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Socioeconomic Systems and Reef Resilience
Project 10.2

Social and economic values in the Wet Tropics World Heritage Area
Project 12.3

1 School of Business, JCU
2 TROPWater, JCU
3 Centre for Sustainable Tropical Fisheries and Aquaculture & School of Earth and Environmental Sciences, JCU
5 Australian National University
6 Great Barrier Reef Marine Park Authority
7 ARC Centre of Excellence in Coral Reef Studies, JCU
8 Centre for Indigenous Education and Research, Australian Catholic University
Socioeconomic Systems and Reef Resilience

Project 10.2
SOCIOECONOMIC SYSTEMS AND REEF RESILIENCE: WHAT DO WE SEEK TO KNOW AND WHY?

- The influence of socioeconomic variables (e.g. price, cattle numbers) on water quality/sediment

  **Tells us about what the economy does to the GBRWHA**
  (also provides an indication of whether market based policies are likely to achieve environmental goals)

- The relative ‘value’ (benefit) of the goods and services provided by the Great Barrier Reef World Heritage Area (GBRWHA) to residents of and visitors to the GBR Catchment area

  **Tells us about what the GBRWHA does to/for the economy**
  (also provides indication of likely environment/economy trade-offs)

- Plus some ‘geeky’ science exploring new ways of estimating the ‘value’ of non market goods and services

- A continuation of the long-term monitoring of tourists as they leave Cairns airport (which Bruce Prideaux has been undertaking since 2007)

  **Gives an indication of trends over time**
  (program also provides opportunity for investigation of ‘pressing’ issues for industry)
SOCIOECONOMIC SYSTEMS AND REEF RESILIENCE: OUTPUTS

Report from Cairns Airport (visitor) exit surveys:


Interim report from cross-sectional (regional) data:


– Overview of methods, data collection processes, and summary of data (descriptive statistics)

Factsheets

– An overview with interim results (largely for DOE) – April 2014
– Tourism factsheets, developed for the industry
  • One of each region (Cairns/Port Douglas; Townsville/Whitsundays; Mackay/Rockhampton);
  One for Chinese visitors, one for Japanese visitors
  • Series focusing on Domestic visitors (at request of TTNQ);
  • Series on specialist issues – drive tourists, food tourists etc.

Residential and Tourist data summaries + LT visitor exit survey data submitted to e-atlas

Maps summarising distribution of responses at regional scale (residential data)
How important is having clear ocean water (with good underwater visibility) to your overall quality of life?

The average amount that respondents would be willing to donate each year to a fund set up to help improve ocean water quality.
Contributions to chapters and working papers

– ADC Northern Australia Development Summit; Working paper on the northern Economy


SOCIOECONOMIC SYSTEMS AND REEF RESILIENCE: OUTPUTS (CONT)

Journal articles – published or accepted

   http://dx.doi.org/10.1016/j.jhydrol.2013.04.043


4. Larson, S., Farr, M., Stoeckl, N., Cacon, A., Esparon, M., (Forthcoming), Does participation in outdoor activities determine residents’ appreciation of nature: explorations of resident activities and perceptions in the Great Barrier Reef region, Australia. Environmental and Natural Resources Research
SOCIOECONOMIC SYSTEMS AND REEF RESILIENCE: OUTPUTS (CONT)

Book chapter


Conference Papers


Journal articles – in review

5. Assessing the impact of price changes and extreme climatic events on sediment loads in a large river catchment near the Great Barrier Reef (Chaiechi et al)

6. Overcoming problems of overlapping values when assessing entire ecosystems: a case-study of Australia's Great Barrier Reef. (Stoeckl et al)

7. The role Great Barrier Reef plays in resident wellbeing and implications for management (Larson et al)

8. The significance of environmental values to the Great Barrier Reef World Heritage Area’s tourism competitiveness (Esparon et al)

12. The impact of economic, social and environmental factors on satisfaction and repeat visitation in the GBR (Jarvis et al)

13. The importance of Water Clarity to Tourists in the Great Barrier Reef and their willingness to pay to improve it (Farr et al)
SOCIOECONOMIC SYSTEMS AND REEF RESILIENCE: ADDITIONAL OUTPUTS ANTICIPATED BEFORE END DEC 2014

Final Project Report

Journal articles – in prep or under revision

– Estimating the existence value of natural assets using the life satisfaction approach: a case study of the Great Barrier Reef (Jarvis et al)

– The potential implications of environmental deterioration on business and non-business visitor expenditures at a natural setting: the case of Great Barrier Reef World Heritage Area, Australia (Mustika et al)

Workshop/presentations

– November NERP conference
• Publications – Technical reports, factsheets

• MTSRF (2007-2010 results)
  – Project 4.9.2 Sustainable nature-based tourism: planning and management

• NERP (2012-2014 results)
  – NERP Tropical Eco-systems Hub, Project 10.2
SOCIOECONOMIC SYSTEMS AND REEF RESILIENCE: WHAT DO WE SEEK TO KNOW AND WHY?

- The influence of socioeconomic variables (e.g. price, cattle numbers) on water quality/sediment

Tells us about what the economy does to the GBRWHA

(also provides an indication of whether market based policies are likely to achieve environmental goals)
Project 10.2

Key Findings

Journal articles – published and in review


2. Assessing the impact of price changes and extreme climatic events on sediment loads in a large river catchment near the Great Barrier Reef (Chaiechi et al, in review)

Full model: predicted change in sediment loads associated with various ‘changes’
SOCIOECONOMIC SYSTEMS AND REEF RESILIENCE: WHAT DO WE SEEK TO KNOW AND WHY?

- The relative ‘value’ (benefit) of the goods and services provided by the Great Barrier Reef World Heritage Area (GBRWHa) to residents of and visitors to the GBR Catchment area

  Tells us about what the GBRWHa does to/for the economy
  (also provides indication of likely environment/economy trade-offs)

- Plus some ‘geeky’ (fundamental) science exploring new ways of estimating the ‘value’ of non market goods and services
• Conducted major literature review

• Ran several workshops in Cairns, Townsville and Brisbane, to identify
  – A variety of different ecosystem services (use/non-use ‘values’) for assessment and other goods/services to be compared with
  – Key management issues/problems for assessment
  – Appropriate sampling strategies

• Used insights to develop draft questionnaires, conducted pre-tests in workshops, amended accordingly

• Conducted pre-tests in airport (mainly tourist surveys) and in residential mail-out, only minor adjustments necessary.

• Collected data, analysed, in write-up phase (interim report already available)
KEY SECTIONS OF THE RESIDENT SURVEY

• **Background demographics, activities in the GBRWHA**

• **Satisfaction with life overall**
  – To compare with satisfaction with GBRWHA goods and services
  – To look at the way in which life-satisfaction varies with social, economic, demographic AND biophysical factors

• **Importance of and satisfaction with 18 different goods and services** (randomised order)
  – To rank goods and services in terms of (a) importance & (b) satisfaction
  – To compare importance and satisfaction, looking for significant ‘gaps’
  – To look at differences in ‘values’ for different ‘types’ of people &/or people in different regions.

• **Impact of 8 different hypothetical “changes” to different goods and services on overall quality of life:**
  – To compare with other prioritisation data
  – Look for similarities/differences in responses for different ‘types’ of people and/or regions

• **WTP (a) for improvements in water quality; (b) to protect top predators; (c) to reduce risk of shipping accidents**, plus questions to help contextualise:
  – To compare with other prioritisation data
  – To look for similarities/differences in responses for different ‘types’ of people and/or regions
KEY SECTIONS OF THE GBR TOURIST SURVEY

• Wherever possible have kept questions identical to those in the resident survey
  – Allows comparisons tourists and residents
• Have included *extra questions often asked and monitored in tourism studies*, so can:
  – continue long-term monitoring started during MTSRF (Prideaux);
  – compare with other tourism studies.
• The *importance questions focus on reason for coming to the region* (rather than importance to overall quality of life)
• Slightly different set of ‘market’ goods (to compare with non-market goods) for satisfaction/importance questions.
• The *Impact of “changes”* question asks about *how much shorter trip the may have been* (rather than on the impact on overall quality of life)
• Also collected *expenditure data* from 50% of sample (the other 50% had WTP instead) so can look at:
  – regional economic impact of tourism;
  – potential regional economic impact of “changes”.
THE GBR RESIDENTIAL SAMPLE

• Mailed questionnaires to random selection of households across 106 postcodes that lie partially (or entirely) in GBR catchment area;
  – 47 responses from pre-test (from 199; response rate of 23.6%)
  – 902 responses from the main survey (from 3977; response rate of 22.7%)

• Also collected data from residents when intercepted during tourism sampling (e.g. fly-in/fly-out miners and or business people at airports; residents at the beach) – additional 663

• In total, 1592 usable responses
  – Reasonably representative of population in terms of location/geography, gender, income, industry of employment (slightly more miners, fishers, and agriculturalists).
  – Those aged over 45 and those with higher education were over-represented.
Collected data from 2743 visitors to the GBR catchment

- Over 12 month period to control for seasonality (2012/13)
- At airports, lagoons, caravan parks, ferry terminals and through tourism operators (36) who gave questionnaires to customers
- In three GBRMPA ‘management areas’
  - Mackay/Capricorn (≈ 10% of visitors; 8% of sample)
  - Townsville/Whitsunday (≈ 40% of visitors; 41% of sample)
  - Cairns/Cooktown (≈ 50% of visitors; 51% of sample)
    - Also translated questionnaires into Chinese and Japanese, and used Mandarin and Japanese speaking research assistants to distribute at Cairns domestic and international airports. In 2012
      ≈ 15% of visitors to this region were Chinese; 16% of regional sample
      ≈ 15% of visitors to this region were Japanese; 18% of regional sample
Our long-term Cairns airport visitor exit survey

Prof. Bruce Prideaux and Michelle Thompson

- A continuation of the long-term monitoring of tourists as they leave Cairns airport (which Bruce Prideaux has been undertaking since 2007)

Gives an indication of trends over time (program also provides opportunity for investigation of ‘pressing’ issues for industry)
LONG-TERM MONITORING AT CAIRNS AIRPORT

HOW DID WE COLLECT THE DATA?

• Exit survey of tourists
• Administered at domestic terminal, Cairns International Airport
• 2-3 days/month since 2007
• 3-4pg self-administered survey form
• Closed and open-ended questions
• Research assistant approach participants, ask if they were visiting the region on holidays, and then invite them to participate

• Limitations
  – Representative of English speaking tourists
  – Representative of those departing Cairns/region via Cairns Airport
  – Views of self-drive market and Eastern markets are under-represented
  – 2014 data comprises only 5 months
LONG-TERM MONITORING AT CAIRNS AIRPORT
WHAT DATA DO WE HAVE?

• Long-term monitoring database across 2 programs:
  1. MTRSF Project
     • January 2007 to June 2010
     • Sample size: 5177
     • Core: socio-demographic variables, travel motivations, travel patterns – regional dispersal, participation & satisfaction, GBR/WTR visitation
     • Themes: WHA listing, interpretation, environmental awareness
  2. NERP Project
     • January 2012 to May 2014
     • Sample size: 2873
     • Core: socio-demographic variables, travel motivations, travel patterns – regional dispersal, participation & satisfaction, GBR/WTR visitation
     • Themes: airlines, climate change, eco-tourism, food tourism, indigenous tourism
LONG-TERM MONITORING AT CAIRNS AIRPORT
WHAT THE DATA TELLS US

Data

Theme

Time series

2007

2014

Time
Overview of Project 10.2’s Data

2013 Survey of 1592 residents living adjacent to the GBR

2012/13 Survey of 2743 visitors to the GBR catchment area

2007 – 2014 8050 visitor exit surveys from Cairns airport
INSIGHTS FROM OUR RESIDENT SURVEY

2013 Survey of 1592 residents living adjacent to the GBR
GBR Residents – How important are each of the following to your overall quality of life? (N=1001)

<table>
<thead>
<tr>
<th>Industry / Economy</th>
<th>Unimportant</th>
<th>Neutral</th>
<th>Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>No visible rubbish</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy reef fish</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Healthy coral reefs</td>
<td></td>
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<tr>
<td>Mangroves and wetlands</td>
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<tr>
<td>Iconic marine species</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear oceans</td>
<td></td>
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<tr>
<td>Preserving the GBRWHA</td>
<td></td>
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<tr>
<td>Eating seafood</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Time on beaches</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undeveloped and uncrowded beaches</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fishing and crabbing</td>
<td></td>
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<tr>
<td>Boating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tourism industry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mining and Agricultural industries</td>
<td></td>
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</tr>
<tr>
<td>Indigenous Culture</td>
<td></td>
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<tr>
<td>Commercial Fishing industry</td>
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<tr>
<td>Cheap shipping</td>
<td></td>
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<tr>
<td>Bragging rights</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Details in interior report
Overcoming problems of overlapping values when assessing entire ecosystems: a case-study of Australia's Great Barrier Reef. (Stoeckl et al.)

**KEY MESSAGE:**

Collective value at least $16b probably in excess of $20b per annum, perhaps more

- Non-use/Intrinsic values
  - (healthy coral reefs, reef fish, iconic marine animals and mangroves; clear oceans, beaches without visible rubbish and preserving the reef for its own sake or for future generations)
- Undeveloped and uncrowded beaches
- Recreational/Lifestyle values
- Indigenous cultural values
- Jobs and incomes from reef-based tourism
- Jobs and incomes from mining and agriculture
- Jobs and incomes from commercial fishing
- Cheap shipping transport
- Bragging rights

**Overall quality of life**
7. The role the GBR plays in resident wellbeing and implications for management (Larson et al.)

<table>
<thead>
<tr>
<th>Importance</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Very important / Very satisfied</td>
</tr>
<tr>
<td>1</td>
<td>Important / Satisfied</td>
</tr>
<tr>
<td>0</td>
<td>Neutral</td>
</tr>
<tr>
<td>-1</td>
<td>Unimportant / Unsatisfied</td>
</tr>
<tr>
<td>-2</td>
<td>Very unimportant / Very Unsatisfied</td>
</tr>
</tbody>
</table>

Satisfaction with life overall: 1.23
7. The role the GBR plays in resident wellbeing and implications for management (Larson et al)

<table>
<thead>
<tr>
<th></th>
<th>Non-Use (I, IDS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>-, -</td>
</tr>
<tr>
<td>Education</td>
<td>+, +</td>
</tr>
<tr>
<td>Single</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Household income</td>
<td></td>
</tr>
<tr>
<td>Indigenous</td>
<td></td>
</tr>
<tr>
<td>Born in QLD</td>
<td></td>
</tr>
<tr>
<td>Main household income from:</td>
<td></td>
</tr>
<tr>
<td>Mining</td>
<td></td>
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<tr>
<td>Fishing</td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>°, +</td>
</tr>
<tr>
<td>Tourism</td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td></td>
</tr>
</tbody>
</table>
4. Larson, S., Farr, M., Stoeckl, N., Chacon, A., Esparon, M., (Forthcoming), Does participation in outdoor activities determine residents’ appreciation of nature: explorations of resident activities and perceptions in the Great Barrier Reef region, Australia. Environmental and Natural Resources Research

**Linked to Use-Values**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Males</th>
<th>$</th>
<th>Single</th>
<th>Young</th>
<th>Indigenous</th>
<th>Non Degree</th>
<th>QLD Born</th>
<th>Gender</th>
<th>Use or Non-use Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaches</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Linked to all values</td>
</tr>
<tr>
<td>Fishing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Indigenous</td>
<td></td>
<td></td>
<td></td>
<td>Linked to all values</td>
</tr>
<tr>
<td>Motor boat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Linked to all values</td>
</tr>
<tr>
<td>Islands</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Indigenous</td>
<td></td>
<td></td>
<td></td>
<td>Linked to all values</td>
</tr>
<tr>
<td>Reef trips</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>Linked to all values</td>
</tr>
<tr>
<td>Snorkelling</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>Linked to all values</td>
</tr>
<tr>
<td>Sailing</td>
<td></td>
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<td></td>
<td>Linked to all values</td>
</tr>
<tr>
<td>Paid boat</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Linked to all values</td>
</tr>
</tbody>
</table>

More closely associated with Non-use values:

- Frequent user
- Rarely or never

Characteristics of most frequent users:

- Indigenous Degree
- Not Mining; Tourism
- Indigenous No Degree QLD Born
- Tourism or Fishing
- Tourism or Fishing
- Tourism or Fishing
- Tourism or Fishing
- Tourism or Fishing
- Non Degree
- Not M or Ag; F
- Young
- No Degree
- Tourism or Fishing
- Non QLD
- Not M; Tourism or Fishing
- Degree
- Not M; Tourism or Fishing
- Young
- Not Indigenous
- Non QLD
- Not M; F
**KEY FINDINGS (CONT)**

**Journal articles – in prep**


<table>
<thead>
<tr>
<th>Determinants of Life Satisfaction</th>
<th>Cairns</th>
<th>Townsville</th>
<th>Mackay</th>
<th>Fitzroy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (older =&gt; happier)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (males less happy)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married (married happier)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University Degree (degree happier)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income (income happier)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>The level of satisfaction that the GBRWHA will be preserved for future generations (positive impact on LS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Age effect stronger in the south

Gender effect stronger in the north

Marital effect stronger in the north

Education effect stronger in the north

Income effect stronger in the south

Preservation effect stronger in the north
INSIGHTS FROM OUR CROSS-SECTIONAL / REGIONAL TOURIST SURVEY

2012/13 Survey of 2743 visitors to the GBR catchment area
Tourists – How Important were each of the following as a reason for coming to this part of Australia? (N = 2455)

- Clear oceans
- Healthy coral reefs
- Healthy reef fish
- No visible rubbish
- Sunshine and warmth
- Iconic marine species
- Time on beaches
- Undeveloped and uncrowded beaches
- Quality accommodation
- Mangroves and wetlands
- Price matches budget
- Eating seafood
- Bragging rights
- Boating
- Indigenous Culture
- Visiting friends
- Fishing and crabbing
- Not travelling far
- Business
- Industry / Economy

Scale:
- Unimportant
- Neutral
- Important
- Very Important
8. The significance of environmental values to the Great Barrier Reef World Heritage Area’s tourism competitiveness (Esparon et al)
**Journal articles – in review**

8. The significance of environmental values to the Great Barrier Reef World Heritage Area’s tourism competitiveness (Esparon et al)

How would each of the following changes have affected your decision to come to the region, and your length of stay?

<table>
<thead>
<tr>
<th>Change</th>
<th>Potential percent reduction in length of stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ocean changed from clear to murky</td>
<td>100%</td>
</tr>
<tr>
<td>Twice as many oil spills, groundings and waste spills</td>
<td>80%</td>
</tr>
<tr>
<td>Twice as much rubbish on the beaches and islands</td>
<td>60%</td>
</tr>
<tr>
<td>Half as much live coral</td>
<td>40%</td>
</tr>
<tr>
<td>Half as much chance of catching fish</td>
<td>20%</td>
</tr>
<tr>
<td>Twice as many tourists</td>
<td></td>
</tr>
<tr>
<td>Prices increased by 20%</td>
<td></td>
</tr>
<tr>
<td>Half as many fish and less variety to look at</td>
<td></td>
</tr>
</tbody>
</table>

*Potential percent reduction in length of stay for different regions: Mackay/Rockhampton, Townsville/Whitsunday, Cairns/Port Douglas.*
14. The potential implications of environmental deterioration on business and non-business visitor expenditures at a natural setting: the case of Great Barrier Reef World Heritage Area, Australia (Mustika et al)

Non-business Visitors (expenditure per trip per person)
Total expenditure = $1562

Business Visitors (expenditure per trip per person)
Total expenditure = $928
14. The potential implications of environmental deterioration on business and non-business visitor expenditures at a natural setting: the case of Great Barrier Reef World Heritage Area, Australia (Mustika et al)

- Business visitors - adjusted for hypothetical bias
- Non-business visitors - adjusted for hypothetical bias
- Business visitors - stated intentions
- Non-business visitors - stated intentions

Key Findings (Cont)

- Half as many fish to catch
- Half as much coral to look at
- Twice as many tourists
- Twice as much rubbish on beaches
- 20% increase in prices (compared...)
- Ocean changed from clear to murky
- Half as many oil spills, ship...
12. The impact of economic, social and environmental factors on satisfaction and repeat visitation in the GBR (Jarvis et al)

**Probability that a tourist will RETURN, depends on**
- Their origin (North America, Asia or Europe: negative)
- The number of previous visits to GBR: positive
- Trip satisfaction: positive

**Trip satisfaction depends on:**
- Tourist income: positive
- Spent 1 or less nights: negative
- Tourist visited reef at least once: positive
- Belief that lost wallet would be returned: positive
- Intensity of construction works: negative
- Rainfall: negative
- Water Turbidity (predicted value\*: negative

\* To control for endogeneity, we used predicted values from the regression of water turbidity (at specific time and location) against rainfall + TSS from closest river + wind speed

Could potentially ‘lose’ up to $400k per annum in tourist revenues (across entire GBR catchment) if a 10% increase in turbidity
### Key Findings (Cont)

**Journal articles – in prep**

12. The impact of economic, social and environmental factors on satisfaction and repeat visitation in the GBR (Jarvis et al)

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Potential increase in tourism revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(from 9.1: Eve MacDonald &amp; Ken Anthony’s project)</strong></td>
<td></td>
</tr>
<tr>
<td>25% reduction in TSS in each of the rivers flowing in to the GBR lagoon</td>
<td>$89,000</td>
</tr>
<tr>
<td>50% reduction in TSS in each of the rivers flowing in to the GBR lagoon</td>
<td>$178,000</td>
</tr>
<tr>
<td>Daintree and Russell-Mulgrave catchments reduce the TSS within those rivers back to the levels experienced before the arrival of European settlers, TSS loads in the other rivers maintained at current levels</td>
<td>$12,000</td>
</tr>
</tbody>
</table>
Journal articles – under review

15. The importance of Water Clarity to Tourists in the Great Barrier Reef and their willingness to pay to improve it (Farr et al)

- Tourists who are most likely to be willing to pay SOMETHING to improve WQ include:
  - Young; University degree
  - DO NOT rely on tourism
  - Happy to pay to help protect the GBRWHA, providing that other users pay too; and do not believe that only those who live near the GBR should care for it
  - Questionnaire with low dollar values on the ‘bid card’ (WQ)
  - Not from China; From Japan;
  - Planning to return to the GBRWHA
  - Felt that WQ was important when choosing destination

- Of those willing to pay SOMETHING, those offering to pay most included people
  - High incomes (WQ); Not from China
  - Planning to return to the GBRWHA
  - Questionnaire with high dollar values on the ‘bid card’
  - Satisfied with water quality & thought it was important
15. The importance of Water Clarity to Tourists in the Great Barrier Reef and their willingness to pay to improve it (Farr et al)

Journal articles – under review
INSIGHTS FROM OUR LONG-TERM CAIRNS AIRPORT VISITOR EXIT SURVEY

Prof. Bruce Prideaux
and Michelle Thompson

2007 – 2014
8050 visitor exit surveys from Cairns airport
LONG-TERM MONITORING AT CAIRNS AIRPORT
WHAT THE DATA TELLS US

• Track long-term tourist trends over the survey period (from 2007)
• Compare results by:
  – Year (2007 to 2014), Seasonality (peak vs trough)
  – *First and repeat* visitors, *domestic and international* visitors
• Profile tourists by *motivations, participation* and *perceptions*
  – Eco-tourists who are they, how are they different from other visitors, how can I target them in my marketing?
• In-depth snapshot of themes
  – *Indigenous tourism*, social media, airline use, *threats to nature*
• Include issues relevant to industry through consultation
  – Visitation to GBR, motivations, visitor profile
  – Reef dredging, climate change, looking for eco-certification, What if...?
LONG-TERM MONITORING AT CAIRNS AIRPORT

RESULTS - TIME SERIES

• Socio-demographics – First by Repeat Visitors (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>First Visit</th>
<th>Repeat</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>67.3%</td>
<td>32.7%</td>
</tr>
<tr>
<td>2008</td>
<td>65.9%</td>
<td>34.1%</td>
</tr>
<tr>
<td>2009</td>
<td>66.7%</td>
<td>33.3%</td>
</tr>
<tr>
<td>2010</td>
<td>66.6%</td>
<td>33.4%</td>
</tr>
<tr>
<td>2012</td>
<td>63.2%</td>
<td>36.8%</td>
</tr>
<tr>
<td>2013</td>
<td>66.6%</td>
<td>33.4%</td>
</tr>
<tr>
<td>2014</td>
<td>74.3%</td>
<td>25.7%</td>
</tr>
</tbody>
</table>
LONG-TERM MONITORING AT CAIRNS AIRPORT
RESULTS - TIME SERIES

• Socio-demographics (%)
LONG-TERM MONITORING AT CAIRNS AIRPORT
RESULTS - TIME SERIES

Country of Origin

- Australia
- UK & Ireland
- North America
- Europe
- Germany
- Scandanavia
- Asia
- New Zealand
- Latin and South America
- Other

%
LONG-TERM MONITORING AT CAIRNS AIRPORT
RESULTS - TIME SERIES

Nature-based Travel Motivations

*Scale: 1 = not at all important to 5 = very important
LONG-TERM MONITORING AT CAIRNS AIRPORT
RESULTS - TIME SERIES

Other Travel Motivations

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Rest and relax</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
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<td>Climate</td>
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<td>3</td>
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<tr>
<td>Enjoy the tropical lifestyle</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Price matched my budget</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Try local foods</td>
<td>4</td>
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<td>Adventure activities</td>
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<td>Spend time with my family</td>
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<td>3</td>
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<tr>
<td>Meet new people</td>
<td>4</td>
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<td>4</td>
<td>3</td>
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<td>3</td>
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<tr>
<td>Experience life in a tropical city</td>
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<td>4</td>
<td>3</td>
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<td>3</td>
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<tr>
<td>Visit local markets</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
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<td>3</td>
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<tr>
<td>Taste tropical fruits</td>
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<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Try reef seafood</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<td>Visiting friends and relatives</td>
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<tr>
<td>Go shopping</td>
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<td>4</td>
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<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Business/conference/meeting</td>
<td>4</td>
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<td>4</td>
<td>3</td>
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<td>3</td>
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</tbody>
</table>
LONG-TERM MONITORING AT CAIRNS AIRPORT
RESULTS - TIME SERIES

• Reef Visitation

<table>
<thead>
<tr>
<th>GBR</th>
<th>2007 (n=1441)</th>
<th>2008 (n=1392)</th>
<th>2009 (n=1146)</th>
<th>2010 (n=630)</th>
<th>2012 (n=1188)</th>
<th>2013 (n=900)</th>
<th>Part 2014 (n=565)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit</td>
<td>71%</td>
<td>73.5%</td>
<td>79%</td>
<td>74.5%</td>
<td>66%</td>
<td>69%</td>
<td>76%</td>
</tr>
<tr>
<td>Not Visit</td>
<td>29%</td>
<td>26.5%</td>
<td>21%</td>
<td>25.5%</td>
<td>34%</td>
<td>31%</td>
<td>24%</td>
</tr>
<tr>
<td>Mean Rank*</td>
<td>4.26</td>
<td>4.24</td>
<td>4.29</td>
<td>4.30</td>
<td>4.13</td>
<td>4.16</td>
<td>4.36</td>
</tr>
<tr>
<td>First-time visitors</td>
<td>80.5%</td>
<td>77%</td>
<td>78%</td>
<td>81%</td>
<td>77%</td>
<td>78.5%</td>
<td>87.5%</td>
</tr>
</tbody>
</table>

• Between 2012-2014, 80-85% rated their visit “good”**

*Scale: 1 = not at all important to 5 = very important

**Scale: good – fair – poor – awful
LONG-TERM MONITORING AT CAIRNS AIRPORT
RESULTS - TIME SERIES

- Rainforest Visitation

<table>
<thead>
<tr>
<th>WTR</th>
<th>2007 (n=1441)</th>
<th>2008 (n=1360)</th>
<th>2009 (n=1134)</th>
<th>2010 (n=648)</th>
<th>2012 (n=519)</th>
<th>2013 (n=900)</th>
<th>Part 2014 (n=565)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit</td>
<td>77.5%</td>
<td>74%</td>
<td>76.5%</td>
<td>72.5%</td>
<td>62%</td>
<td>59%</td>
<td>60%</td>
</tr>
<tr>
<td>Not Visit</td>
<td>22.5%</td>
<td>26%</td>
<td>23.5%</td>
<td>27.5%</td>
<td>38%</td>
<td>41%</td>
<td>40%</td>
</tr>
<tr>
<td>Mean Rank*</td>
<td>4.00</td>
<td>3.90</td>
<td>3.93</td>
<td>3.78</td>
<td>3.66</td>
<td>3.65</td>
<td>3.64</td>
</tr>
<tr>
<td>First-time visitors</td>
<td>73%</td>
<td>70.5%</td>
<td>73%</td>
<td>71.5%</td>
<td>69%</td>
<td>73%</td>
<td>82%</td>
</tr>
</tbody>
</table>

- Between 2012-2014, 80% consistently rated their visit “good”**

*Scale: 1 = not at all important to 5 = very important
**Scale: good – fair – poor – awful
LONG-TERM MONITORING AT CAIRNS AIRPORT RESULTS – THEME

• Indigenous tourism
  – Sample of 326 visitors
  – 58% females, 42% males
  – 67% international and 33% domestic visitors

• Indigenous experiences as a travel motivation
  – Consistently ranked 15 out of 20 motivations

<table>
<thead>
<tr>
<th></th>
<th>Overall Sample</th>
<th>First-time</th>
<th>Repeat</th>
<th>Dom</th>
<th>Intl</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.90</td>
<td>3.02</td>
<td>2.59</td>
<td>2.78</td>
<td>2.96</td>
<td>2.70</td>
<td>3.04</td>
</tr>
</tbody>
</table>

*Scale: 1 = not at all important to 5 = very important*
LONG-TERM MONITORING AT CAIRNS AIRPORT
RESULTS – THEME

• Actively look for opportunities to participate in indigenous tourism experiences
  – 16% “Yes”, 35% “Sometimes”, 49% “No”

• Prefer: cultural history (71%); food (51%); art (50%); festivals (43.5%); dance (23.5%)

• 13% had an indigenous experience this trip
  – 81% rated the experience “good”, 14% “fair”

• Experiences located in regional TNQ
  – Kuranda, Mossman Gorge, + specific attractions
LONG-TERM MONITORING AT CAIRNS AIRPORT
RESULTS – THEME

• 12% purchased indigenous artifacts this trip
  – 77.5% made by those who did not participate in an indigenous activity
  – 67.5% purchased boomerangs - most popular

• 85% of purchasers stated the importance of the artefacts being locally made

• 38.5% stated they would pay more for locally made artefacts, another 42.5% “maybe”
Relative social and economic values of residents and tourists in the WTWHA

Project 12.3

12.3 TEAM:

Natalie Stoeckl\textsuperscript{1, 2} Michelle Esparon\textsuperscript{1} Silva Larson\textsuperscript{1}

\textsuperscript{1}School of Business, JCU

\textsuperscript{2}TROPWater, JCU
WHAT DO WE SEEK TO KNOW AND WHY?

- The relative ‘value’ of the goods and services provided by the Wet Tropics World Heritage Area (WTWHA) to residents of and visitors to the region

  Tells us about what the WTWHA does to/for the economy
  (also provides indication of likely environment/social/economy trade-offs)

- Also – testing and comparing different methods for attempting to ‘value’ non-market good and services
WTWHA Resident and Tourist Studies

- Conducted major literature review
- Ran workshops in Cairns to identify
  - A variety of different ecosystem services (use/non-use ‘values’) for assessment and other goods/services to be compared with
  - Key management issues/problems for assessment
  - Appropriate sampling strategies
- Used insights to develop draft questionnaires and amended accordingly
- Collected data, analysed, in write-up phase
KEY SECTIONS OF THE RESIDENT SURVEY

• **Background demographics, activities in the WTWHA**

• **Satisfaction with life overall**
  - To compare with satisfaction with WTWHA goods and services
  - To look at the way in which life-satisfaction varies with social, economic, demographic AND biophysical factors

• **Importance of and satisfaction with 27 different goods and services** (randomised order)
  - To rank goods and services in terms of (a) importance & (b) satisfaction
  - To compare importance and satisfaction, looking for significant ‘gaps’
  - To look at differences in ‘values’ for different ‘types’ of people &/or people in different regions.

• **Impact of 12 different hypothetical “changes” to different goods and services on overall quality of life:**
  - To compare with other prioritisation data
  - Look for similarities/differences in responses for different ‘types’ of people and/or regions

• **WTP (a) for improvements in water quality; (b) to protect native plants & animals; (c) to maintain undeveloped scenery; (d) to protect the Aboriginal cultural values**, plus questions to help contextualise:
  - To compare with other prioritisation data
  - To look for similarities/differences in responses for different ‘types’ of people and/or regions
KEY SECTIONS OF THE WT TOURIST SURVEY

• Wherever possible have kept questions identical to those in the resident survey
  – Allows comparisons tourists and residents
• Have included *extra questions often asked and monitored in tourism studies*, so can:
  – continue long-term monitoring started during MTSRF (Prideaux);
  – compare with other tourism studies.
• The *importance questions focus on reason for coming to the region* (rather than importance to overall quality of life)
• Slightly different set of ‘market’ goods (to compare with non-market goods) for satisfaction/importance questions.
• The *Impact of “changes”* question asks about *how much shorter trip there may have been* (rather than on the impact on overall quality of life)
• Also collected *expenditure data* so can look at:
  – regional economic impact of tourism;
  – potential regional economic impact of “changes”.

Project 12.3
Parts deliberately similar to facilitate comparisons

But ...WT focused on:

– Aesthetic values

– Indigenous cultural values

– Importance of environment, aesthetics and Indigenous cultural values relative to ‘social’ values (e.g. safety of family) as well as to market values (e.g. employment).
Overview of The Wet Tropics Samples

- Mailed questionnaires to random selection of households across 33 postcodes that lie partially (or entirely) in WTWHA;
  - 386 responses from 2000 households; response rate of 25%

- The Rainforest Aboriginal People’s Alliance (RAPA) distributed questionnaires for us in four regions of the Wet-Tropics
  - 160 responses

- In total, 546 responses from residents.

- In total, 621 responses from tourists (July 2013-Jun 2014)
  - 309 from domestic terminal
  - 104 from international terminal
  - 208 from lagoon
SOME INSIGHTS...
Frequency of activities in the WTWHA – Indigenous residents

- Learning about culture & country
- Enjoying scenic beauty & peacefulness
- Driving along scenic routes
- Bushwalking/hiking
- Kayaking
- Waterfalls/swimming
- Camping in the WTWHA
- Quad biking/4WD
- Mountain biking/horse-riding
- Pay for a tour

Legend:
- I have never done this
- Rarely
- About once a year
- 3-4 times a year
- About once a month
- A few times a week
- Almost every day
Non-Indigenous WT Residents - Importance to overall quality of life (N=370)

- Safety of family & friends
- Quality infrastructure
- Time with family & friends
- Healthy native plants & animals
- Some control over life
- Undeveloped scenery
- Scenic beauty & peacefulness
- Relax & reflect
- Iconic species
- Waterfalls and swimming
- Protection of the WTWHA for future generations
- Uncrowded camping & picnic areas
- Walking tracks
- Proximity of GBRWHA & WTWHA
- Agriculture
- Rainforest walks
- Other industries
- Roads & bridges
- Unique & ancient Australian environment
- Protection of places with Aboriginal cultural values
- Tourism
- Community activities
- Protection of places with other cultural values
- Learn about culture & country
- Rail & skyrail
- Mining
- City entertainment

Unimportant | Neutral | Important | Very Important

Project 12.3
National Environmental Research Program
### GBR Residents - Importance to overall quality of life (N=1001)

<table>
<thead>
<tr>
<th>Industry / Economy</th>
<th>Unimportant</th>
<th>Neutral</th>
<th>Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undeveloped and uncrowded beaches</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No visible rubbish</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy reef fish</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy coral reefs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mangroves and wetlands</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iconic marine species</td>
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</tr>
<tr>
<td>Clear oceans</td>
<td></td>
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</tr>
<tr>
<td>Preserving the GBRWHA</td>
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<tr>
<td>Eating seafood</td>
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</tr>
<tr>
<td>Time on beaches</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Boating</td>
<td></td>
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<tr>
<td>Tourism industry</td>
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<tr>
<td>Mining and Agricultural industries</td>
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<tr>
<td>Indigenous Culture</td>
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<tr>
<td>Commercial Fishing industry</td>
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<tr>
<td>Cheap shipping</td>
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</tr>
<tr>
<td>Bragging rights</td>
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<td></td>
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</tr>
</tbody>
</table>

#### Additional Information
- **Project 10.2**: Details in interim report
- **GBR Residents**
  - Importance to overall quality of life (N=1001)
Tourists - Importance as a reason for coming to this part of Australia (N=585)

- Safety of self & of travelling companions
- Undeveloped scenery
- Quality infrastructures such as roads, hospitals
- Weather
- GBRWHA
- Budget
- Iconic marine species
- Iconic land species
- Healthy native plants & animals
- Scenic beauty & peacefulness
- Relax & reflect
- Protection of the WTWHA for future generations
- Waterfalls and swimming in clear, clean rivers
- Proximity of GBRWHA & WTWHA
- Quality accommodations, shops & restaurants
- Time with family & friends
- Rainforest walks
- Quality guided tours & attraction venues
- Unique & ancient Australian environment
- Walking tracks
- Protection of places with Aboriginal cultural values
- Uncrowded camping & picnic areas
- Roads & bridges
- City entertainment
- Learn about culture & country
- Protection of places with other cultural values
- Rail & skyrail
- Community activities
- Proximity to home
- Business

Industry / Economy

Neutral

Important

Very important
Tourists - Importance as reason for coming to this part of Australia (N = 2455)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Unimportant</th>
<th>Neutral</th>
<th>Important</th>
<th>Very Important</th>
</tr>
</thead>
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<tr>
<td>Clear oceans</td>
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<tr>
<td>Healthy coral reefs</td>
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<tr>
<td>Healthy reef fish</td>
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<tr>
<td>No visible rubbish</td>
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<tr>
<td>Sunshine and warmth</td>
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<tr>
<td>Iconic marine species</td>
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<tr>
<td>Time on beaches</td>
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<tr>
<td>Wet tropics</td>
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<td>Iconic land animals</td>
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<tr>
<td>Undeveloped and uncrowded beaches</td>
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</tr>
<tr>
<td>Quality accommodation</td>
<td></td>
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</tr>
<tr>
<td>Mangroves and wetlands</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Price matches budget</td>
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<tr>
<td>Eating seafood</td>
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</tr>
<tr>
<td>Bragging rights</td>
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</tr>
<tr>
<td>Boating</td>
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<tr>
<td>Indigenous Culture</td>
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<tr>
<td>Visiting friends</td>
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<tr>
<td>Fishing and crabbing</td>
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<tr>
<td>Not travelling far</td>
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<tr>
<td>Business</td>
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</tbody>
</table>
Widespread agreement that the safety of **family and friends** and that of **self and travelling companions** may top all

- Intrinsic (environmental) values more important than other values.

Responses indicate recognition (even if only implicit) of important inter-relationships between values, evidenced in

- analysis of correlation coefficients
- principal component analysis
But its about more than just ‘importance’ ....
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Importance & Satisfaction
WT Tourists

Importance (n=238)
Satisfaction (n=238)

2 Very important / Very satisfied
1 Important / Satisfied
0 Neutral
-1 Unimportant / Unsatisfied
-2 Very unimportant / Very Unsatisfied

Safety of self & of travelling...
Quality infrastructures such as...
Undeveloped scenery
GBRWHA
Weather
Iconic marine species
Healthy native plants & animals
Iconic land species
Budget
Protection of the WTWHA for...
Relax & reflect
Scenic beauty & peacefulness
Waterfalls and swimming in clear,
Proximity of GBRWHA & WTWHA
Quality accommodations, shops &...
Proximity to home
Community activities
Rail & skyrail
Protection of places with other...
Rocks & bridges
Learn about culture & country
City entertainment
Uncrowded camping & picnic areas
Walking tracks
Unique & ancient Australian...
Time with family & friends
Rainforest walks
Quality guided tours & attraction...

Satisfaction with overall experience: 1.02 (n=578)

*** Very important / Very satisfied
** Important / Satisfied
* Neutral
-1 Unimportant / Unsatisfied
-2 Very unimportant / Very Unsatisfied
Satisfaction with life overall: 1.24 (n=368)

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RAINFOREST
NON-INDIGENOUS RESIDENTS

1 Very important / Very satisfied
0 Important / Satisfied
-1 Neutral
-2 Very unimportant / Very Unsatisfied

Importance
Satisfaction

Safety of family & friends
Quality infrastructures such as schools, hospitals
Healthy native plants & animals
Time with family & friends
Some control over life
Undeveloped scenery
Scenic beauty & peacefulness
Waterfalls and swimming in clear, clean rivers
Relax & reflect
Iconic species
Uncrowded camping & picnic areas
Protection of the WTWHA for future generations
Walking tracks
Proximity of GBRWHA & WTWHA
Agriculture Rainforest walks
Other industries
Roads & bridges
Unique & ancient Australian environment
Protection of places with Aboriginal cultural values
Community activities
Tourism
Learn about culture & country
Rail & skyrail
**IMPORTANCE & SATISFACTION – INDIGENOUS RESIDENTS WTWHA**

- Very important / Very satisfied: 2
- Important / Satisfied: 1
- Neutral: 0
- Unimportant / Unsatisfied: -1
- Very unimportant / Very Unsatisfied: -2

- **Importance**
  - Safety of family & friends
  - Healthy native plants & animals
  - Time with family & friends
  - Undeveloped scenery
  - Learn about culture & country
  - Relax & reflect
  - Unique & ancient Australian environment
  - Iconic species
  - Protection of places with Aboriginal cultural values
  - Waterfalls and swimming in clear, clean rivers
  - Scenic beauty & peacefulness
  - Proximity of GBRWHA & WTWHA
  - Rainforest walks
  - Uncrowded camping & picnic areas
  - Some control over life
  - Quality infrastructures such as schools, hospitals
  - Protection of the WTWHA for future generations
  - Community activities
  - Walking tracks
  - Other industries
  - Rail & skyrail
  - Roads & bridges
  - Agriculture
  - Tourism

- **Satisfaction**

**Satisfaction with life overall: 0.69**
(n=140)
KEY MESSAGES...

Importance almost always greater than satisfaction, not generally a problem unless big differences

- Most significant problem likely to be associated with Intrinsic values/environmental values

- Gap between importance and satisfaction not particularly large for tourists, larger for non-Indigenous residents; largest for Indigenous residents
So how would people react if the things they value deteriorated?
Impact of Hypothetical Changes on Decision to Come to the Region - Rainforest

- Twice as much rubbish in the rainforest & rivers
- Undeveloped scenery & peacefulness declined
- Fewer native plants & animals & twice as many pests &...
- Rivers changed from clear to murky
- Local prices rise by 20% compared to other places in...
- Half as much chance of seeing an iconic animal
- Twice as many tourists
- Half as many good quality infrastructures
- Half as many cafes, shops, theatres etc.
- More public information about Aboriginal cultural values

- I would not have come at all
- I would have reduced by stay by 25%
- I would have reduced by stay by 75%
- It would not have affected by decision
- I may have stayed for longer

Percentage of respondents
Impact of Hypothetical Changes on Decision to Come to the Region

Non-parametric tests confirm that differences between ‘price’ distribution and all other distributions are statistically significant.

Visitors to the Cairns/Port Douglas region more sensitive to environmental degradation than visitors to other regions.

NB: Non-parametric tests confirm that differences between ‘price’ distribution and all other distributions are statistically significant.
**IMPACT OF HYPOTHETICAL CHANGES ON OVERALL QUALITY OF LIFE – NON-INDIGENOUS RESIDENTS (WT)**

- Twice as much rubbish in the rainforest & rivers
- Rivers changed from clear to murky
- Undeveloped scenery & twice as many pests &...
- Half as many good quality infrastructures
- Half as much time spent with friends & family
- Half as much chance of seeing an iconic animal
- Local prices rise by 20% compared to other places in...
- Half as many walking tracks
- Twice as many tourists
- Half as many cafes, shops, theatres etc.

**Percentage of respondents**

- Much less satisfied
- Less satisfied
- No effect
- More satisfied
- Much more satisfied
**Key Messages...**

- Environmental degradation generally perceived as ‘worse’ than 20% price increase

- Northern visitors seem more sensitive to prospect of environmental degradation than southern visitors
  - (matches observation about residential ‘values’ in GBR and very preliminary analysis of WTMA residential data)

- More information about Aboriginal culture and activities would encourage longer length of stay
WT NON-INDIGENOUS RESIDENT WILLINGNESS TO PAY, PER ANNUM, FOR IMPROVEMENTS...

- To protect native plants & animals from weeds & pests
- To maintain undeveloped scenery & peacefulness
- To improve water quality
- To protect Aboriginal cultural values

Percent of respondents

- $0
- up to $5
- $5 - $10
- $10 - $30
- $30 - $50
- $50 - $100
- $100 - $250
- $250 - $500
- more than $500
To protect native plants & animals from weeds & pests
To maintain undeveloped scenery & peacefulness
To improve water quality
To protect Aboriginal cultural values

WT MEAN WTP RESIDENTS & TOURISTS

- $45 for Indigenous residents, $49 for Non-Indigenous residents, and $20 for Tourists
- $41 for Indigenous residents, $36 for Non-Indigenous residents, and $22 for Tourists
- $48 for Indigenous residents, $47 for Non-Indigenous residents, and $26 for Tourists
- $75 for Indigenous residents, $31 for Non-Indigenous residents, and $23 for Tourists

Legend:
- Blue bar: Indigenous residents
- Red bar: Non-Indigenous residents
- Green bar: Tourists

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Indigenous and Non-Indigenous Incomes Compared

Percent of respondents

Household income per annum
GBR TOURISTS: WTP TO HELP IMPROVE WATER QUALITY AS A % OF INCOME

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Farr et al., in review
Despite indicating the environment as the most important factor, many people are not WTP anything to protect it:

Many ‘not wanting to pay unless others pay too’

WTP linked to income (and other things)

Those on high income are WTP smaller proportion of income for the environment than those on low income
COMPARISON OF DIFFERENT WAYS OF THINKING ABOUT ‘VALUE’
## Aboriginal culture

<table>
<thead>
<tr>
<th></th>
<th>Indigenous residents</th>
<th>Non-Indigenous residents</th>
<th>Tourists</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Importance</strong></td>
<td>High Mean 1.76</td>
<td>Low Mean 0.43</td>
<td>Moderate Mean 0.49</td>
</tr>
<tr>
<td></td>
<td>Highest =1.82</td>
<td>Highest =1.77</td>
<td>Highest =1.58</td>
</tr>
<tr>
<td></td>
<td>Lowest = -0.14</td>
<td>Lowest = 0.17</td>
<td>Lowest = -1.03</td>
</tr>
<tr>
<td><strong>Satisfaction</strong></td>
<td>Moderate Mean 0.34</td>
<td>Low Mean 0.05</td>
<td>Low Mean -0.01</td>
</tr>
<tr>
<td></td>
<td>Highest =1.45</td>
<td>Highest =1.19</td>
<td>Highest =1.37</td>
</tr>
<tr>
<td></td>
<td>Lowest = -0.03</td>
<td>Lowest = -0.15</td>
<td>Lowest = -1.03</td>
</tr>
<tr>
<td><strong>Response to hypothetical ‘changes’ to more information</strong></td>
<td>58% ↑ Satisfaction (Biggest increase in satisfaction)</td>
<td>33% ↑ Satisfaction (Biggest increase in satisfaction)</td>
<td>23% ↑ in length of stay (Biggest increase in satisfaction)</td>
</tr>
<tr>
<td><strong>WTP for more information</strong></td>
<td>Highest ($75)</td>
<td>Lowest ($31)</td>
<td>Third Lowest ($23)</td>
</tr>
<tr>
<td></td>
<td>Indigenous residents</td>
<td>Non-Indigenous residents</td>
<td>Tourists</td>
</tr>
<tr>
<td>---------------------------</td>
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</tr>
<tr>
<td><strong>Importance</strong></td>
<td>High (Mean 1.72)</td>
<td>High (Mean 1.43)</td>
<td>Moderate (Mean 1.11)</td>
</tr>
<tr>
<td></td>
<td>Highest =1.82</td>
<td>Highest =1.77</td>
<td>Highest =1.58</td>
</tr>
<tr>
<td></td>
<td>Lowest = -0.14</td>
<td>Lowest = 0.17</td>
<td>Lowest = -1.03</td>
</tr>
<tr>
<td><strong>Satisfaction</strong></td>
<td>Moderate (Mean 0.95)</td>
<td>Moderate (Mean 0.89)</td>
<td>Low (Mean 0.08)</td>
</tr>
<tr>
<td></td>
<td>Highest =1.45</td>
<td>Highest =1.19</td>
<td>Highest =1.37</td>
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<td></td>
<td>Lowest = -0.03</td>
<td>Lowest = -0.15</td>
<td>Lowest = -1.03</td>
</tr>
<tr>
<td>Response to hypothetical</td>
<td>Second biggest</td>
<td>Second biggest</td>
<td>Third biggest</td>
</tr>
<tr>
<td>‘changes’ – from clear to</td>
<td>decrease in satisfaction</td>
<td>decrease in satisfaction</td>
<td>decrease in satisfaction</td>
</tr>
<tr>
<td>murky</td>
<td>WTP to maintain/improve quality &amp; clarity of rivers</td>
<td>WTP to maintain/improve quality &amp; clarity of rivers</td>
<td>WTP to maintain/improve quality &amp; clarity of rivers</td>
</tr>
<tr>
<td></td>
<td>Second highest ($48)</td>
<td>Second highest ($47)</td>
<td>Highest ($26)</td>
</tr>
<tr>
<td></td>
<td>Indigenous residents</td>
<td>Non-Indigenous residents</td>
<td>Tourists</td>
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<td>---------------------------</td>
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</tr>
<tr>
<td>Importance</td>
<td>High Mean 1.79</td>
<td>High Mean 1.65</td>
<td>Moderate Mean 1.25</td>
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<td></td>
<td>Highest =1.82</td>
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<td>Lowest = -1.03</td>
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<tr>
<td>Satisfaction</td>
<td>Moderate Mean 0.56</td>
<td>Low Mean 0.14</td>
<td>Moderate Mean 0.96</td>
</tr>
<tr>
<td></td>
<td>Highest =1.45</td>
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<td>Lowest = -0.15</td>
<td>Lowest = -1.03</td>
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<tr>
<td>Response to</td>
<td>Third biggest decrease in satisfaction</td>
<td>Third biggest decrease in satisfaction</td>
<td>Fourth biggest decrease in satisfaction</td>
</tr>
<tr>
<td>hypothetical ‘changes’</td>
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<tr>
<td>– twice as many pests &amp;</td>
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<tr>
<td>weeds</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>WTP to protect native</td>
<td>Third highest ($45)</td>
<td>Highest ($49)</td>
<td>Lowest ($20)</td>
</tr>
<tr>
<td>plants &amp; animals from</td>
<td></td>
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<tr>
<td>pests and weeds</td>
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</tbody>
</table>
IN SUM

• Quality of life/decision to visit depends on multiple things, including, but not limited to:
  - Safety of family & friend/self & travelling companions; culture; environment; economy
• May need to watch the ‘gap’ between importance and satisfaction relating to
  - environment and Indigenous culture;
  - roads, hospitals, schools and safety
• Potentially vulnerable to some types of change, since people in this region are so reliant upon environment for livelihoods and wellbeing.
• If we damage the environment, it may ‘bite back’.
  - Likely to also be the case if we degrade or damage culture
Changes in the economy affect the environment. These changes feed back and affect people and economy.

Changes in one part of the economy can impact other parts of the economy and/or multiple environments.

Social and environmental values are important to people: deterioration thus has a real impact on the economy and on well-being.
SCIENTIFIC PUNCHLINES

• Emerging body of literature on life satisfaction offers promising new way of ‘valuing’ non-market goods, assessing
  – Total values (how important is x compared to, say, y?)
  – Marginal values (how would a change in x affect you?)

• These ‘values’ can be expressed in non-monetary terms (e.g. just using comparisons/relativities); some can also be converted to monetary equivalents

• Irrespective of whether or not these values have $ attached, these quantitative measures likely to be useable in integrated modelling exercises

• Need long term data sets so can do ‘proper’ dynamic integrated modelling
THANK YOU
COMMENTS, IDEAS AND SUGGESTIONS
WELCOME 😊

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