 - Less birds
- Trees cut down and houses instead
- Increasing development
- Drier wetlands → reducing animal habitat
- Reducing fish stocks
- Increasing bandicoots
- Aquatic animals/fish numbers falling
- Less pools in waterways → fewer summer refuges affects animal numbers
- Birdlife
 - Wetland birds flying round looking for water
 - More birds in summer
- Species outside their natural extent
- Didn't used to be ibis here or cockatoos
- Less dung beetles in last couple of years – they were doing well before
- Increasing algal blooms
- Increasing sea grass in bay on beach
- Fish kills from storms
- Not so many tadpoles but plenty at Chapman Brook
- Plenty of frogs
- More fires

- Increasing intensity
- In wetlands
- Losing more homes
- Driven by strong winds
- Changed fire management practices
- Impact of burns on houses
- Port Geographe → reducing wetlands
- Old habitat trees in the forest die out – not so much regrowth
- Management of tuart forest has changed – it looks different to before
- Stronger Leeuwin current – blue whales back
- Increased ocean temperatures – warm water all summer
- Increasing number of stinger in bay
- Stingers at Meelup and Cowaramup and Smith's Beach
- Vasse River greener and shallower - used to be able to swim in it.
- More access to the wetlands used to be tucked away – now Busselton right up to it.
- Reduced stream flows
- Less gilgie in some places (e.g. Yallingup)
- Dams and barriers can stop stream flow – didn't used to
- Station Gully → reduced flow (Mary Brook & Nanny Brook)
- Drier climate has made other types of crops (e.g. olives) possible
- Roos loving the wetlands to death
- Wetland margins are suffering

What do you expect to happen over the next 15 or so years? / What will happen if we had Climate Change?

- Urban development
- Increasing population
- More housing
- Efforts to stop beach erosion have made things worse
- Lower rainfall
- Less rainfall
- Hotter temperatures
- Plant diseases
- Decline in habitat – possums trying to find habitat ANYWHERE
- Changed management practices
 - Water
 - Farming
 - Rivers
 - forestry
- Changed political system – e.g. carbon tax – people don't believe it
- Changing/moving goal posts
- Increased water usage
 - Irrigation
 - Bigger parks
 - Increasing population
- Intensification of agriculture

- Increasing number of vineyards
 - No ecosystem under the vines – sprayed
 - Were more paddock trees before
 - Lost old red gums
- Increasing sea temperature
- Increase in whale numbers
- More sharks
- Less seals
- Farming using more fertilizers
 - Policy lack of education for alternative ways
- Planning framework doesn't allow for keeping large trees
 - Planners/developers don't have to keep large trees
- Legislation – local planning policy
- Lack of belief in science, distrust in science – don't want to believe there is a risk or decline
- Need more awareness of issues, get out of old mindsets
- Kids are natural 'greenies' but tend to grow out of it

OPPORTUNITIES – What can we do?

- Campaign → polar bear holding a possum
- Corridors
- Be more responsible in
 - The home
 - As home owners
 - Community members
- Water-wise in the garden
- Own water tanks
- How to measure behaviour change – can't do this
- Older properties are good by when developers → opportunity to develop around this
- Campaign to not spend money on green verge grass
- Need to plan for revegetation way back from the coast (i.e. beyond the by-pass)
- If vegetation will change and move south – change planning to take into account the movement of vegetation with the drying climate
- Use water cleverer
- Being environmentally friendly can be costly

GROUP B

What changes are you noticing?

- Less rainfall and increased variability – 800mm used to be the average – now we get that in a wet year but the range is more 600mm -800mm. This changed occurred in the 1970's
- Not just total rainfall but when it falls has changed – rain now comes when it is cold (grass does not grow)
- Where it falls has changed – Margaret River and Augusta get more rain than Busselton (pattern of fronts has shifted)
- Big change in south coast rainfall where it has decreased by 5% but winter rainfall has decreased 50%
- Seasons finish earlier – less runoff into streams – down 40-50%
- Less waterlogging so the farm is more productive
- Reduction water as dams generally not filling
- Increased intensification of agriculture leading to greater reliance on ground water
- When started farming needed dam now intensive vineyard and crops so put down bores
- Urban expansion and particularly coastal
- Last 5 years worst coastal erosion
- Dunsborough initially then Busselton – pressure to clear land
- Developers pressures takes away local government preferences to retain farm land and bush land
- In filled with houses so the numbers of trees are declining in the urban environment
- ¼ acre block → now divided to 400m² → less trees → less possum habitat → less birds
- Corridors become important Geocatch established a corridor but developers take out the trees the Shire put in
- Western Power takes out trees to put in power lines
- 2001 new bushfire planning encouraged large scale clearing
 - Traffic congestion increased dramatically in last 10-15 years
 - → frustration
 - Original town was not designed for so many people
 - Public open space and parks → parking lots
- Public demand to put roads through wet lands
 - Vasse to Dunsborough
 - Ford Rd
- Pollution more vehicles, more congestion, more pollution
- Local government to make public open space worthwhile – payable → sold to build 5 star hotel
- Currently 100m set back but new foreshore development along Geographe Bay Road and Marine Terrace will be closer with 5 story high developments
- More money in town → \$1million houses
- Development / real estate culture
- 50 year old farmer was someone valued by community → now a no-one
- The Swan Coastal plain is very popular

- Increasing pressure from tourism
- Shire/city becoming a money making enterprise
- Events capital in last 3-5 years driven by local government
 - Noise pollution
 - Live a couple of blocks from town/beach/main street
 - Events block off town roads
 - Socially has a large impact
- Shire become an enterprise and things are getting done but
 - Not ground up
 - No community consultation
 - Often developer influences
- Jetty rebuilt
- Positive to see it rebuilt
- Negative – as locals we have to pay to walk on our own jetty
- Car park built like a groyne → erosion and eventually removed with Royalties for Regions funding
- Peppermint on foreshore lost 50% of their leaf coverage
 - Salt water intrusion
 - Drought
 - Evidence of a salt lens?
- Increasing level of tree decline
 - Losing a lot of older trees
 - Deep roots used to be in fresh water now in salty water?
 - Insect attack
 - Variety of phytophthora species
 - Marri decline
- We have a marine park now
- Whales in Geographe Bay have doubled in the last 5 years
- Increase in fur seal numbers at Bunker Bay and Cape Naturalist
- Increasing shark population
- More sightings
- More food around for sharks and seals
- More sting rays in Busselton
- More sea stars
- Reducing number of lots of fish (number and variety) now smaller ones
- Now have a marina with no take areas
- Can still fish off the beach but restrictions on boat fishing
- Professional salmon fishery has shrunk to 1 operation in Hamlin Bay/Bunker Bay
 - Economics
 - Restrictions on fishermen
 - No new licences issued
 - Salmon being caught for bait for crayfish
- Need to protect areas for specific use
- Temporarily prevented Perth taking water from Yaragadee
- Busselton water is now incorporated
- Vasse River - Change in water quality

- has blue green algae which it never had before
 - When kids would go paddling and boating and swimming in Vasse
 - Now can't do any of that
 - Retained water body at butter factory for aesthetic reasons (water feature) changes flow
 - Urban runoff
- Nitrogen in water way
 - Agricultural nitrogen fixed by legumes
 - To solve must stop farming
 - Exacerbated by nitrogen on farms
 - Shift from sub-clovers → ryegrass pastures → more nitrogen dependent
 - Related to soil type and water logging
- Urban-wise
 - A lot of urban areas are on rolling dunes with lakes built on coastal vegetation
 - Now European centred population lawn & rose gardens
 - Leaching sands put nutrients in to the water table
 - Type of people
 - Soil very infertile
 - Smaller block size - On large blocks keep trees → development = concrete
 - In Bunbury there has been a move to have more native gardens
- Busselton airport
 - FIFO
 - Changed social structure
 - Changed rental cost – people can't afford to rent here now
 - Young people (tourism support workers e.g. cook, restaurant worker etc.) can't afford the rent
 - → leave
 - →labour shortage
 - Used to be a large area for Homes West housing – now less areas for low socio-economic group
- More attention to recreation in bush tracks
 - Cape to Cape – last 10-15 years
 - Meelup Regional Park
 - Because more people → more cars
 - Areas use to go are now blocked off
 - Bikes are now a big problem
- Funding national parks to block areas and reopen up
- Not getting much funding for management
- Keep cars off the beach!!
- Intensification
 - Less dairy farms
 - Less farmers
 - = now an employer of people not a family business
- Geocatch encouragement of farmers
 - To fence rivers and revegetate
 - Farmers have embraced the initiative

- Over-arching corridor – river health
 - Awareness raising
- Wine explosion
 - Growing wine
 - Tourism
 - Entertainment
 - Dining
 - Cullen Cullity started the change in 1977
 - Beautiful National Parks before wineries – they were the main attraction
- Biggest attraction is still the coast and fishing
- Forest highway - quick fast access to Perth
 - Makes Busselton closer to Perth
 - More tourists / more development
 - More holiday homes and less caravan parks
- Western Mining did not go ahead to mine at Beelup Beach and there is a stall on coal mining
 - Community stopping coal and gas mining at Margaret River
 - Vineyards, DPAW, Commerce, LGA, whole community = legislation against mining
- Geographe catchment nursery growing tube stock
 - Local indigenous stock
 - Funded through City, Geocatch, Water Corp, DOW and now self-funded
 - Out of Busselton Cape to Cape volunteer group is very effective
- Local aboriginal involvement has been really positive
 - Move in last few years
 - Wardan Centre at Binjadup
- Increase in fire awareness
- Planning system for hobby farmers
- Could have trees → now need >20m round building
- Fire safety – good
- Feeling of bush and habitat – poor

How will a change climate impact?

- Vegetation changes
- Biodiversity will change naturally
- How much do we put into cockatoos etc.?
- But maintain connections
- Increasing impacts of sea level rises on shore line
 - Bunbury – Dunsborough – high interference from
 - Salinity
 - Urban impact
 - Groundwater level
 - → coastal erosion
 - Impact on current developments
- Demand on aquifers will increase
 - Can still get a licence for Yaragadee

- Leederville – fully allocated
 - Dunsborough supplements water from Busselton
- DPAW must engage social indigenous people in land management
- NRM natural progression for indigenous people
- Want more involvement in National parks
- Training, traineeships and staff employed
- More fires – increase in summer fires
 - Summer storms → More lightning strikes
 - More drying vegetation
 - Increased population not trained to fire management
 - → more likelihood of ignitions both intentionally and unintentionally
- More severe storm events with increasing severity
 - → flooding
 - More storm related erosion
 - Stock
 - Climate mild enough in past but future floods may be a problem
 - Now storm and high water levels in Leeuwin current
- Leeuwin current changing
 - Changing salmon coming into the Bay
 - Temperature warmer
 - Change in temperature seasonally but now going further south
- Sea level rise → flood risk high
 - Busselton drained in early 1900's
 - Now need to block drains to stop sea water coming in
- Balansa clover → increased production
- Increasing temperature
 - Karri forest gone
 - Jarrah forest moving south
 - Some new species from north east in South West
- Warming effect on farms
 - ? use different stock
 - Intensification bring in fodder
 - Change crop → might grow wheat
 - Used to be water logging → opportunity to grow other crops
 - Agriculture will continue but change management
 - Only go if urbanised
 - Or goes into development

Key points of change

- Vegetation decline
 - Beginning to lose species
 - Being replaced by others
 - As trees go so will the animals
 - Universities seeing signs of some species being resistant to pathogens
 - Research into why those plants are resistant
 - ? greater DNA diversity

- [illegible]

South West Catchments Council: Community Engagement Climate Change Project 2014

FIGURE 13 GEOCATCH SYSTEM DIAGRAM (Afternoon)



2.5.2 GEOCATCH (Evening)

Location: Busselton

Date: April 3, 2014

Time: Evening 6:00pm to 8:00pm

Group

Two people attended the evening session one a community member and the other worked in a Government agency. However because they attended in the evening both represented their community rather than their job and had a long association with and passion for the natural environment in the Busselton region

Process

The long association with the natural environment meant that the participants understood not only the components of the local system but also how those components linked and impacted on each other. The resulting diagram quite integrated and there is a balance between the components; positive outcomes; and negative impacts. Being longer term residents they identified many past changes and opportunities to engage with the community in the future.

View of the Catchment

The catchment area discussed by the group was focussed on the rural and urban area around Busselton but included tributaries, the ocean and hinterland.

Points of interest from the session

- The willingness of some community members and their understanding of how they could contribute through both actions on ground and 'citizen science' to the management and improvement of NRM was obvious.
- We can inspire people – NRM needs to come from the heart
 - Link to farmers is essential – treat them with respect; It is a way of life; They have a specific culture
- Use Citizen Science to engage and enthuse more people, as well as collect more information, in a ordered and moderated fashion to add to the formal research currently being undertaken. (Examples of Citizen Science were Birds at Bridgetown or Jim Master's Avon river studies)



Recording environmental and lifestyle changes community members have noticed

Community responses

What have you noticed changing – over the last 15 or so years

- Busselton used to have sloppy winters – drains were put in from Wonerup to Dunsborough from 1920's to drain the slop so they could farm.
- 20-30 years ago there were days when we could not get to the back fence because it was too wet, we grew chokos – they grew themselves – it was VERY wet – now it is mild
- I came in 1976 to be professionally involved in the wetland at the start of a few very dry years and thought I would stay until we have well above average rainfall across the SW
- Rainfall data in 60's very wet years → increased salinity → water levels (missed at monitoring) now very low water levels
- Declining water → increasing salinity (no flushing of system)
- Increasing frequency of high temperatures
- Increasing acidification
- Naturalist excursion areas almost have to get through the scrub → now they are sparse areas of bush between.
- In mid-late autumn areas of understory bush stressed or dying (Whichers Scrape)
- The bush is having such a hard time
- Plains of Beaufortia (red scrub) on scarp near Nannup early in 1990's – took my breath away- I have been in the area but have not seen it since
- Understory becoming sparse, The old timers called it Parkland (clearer understory)
- Roger Underwood talks a lot about the change in areas – Manjimup way
- Bush walking through summer I noticed the influx of people in Busselton, but not inland. Most of the forest (Whichers Forest) is visited by few people
- High impact on coasts and fish stocks. Modern equipment used to catch lots of fish
- Forests affect but to a lesser extent by
 - Trail bikes
 - Rubbish
 - Dieback spreading

What will happen over the next 15-20 years and if the climate continues to change?

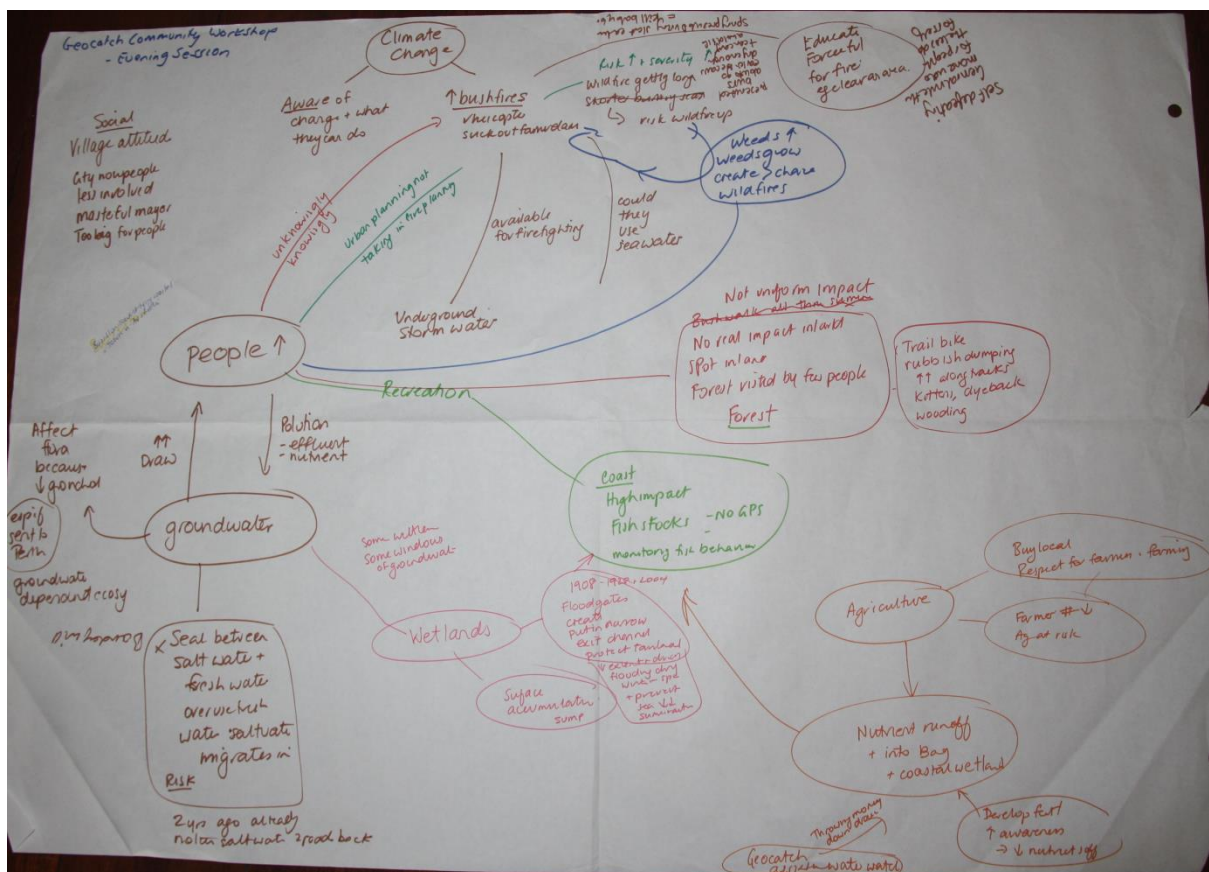
- Disappearance of iconic species
- Naturalist group could tell us what is disappearing – flora
- Dry & hot changes → floristic changes → different ecosystems
- Bush birds –aware of seeing no birds
 - Magpie larks 1968 lots of magpies, mudlarks, and willy wagtails
 - Not seen larks for 2 years
 - Galahs arrived in about 1987 but over the last few years numbers have dropped again
- Major flora & fauna – structure and species change
- People – stress on ground water and pollution
- Bore water is smelly
- 10 years – water pumped from the Yaragadee

- Prescribed burning getting later – increasing risk of fires
- Increased risk of wildfires and severity
- Increase in weeds leads to fires
- Inadequate planning rules and processes – exacerbates fire control issues
- Underground storage of water for fire fighting
- Look at South Australian examples and how they work with the environment
- Fire, population & climate are the biggest risks
- Some wetlands are
 - windows of the ground water
 - surface water accumulation (dish)
- Floodgates
 - Floodgates on exit channel of the Vasse & Wonerup rivers were put in in 1908 they empty into the Geographe Bay
 - Allow outflow but prevent inflow
 - Protect farm land
 - Reduce waterlogging, salinity etc. they were replaced in 1928 & 2004 (\$4 million) by the Water Corporation
 - Their greatest value is protecting the lower lying areas in Busselton
 - Busselton was once completely wet
 - Local farmer very distressed with salt levels – one summer too much salt water was let in and flooded his land – then there was a prolonged time of fresh water flooding due to the Wonerup sand bar being in place.
 - If the area was flushed out it would reduce fish deaths
- Vass River flowed through the town in 1920's a diversion dam was constructed on the river so water drains into Geographe rather than the town
 - Big problems with pollution going through near the high school
- Tree plantings – such a good idea of corridors & fenced off areas.

Opportunities – what can be done?

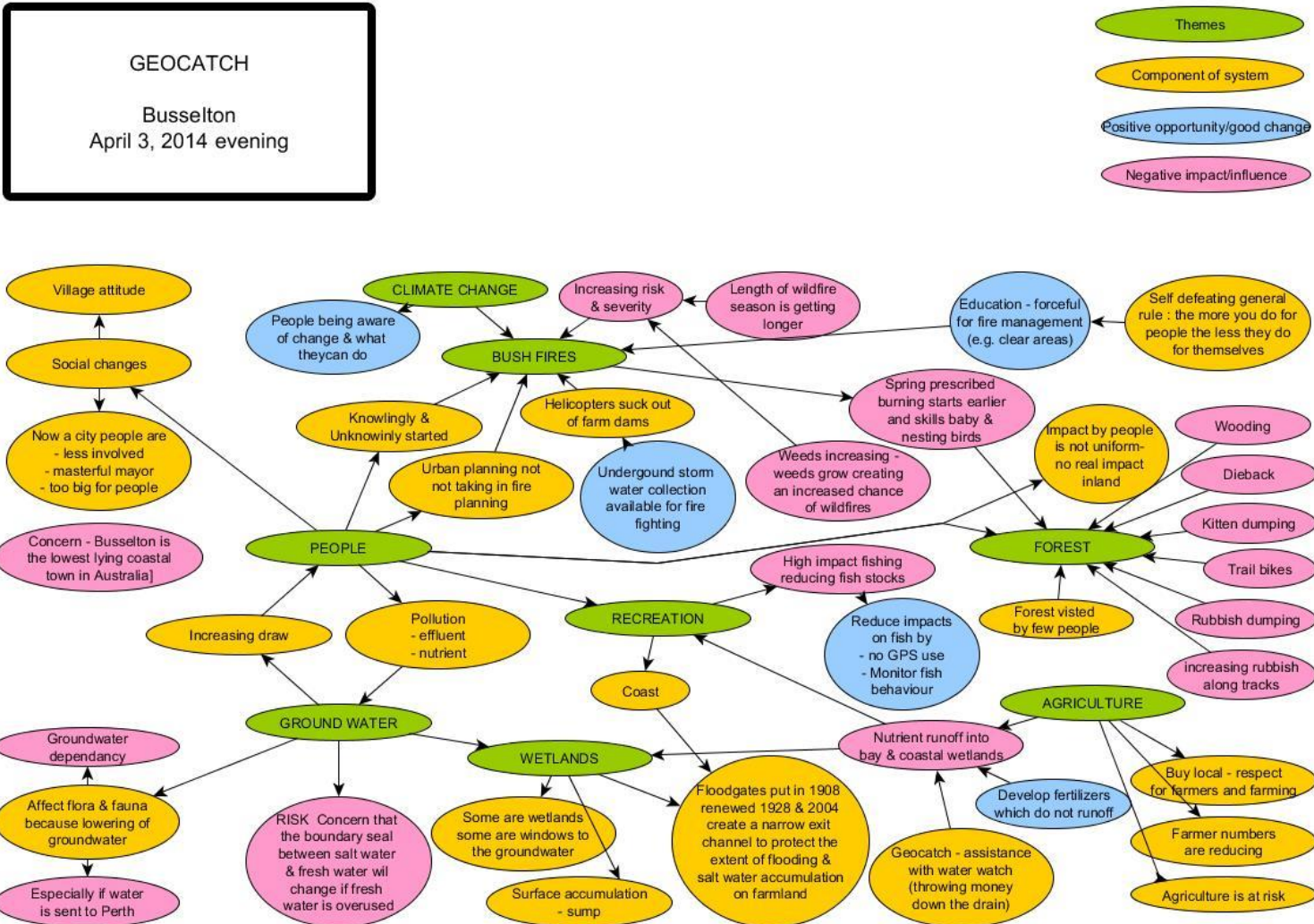
- Preparedness for fire –
 - Education – firebreaks
 - Attitude – unless people are ingrained – no legislation works
- We can inspire people – NRM needs to come from the heart
- Farmers
 - Link to farmers is essential – treat them with respect
 - It is a way of life
 - They have a specific culture
- Fertilizers
 - Farming nutrient runoff into bay and wetlands
 - Geocatch done a good job in this area
 - Will this get worse?
 - Dairy farmers going out of business
 - Better fertilizers, better education, reduction in runoff levels, Geographe Bay mostly affected by farmers
 - Urban runoff is increasing – drain smells – not chemical – rotting

- Citizen Science
 - Monitoring fish program – didn't want people involved (Need people to do the right thing) – believe in Citizen Science
 - Big Citizen Science – Bird Program in Bridgetown for example
 - Jim Masters monitoring the Avon water quality
 - Set up a culture and standard
 - Gentle and many people adopted change
 - Lost all information in a fire. However he had shared the information so people gave it back
 - NOTE Monitor data should be backed up in 4 places



A photograph of the systems diagram developed by the Geocatch community group

FIGURE 14 GEOCATCH SYSTEM DIAGRAM (Evening)



2.6 CAPE TO CAPE

2.6.1 CAPE TO CAPE (Afternoon)

Location: Margaret River

Date: March 27, 2014

Time Afternoon 1:30pm to 4:40pm

Group

This was an afternoon meeting where the management team and staff worked through the process to input and determine if it could go to their members. The group was a mix of experienced NRM and business professionals and younger enthusiastic staff including researchers and NRM Officers. Many of the Cape to Cape Management committee are also involved in other community groups (such as Transition Margaret River and local tourism groups).

Process

The process was delayed in starting, as the group wanted to voice their concerns over some of the past interactions with SWCC, which had not gone well. This meant there was limited time to work on the items on the agenda, but we could not move forward until the group had put their concerns on the table. We then discussed some of these concerns at the end of the meeting.

View of the Catchment

The group had a very clear agreed understanding of 'their' catchment; it is the watershed. The clarity of this boundary may be due to the members of the group being largely restricted in their NRM work being undertaken within the watershed area. However this was matched with a clear ownership of the region of which they were proud and very protective of.



Points of interest from the session

- Wanting/demanding clarity in their relationship with SWCC so that there is a clear understanding on both sides where responsibility and ownership lay. They would like to be involved in all projects being undertaken in their region. And expect there will be discussion between Cape to Cape and SWCC on all matters concerning the Cape to Cape region, projects undertaken in the area and changes to the regional strategy and funding arrangements.
- They would like SWCC to provide a clear framework to work within. (I.e. outlining project planning, funding distribution choices, funding arrangements, project management, work on-ground and reporting systems)
- The suggestion was for a one page outline of each project
- There is a fear of handing over project ideas or proposals to SWCC as it is believed SWCC will take over the project and the funding will not flow through and on-ground works will not be undertaken by local NRM and community groups.



The Cape to Cape management team discussing linkages across the system.

Community responses

Areas of concern with the relationship between Cape to Cape and SWCC

(WALGA / GIS / Links)

- Mind set of staff within SWCC – they see SWCC as the priority or more regional important
- Lost trust in the two way street
- Answer : investment plan – key priorities (1 pagers
- Capes – independent

- SWCC provide overarching framework – e.g. GIS
- SWCC not doing our on-ground work or designing it

Discussion on current groups in the Cape to Cape region

- Relationships with all groups vital to NRM management
- Saw a need for a central hub to achieve sustainability
- Death by a 1000 projects
- Do we want to die
- Need to be clear and realistic about what Cape to Cape can realistically do

Groups currently operating in the area include:

- Tangaroa Blue
- Climate Change Action Group
- DPAW
- Curtin University
- Shire
- SAC
- Cape to Cape
- AMTRA
- Chamber of Commerce
- Transition Margaret River
- LB LCDC
- Wine Association
- Gondwana Link
- SWDC
- Environment Centre

Waterways – where Cape to Cape started

- Reducing water flow (lack of it)
- Climate related
- Demand
 - Agriculture demand increasing – extraction increasing
 - Domestic use increasing
- Timing of flow into dams and waterways
- This summer increase in garden use
- Riparian – integrity of the ecosystem
- Cape to Cape controlling weeds to a point in selected strategic locations
- Feral animal control
- Barriers to migration for aquatic fauna
- Less shade (old issue)
- Don't know enough about the threatened species or invasive aquatic species

Impacts of Climate Change

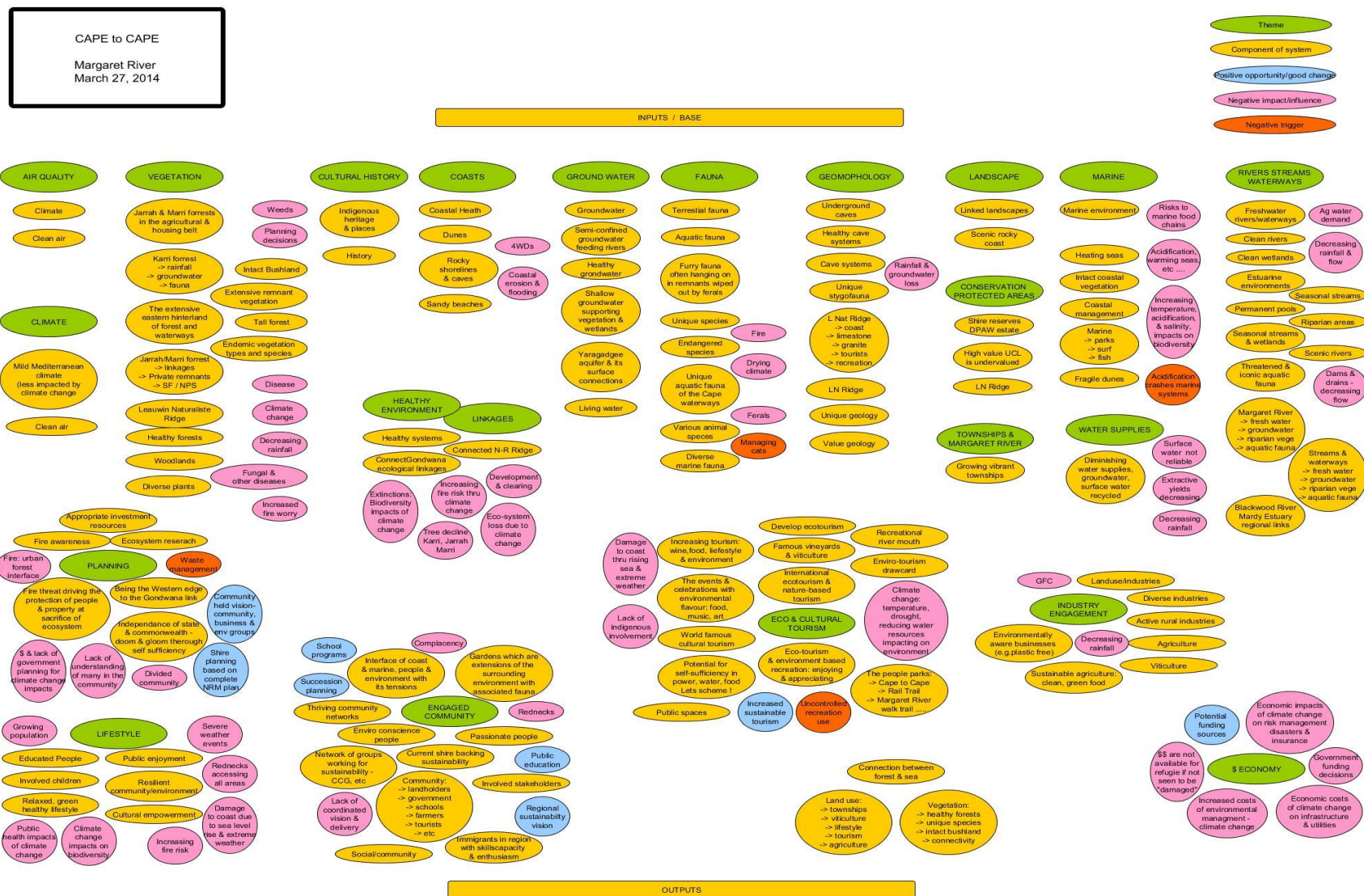
- Increasing population pressures (refuge)
- Increasing numbers of different animals (e.g. pink & grey galahs & parrots) – this may be because of changes in agriculture as well
- Expanding vegetation types
- Changing land management practices
- Farmers changing cattle breeds to hardier types
- Vegetation changes
- → Cumulative changing land management practices
- Increased subdivision
 - → more gardens
 - → increased water use
 - → more cars
- Shire greater capacity to manage reserves
- Reduced rainfall
- Increased drought
- More severe weather
- Increased health risk because of mosquitos carrying Ross River Virus
- Coastal damage due to recreation use
- Stream damage due to recreational use
- Reduction in tree health and distribution of the area of Karri
- Climate change will impact on the tourism industry
- Slow – gradual change in temperature lead to changes in the forest
- Fast – extreme temperature events
 - Possums drop dead
 - Pockets of trees die
- Increase in the frequency of extreme events
- Stepwise nature of change - change then static then change and static
- Water warming
 - Impact on coral beach
 - Pools – affecting fish types
- Ground water reduction impacts on
 - Less trees
 - Cave system
 - Water supply
- Caves system hydrology – unique faun gone & going
- Tufa limestone → snail link → tourism
- Cape to Capes to manage refugia requires resources
- Tree planting
- Lower water capacity
- Change in policy
- Too hard to plant to maximise biodiversity
- Not using local species
- Not planted in areas to create linkages
- Carbon sequestration could increase opportunities for biodiversity but needs planning
- Educated stakeholders
- Extraction limits – old legislation

- Elevate whole of catchment plan
 - Community to picture unique separate catchment for the Margaret River
 - Own genetically distinct species
- River action plans
 - Cape to Cape uses them
 - But shire has limited capacity
 - All fenced where landholders willing and important areas fenced
- Climate change will exacerbate the reduction in stream flow
- Some rivers in the north are totally degraded (but still have life (fish))
- Prevent further spread of aquatic ferals
- Combine all existing GIS data to updated system → better funding
 - some with D of Water
 - Need SWCC & WALGA
- Property management
- Distribution of species
- Don't have an action plan which covers the whole of the Margaret River Catchment
 - Some gaps under different funding
 - Needs revisiting after 10 years
- Question the management of DPAW sensitive land
- North end of DPAW land is untouched
 - Important to get done – small input would have most gains
- Research in hairy marrons
- SWCC please liaise with Cape to Cape re research and hairy marron
- Engage community in vision for revegetation
 - ? how to get to unconverted
 - Chamber of Commerce – driving for a clean sustainable area
 - They see waste reduction as important but not the local environment
 - Curtin University – sustainability unit
 - Shire
 - All need communication
- Eco-tourism & cultural tourism
- Need visioning exercise to engage the community
- Use local issues to tie into them
- ** Cape to Capes needs clear space
- SWCC remote sensing



A photograph of the Cape to Cape system developed by the afternoon group

FIGURE 15 CAPE TO CAPE SYSTEM DIAGRAM (Management & staff)



2.6.2 CAPE TO CAPE (Evening)

Location: Margaret River

Date: April 10, 2014

Time: Evening 6:00pm to 8:00pm

Group

A mixed group of very enthusiastic or interested local residents representing a cross-section of community (including farmers, new to the area, long term residents, some from overseas, professional, technical, environmental enthusiasts, local politics, vegetarians)

Process

The group started drawing their system with clear linkages and impacts written in. The discussions were detailed and the group exchanged much information between themselves. It was generally a very upbeat discussion. The group was split in two to maximise the information gathered.

View of the Catchment

The community was less distinct in their catchment boundary than the water shed used by the management group. It was still a reasonably local system.

Points of interest from the session

- One member described much of the NRM planning and implementation as being a 'linear casualty' where the interactions across the system were not taken into account.
- Suggested an environmental levy on all bed rates and entertainment tickets sold in the region.
- Individuals being more environmentally aware and to be encourage by the shire (e.g. native gardens)
- Better planning of land use and land use change
- More restrictions on new houses (and old) native gardens, rainwater tanks, ban clothes driers etc.



*Cape to
Cape
community
members
drawing their
system*

Community responses

GROUP A

ISSUES

- City no connection and awareness to land and water
- Shire is not promoting low water use gardens – they should – shouldn't have lawns and public open spaces
- Wastage of water in the town site (e.g. Council watering lawns)
- A real changed landscape from Marri decline going to be without trees along local roads
- Conservation areas – reserves becoming more important as refugees – looking at connectivity
- Decision making process coming from technocrats
- Feel powerless to address Global Climate Change e.g. Current government apathy
- Building processes use high levels of energy (e.g. high reliance on air conditioners)
- Mining
- Increasing resident and tourist population – people moving south
- FIFO
- Increasing temperature – population moving

Changes caused by climate change

- Marri decline – along roadsides – recent decline marri sap looks different (sick) this is occurring all through the town site Margaret River, Rosa Brook (reserve bush block) over the last four years
- Reduction in honey production over the last four years
- Increase in dieback
- Increase wildlife dependency on human sources of water
- Slower regeneration of vegetation after fire
- Weather is more tropical and balmy
- Soil is drying out quicker despite higher rainfall
- Groundwater is lower- apparent in soaks/wetlands
- Increase in algal issues – Hardy Inlet Augusta. Maybe impacts from reduced Yaragadee flow?
- Reduced water available to residents – rain water tanks
- Faster drop in stream flow after winter rains
- Degradation of top soil leading to increased water runoff

Solutions

- Replace plastics with materials made from organic materials such as agricultural waste
- Environmental levy on all bed-nights in Margaret River and on all MR events
- Corporate profitability vs sustainability is the root of the economic system which causes the issue.
- Shire needs to address Marri decline and look at different tree species
- More education about waste reduction (e.g. living smarter course)
- Fire retardant plant species
- Reduce abuse of recreational water
- Identify and protect high value areas including linkages (wildlife corridors and flora and fauna)
- Allow grass root decision making processes, improve transparency and open discussions to debate (balance power with people)
- Need better land use planning controls which identify high conservation value areas - WALGA
- More solar uptake – find better ways to cooperate with Western Power
- Block corporate power by acting locally
- Local Councils could prohibit air conditioners and other high energy appliances
- Building controls
- Careful planning for a sustainable future

Why you chose to live here

- See those lovely Karri trees – oops not there anymore
- I love the ocean and the forest – wildflowers and birds
- I want to grow my own vegetables
- It's peaceful and quiet
- Feel safe
- Trees (living by the forest)
- Low traffic
- Community farmer markets
- Moved to Margaret River for more opportunities
- It had a sense of community and facilities
- Rich biodiversity region

Why would you leave?

- Coal mine
- Town too busy in summer
- Tourist numbers get too high
- Brookfield mark II – subdivisions
- Tourists and non-residents – if they don't care and learn how to respect our environment and town

GROUP B

What changes have you noticed?

- Some fruit trees are flowering now! (March April) when they should be dormant
- More cockatoos, ibis, pink and grey galah and white cockies
- No significant rainfall difference (local farm records show 2013 to be the second wettest season in 25 years. Wettest was 1999 with 52" and 2013 with 49")
- Other areas rainfall has decreased
- Changing rainfall patterns (distribution)
- Are the changes long term or cyclical, due to solar flares and an 11-14 year cycle?
- General trend drier
- 1920 family settled in area on dairy settlement scheme – dismal winters because it rained all winter
- Now we have drier periods in winter
- In the past there would be one or two balmy evenings in the year now they occur in most of summer and into autumn
- Temperature is increasing leading to an increased evaporation rate and the soil drying out faster
- Burning off with slow cool trickle burns now we have intense hot burns in spring
- Autumn is the perfect time to burn after the first rains
- Birds nesting in spring time at current fire time
- Change in attitude to environment -> more aware
- Groups emerging to take more action over coal mining and environmental issues
- Government EPA did not exist a long time ago but now a toothless tiger
- Significant population increase in Margaret River and local area (growing 4.2% last year almost fastest in Australia)
- Significant decline in commercial farms and increase in lifestyle farming
 - Affecting communities
 - E.g. Cowaramup Community facilities 20 years ago the community built a BMX track and basketball courts with huge community involvement and input. Not the population is much larger but not willing to help and they struggled to build a skate park.
 - Many people do not live here they come down for weekends and holidays.
- Economic pressures – twenty years ago moved here and planted olive trees and built a home. Now we are under financial pressure
 - Both partners need to work

- Leads to reduced volunteering
- Land prices are the most expensive real estate in the world
- Hard to make a living down here – seasonal businesses, artists
- Some of the financial problems are tied to the GFC – it had a big impact on Margaret River Changed the nature of things in Margaret River
- The other big impact was the fire
- Both of these led to people not coming on holidays and if they did spending less money as people are paying down debt and putting money aside for the future.
- *Margaret River sayings*
 - *Money visits*
 - *Margaret River = Mark-up River*
- There are many low socio-economic people in Margaret River
 - The soup kitchen has huge numbers of people come – they run Monday and Wednesday evenings where people can get a meal for \$5.
 - CRC gives food parcels away
 - People living in tents and cars because they cannot afford the high rent
 - Red cross, St Vinnie's and Anglican Op shops do a roaring trade
 - Lions have a huge garage sale every second Saturday where 1000's of people go to get second hand goods. This is a good measure of the state of the economy when so many are purchasing second hand goods.
 - Due to seasonal workers many purchase from Lions then give back when they leave or their job finishes
 - Highly educated by low income earning capacity
 - Seasonal income but costs all year round
 - Plenty of businesses are not viable and businesses change hands regularly
 - Op Shop gives bread away
- Huge community spirit in Margaret river
- Good parent support for school and fund raising

Recreation / interaction with the environment

(Consultant moved the discussion to recreation to see if there were more ideas on how the environment had changed and how people interacted with their environment)

- People go to Perth for activities
- Art in Margaret River is very good
- Good Music
- Settlers venue – good for bands and has won awards
- Sport – football, hockey, cricket, netball, pony club, karate, underwater hockey, basketball etc.

- Volunteer Films are shown Friday, Saturday and Sunday nights
- Strong art culture e.g. open studios
- Surfing, kite boarding, paddle boards, fishing, huge recreational fishing (beach fishing but only one commercial fisher)
- Cape to Cape walk trail, monthly James Scott walk
- Bibulmun track, Mountain biking, off-road bikes
- Warner Cliff accommodation will help improve awareness. Planning a big adventure playground
- Diving for crayfish
- Snorkelling
- Farmers' markets high and very social – local produce (well WA at least but some comes from Perth and Donnybrook) many locals go for a coffee and to catch up with friends even if they are not buying.
- Town markets aimed more at tourists – more variety not just local
- Regular swap day at Fair Harvest Permaculture days
- Regular surfing competitions – especially now as it is on the international circuit
- Leads to problems with car parking – need more parking at river mouth and in town to cope with the number of people
- Regular Anaconda – Iron person

What impact do you think climate change will have?

- Is it real?
- Computer modelling are predicted only
- Recording is undertaken in the same place but they are now surrounded by tarmac and buildings increasing recorded temperatures (e.g. lots of sties at airports) more measuring sites
- Changing vegetation
 - Marri trees already stressed
 - Endemic marri canker
 - Marri trees now just drying
- Grow different crops for food which can take increased heat and reduced rainfall
- In some places it is better with reduced rainfall because if you farm on the west side of the Darling range the land is waterlogged in winter
- Further from coast increased sunlight (due to less cloud cover) → sugar in grass → more value for cattle
 - When you hit the Yelverton Hill cloud cover disappears (clouding at MR than Perth/Busselton)
- Haven't had extreme heat down here except very few days here in summer

- People coming down here to escape the heat of Perth and surprised now hot down here
- When the isobars run North/south but when the trough is the other way it can be hotter
- My parents did not comment on significant weather events over the last 10 years there seems to be more comments on significant weather events
 - Could be increased knowledge science lot more people got time to measure
 - More aware of global system – look at English floods, north Germany now has sludge instead of snow, US extreme weather events
 - Seem to be happening more often
 - 100 year events are happening more often than 100 years
- Population pressure increasing and having more effect so we are living closer to our capacity
- I moved from Busselton to Margaret River because it is higher
 - Noticing the storms damaging the beach.
 - Peppermint trees lots to trees.
 - Hope the hospital is being built on stilts

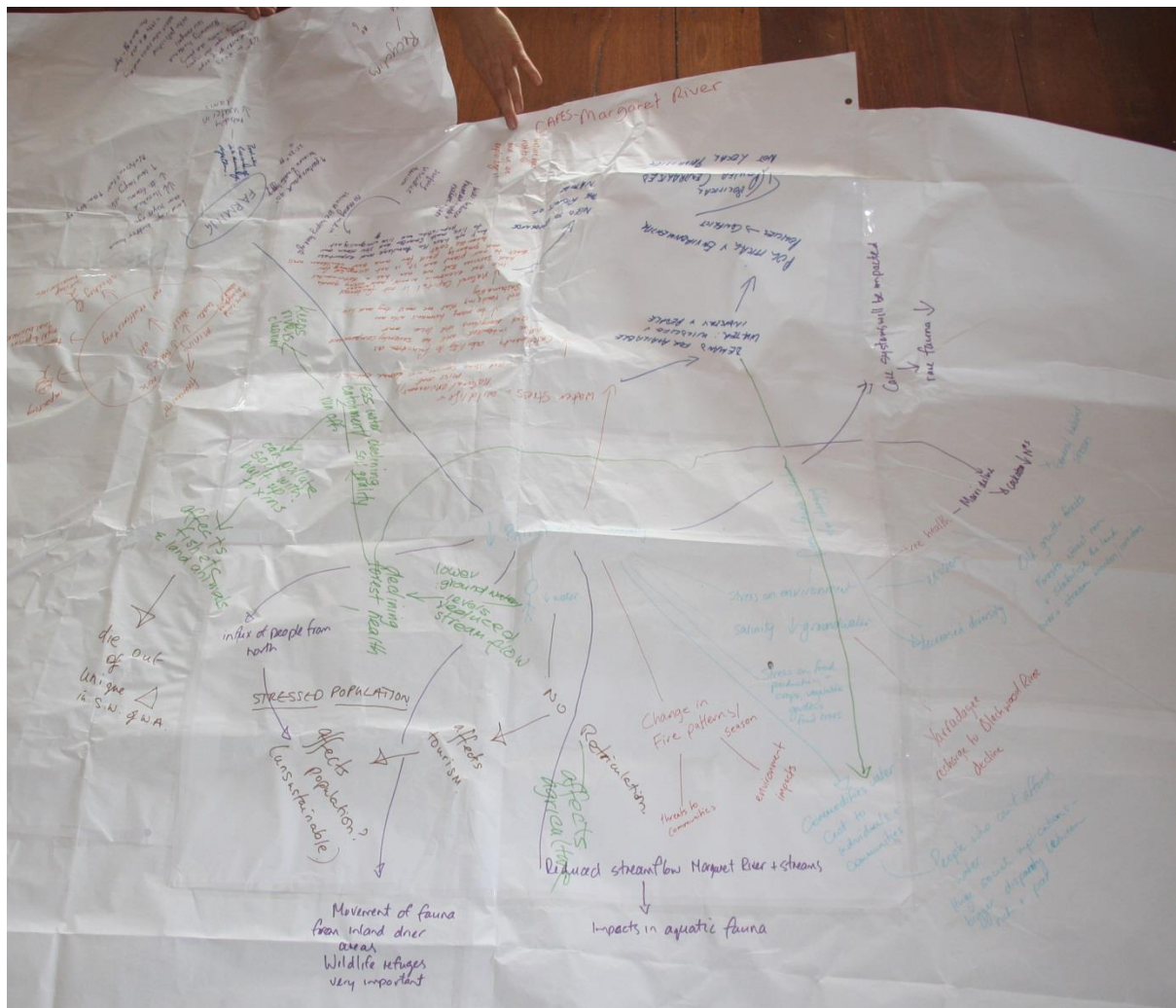
Opportunities

- Use water wisely
- Encourage expansion of perennial plants (especially perennial grasses)
- Ban on land clearing existing vegetation maintained - fostered and cared for
- But can't eat wood so need a balance between farming land and forest land
 - Isn't there enough cleared land
 - Primary food production not a viable business
 - People don't want to pay for food
 - Cost inputs – costs of government intrusions
 - Own land in which natural vegetation belongs to the title holder, required by law, paid dollars to bureaucrats to be allowed to move a dead tree
 - Not allowed for health and safety reasons to go on slaughter floor change to check our own stock (used to be about to talk to plant manager and carcass inspectors about carcasses)
 - Wish abattoir had walls of glass
 - Hate factory farming
- Vegetarian for 25 years – this is my way of contributing
 - Come from a dairy and fishing family
 - But hate the way fish are being mined (drag nets and walls of death)
 - Turning kilograms energy in to produce kg protein -> stressed planet
 - My choice
- Adopt alternative technology wind/solar/wind

- Ride bikes and use public transport
- Identify good agricultural land and preserve it
- When building houses
 - Put in rainwater tanks
 - Thermal quality rating is good
 - Solar panels
 - Ban black rooves
 - Ban clothes driers
- Farming
 - Increased diversity
 - Tree belts
 - Farm debt levels increased dramatically
 - In the year 2000 the debt level of farmers equals GDP of food
 - In 2010 debt level is now six times GDP
 - Food
 - Food distribution and food miles
 - Eat seasonally
 - Support local produce
- Open governance – e.g. Margaret River shire sold prime block to Woolworths to then build a monstrosity of the shire offices.
- Control by stealth – e.g. protracted delays for planning and building and not being told what the rules are.

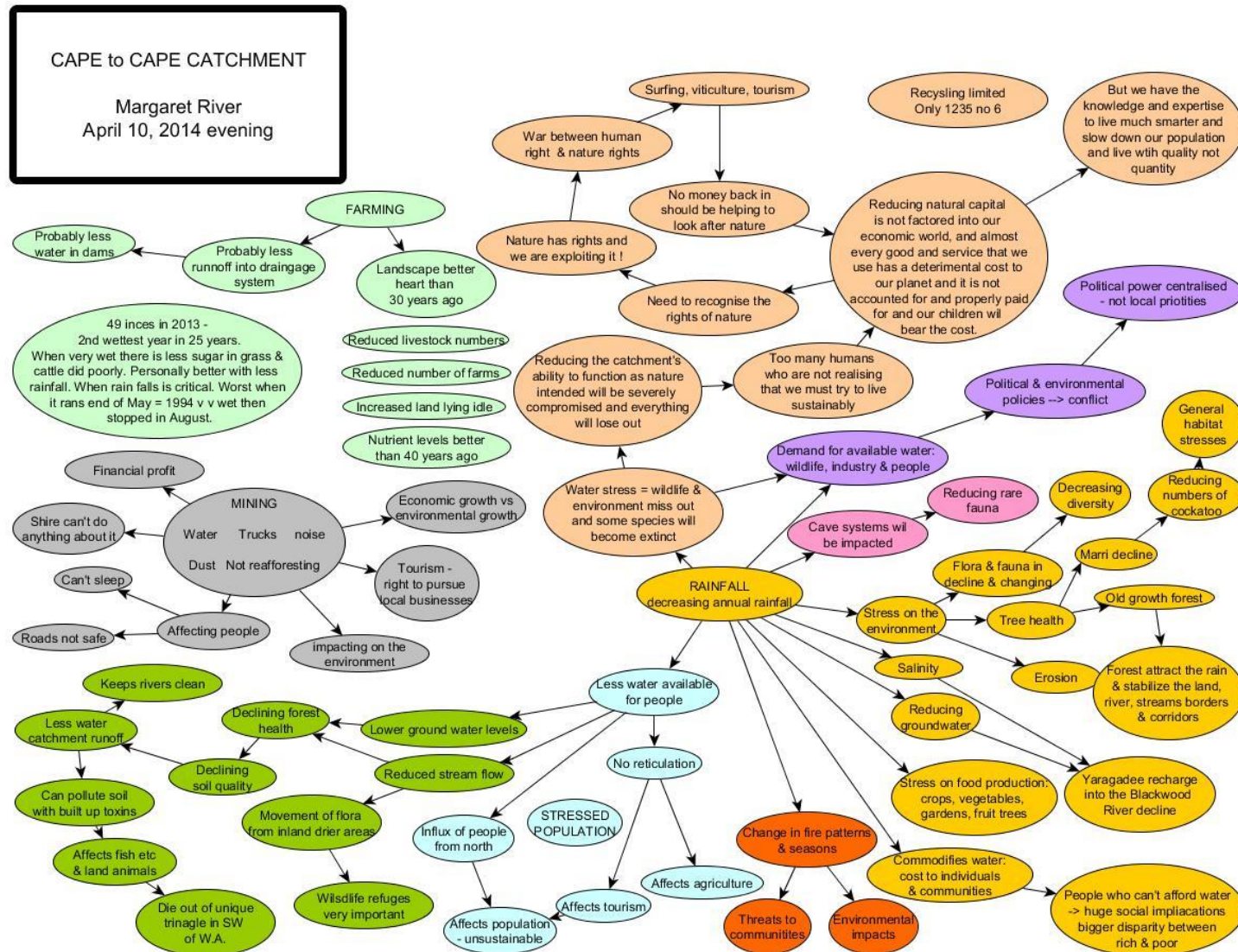
What would cause you to move from Margaret River?

- Bureaucratic intrusion
- Increasing rates – currently our rates (Margaret River) are three times the \$/ha rate in Capel
- Good farm land subdivided 1000 acre to 100 acre to 10 acre block
- We would like to hang in there for our son but because of the costs of mortgage etc. and our income is less than costs we may need to sell.
- Not enough money to stay
- Traffic lights
- Multinational companies like Woolworths
- Coastal development
- Mining
- Oil rig off-shore
- Fracking



A photograph of the system diagram drawn by the Cape to Cape community group

FIGURE 16 CAPE TO CAPE SYSTEM DIAGRAM (Evening)



2.7 WARREN CATCHMENT

2.7.1 WARREN CATCHMENT (Afternoon)

Location: Manjimup

Date: April 9, 2014

Time: Afternoon 1:30pm to 4:40pm

Group

Afternoon session with a young to middle aged group of professionals. All group members were relatively new to the area (under 6 years some as new as 2 years in the district) and this influenced their ability to participate for two main reasons

- They had not been in the area long enough to notice changes;
- They did not feel they could speak for the community or in some ways for themselves as they were very aware of being 'new-comers';
- However they could clearly articulate why they chose to live in the area; and
- The view of NRM was a very personal one – from the heart – and their interaction with the immediate environment around them.

Process

The mapping of the system was only done at a superficial level. One member drew a diagram of the flow into and out of his property which highlighted how he and others saw the system (other participants related well to the diagram but were reluctant to add or adjust it when it was presented). Identifying the reasons for living in the area and why these people moved to the region helped show what is important to them. Fire is seen as a real threat and many were scared of the potential impacts. Many of the responses were the 'expected' ones and I wonder about the 'real' impacts as opposed to those which people are told to expect.

View of the Catchment

Being interested new comers to the area most were interested in what were the best ways to set up their homes and farmlets to encourage native fauna and reduce fire risks. They thought in terms of their immediate homes and how they interacted out from there to their new community. The feeling of 'place' was still being developed.

Points of interest from the session

- One key participant noted that he had not thought that he 'lived in' the environment and that he interacted with NRM every day. This changed his view on how NRM could be approached.
- Fear of fire was evident and so extra precautions were undertaken to ensure homes, families and businesses were safe, this could be at the expense of the environment and remnant vegetation. Lack of awareness by weekenders of the fire protocols and risks. In fact the threat of fire was the key reason they would sell and leave the area.
- Strong feeling that the area is special and important (that is why they chose to live here) and the land should be looked after and used appropriately (i.e. broken up into hobby farms and not looked after – it should be used).

Community responses

What is changing?

- Anecdotal evidence starts the scientific process (if people do not notice then they will not research that area).
- Cockatoos are moving west – Have not seen groups in four years
- Marri trees are flowering early
- March flies are starting earlier and staying through til February
- Farm was burnt. Nothing grew for four years. Then a wet season and Jarrah seedlings sprouted.
- Much wetter than year before
- More birds around than year before.
- Last four years seen unusual things. E.g. Sea Eagle
- Need local observations as this builds a rich picture
- Two of the driest years for Manjimup.
- Local group planting different trees for example Wandoo (species from drier regions).
- Changing crops and plants for example Canola.
- Weeds encroaching – some non-native weeds so bad DAFWA says they cannot keep up
- Has been distinct broom and grass weed fringe in the region (Manjimup worst they have seen).
- Once cotton-brush has invaded it is right across the South West
- Changing Climate and variability will favour – broom – does well after fire
- If broom competes with a native species that's an issue. May not be caused by CC.
- Circling effect: Fire causes a space that Broom and grasses fill leaving fewer opportunities for Native Species. Broom and grasses more flammable so repeats.
- 6 year project – Middle Warren. Natural Dieback. Only effecting blackberry in flooded areas. Flows are flood areas changing. Issues with blackberry.
- Planting in areas where dieback could be an issue
- Changes in flood regimes effects weeds and.
- More extreme weather events – strong winds – inland – ferocious wind storms – affecting trees
- Less rainfall. Greater intensity. Erosion. Lose remnant bush.
-Enormous damage
- Re-veg belts, water swales.
- Graze at a more moderate level
- Mega-farms – broad acres –
- Mixed diverse family farms. Diversity and more conservation in farming
- Must be many farmers leaving the land as they cannot be moderate or being system that makes money.
- Average age farmer – 65 years – farmers amalgamated
- Farms sold to Chinese and big business
- Foreign owned farmers – use only methods that are more economically viable.
- We need more people that care about land.

- Farmers being paid less with big supermarkets as many people want cheap products
- Farming lifestyle – who wants to do it
- Getting down to less than 7000, hundreds walking off land.
- What happens to the land? If abandoned then weeds and feral animals increase.
- There's an assumption that we are a Food-bowl (Manjimup). People depending on productivity
- Changing Climate will seriously affect. DAFWA getting less money to do more – biosecurity etc.
- Chemical restriction issue soon. Water restrictions
- Over use of antibiotics → resistance strains of bacteria in the community → large companies shandy milk to put levels below critical point. Small producers cannot do this because of Government regulation – Testing dairy cows regular milk
- If too much overuse in milk not being throwing it away.

How will climate change affect this system?

- Drying, changing climate – power usage
- Streetscape maintain mature trees – for shade
- Be dustier
- Depressing when it doesn't rain
- Be over populated – Manjimup is a super town
- NRM is a backdrop but farming is getting harder plus C/C then hard to sustain
- Government can't do everything
- How do we respond or address Climate Change? Increase in political parties and social media might improve the sustainability vote
- If a solution – Mainstream governments won't deliver – People must change
- When Veranus (gas) went down WA got down to only 18 hours of cold food left. Food security is a real issue
- People hold up Cuba as a model because they become sustainable – If we lose the skills and knowledge of farmers. Can't make it up quickly.
- Hobby farmers shouldn't buy land unless they use it. Then issue is land use cost.
- We do have high priority Ag-land. You can't subdivide
- Orchardist rated off the land
- Hard to make comparison from the city and country. Supply chain. Capital cities
- Farmers can't use water while people in the city are not affected.
- No one wants to farm the land anymore so hobby farmers helps keep people invigorated
- How do you make it attractive for young people?
- Stephanie Carstairs – local program for young people
- Food security is an issue. Especially with C/C
- We need to find good pathways for kids' education, sport and recreation
- Need to change crop varieties, more netted orchards
- What we can and can't grow will change but it will happen over time.
- Don't think it is happening gradually...

Why do you love living here and what would make you leave?

- Love the following:
 - Chose a house for orientation and thermal issues
 - Happy to be self-reliant – age is an issues so need medical services & mobile phone service
 - South West is the land of milk and honey – organics, apples, biodiversity forest, wildflowers
 - Greenery in summer
 - Sense of pride – low food miles for food
 - Productive food nodes wrapped in forest
 - Proud its mine and where you live, fairly benign environment or green.
 - My own water supply – used the same spring for 130 years Giblets – it usually replenishes within two days.
 - Live close to family – after living overseas
 - Well located for work – close to trial work – Didn't need to be in Perth
 - Has a choice of schools and high schools
 - Vibrant welcoming community
- What would make you leave?
 - Bushfires – designed house to suit so I can enjoy a tree from a distance
 - The projection (risk) map didn't show fire – this is puzzling in our drying climate
 - If it gets too hot here I will move to Northcliffe
 - Fire – I have never had to deal with it in Queensland – it was more floods – so I have a higher focus on fire protection and education
 - DEPAW may not be able to do more to combat fires due to lack of resources
 - Fire - but we are prepared and well equipped

FIGURE 17 WARREN SYSTEM DIAGRAM (Afternoon)

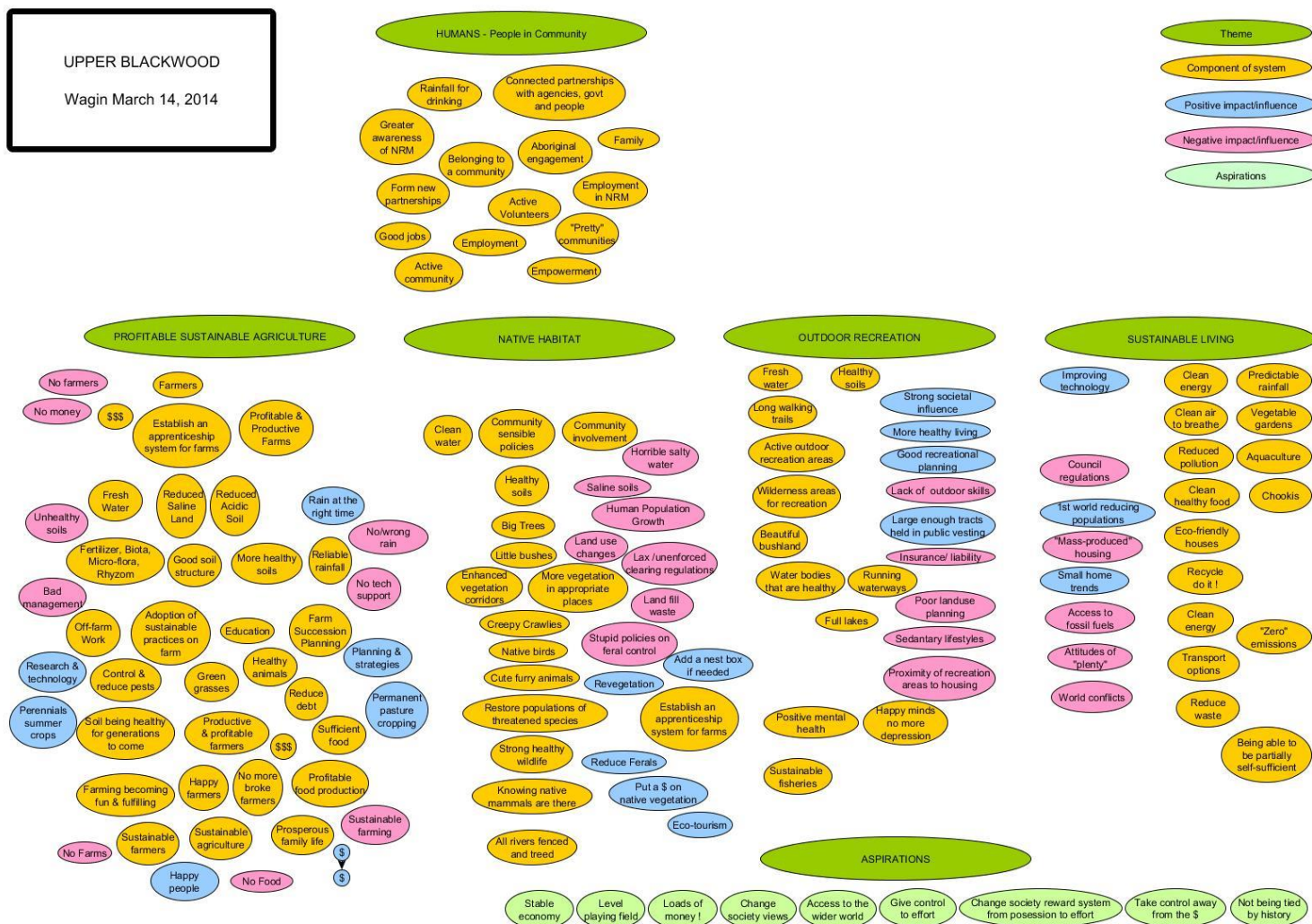
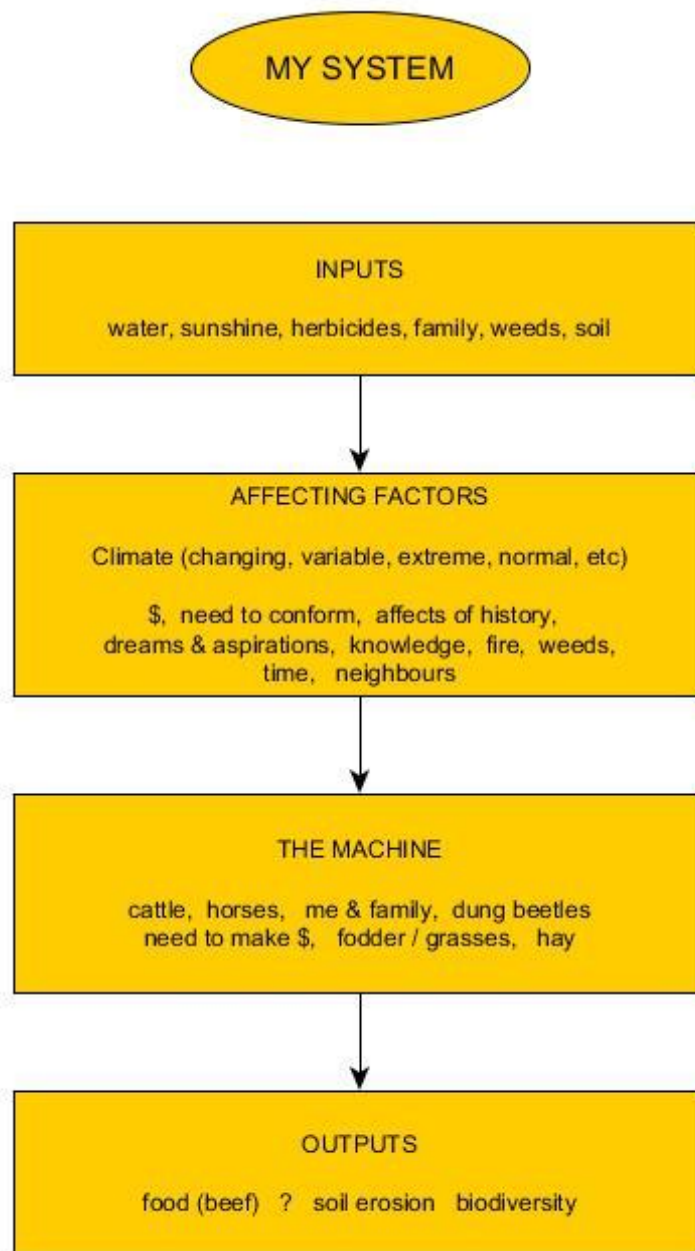


FIGURE 18 WARREN INDIVIDUAL SYSTEM DIAGRAM (Afternoon)



2.7.2 WARREN CATCHMENT (Evening)

Location: Margaret River

Date: March 27, 2014

Time: Evening 6:00pm to 8:00pm

Group

Only one person came to the evening session and he really came to sell bio char to us. Michael is a very well read travelled research academic who chose (after looking all round the world) to live near Bridgetown.

Process

We began by outline the reason for the evening, watching the wolves in Yellowstone National Park then discussed bio char as the participant had a particular interest in how that could help sustainability of the environment. Because there was only one participant for this evening session a one on one focused interview was undertaken by the consultant

View of the Catchment

This gentleman's view of the catchment was a very social one. He wanted a stable safe sustainable community who provided for its members with as little impact on the environment as possible.

Points of interest from the session

- Chose to live near Bridgetown/Manjimup from anywhere in the world.
- Look after the local community first (a bit like family first) by having a range of industries there will be work available all year round creating more stability and a better community.
- Buy local; keep money in the town; regularly farmers markets; direct marketing; but in season; and reduce food miles.

Community responses

A gentleman arrived in the evening principally to give his views on the benefits of bio char. After discussing this option with him we then discussed how he related to his environment and because he had worked in many countries round the world, why he chose to live in Bridgetown, Western Australia.

The south west of Western Australia in particular Bridgetown and surrounds offer a north Mediterranean climate, it is not as crowded as Europe and Australia is more like to survive the sustainability crisis than other countries. Other choices were South Africa – but there is a colour problem there; Vancouver – but it is too far away from daughter; Chile – they do not speak English. He has an interest in forestry and all the necessary amenities are nearby. He moved to the location in 2007.

Changes noticed from 2007 to 2014 are:

- People are a little less despondent about farming
- Government has made farming difficult
- Government likes to keep a tight grip and grants control where the money goes
- Farming valuable to the state but is vulnerable
- Grapes are grown and make beautiful wine but mainly because they are a tax haven. The grapes displaced cauliflower and potatoes which are more important providing staple food.
- Proper farms are mixed farm and this means labour is employed all year around. Now with single industries there is not consistent work and so casual labour is employed as required. This means less people in the community and reduction in the quality of life in the region.
- Many hobby farmers in the region.
- Need the state to be much more self sufficient
- Manjimup cannot keep money in the region as it pays outside companies (e.g. outside ownership of chickens)
- There are six kinds of renewable energy and most can be made on the spot so there is not the loss along the lines. We are using 200 year old technology to produce energy. Bio char could over an option because it creates a gas 90% hydrogen gas going into a fuel cell producing 80% energy efficiency. This means the potential energy is stored as a gas before use and not in a battery as electricity so it is much cheaper and easier to store.
- Could use water to create energy by storing even a 2 meters high will create energy.
- In Warren there is 80% of land is not rateable (forest) 5% is shire land leaving only 15% is rateable.
- We could create a local currency and reduce unemployment.

Climate change

- Rainfall is spread out across the year
- Change from annual to perennial plants this will impact farm choices and improve soil
- Need to encourage people to buy local; to buy in season; and to keep money in the community.
- Creating work throughout the year – make what is needed locally (diversity) not what is needed in UK (export)
- Farmers markets do not work when they are held twice a month. We need them twice a week so we can regularly get fresh locally grown vegetables and fruit.

2.8 PEEL HARVEY CATCHMENT COUNCIL

Location: Mandurah

Date: June 19, 2014

Time: Afternoon 12:30pm to 2:00pm

Group

The group was a mix of the Peel Harvey Catchment Council (PHCC) management committee and staff.

Process

Because the PHCC is succeeding from SWCC the process used was limited to defining the components of their system and discussing the changes noticed across their catchment. The group was keen to revisit the system components at a later date to think about the linkages and interactions between the different parts of the system.

View of the Catchment

The catchment was clearly identified as the area being managed by PHCC from the Wheatbelt to the coast. It included all land users (for example farmers, households, government agencies, mining and other industry) and a range of land uses (including remnant vegetation, coastal, riverine and agricultural landscapes).

Points of interest from the session

- The group was inclusive in their approach to including all land users; they were looking at ways to positively engage with industry such as mining.
- The team was keen to manage their catchment as a separate and recognised NRM group.
- Interested in reviewing the systems approach to see if it would be suitable for the way they would like to work.
- Biggest asset is people
- *“What if climate change is not real we have just improved the environment for nothing”*
-

Community responses

What is changing?

- Less water in the creeks (canal is OK)
- The estuary opening is relatively stable
- Shift in seasons – summer seems to be coming later
- New species along the Eastern Coastal Plain
 - Acacia
 - Birds
- Cleared plains – losing trees, paddocks, scarps

- More people
- Infrastructure
 - Cut
 - Train
 - Forest Highway
- Decreasing rainfall e.g. can subdivide two areas that were flood plain
- Fuel loads – worse fires
- Fewer summer storms – harsher winter storms
- Less Easterlies (winds)
- Lack of Perch – too salty
- Rivers more salty → lack of marron
- Cockatoos – size of flocks and regularity increasing
- Increase in galahs and corellas (parrots and ringnecks)
- Declining volunteers – change in the way people volunteer (Events)
 - Social media – who's attending
 - Nature of volunteering – not long term
- Less water on paddocks – drains flow of a shorter period of time
- Roadside vegetation changes
- Areas of trees just dying changes balance of flora & fauna
- Some areas coming back from decline
- Dieback not under control – changing temperature increases it
- Losing good roadside reserve conservation
- Urbanisation
- Unsustainable population growth
- Development of farming land
- Cut
 - Change in the fringe vegetation
 - Change in estuarine → marine
 - Has had a beneficial effect for a human in the area at Cox Bay the smell was so bad – now it is liveable.
- Recreational use of estuary has increased dramatically
 - RAMSAR areas have been trashed
 - Wouldn't want to be a dolphin or crab
 - Impact on fish – numbers reduced
- Mobile phones have benefits and disadvantages
- People's attitudes to forest/bush changing – off-road use of 4WD not hiking
- Forests and nature used to be valued for walking and passive pursuits now there is a need to bush bash
- Infrastructure – increase in roads and rail
 - Cross wetlands changing hydrology, changing vegetation
 - Positive for people – easier access and reduction in traffic jams
 - Negative impacts on the environment
 - Increased nutrients into the port and more roadside rubbish especially along the Forest Highway
- Forest highway east side of the estuary
- National shore birds reducing

- Increase in fires - especially wildfires
 - Summers are hotter
 - Vegetation is drier
 - Some people delight in lighting fires
- Building in wrong areas without consideration of being in a wildfire zone
- I.T – availability of communication
 - More opportunity
 - More ‘doof doof parties’ in the forest which drink and drugs
- Volunteer
 - Increase in support especially from older members of the community
 - Aging fire brigade
 - Young don’t engage unless paid
- Increase in pests and diseases
 - More foxes and cats – many more feral cats
 - Phytophthora spreading
 - Canker
- Growth in mining
 - More long the scarp (Wagerup, Newmont, Boddington)
 - Bad - More clearing
 - Good - Improvements in mining rehabilitation
 - But revegetation is measured by number of stems in the ground which impact on the water flows in underground streams
- Alcoa burned forest around regrowth – but regrowth not burnt
- Change in ecosystem to a monoculture
- Declining discharge from piggeries and feedlots (much less effluent runoff)
- Reduction in discharge from dairies
- Better revegetation techniques
 - Landholders
 - Species
 - Who we do it
 - Success rates
 - Right plant for tight place
 - Direct seeding
- More partnerships with community, government, catchment councils – this is a positive change
- Change from autonomous agencies to more integrated
- Threat dominant source of funds is tax payer dollars
 - Stakeholders not involved 9e.g. industry)
 - Goal posts changing for on-going projects – especially with community
- No longer concerned with key environmental issues
 - Salinity
 - Phytophthora
 - Being replaced by the new buzz – climate change
- Phytophthora is an insurmountable problem – do nothing cos it is too big
- Biggest asset is people
 - Support on-going support to deliver projects
 - External support for community

- Commonwealth government despair
 - Things can be done
 - But negative government support
 - No emissions trading
 - Limited forward planning
 - Short government terms
 - Carbon tax changes
- “What if climate change is not real we have just improved the environment for nothing”
- Clearing regulations have had massive benefits, however there is a risk now that the rules have been slightly relaxed
- Cultural assets are being lost – Noongar & heritage
 - Noongar elders are not passing knowledge and language on
 - Losing identity
 - We are improving engagement but elders are aging and dying
- Short term political terms are at odds with long term NRM objectives
- News is very short term – 24 hour news cycle so it is hard to put NRM on the list

How will climate change affect this system?

- Fire – changing material you need to build with – planning rules changing
- Sea levels rise
- Hotter – what we grow will change
- Storms getting worse
 - Erosion
 - Sediment
 - Water quality
- Climate change is a distraction from the fundamentals of caring for the environment
 - Opinion
 - Political
- Good management results with better
 - Reserves
 - Connectivity

3 CONCLUSION

This community engagement project achieved a number of desired outcomes including:

- Consulting with community members to obtain a better understanding of how they view climate change, and what impacts they think continued climate change will have on their landscape, lifestyle and livelihoods;
- Re-engaging with the community in a novel way;
- Introducing the systems approach to the NRM community; and
- Providing feedback on Climate Change to update the Regional NRM strategy.

Much information has been gathered from community and NRM professionals. It will take some time to review this information and determine appropriate strategies to use it in the context of a systems approach and within the constraints of reduced funding.

A warm thank you is extended to all those who participated in this project.

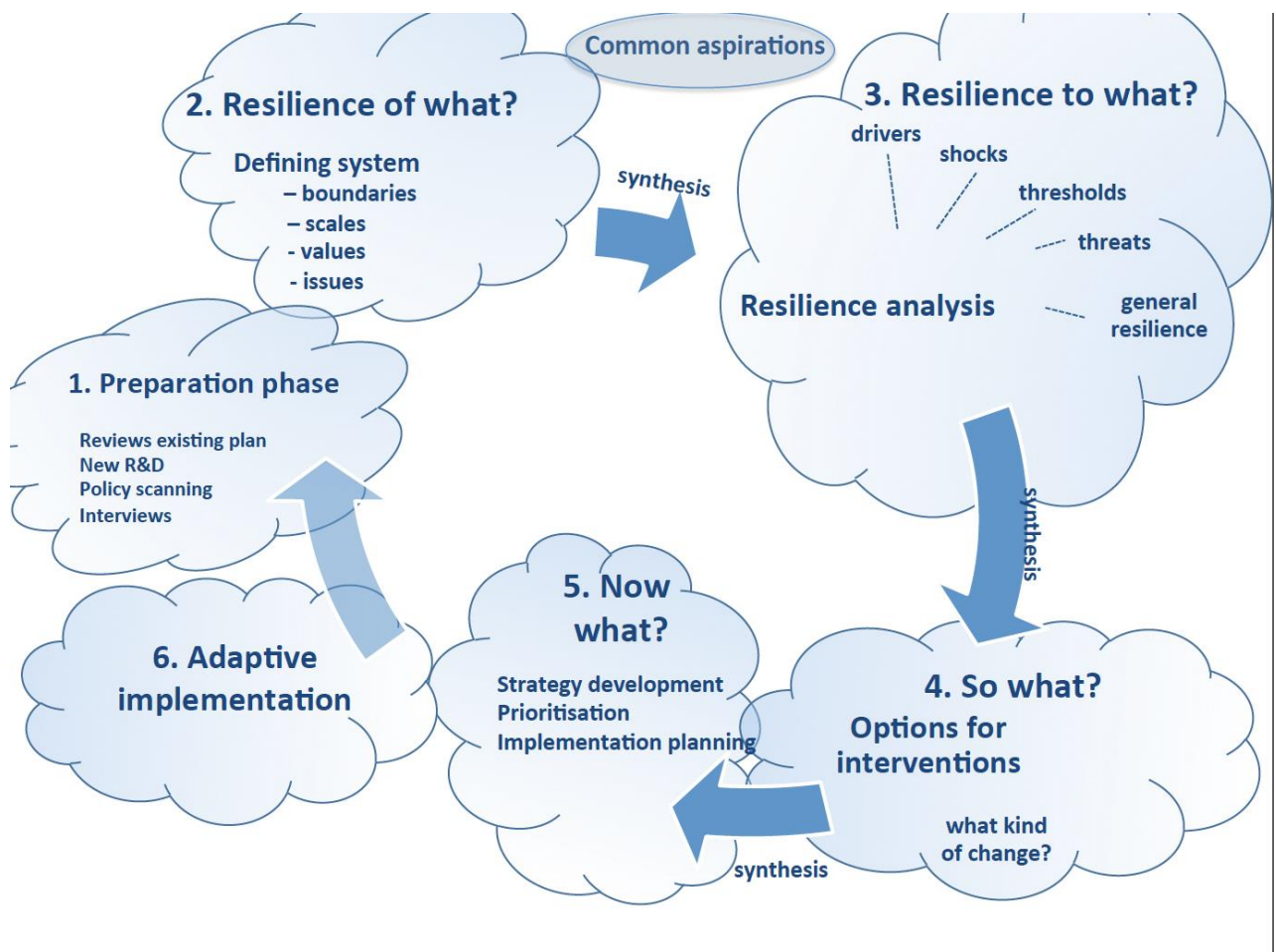
APPENDIX I THE RESILIENCE SYSTEMS APPROACH

Kindly written by Paul Ryan – Resilience Systems Specialist Consultant

Overview

This document outlines a process for understanding the limits of both natural resource systems and the capacity of regional communities to manage within those limits under changing future circumstances. The process outlined is based on *resilience thinking*, a multidisciplinary or integrated way of looking at natural resource systems and the way people use and manage these. Resilience thinking focuses on understanding the limits of change in natural resource systems, the consequences of crossing those limits and our capacity to manage within them. In other words, resilience thinking identifies a 'safe operating space' within which to manage natural resources. The core of the resilience thinking approach involves understanding this safe operating space; the capacity of people and natural systems to stay within that space; what events both expected and unexpected that may push you beyond the limits or indeed if and how it's possible to navigate back to the safe operating space if important thresholds have been crossed.

The 'clouds' diagram illustrates the broad phases of a resilience (systems) based planning approach.



The planning process needs to 'internalise' a set of key principles to guide and consider through each phase that embody the systems based paradigm;

- Social and ecological systems are inextricably linked, have complex interactions and they coevolved.
- The presence of thresholds or tipping points can create sometimes significant, rapid and therefore usually unexpected changes in the dynamics of the systems we are trying to manage. These changes (called non-linearities) lead to changes in system function therefore in the delivery of values from the system.
- Systems are multi-scaled (thin paddock, farm, local landscape, sub catchment, catchment, region), the scales are linked and what the dynamics at one scale can influence the dynamics at another scale. You cannot understand or manage a system at one scale; you must plan and operate at multiple scales.
- Systems at any scale are going through cyclical changes in the growth of capital and connections and 'rigidness' of function, a growth phase is typically followed by a collapse and reorganization phase. This cycle (termed the adaptive cycle) has major implications for trying to introduce change.

You need multiple types of knowledge to manage these complex system dynamics. The planning process should strive to draw on and synthesis these different types of knowledge.

BROAD DESCRIPTION OF THE PROCESS

Cloud 1 Preparation phase – positioning the organization for planning

- 1 Reflect on where the region and the key organisations including your own are at and think deeply about trends and fit – have a first stab at the scale of the task facing planners whether business as usual, incremental adaptation or radical change might be required to make progress. This reflection should be informed by reviews of past plans, programs etc. as well as MER about the effectiveness of previous efforts.

Get the governance right for complex adaptive approach – needs to address internal structures, agency and culture to perform these planning and implementation functions and to consider how learning, networking, knowledge packaging, leadership and incentives might be applied during and post planning during the implementation phase.

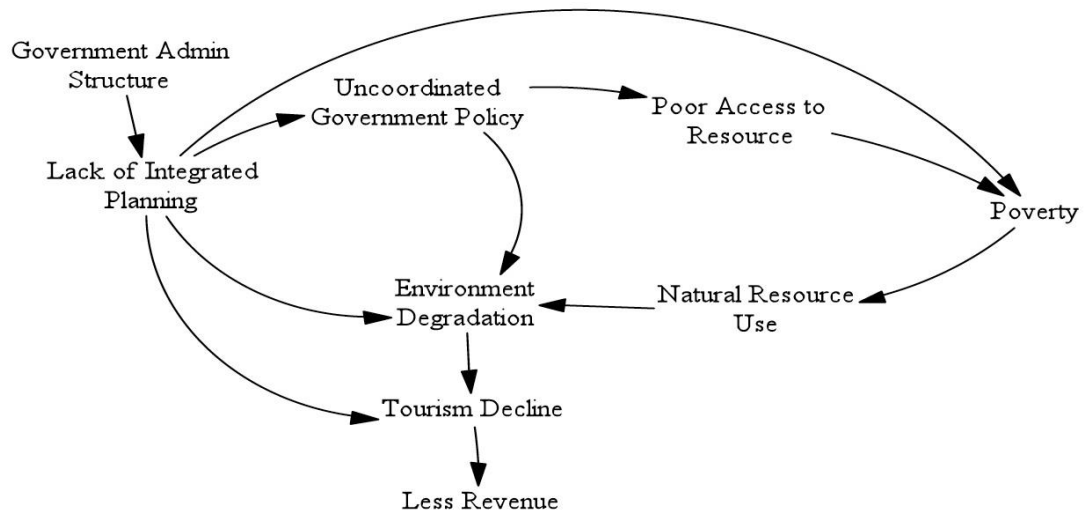
Document key assumptions about the planning process, the mental models of NRM and theory underpinning it and the intended function of the plan – have a first go at planning the planning – think about whether to work from wholes (SESs) to parts (problem spaces and other sub-systems/asset systems) or parts to wholes – could do concurrently/iteratively if lots of resources?

Engage individuals in defining landscape and community identity (these are the Social-ecological Systems SES's that people recognize and identify with) and problem spaces - leads to Cloud 2, describing the current system – information about boundaries, scales, system functions that people values (goods, services, products, outputs). A key question to ask here is 'are there any major trends (caused by external drivers) or threats (internal dynamics) that are leading to or could lead to major changes in the delivery of desired functions (that deliver desired values)? This helps to define values and start to define 'problem spaces' that become the focus for further analysis later on.

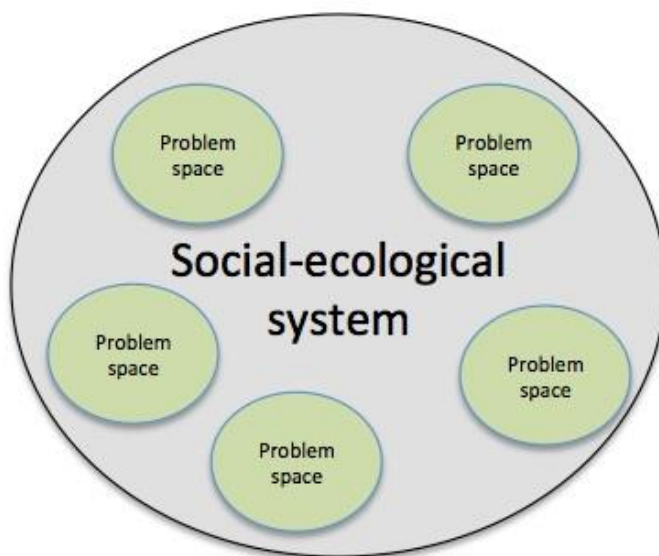
Cloud 2 The resilience of what? Describing the system

- 2 Start identifying SES's and the goods service, products associated with those. You can develop production functions (i.e. what delivers this good, services or product), then causal loops to look at how changes in one part of that production function changes delivery of the values good, service or product. And how this relates to the common aspirations that emerge across Clouds 1, 2 and to a lesser extent Cloud 3

A simple causal loop diagram.



Use the actual or perceived changes in the delivery of values, production functions and /or causal loops to define sub systems 'problem spaces'.



Diagrammatic representation of multiple problem spaces (big issues) within an SES. A region may contain multiple SES's.

A problem space encapsulates the problem or big issue that people are concerned about – it is more than just a biophysical or ecological threat, it is a social-ecological problem, and it includes the biophysical, social, economic, political dynamics around the problem. Problem spaces can be functional (i.e. industry) or place based. This process should include an understanding (and description) of how the ‘problem space’ relates to the focal scale (e.g. increased soil erosion of vulnerable soil types caused by increasing rainfall intensity and late summer storm activity driven by climate change in the xx catchment, if sufficient area erodes it will impact on future generations ability to generate income from farming) – that’s a place based problem space that could influence the whole SES. A functional problem space might be reduced yield due to reduced Autumn rainfall, leading to decreasing economic viability, leading to decreasing population, reducing services of the whole SES) – that’s a more functional problems space (rainfall/yield) that has implications for the whole SES.

Bring people together around ‘problem spaces’ – let them reframe the problem space as an ‘opportunity space’ and share their ideals – what do they want the future to be like? – then ask them to co-design developing conceptual models of the space and assess whether current practice is likely to deliver on ideals and if not seek new ideas and innovative practice which breaks the pattern and form self-organising collaborations around these ideas. This scoping of the problem space gives the basic raw materials for developing a more detailed understanding that is mostly expert derived (see next step)

Cloud 3 Resilience to what?

- 3 Detailed analysis of ‘problem space’ – document the key dynamics
 - Drivers (external pushing forces, originating outside the immediate system)
 - Threats (internal processes that cause the negative changes in values)
 - Shocks (shorter, unexpected events that disrupt the normal dynamics)
 - Thresholds (known or suspected tipping points beyond which feedbacks change and the system moves towards a different state, resulting in a major change in the delivery of values or benefits.

- 4 Develop a conceptual model that builds on the causal loop or production function, it could be an S&T model, it could be a diagram, a description etc. whatever is most appropriate to capture what the problem is, the dynamics, what drives it, how that is taking it away from peoples aspirations, what are potential interventions etc. From a resilience perspective, issues with thresholds or tipping points are considered more important to identify and focus on as they represent a great risk that issues with more linear dynamics. Importantly this analysis identifies the ‘critical dynamics’ of the problem space, which include the ‘controlling variables’ if known, threshold if known and the important feedbacks.
 - Identify controlling variables – look around thresholds, what changes when you cross the threshold? There should be an indefinable change in feedbacks.
 - If there are alternate states that can be identified then there must be a threshold.
 - Thresholds can be known or suspected – they might be data derived, management derived or ‘socially’ derived

- If causal loops are developed initially, you can go back to these and look for reinforcing feedback loops.
 - Other soft systems approaches
- 5 Check individual problem space conceptual model back against initial focal system description – does the deeper analysis still make sense in the context of the larger ‘multi problem space’ scale. How do this individual model dynamics impact on the capacity of the system to deliver the collective aspirations? Are any interventions apparent?
- 6 Bring problem space conceptual models together –
- How do they interact?
 - Do any of the critical dynamics of individual problem space influence the critical dynamics of other problem spaces?
 - Are any nested? I.e. does one problem space ‘fit’ within another?
 - How do the interacting sets of problem space dynamics influence the capacity of the system to deliver the collective aspirations? Are any interventions apparent at this stage?

What is the relationship between the dynamics at this scale and the dynamics of systems and subsystems below and above? This linkage across scales of important dynamics, termed ‘panarchy’, may be important in causing or preventing change at the focal SES scale.

- 7 Assess general resilience – general resilience is the capacity of the biophysical and social domains to cope with and manage *unknown and unexpected dynamics* in any of the problems spaces, SES’s or whole system scale.

Cloud 4 So what? Identify change pathways

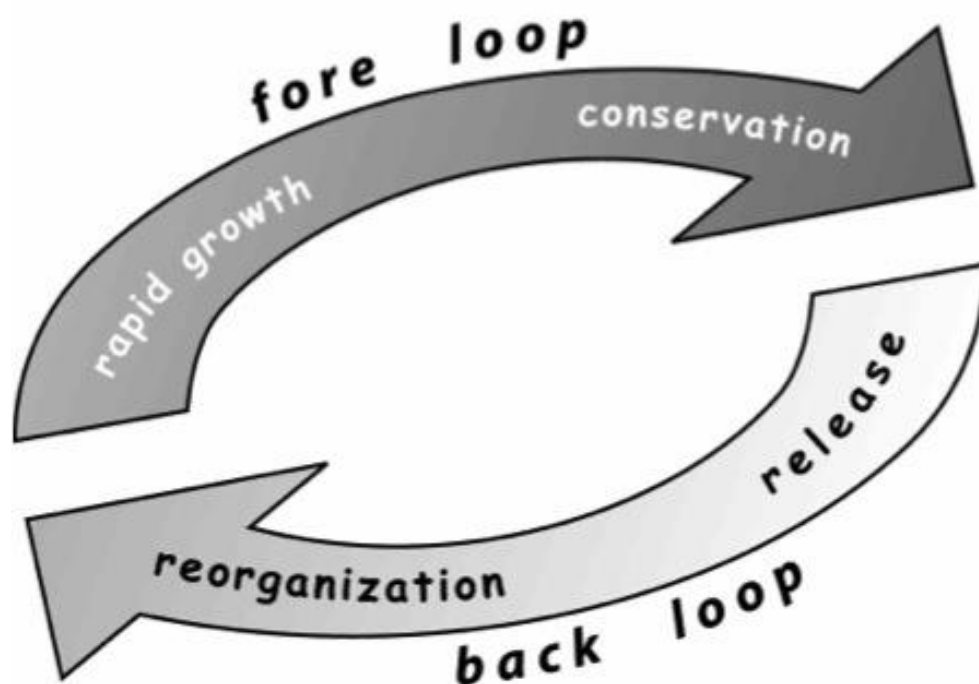
- 8 Looking at the information generated in Cloud 2. What is the nature and degree of change required to ensure that the current system will deliver future aspirations? Will continuing on the same trajectory, a business-as-usual approach achieve the future aspirations? Will some adaptation be required? Will major change, a transformation be required? Depending on the type of change required it may require very different approaches to intervention.
- Exploring alternative futures - What are the possible pathways the system could move along given different scenarios for how problem spaces could interact in the future? How does the breadth of future system ‘options’ change in the future along these different pathways?
 - Explore the relationship between these pathways – are they exclusive, are there possible transition points where it might be possible to change pathways in the future or are there any obvious points of no return along these pathways? Is the current pathway viable in the medium term? The long term?

9 What is the current capacity to manage the (shorter term) dynamics within the problem spaces? Barriers and enablers.

10 What types of specific interventions are required to produce the desired change *within this problem space*? Interventions usually fall into only a few categories –

- Governance changes
- Knowledge management - education, extension and capacity building,
- Incentives (positive and negative),
- Policy and regulation
- technological change through R&D
- no intervention (deliberate no intervention)

11 Can change be achieved at this time? Where is the system or problem space in its dynamics, on the adaptive cycle? The rapid growth phase, conservation phase, release or collapse phase or reorganization phase. Achieving major change is difficult in the rapid growth phase and almost impossible in the conservation phase.



12 How will intervening in a problem space actually influence the problem space? Influence the whole system? Influence the scales above and below? What are the possible unintended consequences of intervening in a subsystem?

Cloud 5 Now what? Strategy development

13 Thinking strategically across problem spaces, where are the most strategic 'levers' to influence the critical dynamics of one or multiple problem spaces? Will intervening at these points maintain the sub system or system in the desired state (prevent in moving to an undesired state) or restore the system to a desired state (i.e. deliberately cross a threshold). Will this maintain or move the system closer to the collective aspirations?

14 The strategic levers may be;

- Governance changes (such as changes to the organizational role, scope, processes or even organizational structures), new partnerships,
- Knowledge management (collecting organizing, ranking and synthesizing new knowledge, defining knowledge gaps),
- On-ground actions – delivered through positive or negative incentives, capacity building

APPENDIX II

ACRONYMS USED IN THE REPORT

APB	Agricultural Protection Board
BBG	Blackwood Basin Group
DAFWA	Department of Agriculture and Food WA
DEC	Department of Environment and Conservation
FBT	Fringe Benefit Tax
LCDC	Land Care District Commission
LGA	Local Government Authority
NFP	Not for Profit (organisation)
NRM	Natural Resource Management
NRMO	Natural Resource Management Officer
PHCC	Peel Harvey Catchment Council
R&D	Research and Development
R&D & E	Research, Development and Evaluation
SWCC	South West Catchments Council

In response to

The Changing Climate

The South West Catchments Council (SWCC) is updating the South West Regional NRM strategy to incorporate the anticipated effects of a changing climate.

To help do this, SWCC and GeoCatch want to hear from you and find out how the changing climate is affecting you in your local area.

Come and have your say!

Venue: Abbey Beach Resort
595 Bussell Highway, Busselton 6280
Date: Thursday, 3rd of April
Time: Afternoon 1.30pm-4.30pm, Evening 6pm-9pm
Refreshments will be provided

At these discussion forums, we will work together to:

- Determine what is important to you in your area;
- Explore the potential effects of a changing climate in your patch
- Identify the associated challenges and opportunities; and
- Identify options and actions for adoption and a positive long term future.

We hope that this series of discussion forums will encourage you to provide input into our South West regional planning and help us all to:

- Maintain and improve our natural systems
- Protect our livelihoods and lifestyle
- Identify how to manage the possible negative impacts of the changing climate and make the most of positive effects; and
- Enhance our local communities


To register your attendance at the Forum please contact Amy Clifton on 08 5780 6177 or by email amy.clifton@agric.wa.gov.au

<http://swccnrm.org.au/>

  This project is supported by the South West Catchments Council, through funding from the Australian Government and the Government of Western Australia.  

APPENDIX IV

SLIDES USED IN THE PRESENTATION


south west catchments council

In response to The Changing Climate

**Community Consultation Forums:
Community Input into the Update of the South
West Regional NRM Strategy**

Wagin - 14th March 2014

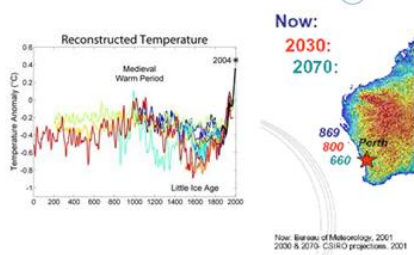
working together to make a difference today and
develop a sustainable environment for tomorrow.

What's the issue?....



working together to make a difference today and develop a sustainable environment for tomorrow.

What do we know already?...



Now: 2030: 2070:

Now: Bureau of Meteorology, 2001
2030 & 2070: CSIRO projections, 2001



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What are we doing about it?

- The SWCC "Climate Change Project" is a 4-year project (2012-16) funded by the Australian Government as part of a National Initiative for all Regional NRM bodies to consider climate change in their strategies, in consultation with the community
- Using most up to date data on climate change, from CSIRO, BoM and CNRM (UWA) *(the latest information is that this data is delayed and won't be available until September-November 2014)*
- Ultimate aim:** to update the existing South West NRM Regional Strategy to incorporate Climate Change, and for this Strategy to be community owned and widely used



working together to make a difference today and develop a sustainable environment for tomorrow.

Why are we holding these forums?...

- Community consultation is vital to getting this right and to facilitate community ownership
- SWCC will be co-hosting a series of discussion forums in March and April, with our Regional Partners, to get initial input
- This isn't the only opportunity to have input!
 - Consultation will be on-going and 2-way throughout 2014, via a number of approaches, including website, contact with key project staff and more community consultation forums in November 2014



working together to make a difference today and develop a sustainable environment for tomorrow.

How is this going to look? – the Systems Approach

- Consultation with Paul Ryan (NRM Planning specialist) showed that the Systems Approach (resilience thinking) was the way to go
 - Already been adopted by 22 other NRM Regions across Australia
- At its most basic, it incorporates social, economic and environmental attributes into NRM planning
- Tries to identify which are the key risks, drivers, linkages and thresholds when it comes environmental management
- Its about adaptive management – its not static and is designed to respond to new information, ideas and environmental changes
- It is complex



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What are we at right now?



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Where to after this forum?

- Your info will be collated and incorporated into the development of the updated strategy
- Interim Draft Strategy will be developed in May
- Climate change data from CNRM *et al* will be available by November 2014
- Second round of community consultation in November 2014, to consider and incorporate this data
- Any questions or further feedback, please contact Leonie on 9780 6102 or leonie.offer@agric.wa.gov.au



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Example to help put these principles into context:

How Wolves Change Rivers



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Other ways to have your say!

- More forums planned for November 2014
- Contact key project staff
- Website is being developed (almost finalised) specifically for the project:
 - Will be linked to SWCC website homepage at swccnrm.org.au
 - Community blog/feedback page
 - Regular information updates
 - Most up to date climate change data
 - Links to other related resources and websites



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Key points to remember today....

- **The 3 Ls!!**
 - Landscape (natural features)
 - Lifestyle (sense of place, recreation, etc)
 - Livelihood (jobs, industries, services, etc)
- Try to think in terms of your **systems, inputs, outputs** and **thresholds** not just individual **assets**



working together to make a difference today and develop a sustainable environment for tomorrow.

APPENDIX V FOCUSED GROUP WORKSHOP RECORDING SHEET


recording sheet below shows the areas captured during group discussions

SWCC - CLIMATE CHANGE FORUM		Fifty Year Scenarios
<div>What is changing?</div>	<div>What are the important points of change?</div>	<div>What does it look like?</div>
<div>WHERE ARE WE NOW?</div>	<div>WHERE ARE WE GOING?</div>	<div>WHAT DOES THE BEST SENARION LOOK LIKE?</div>
		<div>WHAT IS THE LIKELY THE WORST CASE SENARIO</div>

APPENDIX VI TBL FOCUS THEMES



APPENDIX VII EVALUATION SHEET

 **SWCC**
South West Catchments Council

T1B: Event Evaluation Form

Event Name: Changing Climate Forums		Location: 		Date:
Facilitator(s): Wendy Dymond		Name: 		Occupation (if applicable):
Industry sector: <input type="checkbox"/> Retail professional <input type="checkbox"/> State and LG Government staff <input type="checkbox"/> Consultant <input type="checkbox"/> Farmers/landowners <input type="checkbox"/> students <input type="checkbox"/> general public <input type="checkbox"/> other (please describe): 				
Postal Address: 			Postcode: 	
Phone Number: 		Email: 		

Would you like to receive the SWCC Newsletter (if yes, ensure you include your email above)?
☐ Yes ☐ No

How did you find out about this event?
☐ Email ☐ Newspaper ☐ Website ☐ Newsletter ☐ Word of Mouth ☐ Radio/TV
☐ Other (Please specify):

Were your expectations met?
☐ Yes ☐ No

Rate the following using a 1 to 5 scale (1 being the lowest, 5 being the highest) (Please tick)

	1	2	3	4	5	Comments
Place of the event/workshop						
Quality of event/workshop content						
Quality of the workshop content						
Skills of facilitator(s)/presenter(s)						
Organisation of the event						
Participant involvement						
Quality and quantity of materials provided						
Venue						
Catering (if applicable)						
Has the workshop improved your capacity to consider Climate change?						

SWCC Item 2 Page 1 of 2 Council of Directors' Minutes
 Approved Template 01/11/14

+

¶

T1B-Event Evaluation Form.....¶

Did this workshop help identify your aspirations and ideas about Climate Change? ☐ Yes ☐ No¶

Why?¶

¶

¶

¶

¶

The best part of today's event was:¶

¶

¶

¶

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A series of forums are being considered to deliver more specific Climate Change information and data sets in relation to biodiversity and Agriculture later in the year.¶

Would you be interested in further information about these forums? → ☐ Yes ☐ No¶

¶

Do you have any suggestions for future events or other engagement activities to encourage stakeholder's involvement in updating SWCC's Regional NRM Strategy to incorporate Climate Change?¶

¶

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¶

¶

Other comments:¶

¶

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¶

¶

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¶

FEEDBACK¶

Would you like SWCC to provide feedback on how our organisation will address your comments, please tick the appropriate¶

box.¶

¶

→ ☐ Yes → ☐ No¶

APPENDIX VIII WORKSHOP EVALUATION REPORT

Kindly collated by Amy Clifton

Workshop/Event	Changing Climate Workshop				
Location	All				
Date	All				
Facilitator	Wendy Dymond, Leonie Offer				

Total Number of Participants	80
Total Number of Evaluations Returned	70

Attended Afternoon?	57
Attended Evening?	23

Industry Sector?	NRM Professional	State & LG Government Staff	Consultant	Famers/ Landholder	Student	General Public	Other	No Response
	22	14	2	16	0	14	4	4
<i>% Total</i>	<i>31%</i>	<i>20%</i>	<i>3%</i>	<i>23%</i>	<i>0%</i>	<i>20%</i>	<i>6%</i>	<i>6%</i>

Event Promotion	Email	Newsletter	Newspaper	WoM	Website	Radio/TV	Other	No Response
	38	1	8	6	1	0	15	4
<i>% Total</i>	<i>54%</i>	<i>1%</i>	<i>11%</i>	<i>9%</i>	<i>1%</i>	<i>0%</i>	<i>21%</i>	<i>6%</i>

Expectations Met?	Yes	No	No Response
	38	3	29
<i>% Total</i>	<i>54%</i>	<i>4%</i>	<i>41%</i>

100%

Evaluation Questions (1=Lowest)	1 (Low)	2	3	4	5 (High)	No Response
Pace of Workshop	0%	1%	14%	50%	33%	1%
Quality of event/Workshop Content	1%	6%	9%	51%	31%	1%
Quality of Workshop Content	1%	6%	7%	41%	34%	10%
Skills of Facilitator (s) / Presenter (s)	0%	1%	6%	41%	51%	0%
Organisation of the event	1%	3%	10%	47%	39%	0%
Participants involvement	0%	4%	11%	29%	54%	1%
Quality and quantity of handouts provided	1%	1%	14%	23%	21%	39%
Venue	0%	1%	21%	34%	40%	3%
Catering (if applicable)	1%	1%	13%	33%	37%	14%
Has this workshop improved your capacity to consider Climate Change? (1 = No, 5 = Yes & 3 = neutral)	6%	4%	17%	36%	30%	7%

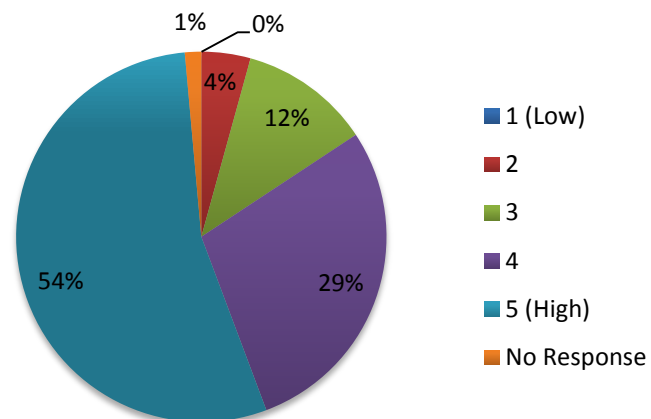
Industry Sector Other

BBG
BBG
Councillor (ticked other)
NGO Environment
NRM Volunteer
Council Member

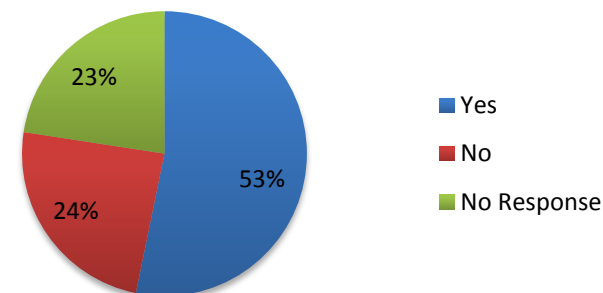
Event Promotion Other

Yasaman (ticked other but word of mouth)
From the LCC
From the LCC
From the LCC
From the LCC
WA famers Zone Co-ordinator
Heard from Leonie (WoM but ticked other)
CCCG
CCCG
Agenda
Boss told me
PHCC Board Member
PHCC

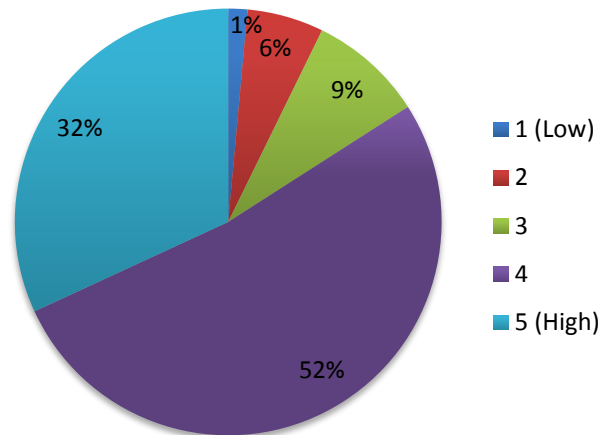
Participants involvement



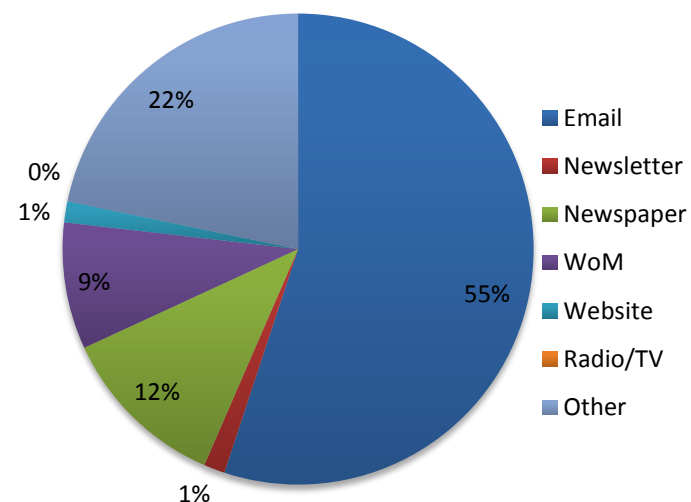
Did this workshop help Identify you aspirations and ideas about Climate Change?



Quality of Workshop Content



Event Promotion



Did this workshop help Identify you aspirations and ideas about Climate Change?

- breaking it down into particular aspects applicable + controllable for us
- Facilitator did excellent job of the workshop
- I'm interested in environmental issues and a system approach
- I am already involved but to meet with other interested also is uplifting
- much was learnt from group discussion and shaping of ideas
- Able to express concerns and solutions
- I think about it at the other times so...
- It was very conversation-orientated which helped draw out thoughts, feelings, biases and Ideas
- Really Didn't know what to expect so will be interested in outcomes and how SWCC will develop their strategy/plan
- was good to discuss various issues affecting our region and bounce ideas off others
- It made us take the step from "this is what is going to happen" to "how will that impact on my life" very interesting!
- heard different views & outcomes
- To be able to involve with different ideas and opinions
- More Clarification and ordering of ideas
- Broadens the way I think about climate change and possible outcomes for our area and this to the South West
- Good to hear other professionals on the subject as I tend to overlook the human aspect
- started to pick up the different views of others and made them into refine my own
- Listening to other views and considering them, clarifying my own concepts
- (Said No) Climate change has been very poorly managed by the Political process, general population somewhat confused and turning off
- reinforcing
- Always helps to talk about ideas, helps consolidate
- helped, yes, not necessarily changes but plenty food for thought, which is really useful
- being with a group of people who actual believe in and accept climate change as a reality (so many people are in denial now days), I really enjoyed that the discussion was kept local
- this wasn't what I'd expected the event to be about, I was expecting more information about the area and past related SWCC programs so was surprised that my experiences were Landcare being called upon
- 2 + way from
- Already involved so I believe I am up to date with issues
- Really just shared our ideas, didn't think of anything new
- increased the complexity each individual, to his own government politician, stumbling block
- Helped to list appreciation of environment & CC Impacts
- I already had ideas, but the conversation flowed well to bring out the ideas
- Very while info on climate change focus appeared more on everything (poorly) systems targets for inclusions in regional strategy
- I thought we would be able to drill down to what needed to be done in our special systems. I am not sure information collected will be synthesised and made into something useful for incorporation into the strategy. If it was good information but how will it help priority what will be done to address climate change in the region?
- Because as an environmental scientist I am already aware of the major issues
- Process used by SWCC was far too open-ended, unfocussed, and vague to enable the participants to meaningfully participate in SWCC strategic planning and appropriately include climate change. The question "identify my aspirations and ideas about Climate Change" reflects this mismatch between what I wanted to contribute and presumably what SWCC wanted from the workshop – a vague, undirected snapshot of current community thinking about Climate Change and how it applies to the South West?
- Hearing the various views of the local community members
- a little bit - I study it quite a lot
- I aspired to pressure the unique habitat of the Augusta/MR Triangle not altogether surf that it

has held identify this further but food for thought

- Not especially, I remain hopeful that all this info will go somewhere and make a difference
- It was good to see the interesting connections in the environment
- diverse participants offered fresh perspective
- I've read quite a few climate change books to try and understand the evolution science
- different format to what was expected
- People's shared views
- Not Sure
- I found the workshop to be a little too high level, lacking in details and strategies for climate change.
The topics covered were quite general and broad, especially lack in a prioritisation strategy during the process.
- I am ambivalent towards the subject. I am confident that people do not want to suffer and will adequately prepare for events that may or may not happen and make necessary adjustments to their life and lifestyles
 - Already pretty well informed
 - It more emphasised the best method approach, system

The best part of today's workshop?

- Small Contributions we can all make, brain storming info out of us in non-direct way
- Process that we worked through in the groups
- listening and discussing with the other participants
- the enthusiasm of presentation
- discussion and summaries
- Interactions and feed back
- the organisers
- The People
- the sticky notes, it was difficult to get started but once the ball got rolling it was awesome
- Ideas sharing; sticky notes, the people
- Good Small group discussion
- All good, small group, everyone heard
- Interaction with different participants, different ideas and different ideas
- Covering the issues - landscape, lifestyle & Livelihood & Recognising the overlap/interacting issues
- I appreciated the variety of the views and the knowledge of the group
- Adrien Egan's dissertation on human adaptations
- I attended only the latter half of the workshop but I liked the discussion on future impacts from climate change
- the sharing of views in the discussion groups
- Listening to Mike Newton's Views
- helps to explain my points of view, we need to keep the SWCC pointed in the right direction not the left handed green direction
- facilitations skills
- the personal approach, listened, happy to chat to us, liked the film
- hearing other's views, being pushed and articulating my own
- Discussion around the table
- hearing about the other participants ideas and aspirations for their properties and their district
- interaction
- Wendy management to make butchers paper and post-its tolerable, hope it contributes to a regional strategy that is accepted by the feds and utilised to guide local investment
- Brainstorming
- Brainstorming
- Sticky labels - Ideas Issues opportunity to relate changes in local area
- Brainstorming wheel (post-it-Notes) and one-on-one discussion with facilitator

- System approach
- The idea of taking the whole of systems approach was good, it was good to get people thinking from the basic elements of the environment
- I think we need to wait until some of the scenario data is available and then consider the impacts on the landscape when we know more about what is predicted. Putting a map on the table showing how things might change and how this could impact on various elements would get people really thinking
- Hard to find a positive
- discussion between participants
- meeting Mike and listening to people
- conglomeration of ideas surfacing
- meeting Jane who obviously cares about the local environment and planet a great deal (MR)
- to see how I can do my bit to be involved
- discussing with others, possible solutions makes me optimistic
- face to face with people I don't necessarily connect with
- hearing other people's points of views
- the varied input
- interactions
- Clever Facilitator
- Talking with others
- Facilitation and inclusion of all stakeholders and participants
- Discussion and input into the process
 - Interaction woven into the components, risks etc.
 - new approach, interesting
 - Nothing sticks out
 - Intelligent and informative communication
 - Good Discussion

Do you have any suggestions for future events or other engagement activities to encourage stakeholder's involvement in updating SWCC's Regional NRM Strategy to incorporate Climate Change?

- Discussion with LGA
- Involve wider community @ field days etc. with competition to have input into consultation to go in draw for prize
- waste to energy vs. recycling
- needs to be on going
- not at this time
- Schools, Rotary Lions
- Would like to hear any other views for and against
- As water is a major issue with climate change we need to look at the issues of sea water, ground water and surface water that will impinge on our life style
- Greatest Publicity to inform Public and generate interest in open discussion
- Different subject to interest point in general only attracts the climate sceptics, not the general community at large
- interactive with public events
- Observation; we need to have input from many more young people, suggestion (If I think of how to achieve I will let you know)
- no, I think this is an excellent venue and the discussion was really relevant, everyone got a say and it was really well organised
- direct involvement with local NRM
- personal posted invitations to local environmental groups (there were a few missing, hopefully

the come to the evening session)

- defined component, e.g.; biodiversity, water, climate change, coastal
- Engage while community section is
- Engage farmer groups e.g.) western Dairy as an example
- less workshopping and more conversational seems to be the more effective for have information/discussion flowing
- Truly engage with your stakeholder groups – the Catchment Committees etc. – in jointly developing the strategy and planning these exercises to best engage their communities to achieve this.
- Do you have any suggestions for future events or other engagement activities to encourage stakeholder's involvement in updating SWCC's Regional NRM Strategy to incorporate Climate Change?
- I think we need to wait until some of the scenario data is available and then consider the impacts on the landscape when we know more about what is predicted. Putting a map on the table showing how things might change and how this could impact on various elements would get people really thinking
- Needs the climate change data/scenarios to people can see the potential changes how it might affect their patch
- Presentation, data, summation of peer reviewed studies
- Good Luck
- To indicate tourist to be involved, and the care of our beautiful environment. It is was longer good enough to love somewhere and admire and use but there has to be the opportunity to be offered for tourist to give more than just spend money - maybe half a day weeding (e.g.) (MR)
- Be involved in our energy forum run by council on may the 19th
- It would be great to have a weighing system that would distinguish between different stakeholders and the weight of their feedback/concerns and priorities. This way, a better methodology could be developed to have a more precise direction in getting feedback from the community
- No
 - N/A
 - Inland climate conditions e.g. declining rainfall / high fire risks etc.

Other comments?

- thanks for the workshop, very interactive, felt a bit unmotivated at the start with facing impacts of changing climate but felt re-motivated and enthused by the end of it
- I want to know why "hippies, tree huggers" are so scary for people?
- I personally wasn't sure how this would go, glad we were so involved and not "talked at" Food for thought
- Thanks
- This issue needs a lot of credible education
- Looking forward to the outcome of the integration of all participants inputs
- Need to be careful to attract the general community, if there are some dollar signs hanging off the future schemes, that usual gets them in.
- stimulating inclusive and informative - enjoying the interaction
- what an enjoyable evening
- Tricky to cover all of the complex issues in the time, many thanks and all the best with writing up the report
- really great to encounter people with similar and different views
- It's a complex subject to discuss
- I really did not find this form of consultation very effective (placing stickers in a primary school activity), nor presumably of much value
- Tricky to cover all of the complex issues in the time, many thanks and all the best with writing up the report

- really great to encounter people with similar and different views
- well done, look forward to hearing about the new information and knowledge on how CC will affect our area
- I was expecting more feedback on work already progressed
- It's a complex subject to discuss
- Thank you