FLOODPLAIN MANAGEMENT

AUSSIE STYLE
Thank You

My 4th Visit to your great country
(Dinham family to about 20 States so far)
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 USA ….EXCEPT…
- 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 $\equiv$ USA

Miami

Gold Coast
AUS = USA

San Francisco Bay  Sydney Harbour
USA television  AUS Television
AUS=USA

51st STATE???
SO....WHAT’s THE DIFFERENCE?

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
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
Open space, recreation and agriculture
High rise residential and commercial
Hospitals and critical facilities

PROBABLE MAXIMUM FLOOD
100 YEAR FLOOD

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)
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

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 in Drought
Darling River “Normal”
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
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 Chairman held the post until 1999 when current Chairman, Mr Allan Ezzy was elected.
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)
What’s my role?

(Work 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

!!!!!
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
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 H2SO4.

Fish don’t do so well in Sulphuric Acid!
ASS produced acid runoff after rain events and “Red Spot” disease became evident in fish stocks.
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???
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

AFTER

Little Broadwater
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
**EARTHQUAKES**

- Negligible Risk
  (Newcastle 1989 – 13 killed – only recorded earthquake to claim lives)
DUST STORM 2009

First Major dust storm since 1945
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.

1856 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 worldwide.

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

FMA Executive – Technical

P.O. Box 816

Murwillumbah

NSW  2484

(02) 6670 2759

idinham@tweed.nsw.gov.au