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Coastal adaptation: estimating values of sensitive coastal environments and planning for the future.

DR HELEN SCARBOROUGH, ASSOC PROF. DEAKIN UNIVERSITY, WARRNAMBOOL

Contributed presentation at the 60th AARES Annual Conference,
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Coastal adaptation: estimating values of sensitive coastal environments and planning for the future.

**DR HELEN SCARBOROUGH,
ASSOC PROF. DEAKIN UNIVERSITY, WARRNAMBOOL**



OUTLINE

- Brief background: Coastal governance
- Coastal crown land caravan park project (CCP)
- Implications for coastal management

DEFINITION OF COAST

- The marine environment and waters out to three nautical miles
- Foreshore or coastal crown land up to 200m from the high water mark
- Coastal hinterland directly influenced by the sea or directly influencing the coastline, catchments- including estuaries and the atmosphere near and around the coast

(VCC 2014)

COASTAL GOVERNANCE IN VICTORIA

- Coastal Management Act 1995
- Victorian Coastal Council and Regional Coastal Boards
- Victorian Coastal Strategy 2014
 - Hierarchy of principles
 - Ensure the protection of significant environmental and cultural values
 - Action: establish clear reporting on value of coastal assets;
 - Ensure CBA of coastal use and development proposals include environmental values.
 - Undertake integrated planning and provide clear direction for the future
 - Ensure the sustainable use of natural coastal resources.
 - Approx 96% of Vic coastline is in public ownership

WESTERN REGIONAL COASTAL PLAN 2015-2020

- “Managing and protecting coastal values” is a key regional priority
- “The western coastal region provides important environmental, social, cultural and economic values for Victorians and visitors. Understanding these values is essential for effective decision-making.”
- Problem: Moving from plan to practice, general lack of understanding of economics
- One example of project aimed at addressing the issue of understanding coastal values.

COASTAL ASSETS AND VULNERABILITY

- Changes to coastal climate conditions
 - Sea level rise and inundation
 - Coastal erosion
- Some work on vulnerable physical assets
- Very little work on vulnerable non-built assets.
- Hence this project focuses on crown land and in particular caravan and camping parks on crown land.

CROWN LAND COASTAL CARAVAN AND CAMPING PARKS (CCP)

- 84 caravan and camping parks on coastal crown land along Victorian coast
- Provide:
 - Social values associated with holidays
 - Dollars for local communities
 - Revenue for coastal Committees of Management
 - Funding for coastal infrastructure
 - Low cost access to coast
- Some very vulnerable (eg Pt Fairy)
 - Coastal erosion – need for adaptation decisions,
 - Fundamentally, sea walls, groynes, retreat?
 - Policy-makers talk of TBL.
 - Need for benefit cost analysis with distributional preferences incorporated

WARRNAMBOOL FORESHORE (630 CCP SITES)



CCP PROJECT

- **Federal funding**
 - Dept of Climate Change and Energy Efficiency
 - Other partners; Deakin: in-kind
- **Project team**
 - Helen Scarborough
 - Board member, Western Coastal Board and Deakin University
 - Steve Blackley
 - Executive Officer of Western Coastal Board
 - Consultants
 - Christine Walker – Strategic Alliance
 - Dr Boyd Blackwell
 - Prof John Rolfe
 - Carolyn Tsioulos

PROJECT OBJECTIVES

- Estimate the market and non-market economic values of public CCPs
- Analyse the social equity preferences of CCP users and adjacent communities for managing the impacts of adaptation strategies on CCPs
- Develop a CCP adaptation pathway decision-framework incorporating social and economic considerations.

METHOD

- Combination
- Some data very hard to collect- eg land values for crown land?
- Market values
- Non-market valuation
 - Travel cost method for recreational values
 - Choice modelling for beach and site values
- Equity questions
- Benefit cost approach
- 770 responses; 380 campers, 382 residents.

SITES IN SAMPLE

Name	Portarlington Holiday Park	Barwon Heads Caravan Park	Apollo Bay Recreation Reserve	Warrnambool Surfside Holiday Park	Gardens Reserve Park Port Fairy
Shire	CoGG	Geelong (CoGG)	Colac Otway	Warrnambool	Moyne
Location	Port Phillip Bay	Barwon Estuary	Barham River	Ocean & Lake Pertobe	Moyne River
Total Sites	877	425	311	630	458
12 month permit sites	365	163	65	0	50
Cabins	20	19	7	24	10
Town Population ABS State suburb	3,022	2,993	1,779	27,541	2,785
Peak population multiple in summer	3.5	3	8	4.5	n/a
Community Access to CCP	No township sporting reserves within the CCP.	Gated Controlled access for football, netball	Main reserve for football, tennis, cricket, ag show.	No township sporting reserves within the CCP.	Football oval, grand stand and club facilities via separate entrance un-gated.
Community Access to adjacent Crown land	Beach front walk, yacht club, no bushland area	Kiosk, jetty on Barwon River, near Bluff Reserve	Beach and River Reserve	Most of Lake Pertobe area is public land, boat ramps, yacht club, harbour, pathway along dunes extends to Hopkins River	The harbour is downstream, but not adjacent to the CCP.
Inundation threat	Experienced	Low	Experienced	Low	Moderate

CAMPERS SURVEY: PROFILE OF CAMPERS

	Total
Av No. of Years visited	14.7
First time/one year	17%
Av No. Nights will stay/yr	29
Av No. people staying/night	4.1
Av \$ spend Per site (day)	\$61.70
Av Gross H'hold Income PA	\$82.6k
Av age of respondent	49
Av investment in camping gear '000s	\$26.0

RESIDENTS SURVEY: PROFILE OF RESIDENTS

	Total
Av No. of Years Lived Here	21.4
Av No. of Years Visited before Living Here	25.6
Proportion Who Visited before Living Here	51%
Av Gross H'hold Income PA	\$62.1k
Av age of respondent	53

TRAVEL COST RESULTS: CAMPERS

GROSS VALE ESTIMATES USING DIFFERENT ALLOCATIONS OF OPPORTUNITY COST OF TIME; ALL SITES

	TCPD, 0% time allocation	TCTIM25, 25% time allocation	TCTIM40, 40% time allocation
Coefficient of travel cost	-0.0015	-0.0007	-0.0004
Sign correct	Yes	Yes	Yes
Significant	Yes*	Yes*	Yes*
Overall model significance (Chi squared)	2672*	2884*	2930*
McFadden's adj. R²	0.470	0.488	0.491
Gross value \$AUD 2012/person/day	67	145	252

USING VALUES – BACK OF ENVELOPE: PORTARLINGTON

Market Value

*\$62 per night park
fee per night (peak)*

*\$61 spend per site
per day*

*\$123 x 877 sites
=\$107,871 per day*

Non Market Value

*\$49 consumer surplus
to person per day*

*Average No. people per
site per night 4.1*

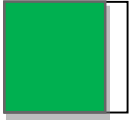
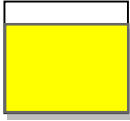
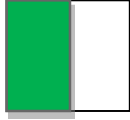

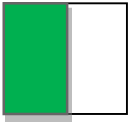

*\$201 surplus per site
per day x 877 sites
=\$176,189 per day*

\$284,060 value per day

CHOICE EXPERIMENT

- 3 policy options
- 3 attributes
 - Possible loss of CCP sites, 4 levels: 50%, 40%, 30% and 20%
 - Possible loss of beach width, 4 levels: 50%, 40%, 30%, and 20%
 - Payment vehicle
 - For campers: Additional ongoing cost: 5 levels: 0, \$5, \$10, \$20, \$50 per night site fee
 - For residents: increase in rates: 3 levels: 0, \$50 and \$100 per year.

EXAMPLE OF CHOICE SET

Option	Possible <u>reduction</u> in number of sites	Possible <u>reduction</u> in beach width at high tide	Cost/site/night <u>increase</u> at coastal parks	Your choice (one only please)
A	20% 	20% 	\$10	
B	50% 	30% 	\$5	
C (let nature take its course)	50% 	50% 	\$0	

WTP to protect sites and beach.

Campers will pay more to protect camping sites than beaches.

Per 1% loss – (Per person)	Per 10% loss
\$1.03 per night to avoid loss in sites	\$10.3 per night to avoid loss in sites
\$0.36 per night to avoid loss in beach width	\$3.60 per night to avoid loss in beach width
\$26 per annum to avoid loss in sites	\$268 per annum to avoid loss in sites
\$9.30 per annum to avoid loss in beach width	\$93 per annum to avoid loss in beach width

Assumes average of 26.1 nights per annum

At 10% loss (assuming 4.1 people/site) Campers' preparedness to pay to avoid loss:

- \$1,102 (sites) and
- \$384 (beach) per annum

Choice experiment results: residents

Per 1% loss (Per person)	Per 10% loss
\$4.05 per annum to avoid loss in sites \$5.83 per annum to avoid loss in beach width	\$40 per annum to avoid loss in sites \$58 per annum to avoid loss in beach width

Residents assign a comparatively low value in total to beaches and sites.

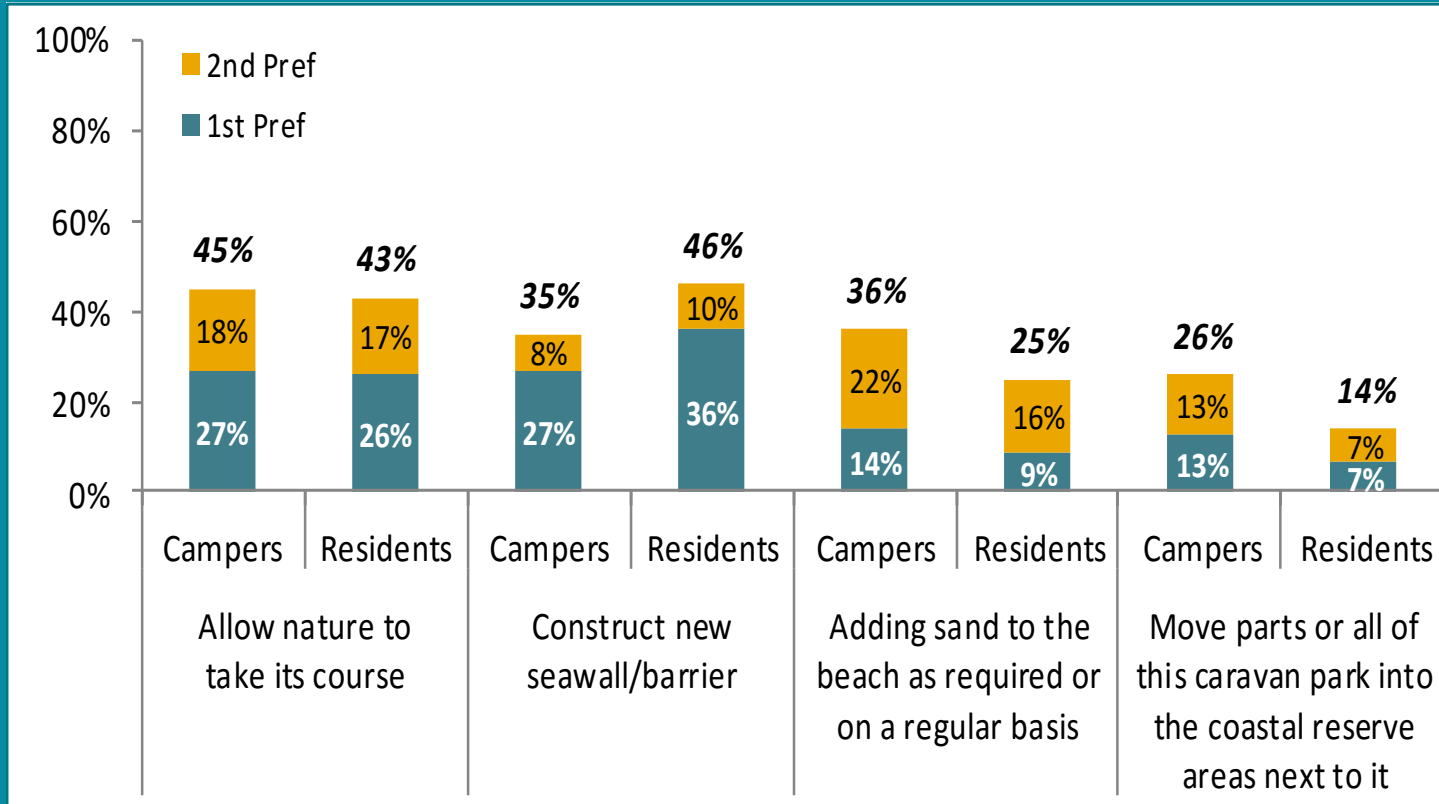
Residents value the beach more than the CCP sites

Comparison of previous literature on beach values

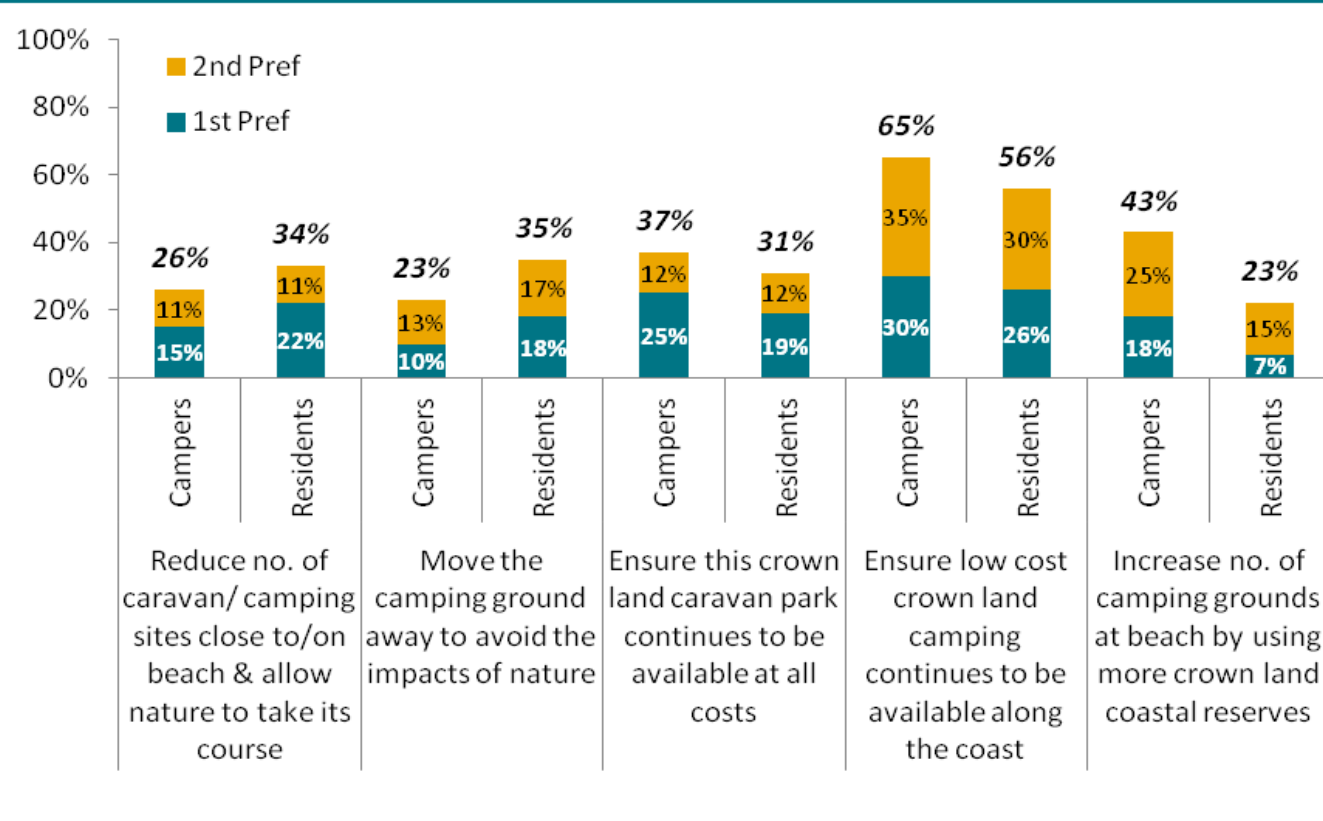
- Worley parsons (2013) appendix 2 has summary of previous work
- Comparison of value of day visit with campers value
 - Commodity consistency problem
- Sensitivity to payment vehicle in CM
 - Especially for campers values

BEACH ADAPTATION OPTIONS:

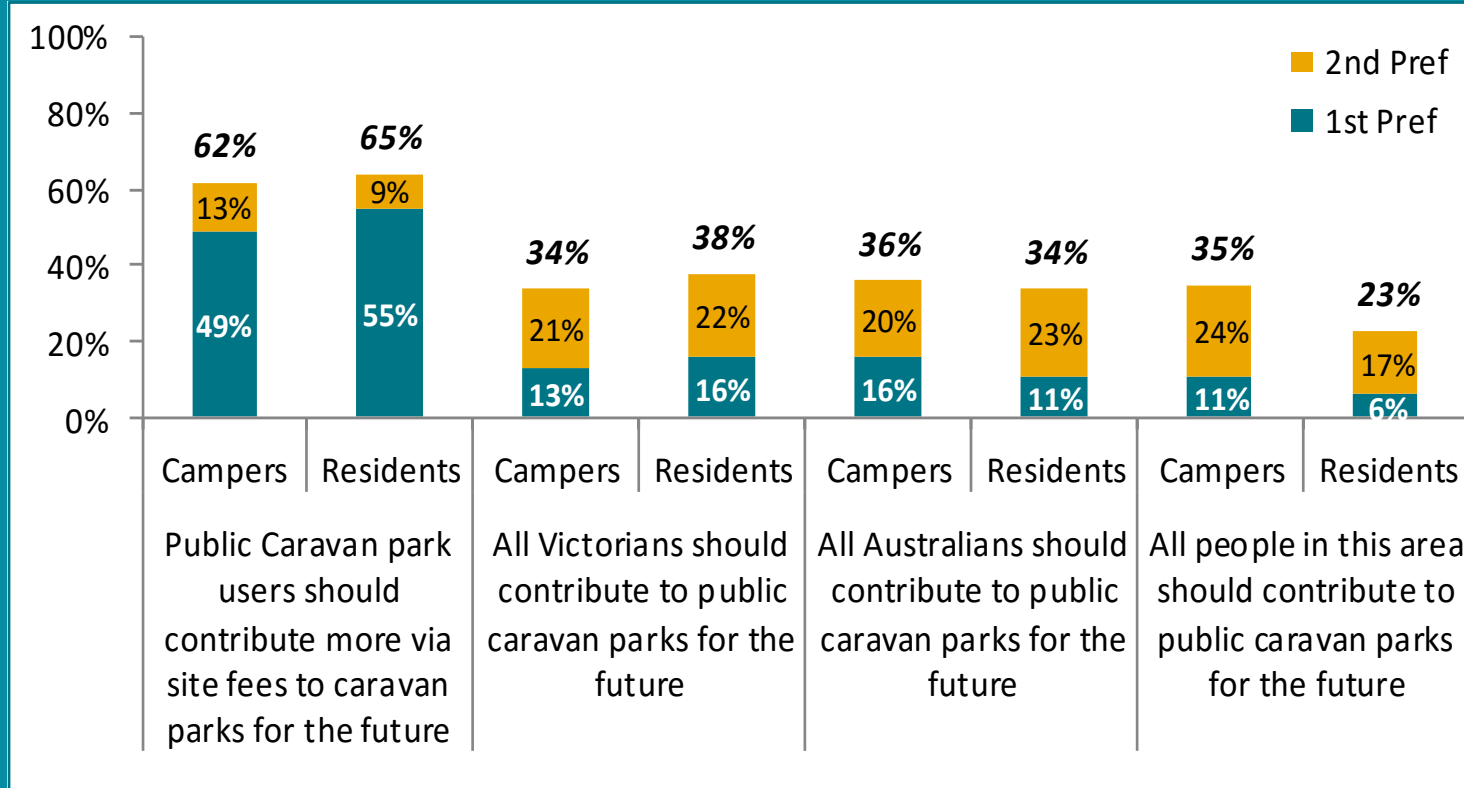
SIZABLE PORTION FAVOUR LET NATURE TAKE ITS COURSE



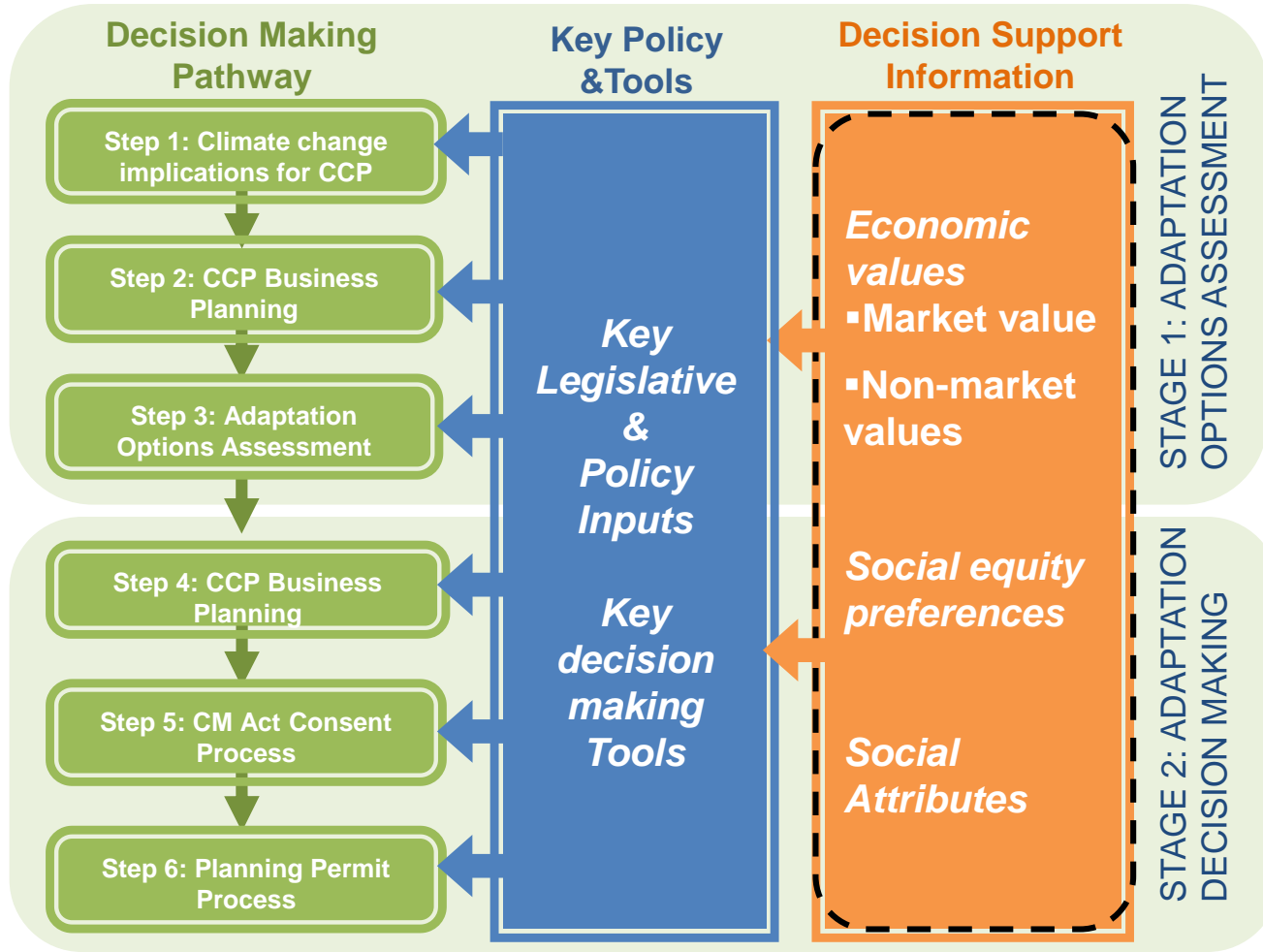
CCP ADAPTATION PREFERENCES



USER PAYS (STATUS QUO?) PREFERRED MOST OFTEN AS THE WAY TO CARRY THE BURDEN FOR ADAPTATION



Decision Support Framework



CHALLENGES

- Incorporating equity
 - Winners and losers
- Education re valuation
- TBL and CBA
- Community preferences
- Multiple parties involved; eg GOR, Vic roads, Local govt, CMA, Committees of Mgt
- Interface, between planners, engineers, and policy-makers
- Coastal governance structure aim is to “facilitate implementation” but lack of resourcing to support structure .

OPPORTUNITIES

- Value of coast - more research and more evidence
- Full documents for CCP project available at:
 - <http://www.wcb.vic.gov.au/projectcaravan.html>
- Thank you