

FLOODPLAIN MANAGEMENT AUSSIE STYLE



Thank You



My 4th Visit to your great country
(Dinham family to about 20 States so far)

WHAT HAVE WE LEARNED TOGETHER



I've learned things from some of your colleagues!!!!

Eg. Many of you know Paul Osman? Yes?

So I thought I should report back to you on his talk at our conference in Australia last year

We've Learnt from your experts



**PAUL OSMAN SHOWS HOW TO TELL OWNERS
THEIR HOUSE IS FLOODPRONE**

MARK HOSKINS



• Hewlett-Packard Guru

Os also suggested AL GOODMAN



MR GOODMAN'S PRESENTATION TO OUR FMA
CONFERENCE

WHY AM I HERE THIS TIME

(apart from getting even with some of your colleagues!)

Today I have been invited to talk about:-

- Australian flood risk and other risks
- How Floodplain Management works in Australia
- How did Australia/NSW manage recent floods 2009
- History of our FMA

So let's get started.....

HISTORY

- Same British heritage as USAEXCEPT...
- Established as a convict colony 1788
- No coins when first established so Rum was unit of currency (now progressed to beer!)
- Haven't yet fought for independence so probably still a convict colony
- Language easy to learn – just say “mate” at the end of each sentence
- USA saved us in WW2 (Darwin like Pearl Harbour except more bombs)
- Today we share much in common with USA

AUS = USA



Area = 3m sq miles
6th Largest in World
6 states + 2 territories



Area = 3.5m sq miles
4th Largest in World
50 states + territories

AUS = USA



Miami



Gold Coast

AUS = USA



San Francisco Bay



Sydney Harbour

AUS = USA



USA television



AUS Television

AUS=USA



51st STATE???

SO....WHAT's THE DIFEERENCE?

WE HAVE A SMALL POPULATION – Less than 10% of USA
(only 22 million people) so we have found ways to do things cheaply

- We can't afford levees everywhere so “softer options” such as more appropriate land use planning and public education/awareness
- No National Flood insurance Program
- We think we do some floodplain things OK sometimes..
(Clarence Floodplain project and acid sulphate soils management)
- Let's take a look

FLOOD RISK IN AUSTRALIA

Types of flood mechanisms in Australia...

- Mainstream Flooding from widespread catchment event/prolonged rainfall
- Localised flash flooding from storm event
- Tropical Cyclones in Northern Australia generate high rainfall/flooding/storm surge (< 74m.p.h.)
- Groundwater flooding (Northern Territory)
- Potentially from infrastructure failure (levees/dams)
- No “snow melt” flooding



Floodplain Management Background

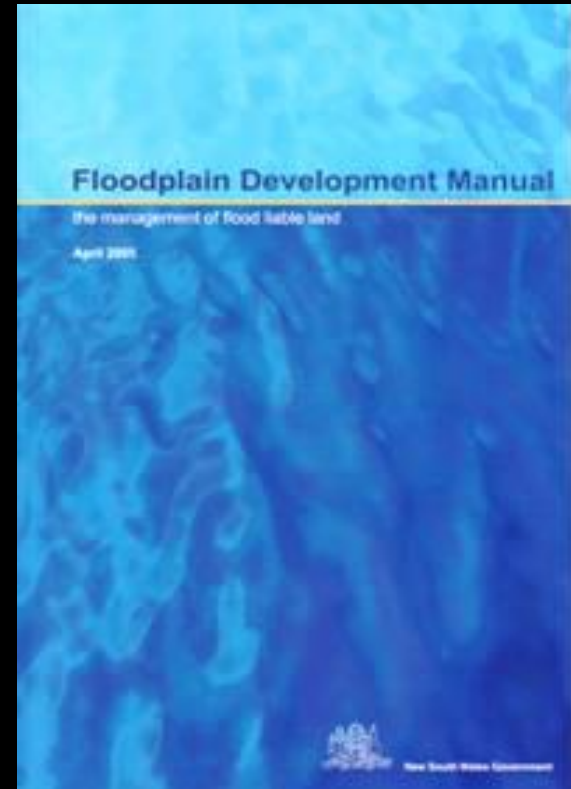
- Australia settled in 1788
- Since then 2213 people have been killed by floods 1788-1996 (+ about 20 since)
- Regular events such as 89 people killed at Gundagai 1852
- 50 people killed at Maitland & Lismore in NSW 1954/5 + \$3billion damage (today's \$)
- By the mid 1950's the Community & Governments wanted something done

Getting Started – 1950's to 80's

- NSW Government proclaimed 3 new County Councils (Macleay, Clarence, Richmond Rivers) and Hunter Valley Conservation Trust in 1950's
- SES Established in 1955 (“combat agency”)
- Federal BOM started new flood warning working group in late 1950's and implemented technology at gauging stations
- New levees/drains/floodgates built by these new FM agencies from 1960's to 1980's
- 1986 Floodplain Development Manual
- 2005 New Floodplain Development Manual

NSW FLOODPLAIN DEVELOPMENT MANUAL - 2005

- Full range of floods to PMF (not just 100 yr)
- Land use planning (Critical/Residential/Industrial/etc)





FLOOD HAZARD INDICATOR

← STEP 1: DISTRIBUTE LANDUSES TO MINIMISE CONSEQUENCES →

STEP 2: REGULATE BUILDING DESIGN AND COMMUNITY
RESPONSES TO MINIMISE CONSEQUENCES

Industrial

Low rise
residential

High rise
residential and
commercial

Hospitals and critical
facilities

PROBABLE MAXIMUM FLOOD

100 YEAR FLOOD

Open space, recreation
and agriculture

RETHINKING FLOODPLAIN PLANNING (using a Risk Management Approach)

How does FM work in AUS

3 Levels of Government involved:-

- Federal – EMA (Attorney General's Department...mainly funding+research)
- State Agencies – Most are named as “Dept of Environment” or similar
- Local Councils
 - 559 in Australia
 - 152 in NSW
 - 80+ are in FMA

State vs Local (proof our states can't agree)



State based



Local Council Based
("old fashioned" 1%)



State based



Local
Council based



State based



Local Council
based



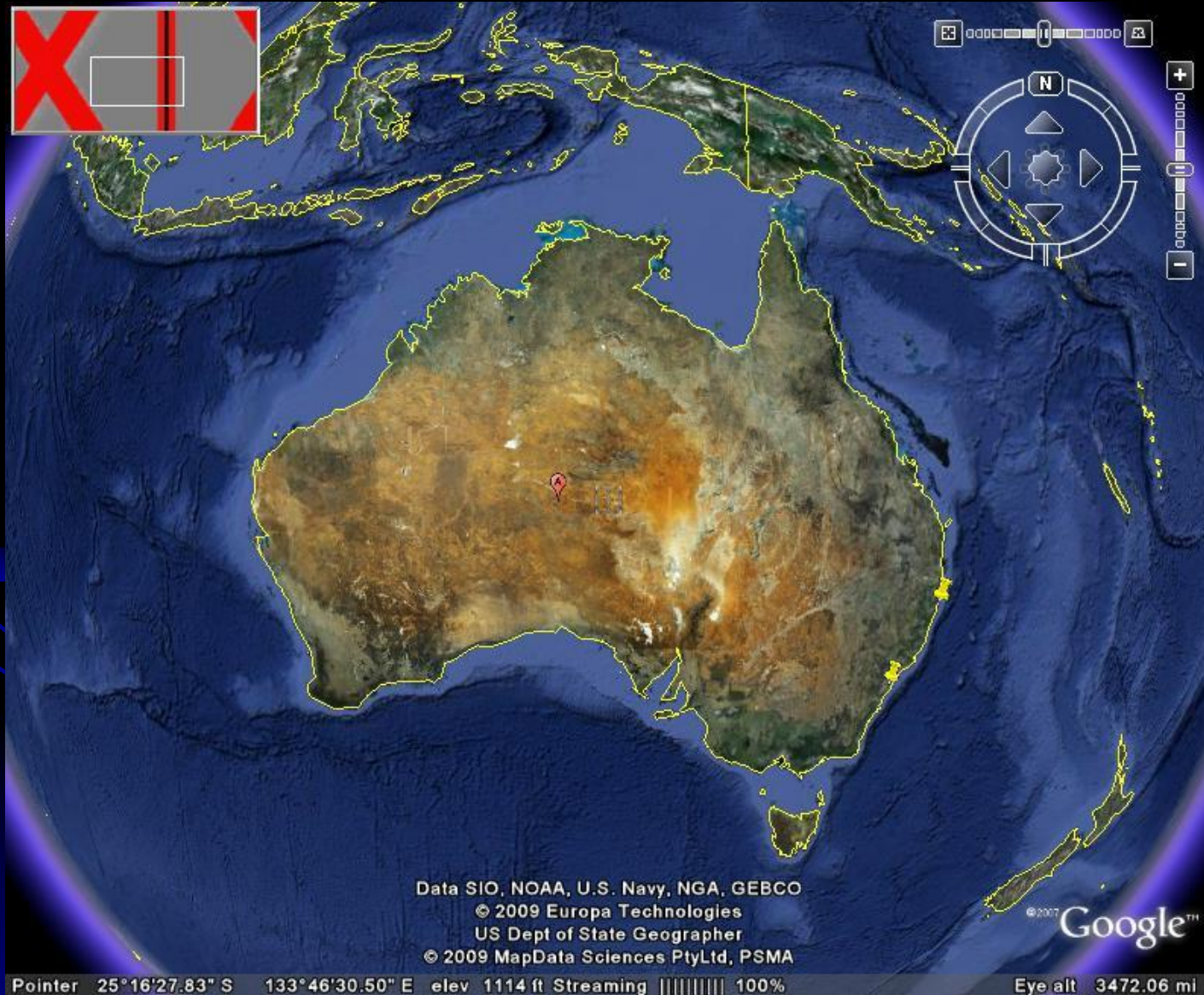
Local Council based



LOCAL COUNCILS

- Councils in NSW achieve reasonably good floodplain risk management plans because of the comprehensive manual provided by the state government (however it can be a lengthy process – 2 yrs)
- NSW State “palmed off” FM to Councils but dictates restrictions through endless new rules (DoP)
- Councils in other states mainly focus only on the 1% flood and get a quicker result but not as comprehensive as NSW

Australian Landforms = DRY!!



AUSSIE HAZARDS

?

ALL HAZARDS MAPPING

We asked Os to prepare an
“All hazards map” for us

ALL HAZARDS MAPPING



OS's AUSTRALIA !

Australian Landforms

East Coast cops the floods



Darling River – Mississippi?



Darling River in Drought



Darling River – Jan 2010



Darling River – March 2010



Darling River “Normal”



But....East Coast Rules



RECENT FLOODS 2009

- Busiest year since 1998/99
- QLD (Feb, May, Dec)
- NSW (Feb, Mar, May, Sept, Dec)
- Vic (Sept)



North Queensland 2009



QLD FLOODS 2009



INGHAM – FAR NORTH QLD

QLD FLOODS 2009



GOOD RESULT – CRICKET FIELD

COFFS HARBOUR NSW 2009

- STEEP COASTAL ESCARPMENT
- FLASH FLOODS (2HRS)



Waterfall Way 2009



Typical escarpment east side of great dividing range

COFFS HARBOUR 2009



NOT DEEP BUT SUDDEN

COFFS HARBOUR 2009



CARS!

CLARENCE

Poor evacuation response!



MAY 2009

LISMORE Jan 2008



Steel culvert failure
(similar to fatal failure at Gosford)

First McDonalds – Chicago 1955



First “Elevated” McDonalds!



Serious floodplain management !!!!!
The first purpose built elevated McDonalds
for floodproofing

HOW DID WE MANAGE FLOODS 2009

- BOM warnings excellent – Gordon Mackay



SES and Council preparation excellent



FLOODS 2009

- THEN.....THE PROBLEMS STARTED!!
- SES decision to evacuate had no credibility (past experience 2001 and forecast low)
- Door knocking with “out of area” volunteers meant no familiarity with evacuation centres (or directions)
 - People sent to flooded roads
 - People gave up trying to evacuate not knowing where to go

FLOODS 2009

- BOM kept flood warnings going too long
 - People heard same predicted river rise when rain had stopped
 - SES “must” continue evacuation call due to BOM continuing warnings for legal reasons, but obviously no necessity
 - “Boy cried wolf” - No credibility next time
 - SES investigation now underway for towns with flood levees



THE AFTERMATH

- No National Flood Insurance Program in Australia
- Flood “recovery” Committee established under Chairmanship of former Police Commissioner
- Good process for handing out relief money to people/citizens
- Not so good for investigating what really went wrong
(Final report “sanitized”)



THE NATIONAL COST = \$400m per Year Average

The cost 2009 ???

No detailed estimates yet but well
in excess of annual average.
(Media reports of “hundreds of
millions of dollars” in every
event during 2009)
Usual Govt budgets < \$100m/yr !)



HISTORY OF FMA

Floodplain Management Authorities of NSW
Evolution.

Started with a conference in May 1961 !!!!
(3 FM Councils plus Hunter Valley Trust)

Conference grew in numbers each year so FMA
was formed with rotating Chairman supplied
from venue for next conference

FMA

In 1980 a permanent Chairman was duly elected and several Chairmen held the post until 1999 when current Chairman, Mr Allan Ezzy was elected.



FMA

The current Board is:

Chairman – Mr Allan Ezzy

Deputy Chair – Ms Betty Green

Executive Member Technical – Mr Ian Dinham

- Executive Member Planning – Ms Sue Ribbons

Executive Officer – Mr Wilton Boyd (retiring)

FMA

What's my role?

(Work Work Work !!)



FMA – EDUCATION PROGRAM

Apart from providing advice on technical issues - one of my tasks has been to initiate a floodplain management education program to sustain the knowledge into the future,

As Chair of the project committee I have conscripted volunteers and formed a partnership with the University of Technology in Sydney and the NSW Department of Environment Climate Change and Water.



Do some of the lecturing



FMA EDUCATION PROGRAM

WHERE DID WE GET THE IDEA FROM??

ASFPM Conference St Louis 2003



Visit the FMA or UTS websites for
information

WHAT ELSE DO WE DO THAT'S NEW?

THE CLARENCE FLOODPLAIN PROJECT !!!!



CFP

We've all seen the benefits of levees, drains and floodgates.

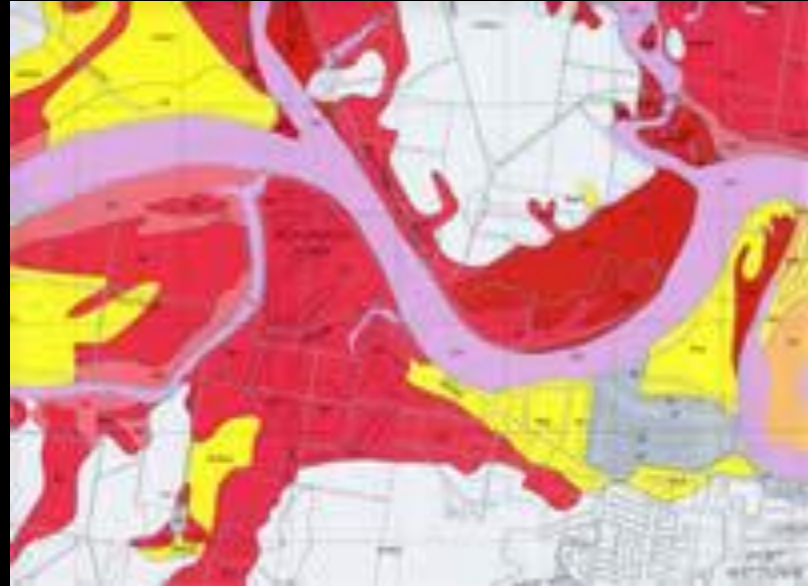
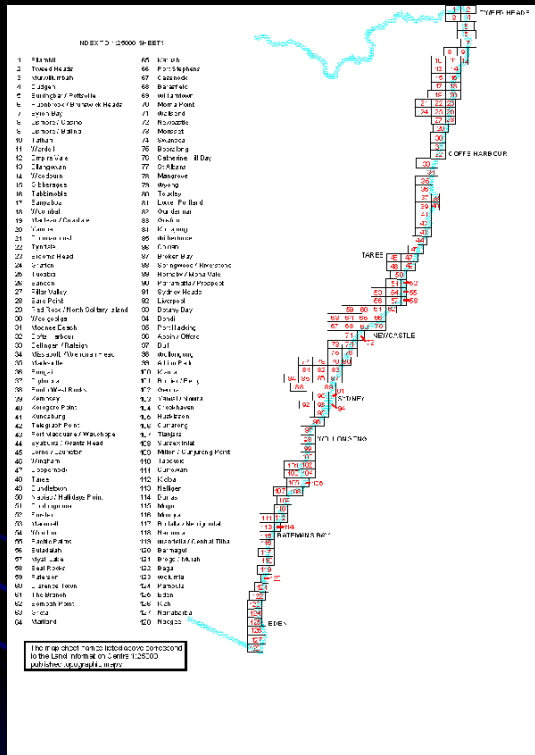
BUT

In the eastern states of Australia we have also seen the downside

- Blocked fish passage for breeding
- Poor water quality
- Degraded wetlands
- Knock on effects (Bird life etc)



WORST OF ALL ACID SULFATE SOILS!



You Have them too!
Virginia/Maryland/California/etc

CFP

ASS were an unknown phenomenon to
Australians back in the 1950's 60's and 70's

Digging flood mitigation drains/channels exposed
these soils (iron sulphides or “pyrites”) to the
atmosphere allowing them to oxidise and
produce H_2SO_4

Fish don't do so well in
Sulphuric Acid!



CFP



ASS produced acid runoff after rain events and “Red Spot” disease became evident in fish stocks.

CFP

- 1997 – In the Clarence River we decided to begin opening floodgates for tidal exchange
- Formed a committee with landowner reps and applied for grant funds
- Winches installed to open gates
- Tidally operated floodgates also invented
- Maybe no tides in Illinois but any acid runoff???

CFP

- Today we have won several “Awards” for the project.
- Fish stocks have improved
- Water quality improved
- Significant reduction in Acid discharge to waterways
- Wetlands rehabilitated = 2000Ha+
- Practice has been copied elsewhere in Australia



SIMPLE METHODS



THE RESULTS.... ASS REMEDIATION



BEFORE



Little Broadwater

AFTER

OTHER HAZARDS!

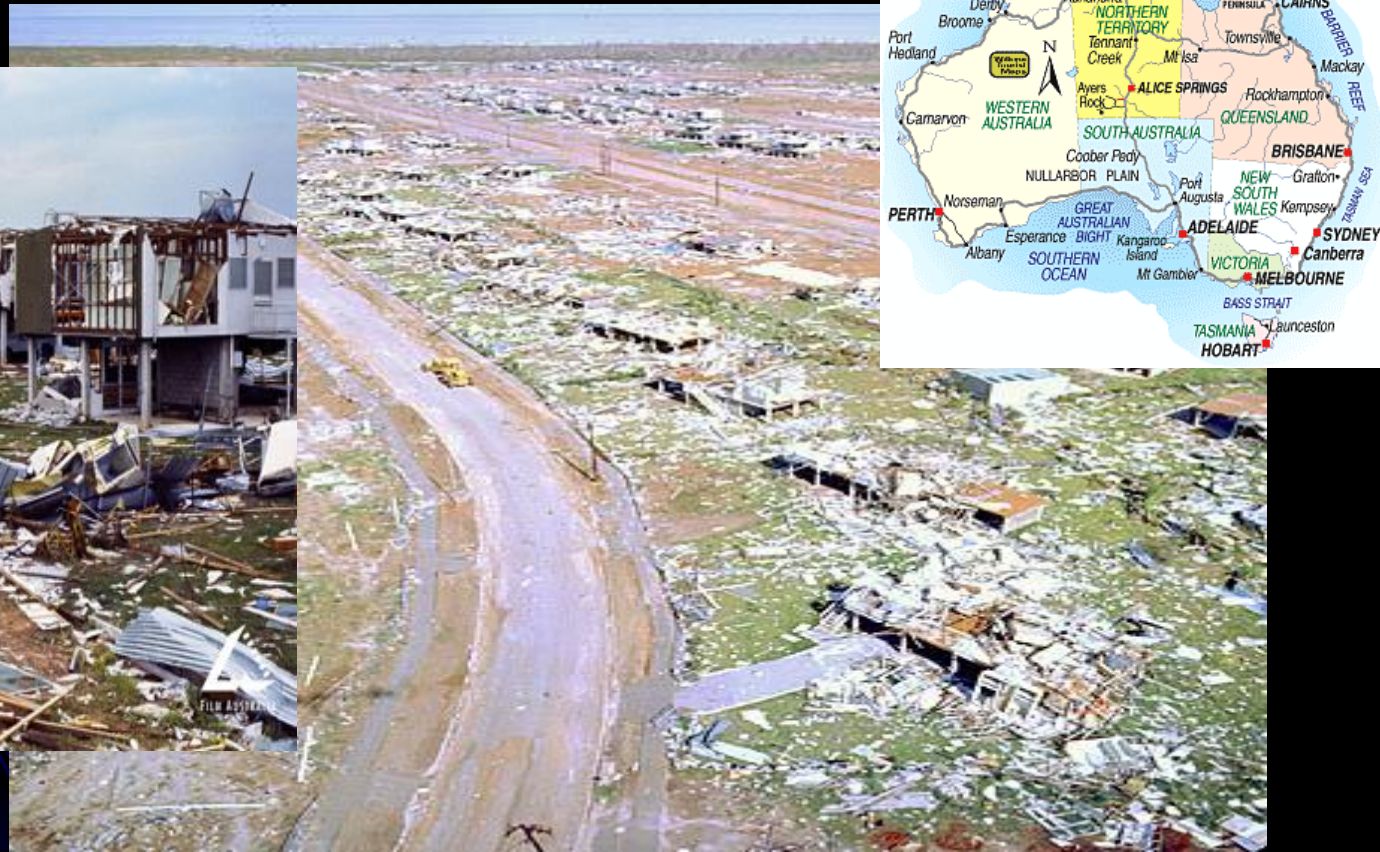
BUSH FIRES

Victoria Feb 2009 –
173 killed

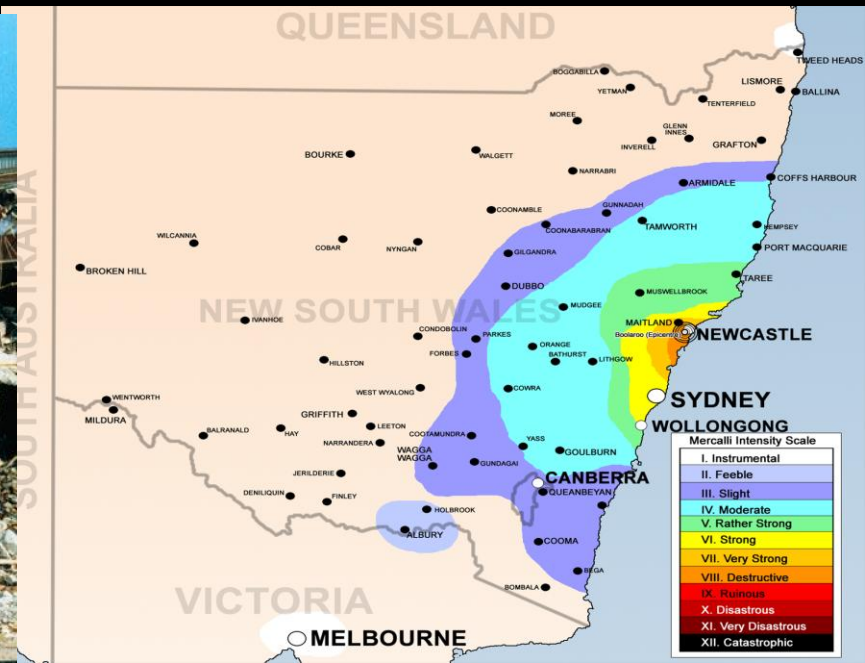
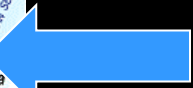


NO TORNADOS! BUT SOME CYCLONES

A few each year in Northern Australia
Worst was Cyclone Tracy 1974
71 killed



- Negligible Risk
(Newcastle 1989 – 13 killed – only recorded earthquake to claim lives)



DUST STORM 2009



First Major dust storm since 1945

CLIMATE CHANGE!!!!



Prime water front property for sale - bargain price

NSW GOVERNMENT GUIDELINE

- DECCW Guideline 2007 recommends modelling to assess impact of “High Impact” climate change scenario
- SLR of 0.91m by 2100
- 30% increase in rainfall intensity

CONCLUSION

SIMILAR LAND SIZE AS USA
BUT

- AUS Budget < \$400b.... USA Budget > \$3,800b
- Challenges also include ageing infrastructure

THEREFORE
WE NEED TO BE INNOVATIVE !!!



PROOF – AUSSIE INNOVATION!

Aussie Inventions

1838 Pre-paid postage - Colonial Postmaster-General of New South Wales, James Raymond introduced the world's first pre-paid postal system.

1843 Grain stripper - John Ridley and John Bull of South Australia developed the world's first grain stripper that cut the crop then removed and placed the grain into bins.



1856 Refrigerator - Using the principal of vapour compression, James Harrison produced the world's first practical refrigerator. He was commissioned by a brewery to build a machine that cooled beer.


1858 Football - In 1858 Tom Will and Henry Harrison wrote the first ten rules of Football, thus becoming the first people in the world to codify a kicking-ball game. These rules predate those of Rugby, Soccer and Gridiron. Football may have been inspired by the Aboriginal jumping/kicking game of Marn Grook.

1876 Stump jump plough - Robert and Clarence Bowyer Smith developed a plough which could jump over stumps and stones, enabling newly-cleared land to be cultivated.

1889 Electric Drill - Arthur James Arnot, patented the world's first electric drill on 20 August 1889 while he was an employee of the Union Electric Company in Melbourne. He designed it primarily to drill rock and to dig coal.

1897 Differential gears - David Shearer of South Australia built a steam car with a differential inside left rear wheel hub.

1902 Notepad - For 500 years, paper had been supplied in loose sheets. J A Birchall decided that it would be a good idea to cut the sheets into half, back them with cardboard and glue them together at the top.



1906 Feature film - The world's first feature length film, The Story of the Kelly Gang, was a little over an hour long.

1906 Surf life - saving reel - The first surf life-saving reel in the world was demonstrated at Bondi Beach on 23 December 1906 by its designer Lester Ormsby.

1912 The tank - A South Australian named Lance de Mole submitted a proposal, to the British War Office, for a 'chain-rail vehicle which could be easily steered and carry heavy loads over rough ground and trenches'. The British war office liked the idea but then developed the tank themselves without paying royalties.


1917 Aspro - A pain reliever based on aspirin was developed in Melbourne by George Nicholas. By 1940 it had become the world's most widely used headache and pain treatment.

More Aussie Inventions

1922 Vegemite - One of the world's richest sources of vitamin B, vegemite was invented by Dr. Cyril P. Callister. It is made by the autolysis of expired brewer's yeast: a process where the yeast's own enzymes break it down.

1924 Car radio - The first car radio was fitted to an Australian car built by Kellys Motors in New South Wales.

1927 Speedo - In 1927 Speedo launched the revolutionary 'racer-back' style, which reduced fabric drag. In 1955, Speedo introduced the use of nylon for their racing swimwear. At the 1968, 1972 and 1976 Olympics, more than 70 per cent of all swimming medals were won by competitors wearing Speedo.



1934 Ute - The utility vehicle, with a front like a car and a rear like a truck was designed by Lewis Brandt at the Ford Motor Company in Geelong, Victoria.


1940 Zinc Cream - This white sun block made from zinc oxide was developed by the Fauldings pharmaceutical company.

1942 Transverse folding stroller - Designed by Harold Cornish, the sturdy, lightweight design of his Stoway Strollers made life easier for many parents using public transport as it could be folded and placed under a tram seat.

1944 Antibiotic penicillin - Produced by Howard Florey with help from a Pome named Ernst Chain.

1945 The Hills Hoist - A rotary clothes line with a winding mechanism allowing the frame to be lowered and raised with ease. Invented by Lance Hill.

1952 Victor mower - by Mervyn Victor Richardson, the two-stroke petrol lawn mower with rotary blades revolutionised mowing world wide. * 1957 Trousers with a permeant crease - The process for producing permanently creased fabric was invented by Dr Arthur Farnworth of the CSIRO.




1958 Black box flight recorder - The 'black box' voice and instrument data recorder was invented by Dr David Warren in Melbourne. David Robinson and George Kossoff's work at the Australian Department of Health, resulted in the first commercially practical water path ultrasonic scanner in 1961.

1965 Inflatable escape slide - The inflatable aircraft escape slide which doubles as a raft was invented by Jack Grant of Qantas.

1965 Wine cask - Invented by Thomas Angrove, the wine cask is a cardboard box housing a plastic container which collapses as the wine is drawn off, thus preventing contact with air.


1970 Variable rack and pinion steering - The variable ratio rack and pinion steering in motor vehicles was invented by Australian engineer, Arthur Bishop.

1972 Orbital internal combustion engine - The orbital combustion process engine was invented by engineer Ralph Sarich of Perth, Western Australia.



1979 Race-cam - Race Cam was developed by Geoff Healey, an engineer with Australian Television Network Seven in Sydney. The tiny lightweight camera is used in sports broadcasts and provides viewers with spectacular views of events such as motor racing, which are impossible with conventional cameras

1979 Bionic ear - The cochlear implant was invented by Professor Graeme Clark of the University of Melbourne.



1983 Winged Keel - Ben Lexen designed a winged keel that helped Australia II end the American's 132 ownership of the America's cup. The keel gave the yacht better steering and manoeuvrability in heavy winds.

1992 Multi-focal contact lens - The world's first multi-focal contact lens was invented by optical research scientist, Stephen Newman in Queensland.

OTHER CHEAP STRATEGIES



WSUD and On-site Detention

Waterway Restoration



Increased retention and storage to reduce peak downstream without affecting upstream levels

PUBLIC EDUCATION

Eg; Radio ads+talkback/Shopping Centre displays/Brochures/schools



**CRITICAL INFRASTRUCTURE
MUST BE PREPARED !!!!**

EVACUATION



TAKE VALUABLES WITH YOU

Public Education?



Don't drive through flood waters

Whats my name



?

WATER FLOW CORIOLIS EFFECT



SOUTHERN HEMISPHERE SINK
CLOCKWISE!



Ian Dinham

Infrastructure Engineer - Tweed Shire Council

Elected Councillor – Clarence Valley Council

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