KPMG

The value proposition of the cruise market for Tasmania

4 February 2022

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Executive Summary

Context and objectives

Context

The cruise sector has experienced rapid growth globally and in Tasmania. Between 2012 and 2015, the number of cruise ship days in Tasmania averaged around 60 per year. In 2019-2020 ship days had increased to almost 200.

COVID-19 has resulted in a 'pause' for in cruise ship visits, with the Australian Government imposing restrictions on cruise ships entering Australia since March 2020. As a result, the Tasmanian Government has an opportunity to ensure that cruise shipping aligns with its broader policies for tourism in the state, which forms the motivation for this study.

The Tasmanian Government has undertaken a number of initiatives to better understand and manage cruise-related tourism. This includes work such as the *Tasmanian Regional Ports Review* and related stakeholder consultations, along with the *Blueprint for Sustainable Cruise Shipping in Tasmania*, which provides the strategic direction and key initiatives for the cruise industry in Tasmania. In addition, the *T21 Visitor Economy Action Plan 2020-2022* outlines priorities for the recovery of Tasmania's visitor economy in line with the state's longer-term vision for tourism, which would include a role for cruise ships.

This study builds on this previous work developing a holistic value proposition of the cruise sector for the state and its regions.

Study objective

The purpose of this study is to provide an evidence base to improve understanding of the impacts and value of cruise shipping and its segments in Tasmania. It does so by adopting a triple bottom line approach, assessing the economic, environment and social impacts.

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Image from Tourism Tasmania Visual Library.

Methodology

The study was prepared in four steps

Step 1: Collecting the evidence

Extensive stakeholder engagement interviewed 60 market participants including, cruise lines, local councils, industry operators, industry groups and government agencies. Their sentiments were verified and complemented with extensive desktop research and data analysis.

Step 2: Defining factor parameters and scenarios

The value contribution of a wide range of economic, social and environmental factors was estimated. Tourism Tasmania's project reference group developed five market scenarios of ship days for ports and anchorages across Tasmania.

Step 3: Estimating the benefits

The number of expected ship days in a given scenario was applied to the estimated (monetised) benefits for a specific vessel type and port. In this way, the costs and benefits for each scenario year by vessel type and port were estimated.

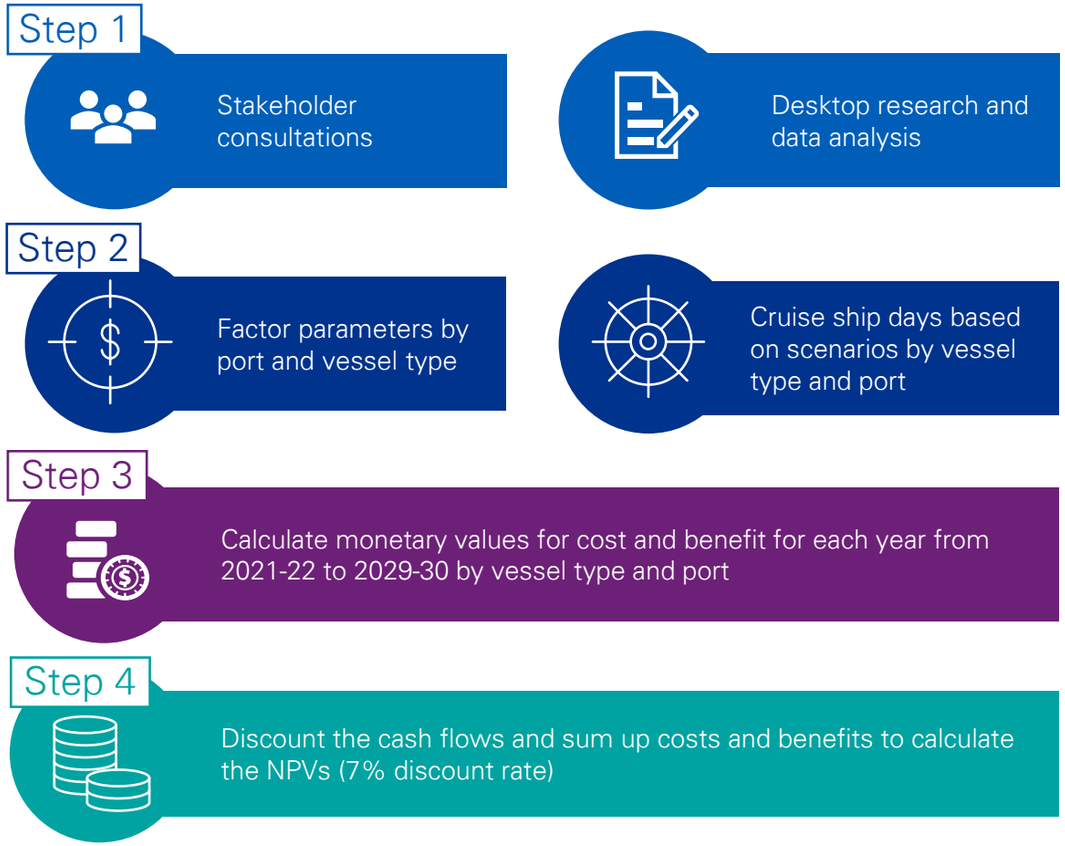
Step 4: Calculating the net present value

With the annual cost and benefits estimated, a discount rate was applied to the annual values. The total costs and benefits across the evaluation period were thus aggregated to a net present value.

Exclusions

As per the scope outlined by Tourism Tasmania, the research focus is on testing potential scenarios illustrating different market compositions to inform future policy positions without making any recommendations. The assessment does not compare scenarios with a 'base case' or counterfactual. The study does not assess the impacts of cruise ships for the entire Tasmanian economy, meaning that it does not account for industry or economic responses to any of the scenarios tested.

Project methodology



Cruise ship value propositions

Economic factors

Passenger expenditure (including pre- and post cruise spending but excluding tours): Driven by number of passengers by ship type, visits by ship type, average per passenger expenditure by ship type and port

Passenger tours expenditure: Driven by number of passengers by ship type, visits by ship type, tour participation rate by ship type, average per passenger tour expenditure by ship type and port

Crew expenditure: Driven by number of crew by ship type, visits by ship type, average per crew expenditure by ship type and port

Port charges: Driven by port and pilotage charges by ship type and port, visits by ship type

Provisioning: Amount spent on Tasmanian produce; cruise lines report spending several million dollars p.a. on Tasmanian products (loaded on the ship usually in Sydney or Hobart)

Environment factors

Emissions from vessel: Driven by emissions by ship type and emission cost

Emissions from transport : Driven by number of passengers by ship type, visits by ship type, tour participation rate by ship type, bus to passenger ratio, average distance travelled by port, bus emissions and emission cost

Bio-security risk and waste water: Fluid discharges and passenger days can introduce invasive species or pollute the environment *(not monetised)*

Social factors

Crowding: Driven by relative increase to visitor numbers by ship type exceeding a critical level where relevant at a given time of day, crowding cost parameter, local population and/or other visitors

Preservation: The value of pristine and remote wilderness areas and the impact that cruise visits would have on this *(not monetised)*

Noise from transport: Driven by number of passengers by type, visits by ship type, tour participation rate by ship type, bus to passenger ratio, average distance travelled, noise, noise cost

Vessels in port: Vessels in port can be regarded as eye-sores by some. They are also reported as creating a vibe and bringing together the community *(not monetised)*

Scenario overview and rationales

For this study, five scenarios were developed to test the value proposition of cruise ships in Tasmania, with the aim of drawing out how different vessel types and call profiles could influence the outcomes and net benefits at a regional level and for Tasmania as a whole.

KPMG developed these scenarios together with Tourism Tasmania's Cruise Ship Reference Group and which were then tested and refined through stakeholder consultation.

Each scenario, along with its rationale is described below.

1 Projection of historical and recent trends – Tasmania has seen high growth in cruise ships over the last five years. It is broadly accepted that this growth will slow over time, particularly if visits are concentrated in the summer months as has been the case. Consultations with cruise lines indicate that cruise visits are expected to return to their previous level post-COVID-19, with some growth in subsequent years

2 Local increase in expedition ships – Consultations with cruise lines indicate strong interest in moving into the expedition cruise market in Tasmania. Pre-COVID-19, only one operator regularly homeported and operated expedition voyages in Tasmania. In interviews, several cruise lines expressed their intentions to deploy an expedition ship to Hobart for the summer season within the next five years. For all other vessel categories, forecast demand is the same as Scenario 1.

3 Global trend of increasing ship size – pre-COVID-19 the trend in cruise ship building was towards larger vessels, on average, then are currently deployed globally. This scenario aims to reflect this trend, with an increase in visits to Tasmania by 'megaships' (as defined in this study), and a corresponding decrease in visits by mid to large vessels. This is not to say that all mid to large vessels are being replaced by megaships, but rather the average size of cruise ships in general, may increase. The mid to large ship segment will continue to be an important sector for Tasmania under this scenario.

4 Luxury and expedition ships prioritised – This scenario assumes that Tasmania could better align its cruise market with its broader tourism brand focused on nature and pristine environments along with specialised and unique products and produce. This could involve limiting the visits of mid to large ships and megaships in order to prioritise expedition and luxury cruise vessels.

5 Focus on luxury and expedition ships – Drawing on the themes from Scenario 4, this scenario would see a complete focus on expedition and luxury cruises only.

The effects of COVID-19

COVID-19 has had a profound effect on the cruise sector over the last 12 months as cruising ground to halt across the world. As Australia eases restrictions on domestic cruising, stakeholder consultations indicate that cruise lines expect a full recovery of the sector by 2022-23. Moreover, they reported seeing pent up demand, and expect that domestic demand for cruising will sufficiently mitigate the fact that international passengers are barred from cruising to/in Australia for the foreseeable future.

Across each scenario, there are risks/uncertainties around COVID-19. For example, redeployment of vessels to domestic destinations may be at risk as international destinations are not available (and vice versa).

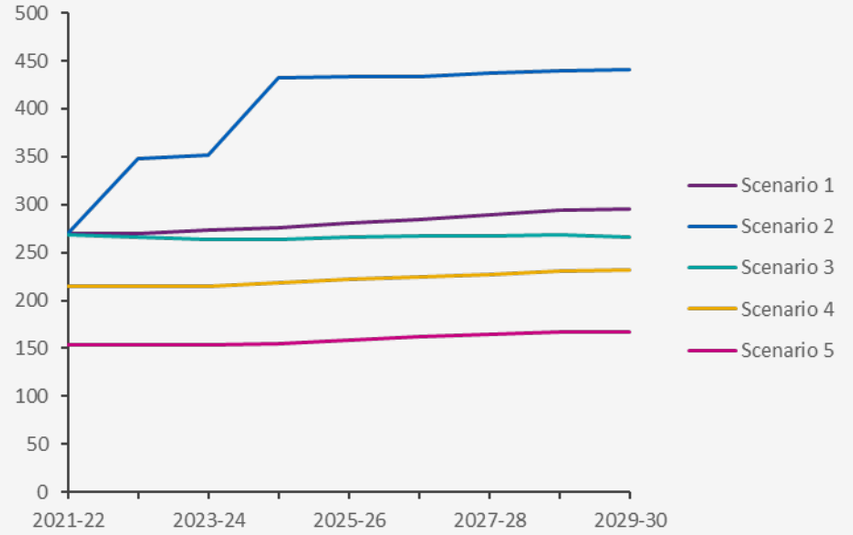
Overview of results

Results assessed over a 10 year period using a 7% discount rate

Scenario Number	Scenario Name	Economic Benefit	Environmental Impact	Social Impact	Net Benefit (NPV)	Total ship days (10 years)	Ratio of NPV per ship day
1	Projection of historical and recent trends	$357.3m	-$53.1m	-$6.6m	**$297.6m**	2,532	$0.12m
2	Local increase in expedition ships	$392.1m	-$54.8m	-$8.7m	**$328.6m**	3,587	$0.09m
3	Global trend of increasing ship size	$336.6m	-$50.2m	-$6.2m	**$280.2m**	2,396	$0.12m
4	Luxury and expedition ships prioritised	$213.2m	-$26.7m	-$5.0m	**$181.5m**	2,000	$0.09m
5	Focus on expedition and luxury ships	$102.4m	-$5.6m	-$3.4m	**$93.4m**	1,433	$0.07m

Annual ship days by scenario

The forecast annual ship days under each scenario is shown in the table below. Scenario 2 has the highest number of annual ship days due to a significant increase in expedition vessels servicing Tasmania. Scenario 3 sees a slight decrease in ship days, as it is assumed that mid to large vessels are replaced by megaships, meaning that the same passenger demand is serviced by fewer ship calls.



Key findings by scenario

Scenario	Scenario Name	Overall	Economic	Environmental	Social
1	**Projection of historical and recent trends**	Assuming historical trends and forecast projections of cruise ship demand in Tasmania hold, the state is expected to realise substantial net benefits. This is largely driven by the significant amount of economic activity generated by visitors. These impacts outweigh the potential costs to the environment and society, which should however be considered in the overall review of the results.	Cruise ship passenger expenditure on shore is by far the largest economic contributor, of which most is retail/hospitality spending. Port charges and provisioning are also a key economic benefits to Tasmania generated by the industry.	Cruise ships have an environmental footprint, however the industry must comply with global regulations with respect to emissions and other impacts. This has seen a sharp decline in negative impacts when compared to the past. Environmental costs are predominantly from vessel emissions in port, particularly from larger vessels.	Expedition vessels travel to remote parts of Tasmania and this has the potential to impact the pristine nature of these areas. This has a cost to society and while these costs have not been monetised, they have the potential to be significant. Social costs from other vessel categories are limited due to the destinations they visit.
2	**Local increase in expedition ships and projection of historical trends for other vessel classes**	Under this scenario there would be an increase in total cruise activity in Tasmania. When compared to Scenario 1, the overall net benefits are higher solely due to this increase in activity. However, when compared on the net return 'per ship' day it is lower than Scenario 1. This is because expedition vessels have a relatively lower economic benefit compared to other vessel types.	The associated increase in total visitors and ship days, of around 42% when compared to Scenario 1, would see an increase in economic spending in Tasmania.	Under this scenario, the impact to environment is not dissimilar to Scenario 1, despite the increase in total ship days. This is due to the low environmental impact of expedition vessels.	Under this scenario, more expedition vessel would service Tasmania and the frequency of visits to new and existing destinations would increase. This would see social costs increase slightly, all other thing being equal (and when compared to Scenario 1). However, the unmonetised cost to society from impacts on pristine nature would be significant, as expedition vessels visit wilderness areas most often.
3	**Global trend of increasing ship size**	The overall net benefit under this scenario is similar to Scenario 1 as the mid to large ship visits are replaced by megaships to service the same passenger demand. Environmental and social costs would remain on par with Scenario 1.	Passenger expenditure (both on tours and retail/hospitality) and port charges continue to be the key economic drivers, however as the destination choice of megaships is limited when compared to mid to large vessels, the geographic/regional impact would change.	There is little change to environmental costs compared to Scenario 1, however a reduction in total ship days sees a small decline in environmental costs.	There is little change to social costs when compared to Scenario 1, as larger ships visit only the main ports. The social cost of expedition vessels would remain.
4	**Luxury and expedition ships prioritised**	Prioritising luxury and expedition vessels would result in a significant decline in the overall net benefit to Tasmania. While there would be improvements in environmental impacts, this is outweighed by the reduction in economic benefits. Social costs would still remain similar.	Maintaining a small offering of larger vessels would not see the same economic decline as under Scenario 5, however given the reduction in total visitors the economic benefits from passenger expenditure and port charges would drop substantially.	There would be a benefit to the environment through a reduction in larger vessel calls to Tasmania when compared to Scenario 1. Under this scenario the environment costs would be halved.	Expedition vessels have the highest potential to incur negative costs to society from crowding in remote areas and a reduction in larger vessels under this scenario would not result in a significant decrease in social costs.
5	**Focus on expedition and luxury ships only**	A focus on expedition and luxury vessels only, at the expense of the larger vessel categories, would result in a significant decrease in the overall net benefit to Tasmania. This is due to the significant reduction in economic impacts when compared to Scenario 1.	Under this scenario, the economic impact would rely solely on expedition and luxury ships. While these passengers spend the most per passenger of all passenger categories, the reduction in total visitors would see a sharp decline in overall spending. Revenue from port charges would also be impacted.	The benefit to the environment would be significant when compared to Scenario 1 as expedition and luxury vessels have the smallest environment footprint.	Social costs would see a decrease as crowding impacts from the large vessels at some sites would not occur.

Key insights

Cruise shipping provides a positive net economic contribution to the Tasmanian economy. As defined in this report, each market segment, under each of the scenarios tested, is expected to make a positive contribution to Tasmania. Each segment however produces benefits and costs to varying degrees. For example, the expedition segment of the cruise market provides passengers that are high spending but are low in total number, meaning the total economic contribution for this segment is relatively low when compared to the other segments. Simply increasing the number of expedition vessels that service Tasmania to increase the economic value may, however, produce a higher social cost in the from crowding of remote areas as well as their impact on preserving the pristine nature of certain areas (not monetised). For the larger vessel segments (mid to large and megaships), these cruise ships provide a higher total economic return but have an effect on the environment through vessel emissions. However, a shift away from these vessels could be detrimental to local business. The luxury vessel segment provides a good balance between the two ends of the market.

Summary of economic factors

Economic benefits are largely generated by passenger expenditure on hospitality, retail and tours. The highest economic benefit is from passenger expenditure on retail and hospitality concentrated in the main cruise ports of Hobart, Burnie and Port Arthur. Tours help to disburse the economic benefits into the regions. On a per ship day basis, megaships and mid to large vessels have the highest economic benefits. Port charges are also an important economic contribution with the mid to large and megaships providing the bulk of the revenue.

The economic contribution by ship and passenger differs by market segment. Focussing on bespoke luxury travel, the vessels from the expedition and luxury market segment show the highest expenditure on a per passenger basis. In addition to the substantial per passenger expenditure on retail and hospitality, these vessel classes often have contracts with local tour operators providing them with revenue security. With a preference for local produce, their visits also constitute an opportunity for generating provisioning revenue for local growers. At the other end, the mid to large and megaships generally have lower spending on a per passenger basis but have a higher total number of passengers to spend onshore (note: there are a number of vessels in these categories that are classed as ‘upmarket’).

Regional dispersal of cruise passengers is determined by time in port and the accessibility of onshore destinations. The typical 10 to 12-hour stay in port determines the geographical reach of benefits and costs of cruise ships. Passengers are limited to day tours at a maximum, where destinations typically have to be within a 1.5 hour drive from the port.

Summary of environmental factors

The environment effect of cruise ships has reduced significantly over the last 20 years. With well-established mitigation strategies for unlikely liquid spills in place, in port emissions are the main contributor to potential environmental costs. Being driven by the size of the vessel, megaships show the highest total emission cost per visit. Importantly, cruise lines continue to improve their operations through technological advances and compliance with international regulations. This is true for emissions of particulate matter which have been substantially reduced in recent years.

In remote areas the risks from the impacts of liquid spills can be higher as – due to their remote nature – response times are often long and equipment is typically kept in the main port cities. This also applies to smaller (expedition) vessels whose visits to such areas could generate high environmental costs.

Summary of social factors

Disturbance of remote and environmentally sensitive areas potentially comes with high social cost of preservation, which is generated in the most part by expedition vessels. These vessels can navigate and travel to remote wilderness sites in Tasmania. Other vessel types tend to visit the main ports limiting the social cost of preservation.

Crowding effects are typically low as cruise passengers only make up a small fraction of total visitors in a given area. Focussing on popular, well-established sites and visiting during peak periods, cruise passengers tend to blend into the large numbers of visitors already present. While a visit from a larger vessel can produce a large number of visitors in a short amount of time, their effect is expected to be lower relative to their economic value. The main exception to this trend are expedition vessels as they visit inaccessible remote sites without a large population base.

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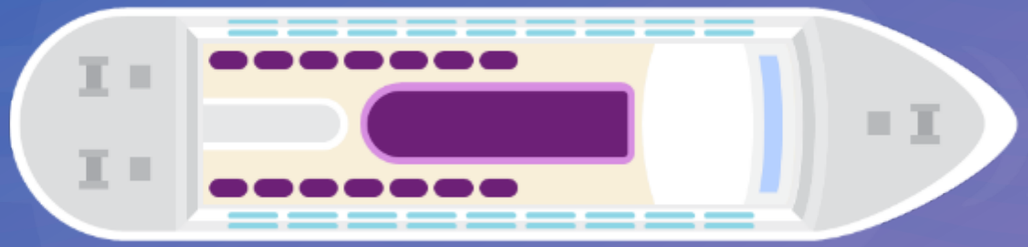


Introduction

Context

The cruise sector has experienced rapid growth globally and in Tasmania. Between 2012 and 2015, the number of cruise ship days in Tasmania averaged around 60 visits per year. Since then ship days have increased to almost 200 in 2019-2020.

The Tasmanian Government has undertaken a number of initiatives to better understand and manage the cruise sector. This includes work such as the *Tasmanian Regional Ports Review* and related stakeholder consultations, along with the *Blueprint for Sustainable Cruise Shipping in Tasmania*, which provides the strategic direction and key initiatives for the cruise industry in Tasmania. In addition, the *T21 Visitor Economy Action Plan 2020-2022* outlines priorities for the recovery of Tasmania's visitor economy in line with the state's longer-term vision for tourism, which would include a role for cruise ships. This study builds on this previous work by establishing an evidence base by collecting data and conducting a full assessment of the value proposition of the cruise sector for the state and its regions.

COVID-19 has resulted in a 'pause' for in cruise ship visits, with Australian Government imposing restrictions on cruise ships entering Australia since March 2020. As a result, the Tasmanian Government has an opportunity to ensure that cruise shipping aligns with its broader policies for tourism in the state, which forms the motivation for this study.

Study objective

The purpose of this study is to provide an evidence base to improve understanding of the impacts and value proposition of cruise shipping and its segments in Tasmania, by adopting a triple bottom line approach, assessing the economic, environment and social impacts.

Methodology overview

KPMG conducted extensive stakeholder engagement in order to establish the parameters and assumptions that would feed into the triple bottom line assessment. Throughout the study, 60 stakeholders were contacted from across the cruise industry including, cruise lines, local councils, industry operators, industry groups and government agencies.

This was complemented by extensive desktop research and data analysis from a range of sources, such as:

- Tourism Tasmania visitor and tours data
- TasPorts historical and forward bookings and cruise line future itineraries
- Tourism Tasmania's Tasmanian Cruise Market Update and Regional Ports Review 2017-18, including Tasmania Cruise Passenger Survey 2016/17
- Blueprint for sustainable cruise shipping in Tasmania 2019-2022
- Regional Anchorages Working Group Findings 2020
- Other previous work completed by the Tasmanian Government relevant to cruise
- Journal and academic papers
- CLIA and ACA cruise economic assessments
- APEC Economic Study on the Impact of Cruise Tourism April 2020

A bottom up approach was used to assess cruise impacts in Tasmania, by first estimating the impacts by vessel type at a regional level and then aggregating to state level.

Exclusions

As per the study objective outlined by Tourism Tasmania, the research focus is on testing potential scenarios, illustrating different market compositions (i.e. vessel types) to inform future policy positions. Our scope of works excludes making any recommendations. The assessment does not compare scenarios with a 'base case' or counterfactual where cruise ships do not visit Tasmania. The study does not assess the impacts of cruise ships for the entire Tasmanian economy, that is, it does not account for potential responses to any of the scenarios by other sectors (e.g. crowding out effects).

Approach and report structure

The diagram below provides a high level summary of the study approach and the structure of this report.

Background and context (Slide 14)

The background and context section summarises key relevant aspects of these studies and adds key insights provided by stakeholders that were consulted over the course of this the study. It also provides an overview of the organisations and operators with which the KPMG team consulted.

This study is to be considered in the context of related work recently conducted by Tourism Tasmania such as Sustainable Cruise Blue Print and the community and industry feedback provided for the Tasmanian Regional Ports Review.

Cruise industry overview (Slide 20)

The cruise industry overview provides a summary of market segments, market participants, ports, and historical growth. It presents the following:

- **Key market segments** provides a summary of the four vessel types assessed in the study.
- **Recent visitation trends** show monthly and ship day patterns for key ports and anchorages.
- **Overview of stakeholder consultations**, outlining the key opportunities and impediments for the cruise industry as identified by stakeholders.

Value contributors (Slide 27)

This section outlines the methodology and assumptions for estimating each of the value contributors

Economic factors comprise monetary stimuli such as onshore tour expenditure, other passenger shore expenditure, crew expenditure and port charges.

Environmental factors focus on the operational externalities of cruise ships such as emissions, waste water and the risk of environmental damage through events such as oil spills.

Social factors focus on passenger and ship days' externalities such as crowding, noise, visual amenity and the preservation of nature.

Scenarios (Slide 61)

This section outlines the scenarios tested.

Scenario 1 illustrates the likely impact of the continuation of most recent trends.

Scenario 2 illustrates the likely impact of a local increase in expedition ships, which stake-holders flagged as a trend.

Scenario 3 illustrates the likely impact of the global trend of increasing ship size.

Scenario 4 luxury and expedition ships are prioritised over mid to large and megaships.

Scenario 5 focus on luxury and expedition ships with no visits from mid to large or megaships.

Value proposition (Slide 71)

This section provides a summary of all qualitative and quantitative impacts under the five scenarios.

The **value proposition** combines the factors estimated in the value contributors section with the scenarios. This results in the net present value for each scenario. The impact for each reference vessel is also calculated.

The **indirect impacts** of each scenario are estimated, including the number of potential jobs supported by the cruise sector.

The **seasonality** of impacts in a given year and between different market segments is estimated using historical ship days to inform seasonality trends for the scenario projections.

Background and context

Stakeholder engagement

For this study KPMG undertook consultations with a wide range of cruise industry representatives and stakeholders across Tasmania to explore sentiments around the State's cruise market and its effect on the environment, economy and community.

To ensure collection of comprehensive and diverse views, meetings were held with representatives from all four groups listed on the right. Within these groups key stakeholders included:

- TasPorts, with a focus on logistics and access for cruise ships, economic, and environmental effects
- Various entities within the Tasmanian Government, such as the Environment Protection Authority (EPA) and Marine and Safety Tasmania (MAST)
- Local councils
- Industry associations, such as the Tourism Industry Council Tasmania (TICT) and the Tasmania Hospitality Association (THA)
- Tourism sector representatives for different areas of Tasmania, such as Destination South and West by North West
- Industry operators such as hospitality, tour operators and other tourism-related businesses.

A full list of stakeholders consulted is on the following slide.

Questions were tailored towards different stakeholder groups to account for different roles and interactions of councils, cruise operators and industry stakeholders. The focus of the interviews was the interaction of cruises with the community be it through provisioning, passenger disembarkations or simply the presence of vessels.

Cruise Ship Operators

There are a variety of cruise lines operating in Tasmanian waters, along with potentially new operators. These cover a range of market segments.

Industry Operators

Many businesses depend on the tourism that cruise ships bring, such as tour organisers and shipping companies.

Government

Government bodies monitor the effects of cruise ships on Tasmania's environment, society and economy.

Councils

Local councils are able to provide a wholistic overview of cruise ships in their areas as compared to the community.

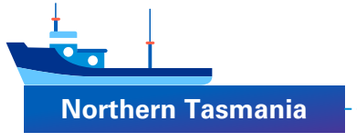
Stakeholders consulted

King Island

King Island Council

Flinders Island

Flinders Island Council

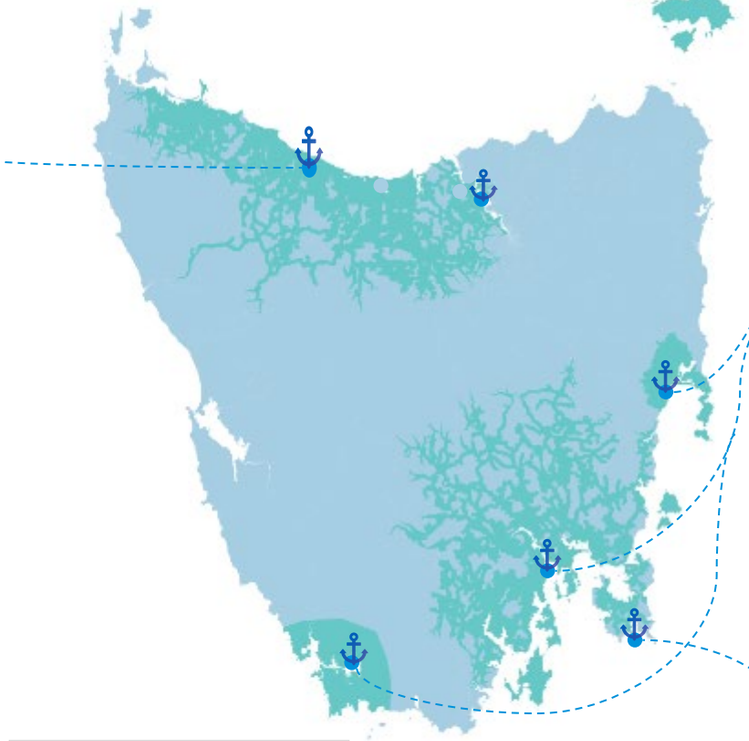


Northern Tasmania

Burnie City Council
West by North West
Visit Northern Tas
Launceston City Council

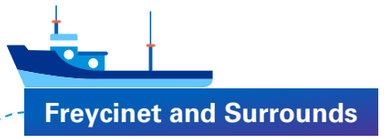
Cradle Coast Tours
Cradle Mountain Canyons
Curringa Farm
Daytripperz
Devils at Cradle
Emu Plains Rhodo Farm
Gunns Plains Caves
Hellyers Road Distillery
Makers Workshop
Wings Wildlife Park

Wonders of Wynyard
Bluehills Honey
The Nut Chairlift
Anvers Chocolate
Bass Strait Maritime Centre
Don River railway
Fernglade platypus tours
Ghost Rock



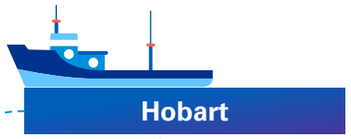
Legend

Cruise affected regions



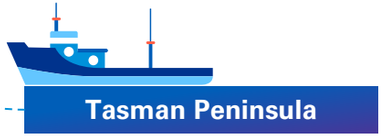
Freycinet and Surrounds

East Coast Tasmania (ECT)
Glamorgan Spring Bay Council



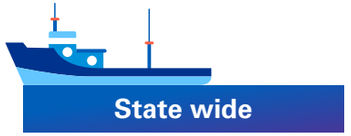
Hobart

Destination Southern Tasmania (DST)
Hobart City Council
Bonorong Wildlife Sanctuary
Grayline Coaches
Inverawe Gardens
Mt Field
Pennicott Tasman Island Cruise
Shene Estate
Tahune Airwalk
Rhuby Delight
Old Woolstore Apartment Hotel



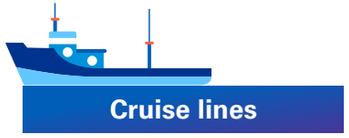
Tasman Peninsula

Port Arthur Historic Site



State wide

Environment Protection Authority (EPA)
Marine and Safety Tasmania (MAST)
Tasmania Hospitality Association (THA)
Tourism Industry Council Tasmania (TICT)
Tasmania Parks
Tasmania Tour Guide
TasPorts
Tassie Tours
Tours around Tasmania
Inchcape Shipping Service

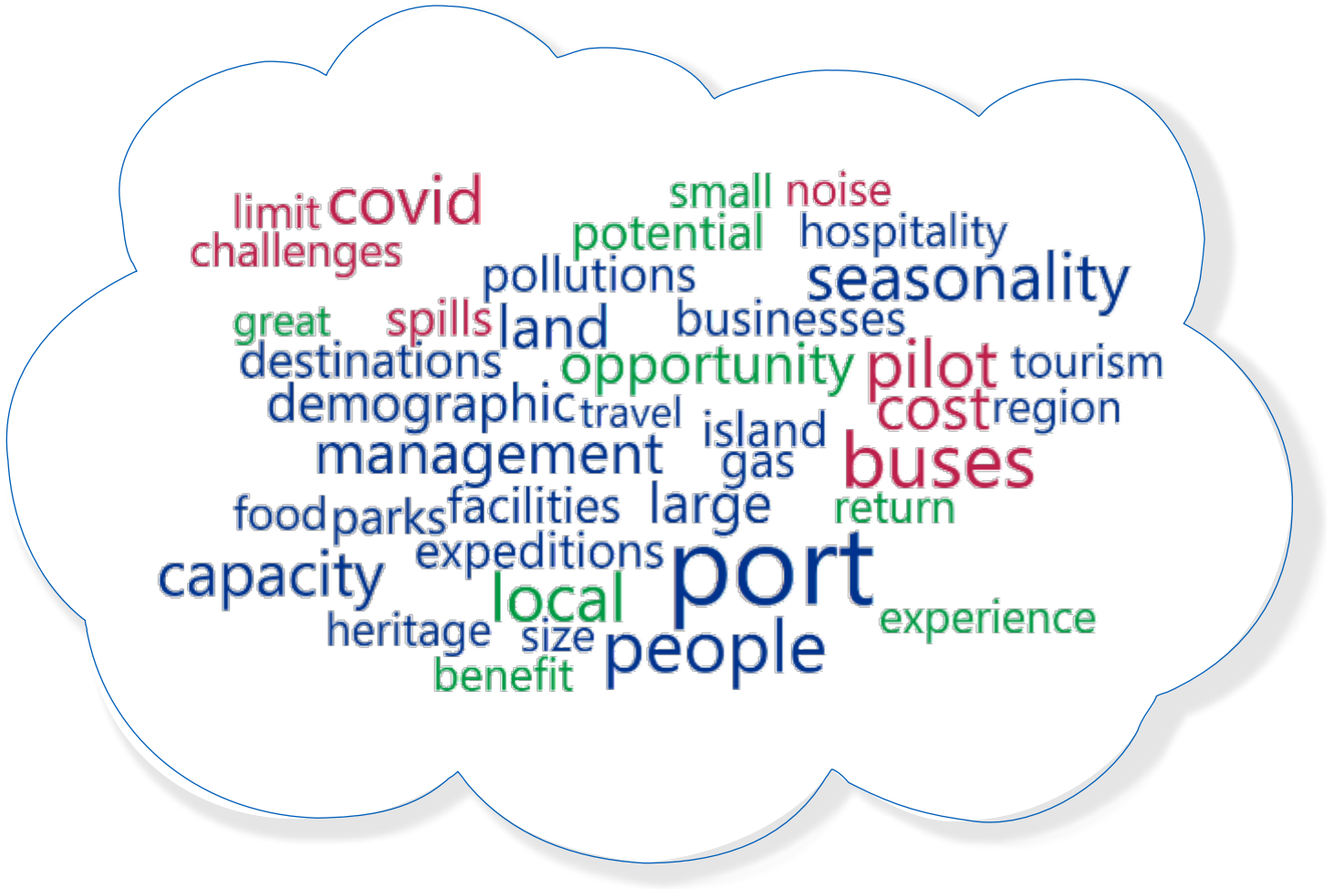


Cruise lines

Aurora
Carnival Cruises
Coral Explorations
Hurtigruten
Norwegian Cruise Line (NCL)
Oceania
Ponant
Regent Seven Seas Cruises
Silversea
Royal Caribbean

Stakeholder consultation themes

Word cloud summarising stakeholder feedback



Positive sentiment | Neutral sentiment | Negative sentiment

The stakeholders consulted highlighted a number of important items for consideration in this study. Most of these were either positive or neutral.

The stakeholder consultations offered a wealth of insights into operators' and administrators' views of cruises. Across the consultations, there were some clearly reoccurring positive and negative perceptions around cruise shipping in Tasmania.

The word cloud highlights these themes and the sentiments associated with them. It demonstrates that while cruise ships were seen as mostly positive or neutral, some issues emerged:

- Crowding of popular natural attractions through the arrival of large groups of cruise passengers could take away from the experience of other visitors at these sites.
- Local infrastructure such as parking and public toilets are strained when large groups of visitors simultaneously arrive.
- Buses transporting disembarking passengers can create short term traffic congestion. Buses and other transport options are limited in some ports, constraining the size of the vessels that can be serviced
- Environmental factors like noise and pollution events by cruise ships can potentially cause damage to remote areas

The research conducted in this report ensures that these key themes are covered and, where appropriate, are monetised as social or environmental cost that might partially offset the economic stimuli that cruise visits bring. The following two slides provide a more comprehensive overview of these themes.

Key opportunities identified by stakeholders

Extensive stakeholder consultations identified a number of opportunities to increase the contribution out of the cruise industry to Tasmania. These cover possible measures of increasing disembarkation and community acceptance through improving port infrastructure, and opportunities to improve the yield for local businesses (i.e. focusing on cruise sectors with higher passenger expenditure, and the possibility of extending the cruise season beyond the current October to April).

Area of Interest	Opportunity	Stakeholders
Environment	• Partnering with cruise lines to develop minimum standards for cruise ships docking in port could be implemented to encourage and reward waste reduction and environmentally sustainable practices. Many cruise lines already have sustainability strategies in place and are likely to be supportive of such schemes	• Cruise lines • Councils
Port Infrastructure	• Current port infrastructure could be improved so passengers can disembark more easily. • Passengers are not allowed to disembark with luggage or bring luggage back on in Burnie due to border controls since it is a not a point of entry. • More communication prior to vessel visits together with potentially staggered disembarkations could ease pressure on infrastructure and environment at popular destinations	• Cruise lines • Councils • Industry operators
Local businesses	• Focusing on higher spending vessel types or developing ways of encouraging expenditure could boost revenue for local hospitality, retail and tour operators • Promoting seasonal homeporting of vessels in Hobart could stimulate the local economy through increased provisioning and pre and post-cruise spending • There is considerable scope to develop ‘new products’ to offer passengers with new attractions and experiences	• Councils • Industry operators
Seasonality	• Industry operators said increased calls in the shoulder, peak and off-season could more evenly distribute passengers and could reduce crowding at popular destinations in the peak season when there are many non-cruise visitors	• Councils • Industry operators

Key impediments and risks identified by stakeholders

As well as opportunities, stakeholder consultation revealed a number of risks and impediments to making the most of cruise ships. Discussions focused on some of the difficulties in planning itineraries and accessing ports/anchorages, both in terms of availability of pilots and capacity of infrastructure. Impacts on the environment in sensitive areas and national parks was also raised as a key risk factor. In addition, COVID-19 continues to create uncertainty for the industry.

Area of Interest	Impediment or risk	Stakeholders
Environment	• There is a bio security risk especially in remote destinations for certain vessel classes • There is limited capability to respond to pollution incidents in remote locations	• Cruise lines • Government bodies
Infrastructure	• Sewage, waste management as well as potable water systems can limit some destination's ability to cater for larger visitor groups	• Councils
Regulation	• Passengers can only disembark with luggage in Hobart often preventing them from participating in multi day port to port tours • Only Hobart can handle international arrivals limiting flexibility in the associated itineraries	• Industry operators • Councils • Cruise lines
Planning horizons	• Limited transparency around accessible anchorages has meant that there is uncertainty when cruise lines are planning future itineraries	• Industry operators • Cruise lines
Pilots	• Limited pilots available in Tasmanian ports can create capacity constraints in the peak season • For most remote regions pilotage is not available	• Industry operators • Cruise lines
Transport Infrastructure	• Limited transport options outside of Hobart and Burnie tend to restrict passengers to staying in walking distance to the port or relying on organised tours • Although tour buses are offered in Burnie, it cannot cater for megaship passengers • Industry operators said the smaller scale of most local operators can constrain their ability to handle the group sizes often associated with the larger vessels and especially megaships	• Councils • Industry operators
COVID-19 (temporary)	• The pandemic has meant that there are more concerns over cruise ships as sources of infection • There has also been a significant reduction in international visitors due to border restrictions	• Cruise lines • Councils

Cruise industry overview

Categorising the cruise industry

The following cruise ship vessel categories were developed by Tourism Tasmania and used for this study:

Expedition	Vessels with a capacity of less than 300 passengers
Luxury	Vessels with a capacity in between 300 and 1,000 passengers
Mid to large	Vessels with a capacity in between 1,000 and 3,000 passengers
Megaship	Vessels with a capacity of over 3,000 passengers

Given the vessel classes used in this study, it is important to note, however, that nuanced products exist across the cruise industry in terms of how vessels and cruise products are defined and categorised.

For example, Aurora, and Coral Expeditions classify their expedition fleet as less than 200 passengers capacity, compared to Ponant and Hurtigruten which classify their expedition fleet as less than 300 and 500 passenger capacity respectively.

Similarly, megaships have been defined by previous studies based on the length of the vessel and/or by passenger numbers with varying classification for individual ships.

Across medium and large vessels, there is a range of products focusing on premium and luxury cruising as well as more economical, family-focused cruises.

Stakeholder consultations have indicated several target market categories including:

- Passengers who are interested in the wilderness and seeking adventure
- Passengers seeking a luxury, fine-dining experience on board, with plenty of time to explore destinations
- Passengers who value the on-board experience with less focus on the shore experience.

The type of passengers on board each vessel and across each vessel type would of course be highly varied. However, for the purposes of estimating the differing influences across the vessel types (particularly in terms of passenger expenditure), assumptions were made regarding the relative spending power of the different vessel categories. This study assumes that expedition passengers have the highest spending power and are more likely to spend money on shore, followed by luxury, then mid to large and finally megaship passengers.

These were informed by stakeholder consultations with cruise lines and supplemented with desktop research on ticket prices, itineraries and vessel characteristics.

Explorer of the Seas, Royal Caribbean Megaship Pool Area

Greg Mortimer, Aurora Expedition Kayaking Activities

Silver Muse, Silversea Luxury Fine Dining

Cruise ship market segments

Vessel type	Product
Expedition (<300 passengers)	• All inclusive ticket pricing • Focussed slow paced holiday • Ships tend to go to remote areas
Luxury (~300 to 1,000 passengers)	• All inclusive ticket pricing • Focussed slow paced holiday • Ships tend to stay in more accessible ports and landing sites • Targeting older demographic
Mid to large (1,000 to 3,000 passengers)	• Diverse market with a wide range of vessels and ticket classes • Focus on experiencing a wide range of coastal sites from the comfort of the ship • Shore excursion typically not included in ticket price • Ships tend to travel long distances, limiting the time in each port
Megaship (more than 3,000 passengers)	• Ship is the experience • Attractive to families and cruising times can be longer • Access to ports often limited by vessel size • Shore excursion typically not included in ticket price • Shorter tours can be more attractive

Le Laperouse - expedition

Silver Shadow - luxury

Queen Mary 2 – mid to large

Ovation of the seas - megaship

Seasonal deployment of cruise ships

The Australian cruise market is typically serviced by vessels that are homebased in other regions around the world, which are then deployed to the Pacific region for the summer season.

It is important to understand how the national and by extension, Tasmanian, cruise market is supplied as it impacts cruise itineraries, provisioning supply chains and an operator's commitment to and dependency the region or cruise market.

For example:

- Some large vessels are homeported in China and deployed to Australia for a summer season.
- Other vessels may only come to Australia or Tasmania for one or two cruises, being largely dependent and focused on other markets.
- Vessels that are in Australia all year round tend to focus on northern Australia, such as North Queensland and the Northern Territory, particularly the Kimberley.

In most cases the "northern" market is the key focus. For example, the Kimberley cruises are regarded as passenger magnets and the recent additions to Royal Caribbean's fleet, such as the *Wonder of the Seas,* are designed for the Southeast Asia market and spend their 'off-season' in Australia.

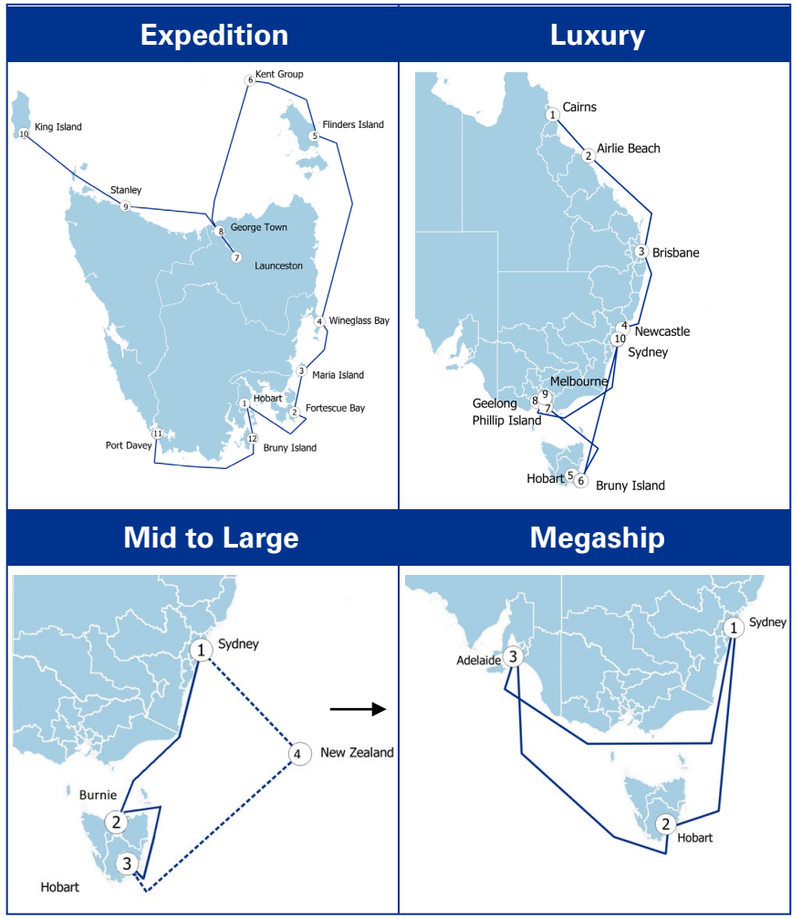
There are a variety of itineraries for each of the different vessel types. The maps on the right demonstrate examples of itineraries for the four vessel types. While most cruises in all four market segments focus on Tasmania's north and east coast, there are some segment specific features:

- **Expedition cruises** visit many different ports and anchorages and have also started offering circumnavigations
- **Luxury cruises** tend to limit visits to the three main ports in Tasmania, often only visiting one or two before continuing on to either the Australian mainland on New Zealand.
- **Mid to large ships** almost always visit Hobart and less regularly Burnie or Port Arthur, typically coming from larger Australian ports on their way to New Zealand (or vice versa).
- **Megaships** are restricted by port infrastructure and tend focus on visiting Hobart on often (shorter) Australian cruises.

Detailed visitations patterns by port are shown on the following slide.

Note: While Macquarie Island is a popular destination for expedition vessels and is administrated by the Tasmania Government, it is usually part of itineraries originating in New Zealand as island hopping is possible, while it is a three day sail from Hobart.

Illustrative example of cruise ship deployments



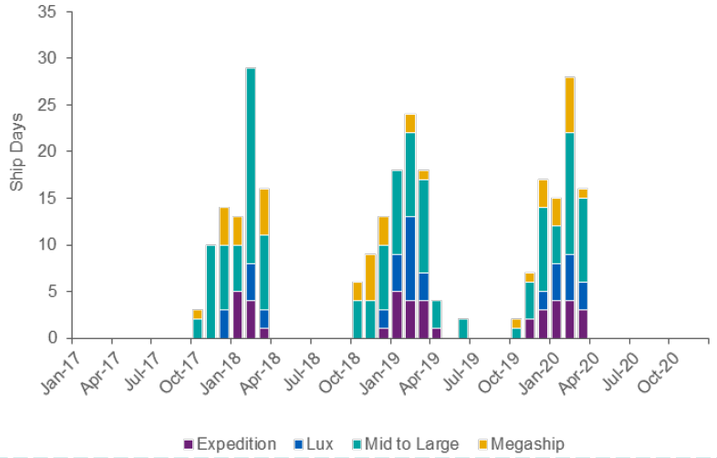
Annual visitation profiles - main ports

Cruise visits tend to be concentrated in the summer months at Tasmania's three main ports.

Including shoulder periods, the cruise ship season occurs between October and April. This seasonality is consistent across the historical data, with February seeing the highest number of cruise ship days.

Hobart has the most ship days with up to an average of one vessel per day in February. Most vessels that visit Tasmania will visit Hobart. This is partly due to international cruise arrivals to Tasmania needing to pass through boarder and immigration processes in Hobart before they can travel to other Tasmanian ports.

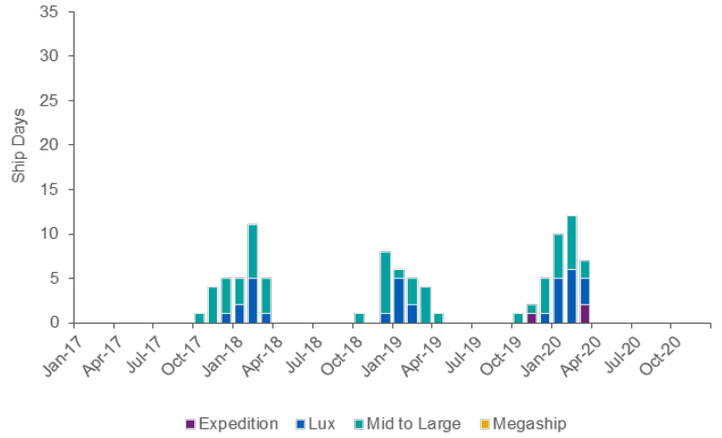
Historically, the majority of cruise ships in Hobart are mid to large vessels. Burnie receives most of its cruise visits from luxury and mid to large ships, particularly as its port does not cater for megaships. Port Arthur receives the fewest visits, but it has a wide range of vessel types. In contrast to Burnie, it can also cater for megaships and their numbers have increased in recent years.



Hobart

Hobart receives the most cruise ship days of all three ports. Most ships that visit other ports in Tasmania tend to also visit Hobart. The majority of visits occur in February.

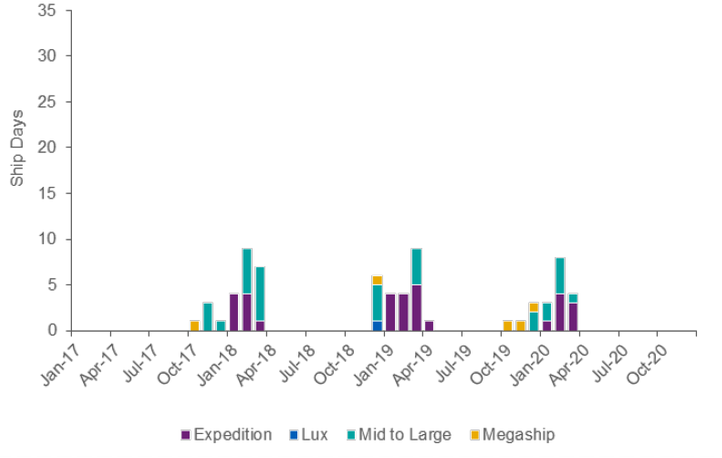
The dominant vessel type in Hobart are mid to large cruise ships.



Burnie

Burnie predominantly sees luxury and mid to large ships, especially since the port is unable to cater towards megaships.

The majority of visits during the cruise season occur in February, although the seasonal pattern is less consistent across years than that of Hobart.



Port Arthur

Port Arthur sees visits from all vessel types. Recently, there have been more megaships coming to the port. However, overnight stays are not possible.

Port Arthur has to lowest cruise ship volume of the three main ports.

Source: TasPorts forward and historical bookings (2021).

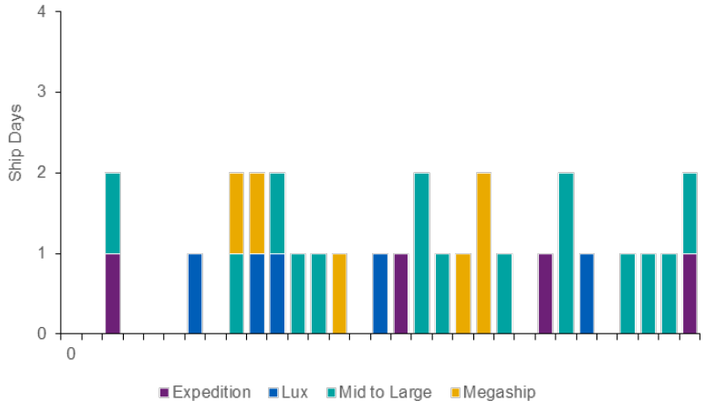
Ships per day in peak month - February 2020

Over the past three years, February has been the peak of the Tasmanian cruise season. In February 2020, Hobart, Burnie and Port Arthur had 31, 14, and 9 visits respectively.

In Hobart this has translated to at least one vessel in port on most days of the month. There were eight 'double ship days' in this period. One of which saw two megaships in port. While most ships stay between 10 to 12 hours in port, there were five overnight stays in February 2020.

Burnie saw a ship every second day on average, mostly from luxury and mid to large ships. While none occurred in February 2020, Burnie can cater for two vessel at a time and has seen double ship days, such as in February 2019 where there was three such days.

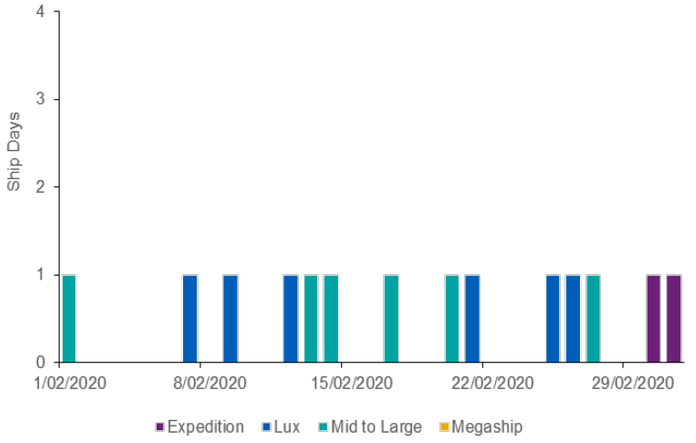
Port Arthur sees fewer ship days than the other two ports. Visits in February 2020 were mostly mid to large and expedition ships. Megaships tend to visit Port Arthur earlier in the cruise season.



Hobart

In February 2020 Hobart had at least one vessel in port almost every day. Most visit for 10 to 12 hours but occasionally there are overnight stays.

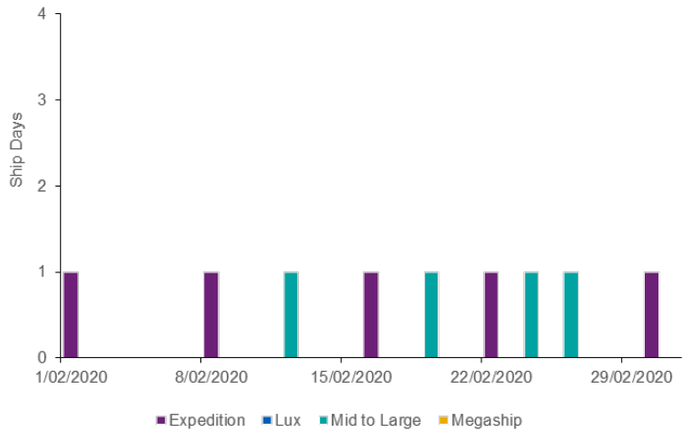
There is a current limit of two cruise ships at Hobart at one time. The port saw eight such double ship days in February 2020.



Burnie

In February 2020, on average, there was a ship at Burnie every second day. These are typically luxury and mid to large ships.

Burnie is able to cater for two vessels at a time. The most recent double ship day occurred in February 2019 however..



Port Arthur

The majority of the vessels at Port Arthur during February 2020 are expedition and mid to large ships.

Port Arthur typically sees its megaships arriving early in the cruise ship season.

Source: TasPorts forward and historical bookings (2021).

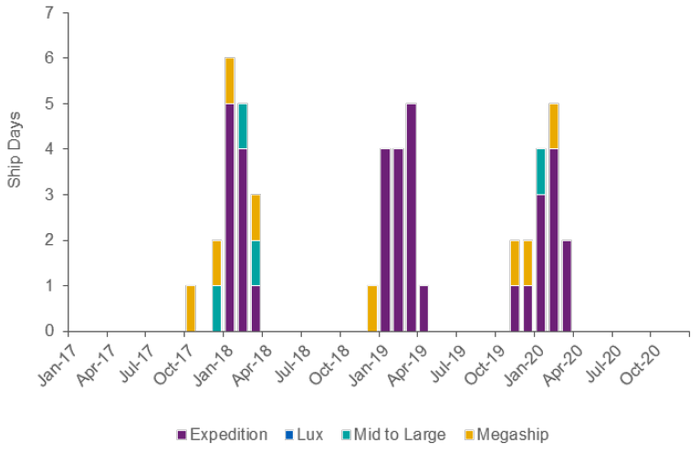
Annual visitation profiles - regional

The regional ports and anchorages tend to be less frequently visited than the main ports.

The Freycinet area includes Coles Bay, Swansea, Bicheno, Ile de Phoques and the coastline of the national park itself. It has had some visits from megaships and mid to large vessels which are on scenic cruises in the area. The only vessels disembarking passengers are expedition vessels operated by Coral Expedition and occasionally, Ponant.

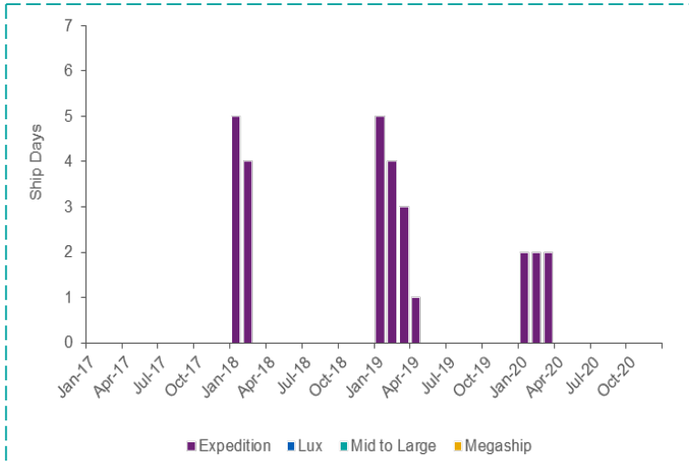
Inspection Head (Beauty Point) can cater for luxury and expedition vessels, and has seen some sporadic visits over the last few years.

Port Davey is a popular destination for expedition vessels. However, access restrictions limit visits to selected expedition vessels only.



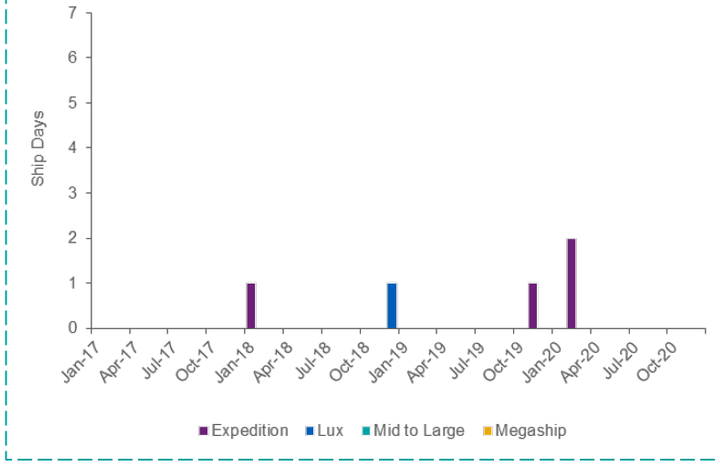
Freycinet area

The Freycinet area includes the national park and is largely considered an environmentally sensitive area. There is no adequate infrastructure to disembark large vessels in the area so they are restricted to cruising. Some expedition vessels allow their passengers to disembark.



Port Davey

Due to its status as a World Heritage Area, access to Port Davey has been limited. Regardless, it has been a popular destination for expedition vessels.



Inspection Head

Inspection Head is able to cater for luxury and expedition vessels. However, due to underground submarine cables, larger cruise ships are unable to visit.

Visitation to this port has been sporadic in the past but could increase as alternative to Burnie for smaller ships.

Source: TasPorts forward and historical bookings (2021).

Value contributors

Methodology

Purpose, scope and limitations

The purpose of this study is to assess the contributions of the different cruise segments (as shown on slide 22) at a regional and state level for Tasmania. It is aimed at building an evidence base and data set. It does not assess a specific project or policy. The assessment does not compare scenarios with a 'base case' or counterfactual where cruise ships do not visit Tasmania.

A bottom up approach was used to assess cruise impacts in Tasmania, by first estimating the impacts at the vessel level, regional level and then aggregating to state level. This approach is appropriate because the research found that cruise impacts tend to be localised around the port or anchorage as a result of the time restrictions imposed on passengers by cruise schedules. It does not estimate the impacts of the cruise industry or the scenarios on the entire state economy.

The report focuses on the direct impacts of the cruise industry and does not estimate how much of the benefits would flow through to other jurisdictions as a result of production inputs or imports. The assessment provides a high-level estimate of indirect flow-on effects but it does not estimate the economic or industry responses to a given scenario, such as crowding out of other activities or the possibility that potential cruise visitors would visit Tasmania by other means if cruising becomes limited or restricted.

Image from Tourism Tasmania Visual Library.

Value contributors assessed

The assessment of cruise ship value contributors considered three key factors:

Economic **Environmental** **Social**

The economic factors are mostly (monetary) benefits (such as passenger, crew and cruise line expenditure in port), while the environmental and social factors tend to be associated with costs or risks (e.g. crowding or vessel emissions).

Not all factors presented in this report are quantified in the value proposition. In some cases this was because costs could not be attributed to cruising in particular or opposing perceptions blurred the direction of effects. For example, the visual effect of cruise ships was only assessed qualitatively as stakeholder perceptions were mixed on whether it would be a positive or negative.

The next slide provides the list of the value contributors, with the methodology and assumptions for each discussed in the following slides. The influence of each vessel type at a given port was calculated separately so as to ensure they could be assessed by both vessel type and at a regional level.

Cruise ship value propositions

Economic factors (see slides 32 to 41)

Passenger expenditure (including pre- and post cruise spending but excluding tours): Driven by number of passengers by ship type, visits by ship type, average per passenger expenditure by ship type and port

Passenger tours expenditure: Driven by number of passengers by ship type, visits by ship type, tour participation rate by ship type, average per passenger tour expenditure by ship type and port

Crew expenditure: Driven by number of crew by ship type, visits by ship type, average per crew expenditure by ship type and port

Port charges: Driven by port and pilotage charges by ship type and port, visits by ship type, number of passengers for Port Arthur handling charge

Provisioning: Amount spent on Tasmanian produce; cruise lines report to spend several million dollars p.a. on Tasmanian products (loaded on the ship in Sydney or Hobart)

Environment factors (see slides 42 to 50)

Emissions from vessel: Driven by emissions by ship type and emission cost

Emissions from transport : Driven by number of passengers by ship type, visits by ship type, tour participation rate by ship type, bus to passenger ratio, average distance travelled by port, bus emissions and emission cost

Bio-security risk and waste water: Fluid discharges and passenger days can introduce invasive species or pollute the environment *(not monetised)*

Social factors (see slides 51 to 60)

Crowding: Driven by relative increase to visitor numbers by ship type exceeding a critical level where relevant at a given time of day, crowding cost parameter, local population and/or other visitors

Preservation: The value of pristine and remote wilderness areas and the impact that cruise visits would have on this *(not monetised)*

Noise from transport: Driven by number of passengers by type, visits by ship type, tour participation rate by ship type, bus to passenger ratio, average distance travelled, noise, noise cost

Vessels in port: Vessels in port can be regarded as eye-sores by some. They are also reported as creating a vibe and bringing together the community *(not monetised)*

Reference vessels

The study was conducted based on the four vessel segments defined in the scope of this work (see slide 22). In such a setting, using a reference vessel approach is a robust method for differentiating between different cruise segments.

This requires developing a representative ship for each vessel category, with typical attributes based on:

- passenger and crew capacity
- vessel size (gross registered tonnes)
- capacity utilisation (the number of passengers on board)
- key behaviours of passengers, such as typical disembarkation shares.

The representative vessel for each category is based on a weighted average of the historical and expected visits of cruise ships to Tasmania. In total, 83 unique vessels were analysed to determine the reference ships. This provides a robust estimate of the most likely effect of each vessel type.

Assumptions on the capacity utilisation per voyage and the number of passenger and crew going ashore were based on stakeholder consultations and desktop research.

These assumptions are summarised in the table on the right.

Vessel Attributes	Expedition	Luxury	Mid to large	Megaship
Representative passenger capacity	95	672	2,268	3,812
Representative crew capacity	38	356	815	1,176
Representative Gross Registered Tons (GRT)	3,509	33,950	83,962	135,753
Capacity utilisation	90%	90%	90%	90%
Passengers on board	86	605	2,041	3,430
Passengers going ashore (berth)	95%	95%	95%	95%
Passengers going ashore (anchorage)	95%	95%	80%	80%

Source: KPMG calculations based on TasPorts forward and historical bookings (2021), Carnival Australia (2021), TasPorts (2021), and Ponant (2021).

Note: Given the scope for this work, the reference vessel approach was appropriate. Some simplifying assumptions were made, however it is not expected that this would have an impact on the outcomes of the study given its focus is on cruise ship segments and regional impacts, rather than the impacts of a particular vessel or operator.
Further work could be undertaken at the ship or operator level. This would allow for an increased level of detail; for example, it could be possible to estimate future daily visits and more accurately project crowding. Improved communications between cruise ships and other stakeholders could be beneficial to gain a more granular understanding of the effects of the industry.

Key terms

It is important to define some of the key terms used in this study. This study has been based on ship days, passenger days and crew days which are defined in the table below.

Term	Definition
Ship day	A day when a cruise ship is in port. If a cruise ship is visiting a port and stays for more than 24 hours, than this is counted as two ship days.
Passenger day	A day when a cruise ship passenger is in port. If a passenger is visiting a port and stays for more than 24 hours, than this is counted as two passenger days.
Crew day	A day when a cruise ship crew is in port. If a crew is visiting a port and stays for more than 24 hours, than this is counted as two crew days.

Image from Tourism Tasmania Visual Library.

Economic factors

Economic factors identified

Stakeholder consultations, supplemented with desktop research identified six key factors that contribute to the overall economic value of the cruise ship industry. These include expenditure by passengers, crew and cruise lines. Where possible, expenditure was disaggregated into more specific purposes, such as passenger expenditure on tours or cruise line expenditure on port charges or supplies.

Economic factors	Description
Passenger expenditure	Shore expenditure includes different activities such as local dining, shopping, and visiting attractions. On a per passengers basis, expenditure tends to be higher in the expedition and luxury classes. Per visit, large vessels tend to generate more expenditure.
Passenger tours expenditure	Onshore tours are tours that are either pre-booked by the cruise lines or purchased on board. Expedition and luxury passengers tend to spend more on tour activities, albeit often though their purchased tickets. Nevertheless, overall larger vessels generate more expenditure on a per visit basis.
Crew expenditure	Crew expenditure includes activities undertaken by the crew, such as purchasing food and beverages, retail shopping, shore excursions, entertainment and transportation. It is typically lower than its passenger equivalent.
Port charges incl. pilotage	Port charges include berth set up, wharfage and pilotage which are collected by TasPorts. Charges increase with vessel size.
Provisioning	Most cruise lines purchase products from Tasmania as supplies for their voyages including wine, fish and agricultural produce such as fruit and vegetables. These are usually loaded at the homeport.

Cruise ship time in port

To estimate the economic impacts, it is important to understand the duration cruise ships stay in each port. This is because the accessibility of shore destinations and tours for cruise passengers is typically limited by the time the ship spends in port. The activities accessible to passengers are thus often determined by their proximity to the port.

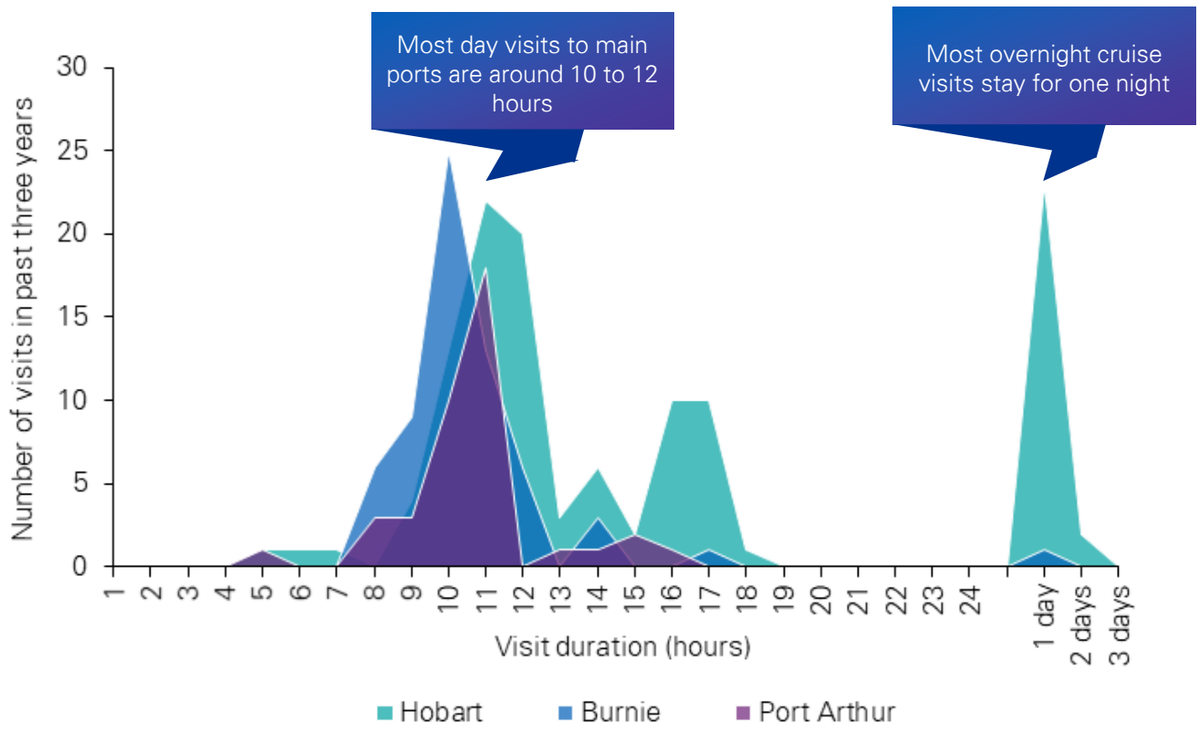
Cruise ships are typically on tight schedules and time in port is limited. Consequently, accessibility of shore destinations and tours for cruise passengers is determined by their proximity to the port.

For Hobart, Burnie and Port Arthur, where TasPorts has time of day specific berth booking data, most cruise visits last between 10 and 12 hours. Ships tend to arrive in the early morning around 7am and depart around 6pm. On most of these visits, passengers can choose between half day and a full day tours. Half day tours are normally split into morning excursions and afternoon excursions so passengers have the opportunity to visit two destinations.

However, at ports with infrastructure constraints, participating in multiple half day tours can be difficult due to extended (dis)embarkation times. Since Burnie is an industrial port, for example, passengers have to be shuttled by bus from the vessel to the port perimeter. As a response to local availability, these transports often use school buses. Typical afternoon excursions would coincide with the start of school pick ups and therefore the vessels' disembarkation capacity is limited at this time, so passengers either stay on board after lunch or in town the whole day.

On average, there are about 20 overnight visits in Hobart between 2018 to 2021. In such instances, visitors would have more time to explore Hobart and full day tours are also more likely to be booked if the ship stays overnight.

Time spend in port by cruise ships (2018-2021)



Source: TasPorts forward and historical bookings (2021).

Accessibility around Hobart

The typical 10 to 12 hour stay in port (as outlined in the previous slide) will impact the geographical reach of benefits and costs of cruise ships. Passengers are limited to day tours at a maximum, where destinations would most likely be within an approximate 1.5 hour drive from the port. Ultimately, this defines the regions geographic extent of cruise ship passenger spending.

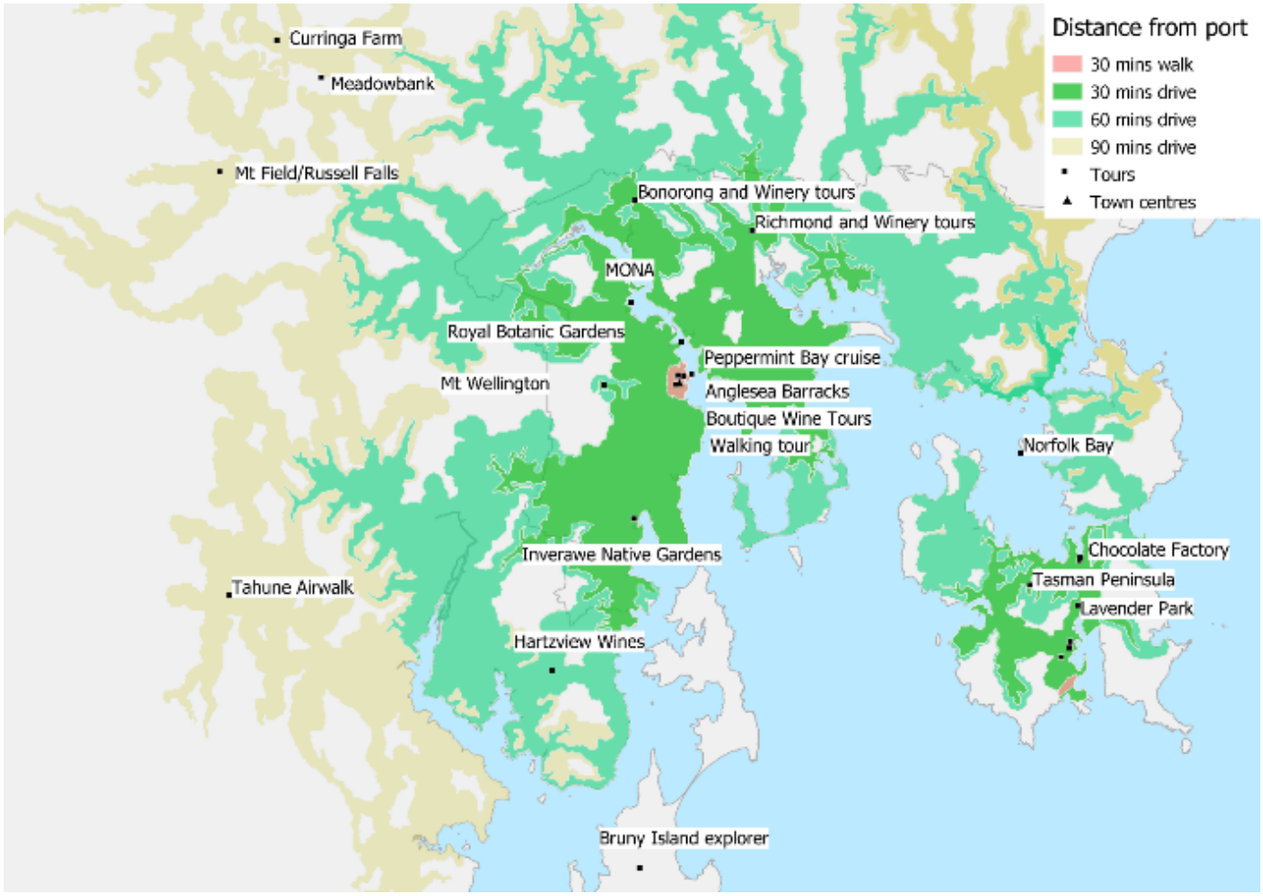
Most cruise visits to Hobart are transit visits, and ships typically stay 10 to 12 hours in port. This influences accessibility of shore destinations and tours for cruise passengers. Assuming disembarkation takes between 30 minutes and an hour, a 1.5 hour drive to a destination and back only leaves about five to six hours for an experience if some buffer is left ensuring the outgoing ship can be caught without any issues. Several stakeholders confirmed this timing and a 1.5 hours drive is typically regarded as the destination horizon.

Therefore, the map on the right shows isochrones from the port indicating how far a bus could drive from the port within 30, 60 and 90 minutes and how far a typical pedestrian might venture from the vessel within 30 minutes. It appears likely that a 30 minute drive is most representative of the range of half day tour and, as mentioned above, a 90 minute drive is indicative of full day tours. It also highlights the key shore excursions identified by Tourism Tasmania in the *Cruise Ship Passenger Survey* (2017).

The map highlights that many major attractions such as MONA, Mount Wellington and Richmond can be visited with a half day tour. Attractions such as Mount Field and Tahune Airwalk are likely to be only accessible via a full day tour and thus might see fewer but more dedicated visitors.

The pink area indicates that the majority of Central Hobart is accessible on foot. It appears likely that much of the hospitality and retail expenditure will be focused on this inner region close to the port.

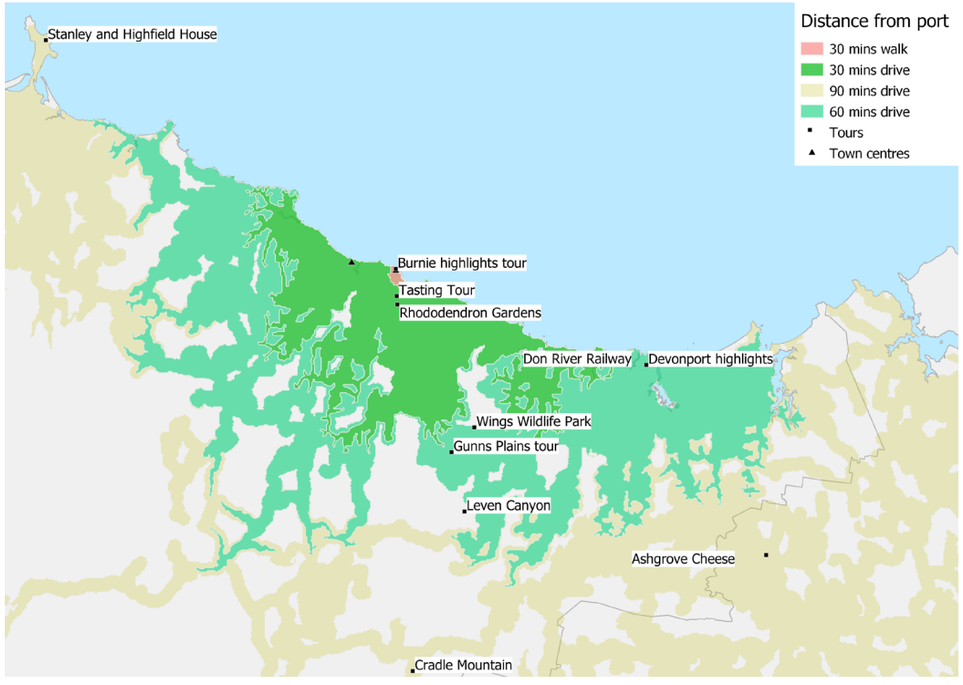
The geographic reach of cruise passengers in Hobart



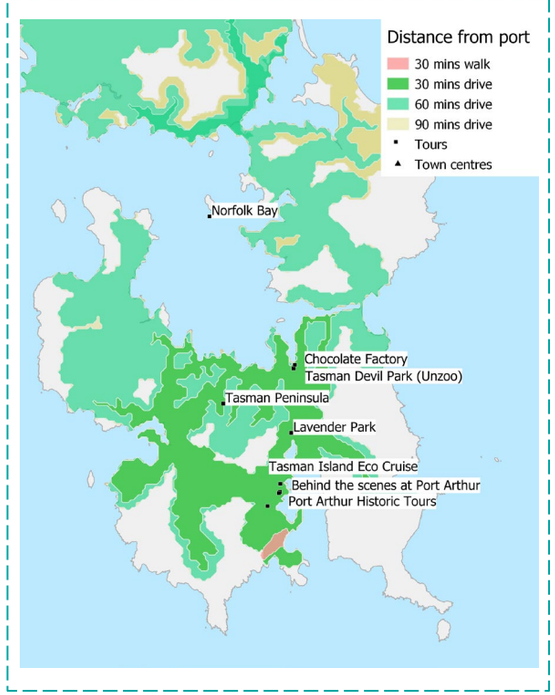
Sources: TravelTime, Tourism Tasmania (2021), and Tourism Tasmania (2017).

Accessibility around Burnie and Port Arthur

In Burnie, half day tours are likely to include the Burnie highlights tour, Rhododendron Gardens, and the tasting tour. 60 to 90 minute bus isochrones indicate that full day tours are likely to visit the Wings Wildlife Park, Gunns Plains tour, Leven Canyon, Ashgrove Cheese, Stanley and Highfield House, Don River Railway, and Cradle Mountain. Burnie's town centre is within 30 minutes walking distance, however as it is an industrial port, passengers must use a bus shuttle service after disembarking. It appears likely that much of the hospitality and retail expenditure will be focused on this inner region closer to port, although the benefits may be less pronounced than those in Hobart. The nearby town of Somerset may also benefit from passengers passing through.



Port Arthur is a small town with only around 250 residents outside of the historic site. There are some shops and hospitality venues at the historic site allowing visitors to purchase souvenirs and food. Other options for on shore expenditure apart from tours are limited within walking distance of the port. All tours are accessible via a tour bus within a 30 minute drive. These tours include the Tasman Peninsula, Chocolate Factory, Tasman Devil Park, Lavender Park, Tasman Island Eco Cruise, Behind the scenes at Port Arthur, and Port Arthur Historic Tours.



Sources: TravelTime, Tourism Tasmania (2021), and Tourism Tasmania (2017).

Passenger spending on retail, hospitality and accommodation

Throughout the consultation process, stakeholders have indicated a difference in expenditure between vessel segments with megaship passengers spending the least in port and those on expedition and luxury vessels spending the most.

There are two categories of passenger expenditure:

- Expenditure by transit passengers
- Expenditure by turnaround passengers

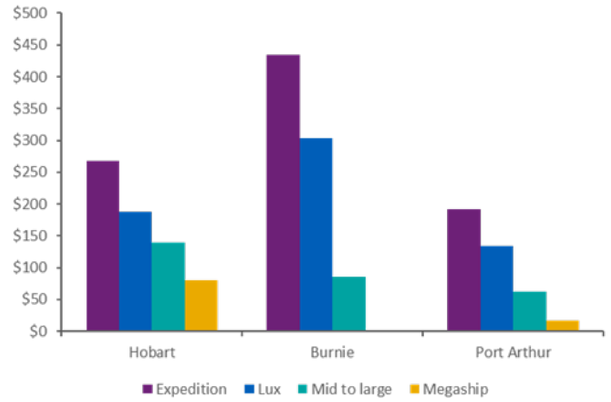
Expenditure in port for transit passengers

Expenditure for transit passengers is made up tour purchases and other spending (retail and hospitality). The average expenditure per passenger for the three main ports is based is on Tourism Tasmania's *Cruise Ship Passenger Survey* (2017). The survey documented the vessels from which passengers were surveyed, the vessel size and the number of respondents from each vessel. Using ticket prices as an indicator for passengers' ability to pay, expenditure per passenger for each type of vessel was derived.

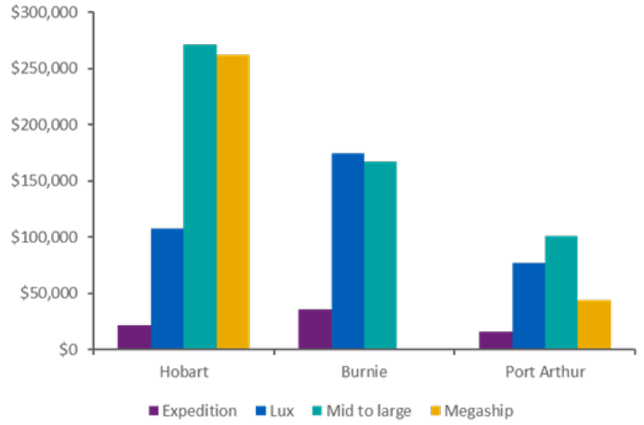
From this, tour expenditure was deducted (calculated separately - see next slide), so that an estimate of just retail and hospitality expenditure could be extracted. The two charts show the expenditure per passenger day and per ship day for each vessel type (excluding tours) for the three main ports.

For smaller anchorages, it was assumed that passengers would have few opportunities to spend on retail and hospitality so the total passenger expenditure in these areas is assumed to be on shore tours.

Expenditure per passenger transit day in main ports – total excluding shore tours



Expenditure per transit ship day in main ports – total excluding shore tours



Expenditure in port for turnaround passengers

Currently, only expedition vessels turnaround in Hobart. Consultations with expedition cruise lines indicate that their passengers tend to spend several nights in Hobart before and after the cruise. Based on Tourism Tasmania's *Cruise Ship Passenger Survey* (2017), passengers stay for about two nights on average. Tourism Tasmania's *Tourism Snapshot* (2020) estimates the average spend per night as $255. Combining these results, this study estimates expenditure of $1,154 per passenger for each expedition vessel turnaround.

Note: passenger expenditure per visit is applied only to those passengers that disembark the vessel, which tends to vary by destination. The number of passengers and the proportion that disembark is based on the reference vessels, as defined on slide 30.

Passenger spending on shore excursions and tours

Shore tours make up a large proportion of passenger expenditure, with over 40 per cent of passengers opting to take a tour per visit day, on average.

The largest share outside of retail and hospitality passenger expenditure during a cruise visit day is spent on shore tours. Luxury and expedition cruise lines tend to design bespoke, often exclusive, tours that are typically included in the ticket price.

Mid to large and megaships tend to offer more generic tours options to their passengers which are often marketed through wholesaler arrangements with local agents. Tours are typically not included in the ticket price for these vessels and passengers have to choose to purchase a tour. Tours can be bought either through the cruise line or directly with the tour operator.

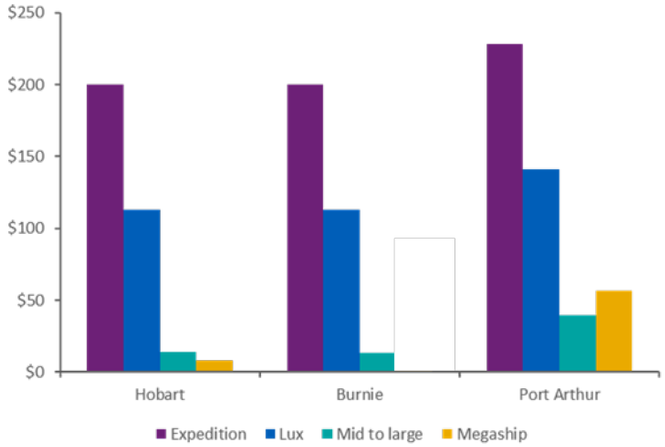
Passenger spending on shore tours was calculated using data from Tourism Tasmania's *Cruise Ship Passenger Survey* (2017), where passengers specified if they went on a shore tour, and if so which tour they participated in. This was coupled with information from the cruise lines about the shore tour options they offer their passengers and the approximate price. For estimating the overall tour expenditure per passenger presented in the charts on the right, the prices of shore tours in Burnie, Hobart, and Port Arthur were weighted by the participation rates for each tour. The differentiation of tour prices by cruise line allowed for the differentiation of tour expenditure across vessel types, coupled with cruise ticket prices where information was not available. It should be noted that the Port Arthur passenger handling fee, charged to all passengers, is included in the estimates shown on this slide, however, the value is not disclosed due to confidentiality reasons.

The table on the right shows the most popular tours at the three main ports.

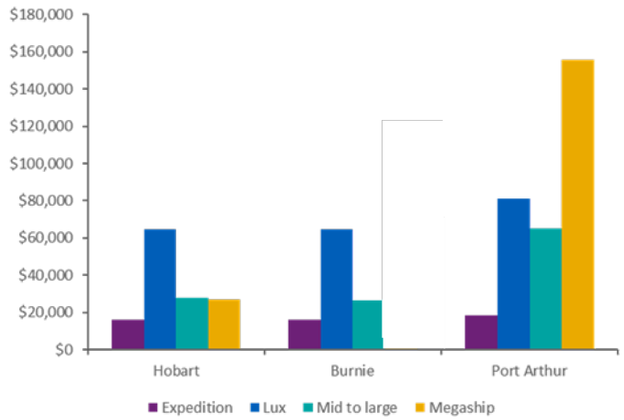
As expedition and luxury vessels include most shore tours in the ticket price, this estimate was informed by consultations with cruise lines.

On a per passenger basis, expedition and luxury vessels spend significantly more than mid to large and megaships. However, on a per ship basis, expedition sees the lowest expenditure and luxury vessels the highest (excluding Port Arthur due to the handling fee). Mid to large and megaships have similar expenditure on tours per visit (when excluding the handling fee at Port Arthur).

Expenditure per passenger day on shore tours in main ports



Expenditure per ship day on shore tours in main ports



Sources: Tourism Tasmania (2017 and 2020).

Most popular tours for passengers at the main ports

Hobart	Burnie	Port Arthur
Hobart City tour	Wings Wildlife Park	Lavender Park
Bonorong	Burnie highlights tour	Behind the scenes at Port Arthur
Bonorong & Richmond		Region/ geological features

Source: Tourism Tasmania (2017).

Crew expenditure

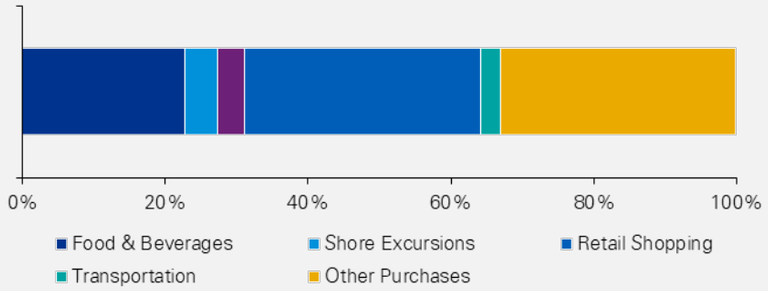
Crew expenditure is a much smaller proportion of the economic benefit of cruise vessels.

Not all crew members are able to go ashore at each port and stakeholder consultations indicate that their expenditure is generally limited to internet, food and beverages.

The crew expenditure is based on an average of the AEC estimate in the *Economic Impact Assessment of Cruise Tourism in Australia 2019-20* (2020) and Tourism Tasmania's *Cruise Ship Passenger Survey* (2017) results. Stakeholder consultations indicate that crew are more likely to go ashore at berths rather than anchorages as places on tenders are prioritised for passengers.

Crew are more likely to go ashore at transit stops rather than turnarounds because turnarounds require a high level of crew activity to prepare vessels for the next cruise.

Breakdown of crew expenditure



The *Cruise Ship Passenger Survey* (Tourism Tasmania, 2017) indicates that very few crew go on a shore tour. This means that their expenditure tends to be restricted to the main ports. Hobart has the highest expenditure per crew visit, and Port Arthur has the lowest.

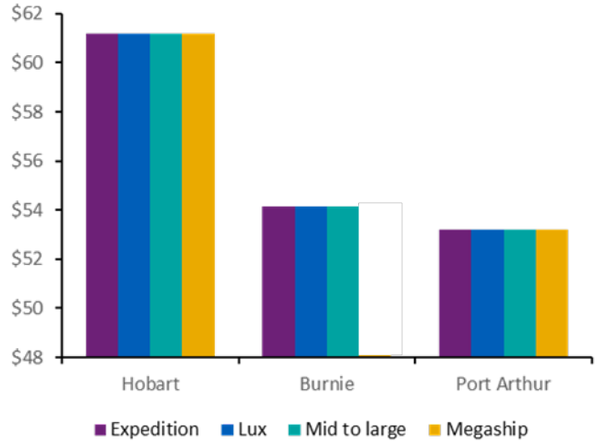
According to the survey, the average crew expenditure per visit day for Burnie, Hobart, and Port Arthur is respectively $52, $59, and $51. These were indexed to 2020 values and are displayed in the table below.

As it tends to increase with passenger capacity, the larger the vessel sizes have higher crew expenditure spend. It was assumed that 40 per cent of crew disembark at berths and 20 per cent at anchorages. Per ship day visit expenditure ranges from about $2,500 for expedition to up to $30,000 for megaships.

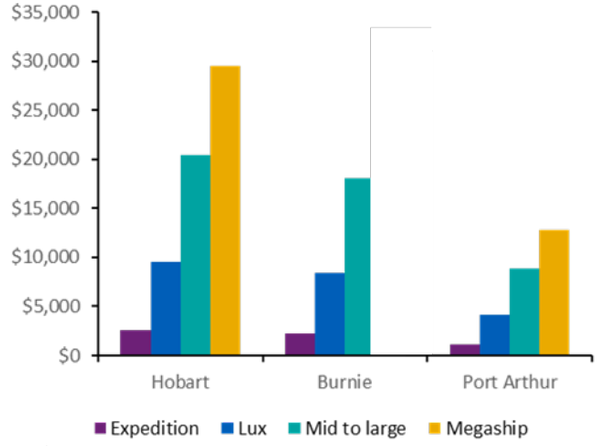
Average crew expenditure per crew visit day ($)

Activity	Average spend/crew visit days (December 2020 values)
Burnie	$61
Hobart	$54
Port Arthur	$53

Expenditure per crew visit day in main ports



Crew expenditure per ship day in main ports



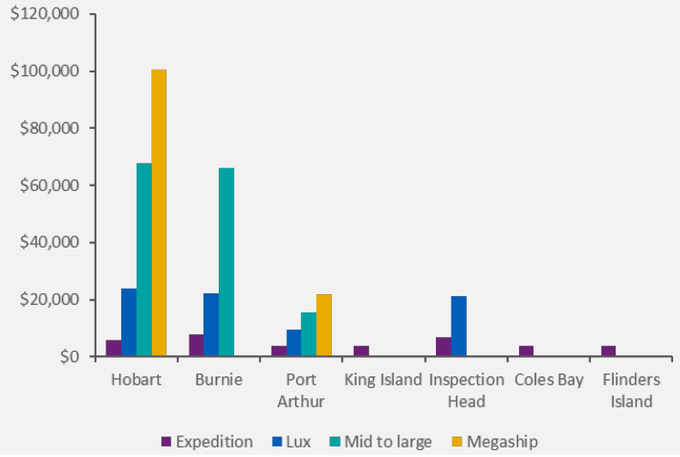
Sources: Tourism Tasmania (2017) and AEC (2020).

Port charges including pilotage

Port charges are fees charged by TasPorts for the services provided to cruise ships. Ports are categorised as primary port areas (Hobart, Burnie, Devonport, and Inspection Head) and secondary port areas (Grassy and Naracoopa at King Island, Stanley, Strahan, Port Davey, Adventure Bay (Bruny Island), Spring Bay and Lady Barron at Flinders Island). Primary port areas have an array of charges including wharfage, tonnage charges and pilotage, while secondary port areas have pilotage. The tables on the right indicate the port charge rates as provided by TasPorts.

The chart below shows the total port charges for each vessel for selected ports. Megaships have the highest port charge followed by mid to large vessels. Expedition and luxury ships have significantly lower port charges because of their lower gross registered tonnage (GRT). Port charges are generally fairly similar across primary port areas. In secondary port areas, only pilotage fees are charged. Maria Island is a popular destination for expedition vessels as is does not have pilotage requirements.

Total port charges by port per ship in selected ports



Element	Fee	Application	Specifications
Wharfage	$0.24	Primary port area	Cost per tonne for vessels over 80,000 GRT, and capped at $29,040
Fixed charge pilotage	$1,990	Primary and secondary port area	Cost per vessel for pilotage for all vessels (in and out of the port)
Expedition cruise pilotage	$330	Secondary port area	Cost per hour for additional pilotage for vessels less than 9,999 GRT
Large vessels variable charge pilotage	$0.12	Primary and secondary port area	Cost per tonne for vessels over 9,999 GRT
First day tonnage charge	$0.34	Primary port area	Cost per tonne for all vessels
Subsequent day tonnage charge	$0.16	Primary port area	Cost per tonne for all vessels for those staying more than 24 hours

Ports	Berth set up	Specifications
Hobart	$4,339	Cost per vessel for those greater than 9,999 GRT
Hobart	$529	Cost per vessel for those less than 9,999 GRT
Burnie	$2,646	Cost per vessel
Bell Bay	$2,646	Cost per vessel
Devonport	$2,646	Cost per vessel
Inspection Head	$1,587	Cost per vessel

Source: TasPorts (2021).

Provisioning using Tasmanian products

Cruise ships take on supplies and provisions at each turn-around. While smaller vessels often focus on quality high value products, larger vessel create substantial economic value through the quantity of purchases.

This economic factor tends to be less "visible" than passenger expenditure but can also contribute to the local economy. Two streams of provisioning with Tasmanian products were observed:

- When turning around in Hobart or being homeported, cruise lines tend to focus on Tasmanian products. Currently this stream is limited to expedition vessels.
- When turning around in other Australian ports, Tasmanian specialties are often part of supplies. This tends to be more pronounced for homeported vessels.

Cruise lines and shipping agents indicated that Tasmanian specialty products are particularly sought after by passengers, including Tasmanian seafood and wine especially when cruises visit the State. Local experts are also important resources for expedition cruise ships.

The key Tasmanian products sourced by cruise ships are listed below.

Key Commodities

- Local experts and scientists
- Tours
- Varied hotels
- Seafood
- Seasonal fresh produce
- Wine and beverages
- Other Tasmanian food

Estimating typical provisioning by vessel type

Based on the stakeholder consultations, expenditure on Tasmanian products per passenger was calculated for each of the vessel type. For luxury vessels, where data was not available, ticket price were used to extrapolate spending from the other vessel classes assuming that the cost of food and beverages per passengers is determined by the price of the voyage.

The comparatively low per passenger expenditure of luxury, mid to large and megaships is reflective of their focus on transit visits. Turning around in Hobart, expeditions vessels have a much higher average provisions spend.

Estimated provisioning spend ($)	Expedition	Luxury	Mid to large and megaships
Spend per passenger on provisioning	$1,190	$70	$19
Spend per turn-around of representative vessel	$83,333	$42,454	$36,015 (mid to large) $63,789 (megaship)

Source: Stakeholder consultations.

Environmental factors

Environmental factors identified

Environmental effects from cruise ships tend to occur both when the vessel is in port and when cruising near the coastline. They include emissions when a vessel is in port, transportation emissions from cruise passengers on the shore, risks of oil spills, waster water and ballast discharges and spills, and other bio-security related factors including sediment disturbance and long term effects of solid waste disposal.

Cruise ship emissions and transportation emissions while in port were estimated and monetised as part of this assessment. Oil and wastewater spills, and other bio-security risks were addressed qualitatively. While the cost of such events could be large, the likelihood is low. A review of global records of all the pollution and environmental fines and violations relating to cruise ships, as per the *Pollution and Environmental Violation and Fines* database (2018), amounts to 723 violations between 1992 and 2019 worldwide, of which only 172 resulted in fines to the cruise line. Moreover, stakeholder consultations with both cruise lines and the EPA indicated that mitigation measures are currently in place. Additionally, cruise lines have made many recent improvements to reduce their environmental footprint (see slide 51).

Legend

- Monetary impact calculated
- No monetary impact calculated

Environmental impacts	Description	Relevant policy
Cruise ship emissions	While cruise ships are docked, they can generate emissions from running their auxiliary diesel engines for onboard activities. This can lead to a deterioration in air quality in the immediate vicinity of the port. Given their size, megaships emit more then the other vessel classes.	**International Maritime Organization regulations** – upper limit on the sulphur content of ship's fuel oil was cut from 3.5% to 0.5%. As a result, scrubbers, which remove sulphur oxides from exhaust, have become more common.
Transportation emissions	Transportation for passengers (e.g. on buses) on shore generates additional emissions and can lead to lower air quality. This was not raised as a major concern by stakeholders.	
Bio-security risk	Fluid discharges and passenger visits can introduce invasive species or pollute the environment. As they go to more remote places where mitigation measures are not in place, this risk is higher for expedition vessels.	Environmental and access regulations are in place to minimise risk in sensitive areas and most port areas have spill response plans
Wastewater	Cruise ships disposing their wastewater into the ocean could result in declining water quality.	Tasmania's main **Sewage Management Directive** from June 2021 (Part 3) prohibits discharge of sewage from vessels carrying 16 people or more, into 13 different types of waters, irrespective of whether the sewage is treated or not.

Source: Pollution and Environmental Violation and Fines database (2018).

Limitations and simplifications - environmental factors

Air quality

Industry consultation found that operators use closed loop scrubbers on vessels visiting Tasmania. The water waste phase produced by these systems is collected on board and disposed of in the homeport after each voyage. As most vessels are homeported outside Tasmania, Tasmania is thus not affected by these discharges. They were therefore not further considered in this study.

EPA Tasmania however notes that open loop scrubbers may require constant discharge whilst in port, either to sewer systems or direct alongside the vessel. TasPorts has previously dealt with a complaint that was thought to be the result of an open loop scrubber discharge. Some vessels may have capacity to store scrubber waste for discharge when underway at sea. Studies on the impact of scrubber waste discharges are currently underway (e.g. by AMSA) and could be further considered in updates of this study.

Waste water

Cruise operators indicated that sewage water is pre-treated/disinfected and stored on board and disposed of in the home port after the voyage. Wastewater is not discharged in coastal waters. With only some small expedition vessels homeported in Tasmania, for the purposes of this study it is therefore assumed that the economic cost of waste water to Tasmania is negligible.

Oil and chemical spill response

It is acknowledged that oil or chemical spills can permanently damage the coastal environment. To prevent this, Tasmania has response plans in place. Cruise ships are not the only vessels in Tasmanian waters with the potential to cause oil or chemical spills. This means that response and recovery plans would have to be in place even if no cruise ships visited Tasmania. It was outside the scope of this study to assess the relative risk associated with cruise ships as it would have required an in-depth analysis of the entire shipping traffic around Tasmania.

Biosecurity

Similar to liquid spills, the introduction of exotic species through vessels is a risk to the coastal environment and the introduction of new marine pest/pathogen could be catastrophic to the aquaculture industry (finfish and shellfish) or a sensitive environment where it would be difficult to detect and harder to eradicate. This potential threat is not unique to cruise ships and will prevail in their absence. It was outside the scope of this study to assess the relative risk associated with cruise ships as it would have required an in-depth analysis of the entire shipping traffic around Tasmania.

Solid waste management

Cruise operators indicated that apart from on very long journeys, solid waste is disposed of in the homeport after the journey. With the small number of vessels homeported in Tasmania, this report does not quantify the associated cost.

Air quality

Cruise ships have historically been associated with negative effects on local air quality when engines are running to generate power in port. However, the use of scrubbers has reduced emission levels substantially in recent years.

Emissions from cruise ships in port stem from a combination of activities including entering the port, maneuvering and hotelling. This refers to engines continuing to run in berth to generate electricity for those on board. It is estimated that this accounts for up to 80 per cent of emissions from cruise vessels in port.

The estimation of emissions from cruise ships in port, used in this study, is based on research conducted by Melo Rodriguez et al. (2017). The Melo Rodrigues study provides estimates of emitted quantities using a bottom up approach for 30 different cruise vessels, by evaluating the fuel used and subsequent emissions based the individual ship's characteristics and activities. The research presents methods for calculating carbon dioxide (CO_2), nitrous oxides (NO_x), sulphur oxides (SO_x) and particulate matter (PM) based on time spent in port and the number of passengers, allowing for a differentiation of emissions based on vessel size.

The study was conducted in 2017 and stakeholder consultations indicated that cruise lines are continuing to improve their environmental performance by retrofitting technologies such as scrubbers on to their vessels. Scrubbers are especially effective at removing particulate matter from exhaust. In addition, in January 2020, the International Maritime Organisation mandated that all ships must burn fuel with a content of 0.5 percent sulphur or less. This was previously 3.5 percent.

To take these changes into account, it was assumed that scrubbers are installed on all cruise ships visiting Tasmania, which is consistent with information collected during the stakeholder consultations. Scrubbers remove 90 percent of sulphur oxides and 85 percent of particulate matter.

The estimated tonnes emitted for each type of vessel and pollutant are shown in the table below.

Estimated tonnes of emissions in port by vessel for an average 10 hour stay

Type of emissions	Expedition	Luxury	Mid to large	Megaship
CO_2	1.49	10.55	35.59	59.80
NO_X	0.04	0.25	0.84	1.42
SO_x	0.00	0.02	0.08	0.13
PM	0.01	0.04	0.13	0.21

Source: Melo Rodriguez et al (2017) and NSW EPA (2015).

Cost of pollutant per tonne

Type of emissions	Cost per tonne emitted
CO_2	$64
NO_X	$2,556
SO_x	$3,253
PM	$406,782

Source: TfNSW (2020).

Parameter values from Transport for New South Wales (2020), provide estimates of economic cost per tonne for each pollutant. These were indexed to the current year and are shown in the table (left). Given its relatively high cost per tonne, the results are likely to be sensitive to the estimated particulate matter emissions. In addition, the actual costs for particulate matter have been shown to vary substantially, depending on population densities with economic cost estimates ranging form $78,000 to $2.5 million per tonne (PAE Holmes, 2013).

Further, the sample used by Melo Rodriguez et al. (2017) focused on larger ships frequenting Barcelona, and might therefore not be fully representative of the vessels visiting Tasmania. For example, the Tasmanian EPA monitored SO_2 emissions from cruise ships in the 2017-18 season and found that they did not cause elevated levels of ambient pollution. The points raised above should be considered when reviewing the environmental costs estimated in this study.

Estimated emission costs

The estimated environmental cost for each of the cruise ship vessel categories is shown in the table below. This is based on the estimates of tonnes emitted and the cost per tonne, assuming a 10 hour visit.

Additional testing of emissions of all pollutants for individual vessels visiting Tasmania could provide more accurate estimate.

Vessel emissions cost in port by vessel type for an average 10 hour stay

Type of emissions	Expedition	Luxury	Mid to large	Megaship
CO_2	$95	$676	$2,281	$3,834
NO_X	$90	$640	$2,157	$3,625
SO_x	$10	$74	$250	$421
PM	$2,144	$15,270	$51,502	$86,550
Total cost per visit	**$2,339**	**$16,660**	**$56,191**	**$94,430**

Source: Estimated based on Melo Rodriguez et al (2017) and TfNSW (2020).

Bus transport emissions

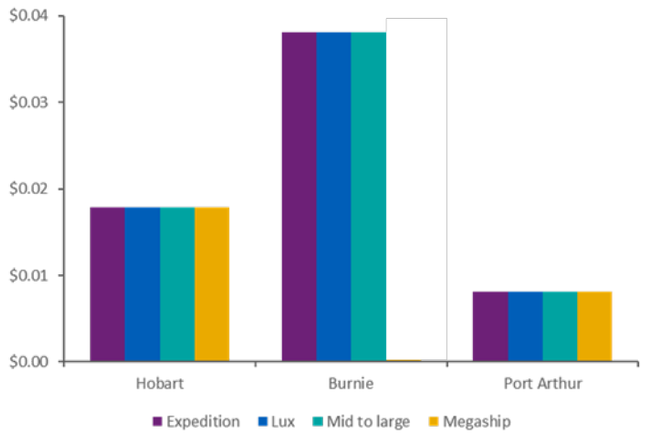
As cruise ships arrive, cities, towns and tour operators tend to mobilise tour buses to cater for the transportation of passengers, often all at once. This creates additional emissions which can reduce local air quality.

Stakeholders did not identify bus transport emissions as a major issue and the estimated costs are relatively small.

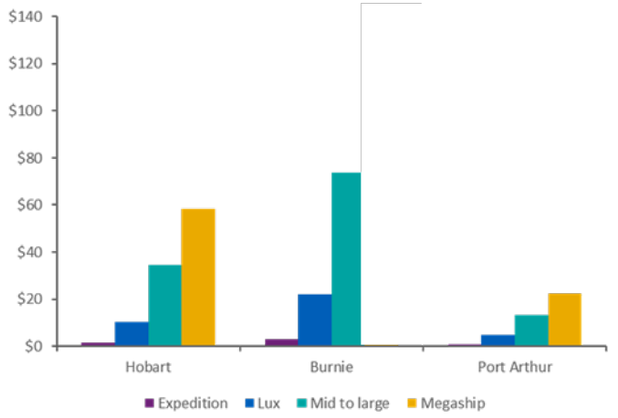
Methodology to calculate transport emissions

- Number of ship visits and passengers on each ship
- Tour participation rate by ship type for the three main ports (Hobart, Burnie and Port Arthur)
- Combine with research on the most popular tours at each destination and the approximate travel distance these tours cover
- Apply the average distance, number of passengers and bus capacity to determine the distance travelled by port and thus the amount of total bus emissions
- Apply the emissions cost from TfNSW (2020)

Emission costs per passenger day in main ports



Emission costs per ship day in main ports



Transport emission cost are highest in Burnie at around $120 per megaship day, and the lowest in Port Arthur at around $20 per megaship day. This is due to the travel distance of different tours from the ports and their participation rates. For example:

In **Burnie**,
over **50%** of passengers
go to the wildlife park,
which is about 90km of travel (both directions).

In **Hobart**,
30% of passengers
go each on a Hobart City Tour and to Bonorong, which are about 23km and 75km of total travel respectively.

40% of passengers
take a tour in **Port Arthur**
(not including those who visit the historic site without a tour), meaning that generally, people do not venture far. The most popular tour from Port Arthur outside the historic site is Lavender Park (about 20km total travel).

On a per passenger basis the estimated emission cost are similar as individual travel patterns align for all four vessel types.

When considered on a per ship day basis, megaships see the highest cost from bus transport emissions due to the larger number of passengers compared to the other vessel types.

Overall bus transport emissions costs are relatively small and were also not raised as a major issue by stakeholders.

Sources: Stakeholder consultations, Douglas-Ellis (2018), AEC (2020), Tourism Tasmania (2017), and TfNSW (2020).

Source: Tourism Tasmania (2017).

Cruise ship wastewater

Cruise ships produce different types of wastewater that can affect marine ecology. Recently, water treatment technology has improved and wastewater has become less of an issue.

A related study, Scarfe (2011), shows that the environmental costs due to marine discharges and emissions can exceed $5 million per year. However, along with technology, on-board water treatment capacity has advanced and black and grey water on ships can now be treated to drinking quality. For example, on the newest Ponant vessel, water treated to drinking quality is stored for the duration of the voyage and then dispersed of in the home port.

Wastewater produced from a 3000 passenger cruise ship	Description	Unit	Min	Max	Average
Black water	Sewage, wastewater from toilets and medical facilities which can contain harmful bacteria, pathogens, diseases, viruses	litres/day	55,500	111,000	83,250
Grey water	Waste water from sinks, showers, galleys, laundry, and cleaning activities aboard a ship	litres/day	333,000	943,500	638,250
Bilge water	Solid wastes and pollutants containing high amounts of oxygen-demanding material, oil and other chemicals	Metric tons/24 hours of operation	NA	NA	8
Ballast water	Can contain non-native, nuisance, exotic species that can cause extensive ecological and economic damage to aquatic ecosystems	NA	NA	NA	NA

Sources: Pollution and Environmental Violation and Fines database (2018), Scarfe (2011), and Brida et al. (2010).

While not necessarily reflective of the full value of the impact of a spill, fines can provide an indication for the frequency and type of such events. The *Pollution and Environmental Violation and Fines* database (2018) is a publicly available database that shows different environmental incidents collated from news reports or public documents from 1992-2018. It contains over 330 incidents, covering a wide range of environmental violations by cruise ships such as plastic/garbage, air pollution, oil spill, grey water, waste water. Many of the violations were issued a Notice of Violation, or has a pending fine. Compared to other potential pollutants, waste water disposal violations have been relatively rare and fines low. In recent years no events have been recorded in Australian waters. They typically relate to:

- Release of grey water in port
- Bilge water violations
- Ballast water violations
- Wastewater violation
- Wastewater landed ashore
- Wastewater discharge
- Untreated wastewater
- Sewage discharge

Specifically, the database contains 145 entries related water disposal from 1992-2018 worldwide relating to grey water, waste water, and other water. However, out of the 145 incidents, only 13 fines were issued. There were 9 fines that were between $0 to $0.1 million USD, 3 fines between $0.1 million to $1 million USD, and 1 fine that is between $1 million to $10 million USD. The key fines are summarised in the below table.

Date	Fine ($USD)	Litres	Element
Aug 2002	$2 million	148,000	Sewage
Nov 2006	$1 million	1,850,000	Untreated wastewater
May 2011	$0.2 million	244,200	Pool water

Bio-security risks

Ballast water discharges

Ballast water discharges and disembarking passengers are the two main sources of potential bio security risk associated with cruise visits

Water can contain various aquatic microbes, plants and animals. Cruise ships arriving from abroad and releasing their ballast water can introduce non-native species into Australian waters and cause disruption to the ecosystem.

Passengers visiting remote places can inadvertently introduce exotic species on clothing, food or the landing vessels.

Risks can be mitigated by limiting visits and visitors to ensure reliable monitoring, vessels anchoring sufficiently far away from sensitive areas, restricting ballast water discharge and introducing checks prior to disembarkation.

Exotic species

Cruise visits to remote locations can increase the risk of exotic species being introduced

According to Tasmania Parks and Wildlife Service (PWS, 2007), Macquarie Island initiated the largest eradication program ever attempted for rabbits, ship rats or mice anywhere in the world in 2014. The introduction of these animals to Macquarie Island had caused a range of ecological costs such as:

- Overgrazing by rabbits damaging vegetation and the breeding habitat of burrow-nesting seabirds
- Ship rats preyed on the eggs and chicks of burrowing seabirds
- Ship rats consumed plants and invertebrates

The program succeeded in eradicating all rabbits, rats and mice and enabled restoration of the island's natural ecological processes including the recovery of plant and animal communities affected by these exotic species. The eradication procedure took about 2.5 years with a core staff of four. After the eradication, vegetation and native species recovered relatively quickly. Results were seen within one to three years of the completion of eradication.

Although eradication of exotic species could be expensive, the mitigation costs are spread across various activities such as commercial activities, not just cruise activities. For example, EPA mitigation strategies will be in place even without any cruising activities. As the mitigation costs are shared across different activities, it is difficult to separate it from a single cost for cruising. Since bio-security is a low cost risk by cruise ships, and there is difficulty in quantifying its mitigation costs for cruise shipping, ballast water discharges are only assessed qualitatively.

Oil spills

Oil spills can have various ramifications on wild life such as migratory birds and marine ecology, with environmentally sensitive areas more prone to these risks. The primary cause of past spills were ship wreckages as heavy fuel oil or diesel fuel leaked out while the hull was damaged.

In 1995, a magnesium ore bulk carrier named the Iron Baron sank 85km east of Flinders Island (Australian Maritime Safety Authority, 1996). The ship's hull was torn when it ran aground on the Hebe Reef, and over 200 tonnes of fuel were released into the ocean. Further amounts were lost as the Iron Baron was towed to a nearby anchorage.

Large areas of the Tasmanian coastline were coated in oil, negatively affecting its wildlife. Various birds such as penguins, cormorants and pelicans were oiled, with an estimated 25,000 killed and some populations reduced by 58 per cent.

Oil spills and other liquid discharges can pollute large stretches of coastline and permanently devalue the affected location. Recovery from oil spills is difficult to quantify and beyond the scope of this research. They have not been monetised.

Fluid spills typically relate to:

The database of *Pollution and Environmental Violation and Fines* (2018) for cruise ships recorded 723 violations between 1992 and 2019 worldwide, of which only 172 resulted in fines to the cruise line. 81 of those fines were between $0 to $0.1 million USD. Outliers from the data include oil discharge and falsifying records resulting in a $40 million fine, and discharging other materials such as raw sewage, toxic chemicals, and plastic along with the oil spill. The average fine per litre of oil discharge is around $847. However, excluding outliers, the average fine is $21. The key fines are summarised in the below table.

While another incident of this magnitude has not occurred in Tasmania since the Iron Baron, there have been smaller diesel spills and many close calls due to boat engine failures. TasPorts has recorded one related incident in the past five years,

Date	Fine ($USD)	Gallons	Element
Jun 1998	$2 million	NA	NA
Jul 1999	$18 million	NA	NA
Feb 2002	$0.41 million	8,000	Fuel
Jun 2007	$1.57 million	14,310	Fuel
Dec 2016	$4 million	4,227	Oil waste

Source: Pollution and Environmental Violations and Fines (2018).

Pollution response plans

A range of risk mitigation strategies and response plans have been developed (and successfully deployed)

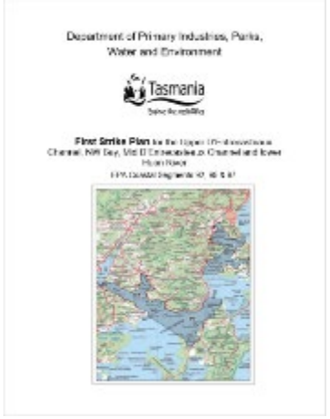
In 1975, the SS Lake Illawarra collided with the Tasman Bridge and had its fuel pumped out soon after in order to avoid any potential leakage (Maritime Union of Australia, 2020) . Other incidents have used booms to contain the spread of oil on top of the ocean. More modern methods aim to reduce the risk of pollution incidents through alternate means such as vessel propeller wash flushing or deflection booming to prevent oil from reaching environmentally sensitive areas.

Government bodies such as the EPA and DPIPWE have put forward action plans, detailing multi-stage responses to such events. The first response strategy would be to monitor and evaluate the situation by performing operations to contain and recover, protect and deflect, and vessel flushing. Shoreline clean-up, waste management, and wildlife responses are also necessary as well as an initial report to the EPA. The initial response priorities are:

- Determine what the product is
- Determine location of spill source
- Determine whether the product is still leaking
- Determine the direction of movement of the liquid
- Determine the volume of the spill if possible
- Determine local tide times and thus predicted tidal flow direction/speed
- Determine local wind speed and direction
- Identify nearest sensitivities at risk
- Determine areas to be protected
- Undertake notifications as required

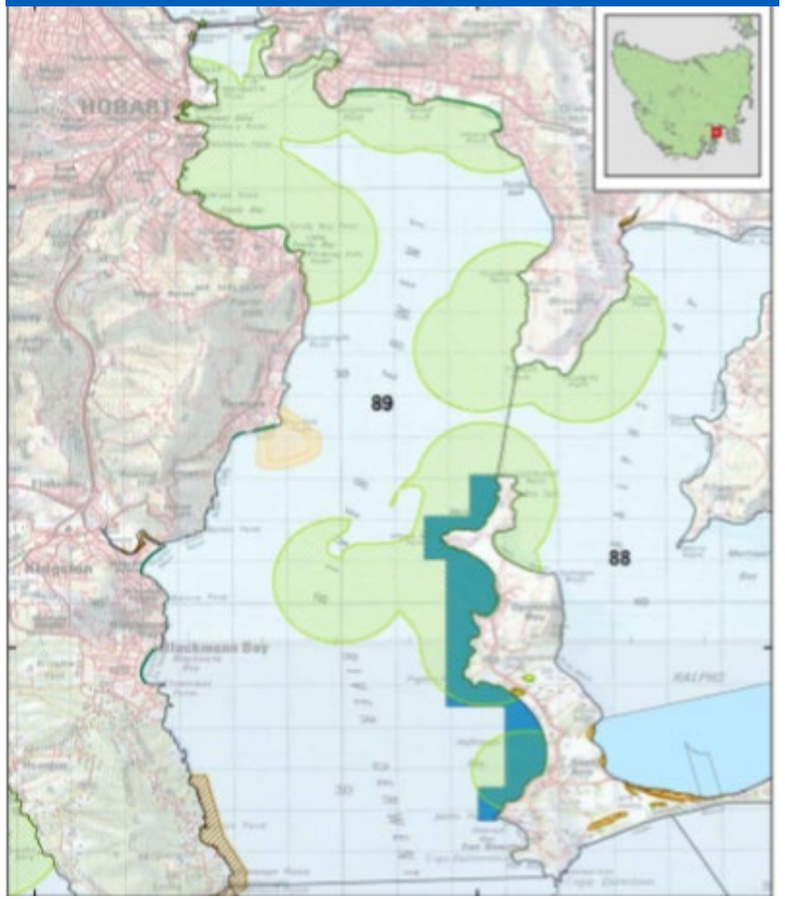
The priority of all actions is containment, and the recovery of the pollutant. The most effective response is to contain the pollutant at the source. For example, it could be skimmed and contained in portable tanks, or propeller wash flushing could direct the hazardous material away from sensitive areas. Risk ratings and zones have been created to assess the danger that a pollutant poses towards flora and fauna in certain locations. Furthermore, the creation of these zones allows for the allocation of specific responders and actions in the event of different spills. An example of a response area map displaying the sensitivities is shown on the right.

An area of particular concern is the potential spillage from vessels in areas with high conservation values where spills are difficult to contain, especially in remote places.



Source: EPA (2017).

Sensitivities segment 89



Cruise ship environmental sustainability

As society's focus shifts towards sustainability and protecting the environment, cruise lines are actively implementing measures to reduce their environmental footprint. This is helping to improve the industry's image, which at times has been impacted, particularly because of concerns relating to air pollution.

In recent years cruise lines have become more environmentally aware and implemented a range of improvements.. For example:

- **Ponant** vessels carry the Bureau Veritas Cleanship certification label, and have achieved the Comfort 1 rating, which is the best level in terms of low noise and vibration. Ponant is also designing a luxury LNG powered polar exploration ship which will be equipped with advanced water treatment systems (Ponant Foundation, 2019).
- **Hurtigruten** has commissioned hybrid powered vessels to reduce their fleet emissions. This hybrid technology is able to sustain fully electrical propulsion for a period of time, significantly reducing their CO_2 emissions and fuel consumption as well as their noise output. A science centre onboard each ship researches plastics in the area, and engages with universities and travellers on board to encourage environmental sustainability and awareness.
- **Royal Caribbean** have achieved – among other goals set in 2019 – a 35 per cent reduction in emissions and 100% landfill free cruising. Ships are equipped with scrubbers and produce 90 per cent of the freshwater used on board. Royal Caribbean also began a wind farm project which, once completed, is expected to offset approximately half a million tonnes of CO_2 (Royal Caribbean Cruises, 2019).

Regulations create additional incentives for improving environmental performance

New regulations have been put in place to continuously reduce the environmental risks around cruise ships. Most recently, the International Maritime Organization have set rules in 2020 to reduce the sulphur content of all ship sizes from 3.5 per cent to 0.5 per cent.

Other countries such as Alaska have imposed "cruise ship taxes" at around $47 per passenger per voyage (Douglas-Ellis, 2018). This tax is applicable if the passengers choose to travel to Alaska on overnight cruises on ships larger than 250 passengers. The tax was imposed to discourage larger ships from visiting Alaska and reducing environmental concerns.

New technologies are being developed for minimising environmental risks around cruise ships

Liquified Natural Gas (LNG) driven engines emit far less that the traditional (heavy) oil engines. Specifically, they emit no sulphur, 99 per cent less particulate emissions, 85 per cent less NOx and 25 per cent less greenhouse gas, as per stakeholder consultations and NSW EPA (2015). Several LNG powered vessel are currently under construction. However, their deployment to Australia is currently inhibited by the lack of LNG refuelling options at key ports.

Social factors

Social factors identified

The social factors identified were informed by the stakeholder consultations and desktop research. Crowding was a key issue discussed in relation to popular tourist sites including national parks, as well as in urban areas and small communities. "Preservation" was considered to address issues raised regarding the impact to Tasmania's tourism brand, which in part focuses on the state's pristine wilderness and natural environments.

While visual amenity was raised on occasion, it was not a key issue for most ports/anchorages and views varied as to whether cruise ships had a positive or negative impact. As a result, the visual amenity of vessels in port was not quantified.

Legend

- Monetary impact calculated
- No monetary impact calculated

Social factors	Description	Relevant policy
Crowding	Cruise ships can carry large numbers of passengers. Their disembarkation can release these large numbers relatively quickly into small areas. Even though they release the largest numbers, large and megaships tend to be confined to visiting more populated areas leading to proportionately low increases in crowds and lower cost.	Remote destinations including Maria Island and Macquarie Island have a range of policies in place aimed at limiting crowding such as direct limits on the number of ship days of passengers or permit systems.
Preservation	Untouched pristine nature is a key part of Tasmania as a tourism brand. Preserving it is therefore highly valuable for the state. Cruise visits can affect the preservation as people and man made objects enter otherwise untouched surrounds and through introducing the risk of pollution events. Expedition vessels going to remote places, have the largest effects on preservation.	Deal Island currently limit visit to a maximum of 30 passengers on the island at a time Access to Wineglass Bay has been restricted for all ships due to the visual dis-amenity.
Noise	Transportation for passengers on shore could generate additional noise and disturb residents and other visitors. This was not raised as a major concern by stakeholders but is included in the analysis.	TasPorts has implemented rules around timing and types of allowed on board activities when a ship is in port.
Vessel in port	In larger cities or ports, the arrival of cruise ships may be seen as a positive visual amenity. Cruise ships often advertise for the best spots to watch a cruise dock. However, in areas that are more pristine, cruise ships can also be seen as spoiling vistas.	

Crowding

Cruise ships can contribute to crowding at popular tourist sites and destinations. In particular, cruise ships can release a large number of passengers, often all at once, putting pressure on local infrastructure and increasing crowding levels.

Stakeholder consultations highlighted that cruise ships are often associated with encouraging many people to gather in one place at one time. In particular, several specific concerns were identified:

- Crowding of popular natural attractions through the arrival of large cruise passenger groups can cause capacity issues leading to queuing at lookouts.
- Simultaneously arriving large groups of visitors can also put strain on local facilities such as parking and public toilets. Outside of national parks, Coles Bay and Swansea appear particularly prone to these issues.
- Buses transporting disembarking passengers can create short-term congestion which, as bus supply is limited in some ports, effectively constrains the size of the vessels that can be serviced.

Sewage

Strain on sewage systems was one of the most discussed topics in the stakeholder consultations. For example:

- Toilets at some major destinations such as the Wineglass Bay look-out have exceeded capacity on particularly busy days spilling effluent
- Port Arthur's sewage system can only handle about 5,000 people a day, effectively constraining visitor capacity. Waste water and drinking water is similarly constrained.
- Public toilets in Swansea reportedly reach capacity in the summer holiday months even without cruise ship days.
- New sewage systems are currently being constructed in the Freycinet area to better cope with the generally increasing visitor numbers.

Crowding is a global phenomenon and has been tackled with a range of measures at different destinations

Venice and Dubrovnik both suffer from over tourism. Dubrovnik decided to cap their visitor numbers in 2017, and Venetian authorities banned cruise ships that are over 55,000 tonnes in size.

Akaroa is a small community of 624 residents south of Christchurch, New Zealand. Throughout 2009 to 2011, there was an increase in cruise visits to Akaroa (Douglas-Ellis, 2018). Passengers increased from 21,000 to 125,000 with up to 4,000 passengers coming ashore per cruise ship. This sudden popularity was due to an earthquake seriously damaging Christchurch. Due to the sudden inflow of passengers, there were multiple congestion issues including a strain on facilities and infrastructure, crowding in public buildings and footpaths, traffic congestion from tour buses, and visitor management and environmental issues. Respondents from a survey in Akaroa proposed solutions to over crowding, including:

- Limiting cruise ship arrivals
- Relocating the bus waiting area
- Redistributing fees from cruise ship anchorage or berthing levies
- Modifying visitor behaviours and community adaptation.

Image from Tourism Tasmania Visual Library.

Valuing crowding

Crowding costs were estimated based on the historical number of visitors to a given destination, and the relative increase a cruise ship would have.

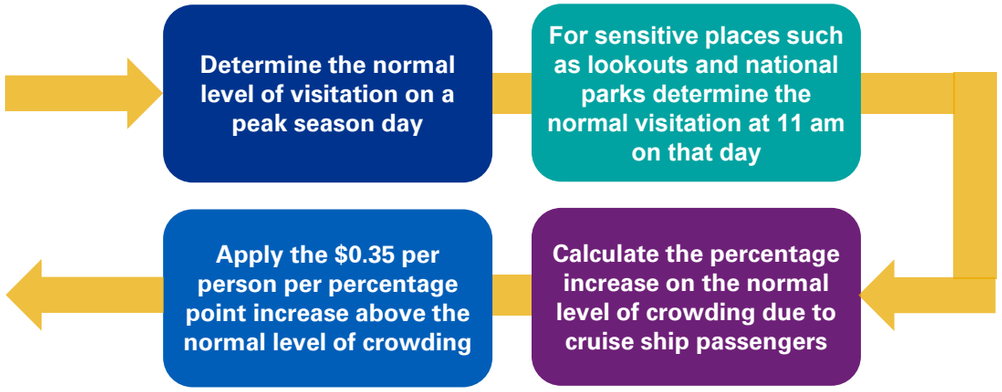
The methodology is based on research by the Flemish Centre for Tourism Policy, which monetised the value of crowding externalities from tourist use for Central Amsterdam (Neuts et al. (2013)).

According to the study most people are at least indifferent to sharing a place with others and some consider it even beneficial. However from a certain threshold onwards, the researchers found that people would be willing to pay for a reduction in the number of visitors present. The study estimates that for the average respondent, a return to normal levels is worth about 11 Euros. Converting this figure to Australian Dollars and extrapolating it to relative levels suggests that exceeding a normal level of visitation at a given destination by one per cent can be valued at 35 cents per local person, or non-cruise passengers in the case of sites with no local population (i.e. national parks).

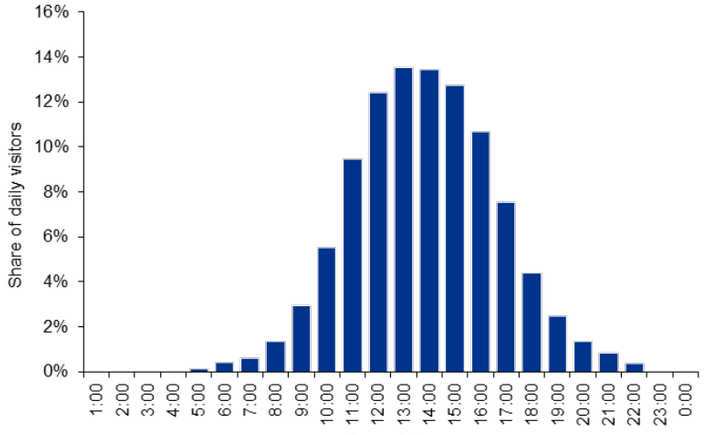
Applying the 35 cents to these increases and the relevant number of 'locals' estimates the monetary cost of crowding. The crowding cost was assumed to be linear, meaning that each percentage increase in visitors as a result of cruise passengers is valued the same, whether it's a ten per cent increase or an 80 per cent increase on the normal visitor levels.

For sensitive areas where visitor disbursal can be difficult resulting in a risk of off-track damage, crowding effects are estimated on an hourly basis.

Methodology to calculating cruise ship emissions



Typical hourly visitation profile



Source: DPIPWE (2019).

Crowding at specific times

As a result of a typical port visit (10 to 12 hours) and seasonality of cruise ships, cruise visitors add to already peak daily visitor numbers at popular tourist locations.

Often arriving in groups, cruise ship visitors tend to create a spike in visitation. As such, for sites where crowds are difficult to disperse, such as on walking tracks, at lookouts, or at the Port Arthur historic site, results are assessed on an hourly basis and crowding is determined at relevant national park and tourist sites if all the cruise visitors arrived at once at a given time (e.g. at 11am).

This approach increases the crowding cost because the number of cruise passengers is relatively higher for hourly visitors than for daily visitors.

Crowding at sensitive sites

Parks and Wildlife identified a number of sites that were of particular concern regarding the risk associated with cruise visitors in diminishing the visitor experience for other tourists through issues such as congestion at car parks from buses/coaches, and queuing at café/visitor information desk. For King Island and Flinders Island, competing demand for limited transport could also potentially be an issue.

The table lists the sites assessed, showing from which port the sites are mainly accessed, as well as the total monthly and daily visitor numbers.

Where information was available, the share of passengers visiting a particular site was applied, sourced from the *Cruise Ship Passenger Survey* (2017). For example, 7.3 per cent of passengers that go on tours at Burnie go to Cradle Mountain. With approximately 60 per cent of passengers reporting to partake in tours, this translates to a per passenger tour participation rate of 4.4 per cent, or just 85 passengers from a mid to large ship.

Similarly for Mount Field, just two per cent of total passengers reported visiting there from Hobart. This is approximately 71 passengers from a megaship or 42 from a mid to large ship.

For expedition and luxury vessels where tours are largely included in the ticket price, it can be expected that most passengers who disembark would visit the tourist site. Therefore, unless in the absence of other information, all passengers from these vessels are assumed to visit a given site.

The table highlights that even small expedition vessels can create significant crowding when average visitors per day are low. For example, on Flinders and King Island a single expedition vessel constitutes a doubling to threefold increase of typical average visitors.

Name	Nearest port	Total monthly visitors at peak (Jan 2020)	Average visitors per day (peak)	Typical number of cruise passengers visiting per ship (contribution to average peak day visitors)
Freycinet area	Coles Bay / Freycinet	51,802	1,671	Expedition: 81 (5%)
Cradle Mountain	Burnie	42,328	1,365	Expedition: 4 (0.3%) Luxury: 25 (1.8%) Mid to large: 85 (6.2%)
Mount Field	Hobart	18,825	607	Expedition: 2 (0.3%) Luxury: 13 (2.1%) Mid to large: 42 (6.9%) Megaship: 71 (11.7%)
Maria Island	Maria Island	8,511	275	Expedition: 81 (29.5%)
Flinders Island	Flinders Island	1009	33	Expedition: 81 (245.5%)
King Island	King Island	1,467	47	Expedition: 81 (172.3%)
Tasman Arch	Port Arthur	25,409	820	Expedition: 8 (1.0%) Luxury: 57 (7.0%) Mid to large: 163 (19.9%) Megaship: 274 (33.4%)

January 2020 visitor numbers are based on Tasmanian Visitor Survey (2020) except for the following exceptions:

- Highfield House and Tasman Arch are based on Tourism Tasmania (2020)

- Tourism Tasmania is sourced from the Tourism Tasmania (2014). King Island data was provided during consultations (2017-18).

Tours and percentage of cruise passengers visiting is based on Tourism Tasmania Cruise Line tour data and Tourism Tasmania (2017) respectively.

Crowding at port

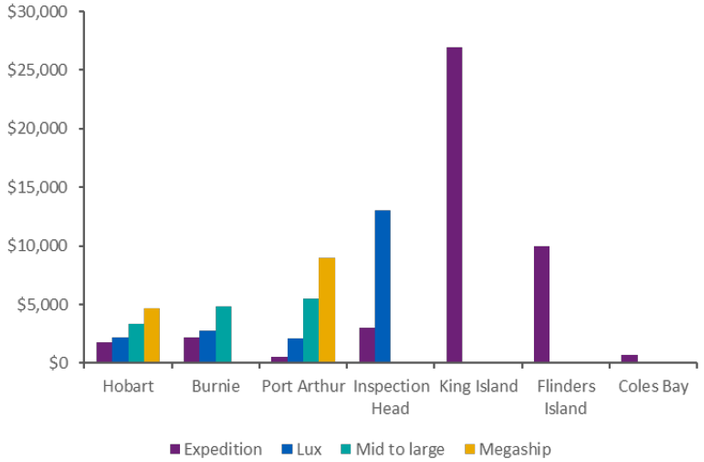
Crowding from cruise ships can also affect urban areas and towns, particularly around the port. This could be at popular tourist sites such as the Salamanca markets, or just in local retail and hospitality (e.g. crowding in cafes).

Crowding costs were also calculated for urban areas around the port. For these areas, where passengers can disembark and access amenities directly, it is assumed that all passengers who go ashore would increase crowding.

However, the crowding cost is mitigated in areas where passengers can easily disperse or where the relative increase from cruise passengers on total visitors is lower. As such, for an urban centre like Hobart, the crowding cost would be lower than in smaller towns such as Burnie or on Flinders or King Island.

To calculate the total cost of crowding at a given port for each vessel type, the costs of both urban centres, national parks and sensitive sites was aggregated. The chart below shows the estimated crowding cost for each vessel type at selected ports.

Crowding costs per ship day in selected ports



Name	Total visitors at peak (January)	Visitors per day (average during peak)	Typical number of cruise passengers visiting per ship (contribution to average peak day visitors)
Hobart (city)	143,236	4,621	Expedition: 81 (1.8%) Luxury: 575 (12.4%) Mid to large:1,939 (42.0%) Megaship: 3,259 (70.5%)
Burnie	24,725	798	Expedition: 81 (10.2%) Luxury: 575 (72.1%) Mid to large:1,939 (243.0%)
Port Arthur	44,586	1,438	Expedition: 81 (5.6%) Luxury: 575 (40.0%) Mid to large:1,939 (134.8%) Megaship: 3,259 (226.6%)
Bruny Island	32,918	1,062	Expedition: 81 (7.6%)
Swansea	34,738	1,121	Expedition: 81 (7.2%)
Coles Bay	40,441	1,305	Expedition: 81 (6.2%)
Stanley	19,166	618	Expedition: 81 (13.1%)

Source: Tasmanian Visitor Survey (2020).

Preservation

The preservation of natural heritage has a high value the general public and society as a whole.

Being a UNESCO World Heritage site, the Tasmanian Wilderness World Heritage Area (TWWHA) is acknowledged to provide value to those who have not, or may not ever visit. This value can thus not be accurately measured by the price a tourist might pay to visit it for a day or two.

The preservation can be described by a site's social, cultural or even iconic status. It represents the importance the area has for Tasmanians, Australians and also globally. Conserving the area as untouched nature for future generations to enjoy is therefore of value to people even if they never visit.

Related research

In a study on *The Economics of Biodiversity* for the UK Treasury, Dasgupta (2021) found that biodiversity does not only have instrumental value, but also an existence value, which could be an intrinsic worth. Similarly, Deloitte Access Economics (2017) conducted a study on the economic, social and icon value of the Great Barrier Reef (GBR). A part of the study estimated the non-use value of the GBR using a contingent valuation approach. The study surveyed how much Australians appreciate nature and the wonders of the natural environment and their willingness to pay to preserve the area. As the GBR and Tasmania are both listed as World Heritage natural sites, the non-use value of the GBR can be considered an indication that the TWWHA could have a similar value.

Weekly willingness to pay by state and territory

Sources: Deloitte Access Economics (2017).

Valuing preservation

Almost two thirds of the Australians surveyed were willing to pay for the preservation of the Great Barrier Reef (Deloitte Access Economics, 2017). Specifically, the study estimated that the average Australian has an average weekly willingness to pay of $1.30 (or $67.60 per year) to ensure protection into the future. Taken across the applicable Australian population, this produces a willingness to pay to preserve the GBR of over $1 billion per year.

According to the Deloitte research, 65 per cent of respondents see the Great Barrier Reef as the most iconic among all Australian UNESCO World Heritage natural sites. This is compared to four per cent of respondents for the TWWHA. Applied to the above estimate for the GBR, this suggests that the annual preservation value of the TWWHA could exceed $100 million.

Impacting preservation

Preservation of untouched nature cannot be guaranteed when humans or man made objects such as cruise ships – irrespective of their size – enter it. In addition to carrying the risk of pollution events and bio security hazards, their visual disamenity can impact the perception of pristineness. In areas of particular sensitivity, this could result in (a share of) the preservation value remaining unrealised creating social cost.

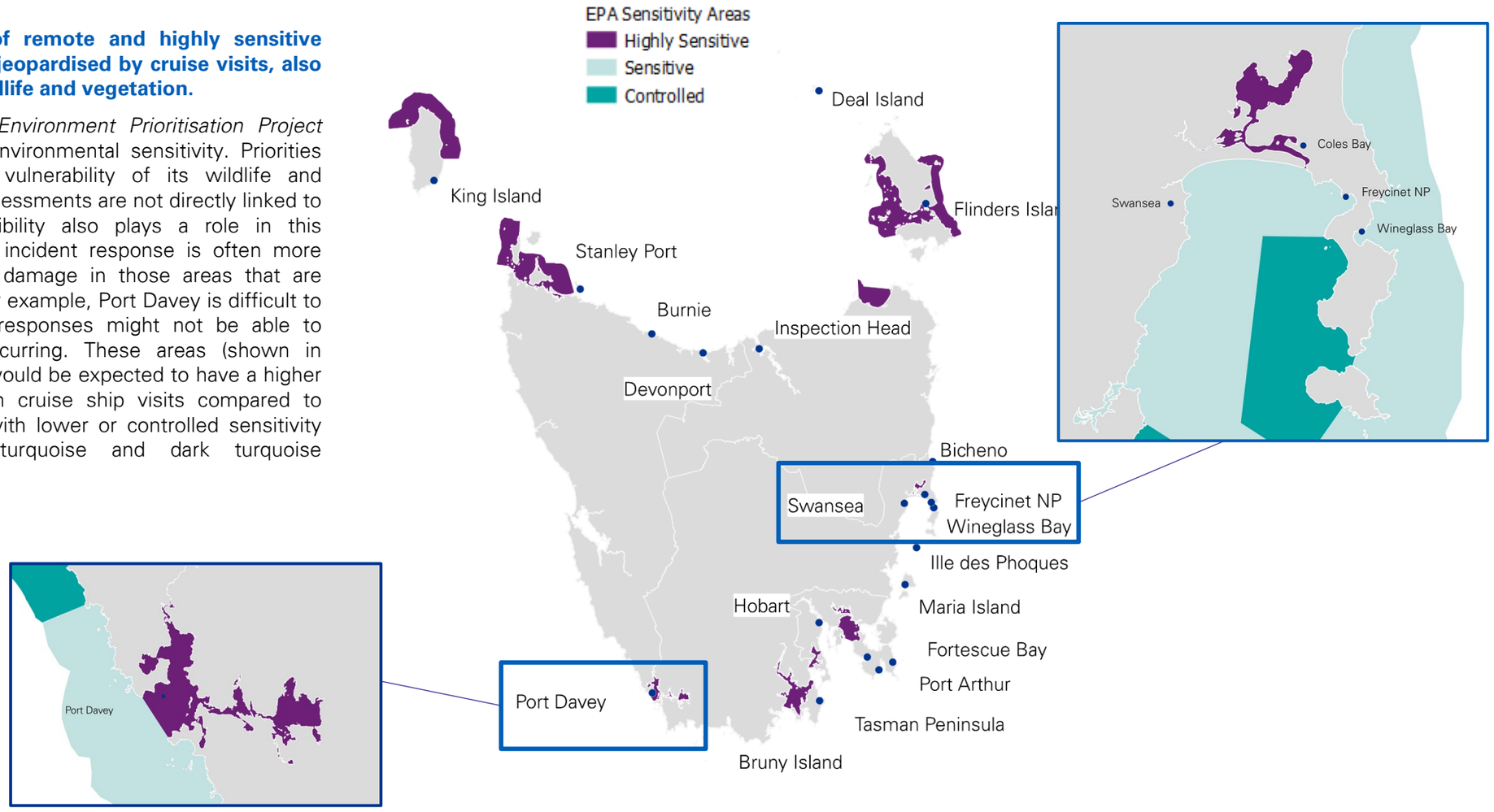
Note:

In the absence of Tasmania-specific information, this study only considered preservation value qualitatively. To accurately quantify this element**, it is recommended that Tasmania conduct a survey to specifically estimate the impact of cruise ships on Tasmania's pristine environments.**

Environmentally sensitive areas

The preservation of remote and highly sensitive anchorages can be jeopardised by cruise visits, also endangering its wildlife and vegetation.

The EPA's *Marine Environment Prioritisation Project* identifies areas of environmental sensitivity. Priorities are based on the vulnerability of its wildlife and vegetation. While assessments are not directly linked to remoteness, accessibility also plays a role in this context because an incident response is often more effective at limiting damage in those areas that are more accessible. For example, Port Davey is difficult to reach and incident responses might not be able to prevent damage occurring. These areas (shown in purple on the map) would be expected to have a higher cost associated with cruise ship visits compared to those destinations with lower or controlled sensitivity (shown in light turquoise and dark turquoise respectively).



Source: Tasmania EPA LISTmaps, 2021.

Noise

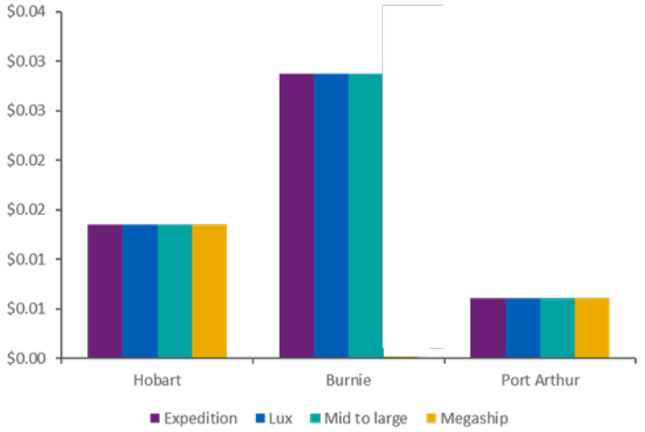
While buses and vessels in port can be noisy, the associated costs are relatively small. Furthermore, stakeholders did not identify this as a major concern.

In addition to their emissions, buses can be noisy as they drive through town. The cost of this additional noise is based on the number of passenger kilometres travelled on buses, and is thus closely linked to the calculation of bus emissions (see slide 45).

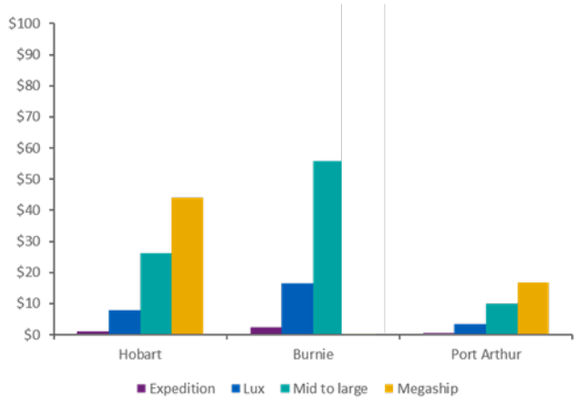
Methodology to calculating transport emissions

- Number of ship days and passengers on each ship
- Tour participation rate by ship type for the three main ports (Hobart, Burnie and Port Arthur)
- Combine with research on the most popular tours at each destination and the approximate travel distance these tours require
- Apply the average distance, number of passengers and bus capacity to determine the distance travelled by port and thus the amount of passenger kilometres travelled
- Apply the bus noise cost of $2.02 per 1000 passenger kilometres (from ATAP, 2020)

Noise costs per passenger day in main ports



Noise costs per ship day in main ports



Buses

The cost of bus noises per ship day is highest in megaships, as they have the most passengers.

Similar to transport emissions, the amount of noise is based on the distance travelled to tours, therefore Burnie has the highest noise cost at around $100 per megaship day. Port Arthur has the lowest at around $50 per megaship day.

As with bus emissions, it is assumed that the distance travelled by passengers while on shore (based on the most popular tours) is similar across vessel types.

Vessel noise

When in port vessels can have on-board outside entertainment such as music or cinema. Passengers announcements and horn sounding can also add to the sounds emitted.

Reacting to the increasing number of visits TasPorts has established noise management measures which ensure noise levels are in line with those of the neighbourhood, effectively treating a visiting cruise ship like a bar, or restaurant with outdoor seating.

Stakeholder consultations suggests that the measures have been successful and noise complaints are no longer a major concern on cruise ship days. Consequently, this aspect is not monetised.

Visual amenity of cruise visits

Cruise ships can make an impression at most ports and anchorages, and this is particularly the case in Tasmania where the larger ships can often tower over the local towns. Throughout the stakeholder consultations, opinions were mixed as to whether cruise ships add or detract from the view. As a result, the visual amenity of cruise ships was not monetised in this study.

Big and beautiful: Cruise ships add 'vibe' to the town

Cruise lines often announce the arrival of their more well-known ships (particularly megaships) and even advertise the best viewing spots. In more urban and industrialised areas, people tend to enjoy the view of a cruise ship. Stakeholders from Hobart and Beauty Point have all expressed deriving pleasure from cruise ships' visual amenity. For example, as Beauty Point is closely located to Bell Bay, an industrial port, cruise ships are perceived as an improvement to the view. Although no large or megaships can enter due to port size limitations, the community is proud to host these luxury vessels. Stakeholders from other regions of Tasmania have expressed similar views and in some instances cruise ships are perceived as bringing communities together. Specifically, industry operators in Burnie emphasised that volunteers from different tour sites enjoyed chatting to visitors.

Beauty Point

Image from Tourism Tasmania Visual Library.

Cruise ships are 'an eyesore that spoil the harbour view'

Another perspective on cruise ships is that they are an eye-sore as they obstruct otherwise uninterrupted views. Stakeholders have expressed this particularly in relation to pristine locations. For example, people go to national parks or wilderness expecting to experience isolation and disconnection from modern society. However, large cruise ships with hundreds or thousands of passengers can spoil such an experience. This view is underlined by the petition to ban cruise ship from Wineglass Bay began in 2018.

Hobart

Image from Tourism Tasmania Visual Library.

Scenarios

Scenario overview

For this study, five scenarios were developed to test the value proposition of cruise ships in Tasmania, with the aim of drawing out how different vessel types and call profiles could influence the outcomes and net benefits at a regional level and for Tasmania as a whole.

KPMG developed these scenarios together with Tourism Tasmania's Cruise Ship Reference Group and which were then tested and refined through stakeholder consultation.

Each scenario, along with its rationale is described below.

1 Projection of historical and recent trends – Tasmania has seen high growth in cruise ships over the last five years. It is broadly accepted that this growth will slow over time, particularly if visits are concentrated in the summer months as has been the case. Consultations with cruise lines indicate that cruise visits are expected to return to their previous level post-COVID-19, with some growth in subsequent years

2 Local increase in expedition ships – Consultations with cruise lines indicate strong interest in moving into the expedition cruise market in Tasmania. Pre-COVID-19, only one operator regularly homeported and operated expedition voyages in Tasmania. In interviews, several cruise lines expressed their intentions to deploy an expedition ship to Hobart for the summer season within the next five years. For all other vessel categories, forecast demand is the same as Scenario 1.

3 Global trend of increasing ship size – pre-COVID-19 the trend in cruise ship building was towards larger vessels, on average, then are currently deployed globally. This scenario aims to reflect this trend, with an increase in visits to Tasmania by 'megaships' (as defined in this study), and a corresponding decrease in visits by mid to large vessels. This is not to say that all mid to large vessels are being replaced by megaships, but rather the average size of cruise ships in general, may increase. The mid to large ship segment will continue to be an important sector for Tasmania under this scenario.

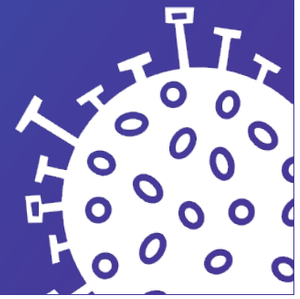
4 Luxury and expedition ships prioritised – This scenario assumes that Tasmania could better align its cruise market with its broader tourism brand focused on nature and pristine environments along with specialised and unique products and produce. This could involve limiting the visits of mid to large ships and megaships in order to prioritise expedition and luxury cruise vessels.

5 Focus on luxury and expedition ships – Drawing on the themes from Scenario 4, this scenario would see a complete focus on expedition and luxury cruises only.

The effects of COVID-19

COVID-19 has had a profound effect on the cruise sector over the last 12 months as cruising ground to halt across the world. As Australia eases restrictions on domestic cruising, stakeholder consultations indicate that cruise lines expect a full recovery of the sector by 2022-23. Moreover, they reported seeing pent up demand, and expect that domestic demand for cruising will sufficiently mitigate the fact that international passengers are barred from cruising to/in Australia for the foreseeable future.

Across each scenario, there are risks/uncertainties around COVID-19. For example, redeployment of vessels to domestic destinations may be at risk as international destinations are not available (and vice versa).



Long term growth rate

Longer term cruise ship demand forecasts, outside of the TasPorts forward bookings, was estimated based on review of term trends in the wider Australian cruise market.

As mentioned on slide 23, most cruise visits to Tasmania originate from mainland Australia where deployments typically come from other regions around the world for the South Pacific summer season. Tasmania's long term growth trends are therefore best derived from those of the Australian market.

In a paper titled "*The Demand and Economic, Environmental & Social Impacts of Australian Cruise Tourism*", Douglas, Ellis et al. (2018) analyse the long term trends of ship visits for Australia.

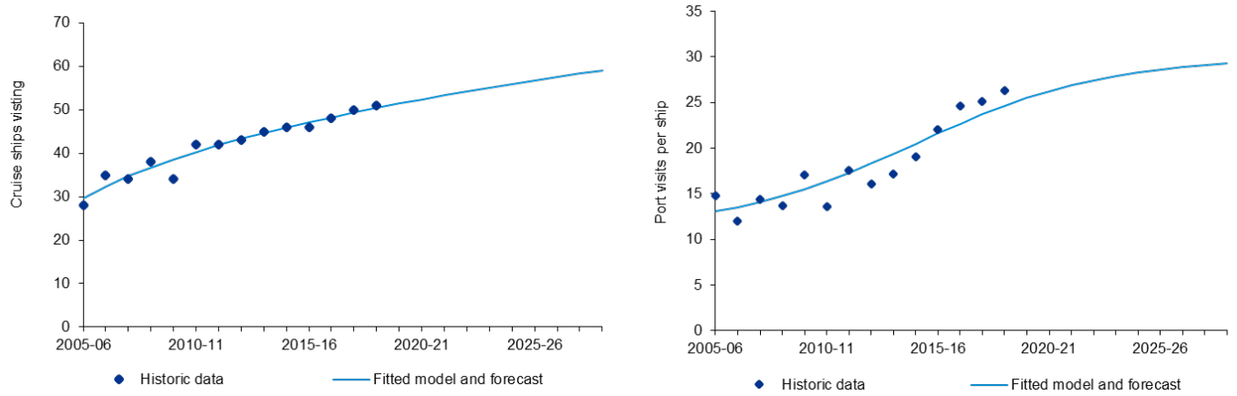
Based on this analysis, the paper projects the number of cruise visits via a two staged forecasting model predicting:

- The number of cruise ships visiting Australia
- The number of ports each of these ships typically visits in a season.

The paper found that non-linear time trend equations depict the long term data. As the accompanying figures show, the model predicts a gradual slowing in growth for both the number of cruise ships visiting Australia and the number of port visits per ship.

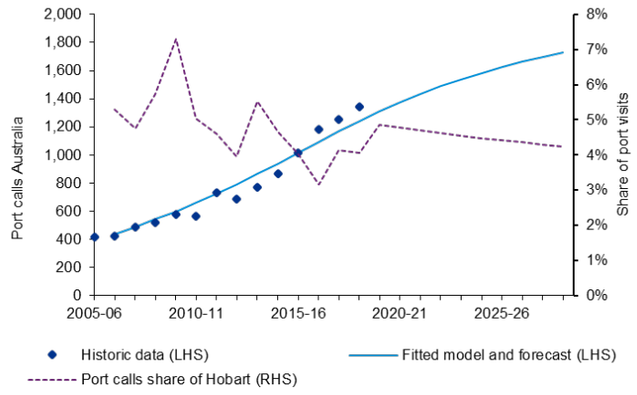
Applied to Hobart, the study predicts growth of just under 13% for the forecast period which translates to a compound annual growth rate of 1.2 per cent. This long term growth rate is to forecast demand outside of TasPorts' forward booking. The next slide illustrates the process and compares results to historic data.

Number of cruise ships and visits per ship in Australia– historic data and fitted model



Source: Douglas-Ellis (2018).

Port calls Australia and Hobart – historic data and fitted model



- Port call in Australia have followed a flattening upwards trend which is expected to continue.

- Despite an increases in visits in Tasmania, port calls to Hobart have grown slightly slower than in other Australian destination resulting in a slightly declining share of port calls.

Source: Douglas-Ellis (2018).

Growth narratives

While Tasmania has seen rapid growth in cruise ship visits over the last few years, historical trends and future itineraries data suggests that this growth rate will slow over the project period.

Tourism Tasmania has provided port calls data for Tasmania from 2011-12 to 2021-22 (post 2019-20 are projections based on forward bookings in this dataset). Using the overlapping pre-COVID-19 periods, we can extract a ship day to port call ratio that can be applied to projection years for which there is not data to extrapolate ship days. The result is the ship days series covering 2011-12 to 2029-30 shown in the chart. In effect we have four series:

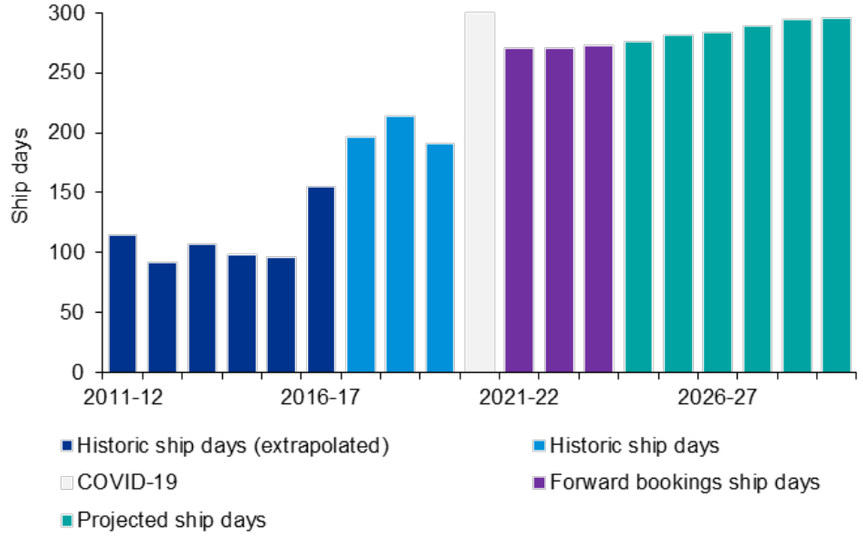
Extrapolated Tourism Tas data

Historical data used in KPMG model

Forward bookings and itineraries

Projected ship days

Historical and projected ship days for Scenario 1



This provides a level of confidence for the data up to 2023-24, where the numbers are reasonably accurate, with the cruise lines are currently selling the underlying itineraries.

The chart suggests that ship days tend to follow a step-wise growth pattern as there are three periods with relatively similar ship day levels: 2011-12 to 2015-16 (just under 100), 2016-17 to 2019-20 (about 175) and the forward bookings (about 250). Previous growth has been more staggered presumably as ships had to be re-routed in an operational setting. With the current break on cruising globally, this is not necessary and it seems likely that all growth will take place in one hit and then operations will continue on the new (much higher) level.

Considering absolute growth, the pre-COVID-19 years saw 99 additional ship days over seven years. Going forward it is expected there would be 104 additional ship days over 10 years. Evenly spread out across these periods this means that year to year historic and scenario growth are quite similar. While this suggests that Scenario 1 represents one reasonable future growth path possibility, it is worth highlighting that post the forward booking years, the scenarios serve for comparative purposes and are not intended as firm forecasts.

Scenario assumptions

The table below provides an overview of the assumptions made for each scenario in terms of growth rates, fleet mix and port visited.

No.	Scenario	Growth	Fleet	Ports
1	**Projection of historical and recent trends**	• 1.2% p.a. growth rate in all segments	• TasPorts historical and future bookings • Planned itineraries from cruise lines.	• Port mix based on historical and forward bookings up to 2021-22
2	**Local increase in expedition ships**	• Two new expedition vessel homeported in Hobart • 1.2% p.a. growth rate in other segments	• Two new operators enter market with one ship each deployed to Tasmania • First ship deployed in 2022-23. • Second ship deployed in 2024-25	• Additional ports/anchorages added where relevant based on published expedition itineraries
3	**Global trend of increasing ship size**	• 1.2% p.a. growth rate assumed	• Assumes that mid to large ships are phased out in favour of megaships • Average age of mid to large ships that service Tasmania is 20 years. • Replacement rate of two ships per year.	• Port mix based on historical and forward bookings up to 2021-22
4	**Luxury and expedition ships prioritised**	• 1.2% p.a. growth rate in luxury and expedition segments	• No megaships comes from 2021-22. • Mid to large ships capped at 20 visits per year per port from 2021-22.	• Port mix based on historical and forward bookings up to 2021-22
5	**Focus on expedition and luxury ships**	• 1.2% p.a. growth rate in luxury and expedition segments	• No megaships and mid to large ships from 2021-22	• Port mix based on historical and forward bookings up to 2021-22

Scenario 1 - Projection of historical and recent trends

Scenario 1 – continuation of most recent trends

- Based on historical and recent trends
- No major change from the currently made forward bookings.

Scenario 1 projects cruise visits under a 'business as usual' scenario. This projection of historical and recent trends provide an indication of the potential costs and benefits of the cruise industry post-COVID-19 if no actions or intervention occurred.

The charts on the right show the projection in ship days by both vessel type and by region. Post-COVID-19, cruise visits are expected to return to their previous levels, and continue on a trajectory of low growth across all vessel types and ports.

Region definitions

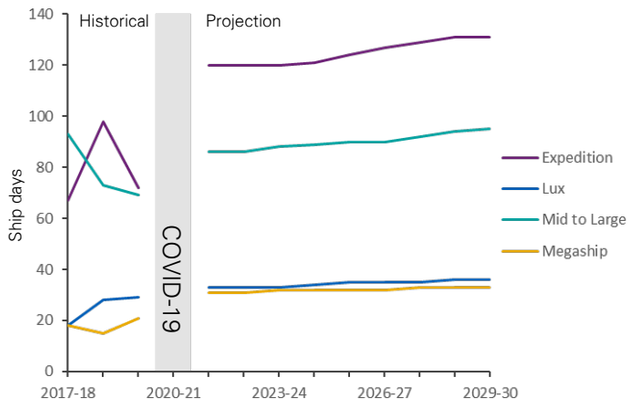
Northern Tasmania includes: Burnie, Port Stanley, Devonport and Inspection Head

Hobart includes Hobart, and Woodbridge and Huon River

Freycinet includes Wineglass Bay, Coles Bay, Bicheno, Swansea, and other Freycinet National Park anchorages

Tasman Peninsula includes Port Arthur and other Tasman Peninsula anchorages.

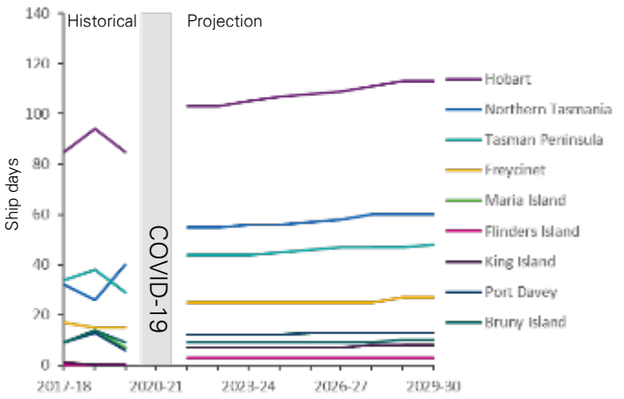
Scenario 1 – ship days by vessel



Key points:

- Post Covid-19, the mix of vessels and number of ship days is expected to remain stable, with low but steady growth.
- Mid to large ships and expedition ships remain the two most common vessel type by ship day.

Scenario 1 – ship days by region



Key points:

- Hobart is expected to see highest growth, as almost all cruise visits to Tasmania would visit Hobart. Larger vessels tend to only visit one other port.
- There are some visits to regional anchorages such as King Island, Port Davey and Bruny Island. These are exclusively from expedition ships.

Scenario 2- Local increase in expedition ships

Scenario 2 – Local increase in expedition ships

- Trend towards expedition cruises continues
- Additional vessels homeported in Hobart in the cruise season
- No major change from this season's port bookings going forward in other segments.

Scenario 2 looks at the effects of an increase in expedition vessels within Tasmania. Stakeholder consultations indicated interest in this scenario, both from the community and from cruise lines. The *Blueprint for Sustainable Cruise Shipping in Tasmania* prepared by Tourism Tasmania (2019) also demonstrates a preference for expedition ships.

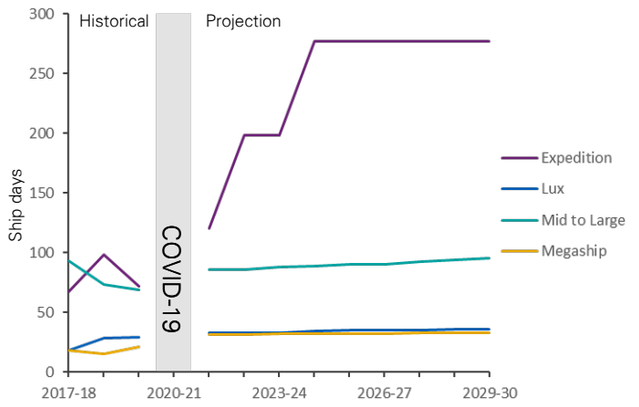
The scenario projects that over the course of the next few years, two more expedition vessels would be deployed to Tasmania and be homeported in Hobart for the cruise season. The first vessel would start in 2022-23, and the second in 2024-25. This would see an increase in expedition ship days (see first chart), as each additional vessel is assumed to conduct at least 12 cruises each season, calling at a range of ports and anchorages. The assumed itineraries and number of cruises per season per vessel were based on published itineraries for expedition vessels in Tasmania.

The number of ship days for other vessel types remains the same as in the Scenario 1.

As shown in the second chart, in this scenario Hobart remains the dominant port as the expedition vessels would be homeported there for the season. There is an increase in ship days across a number of regions, with popular expedition anchorages being around Freycinet and Maria Island in particular.

While Coral Expeditions does visit Port Davey on its current tours, the scenario assumes that the additional operators would not be able to visit this area.

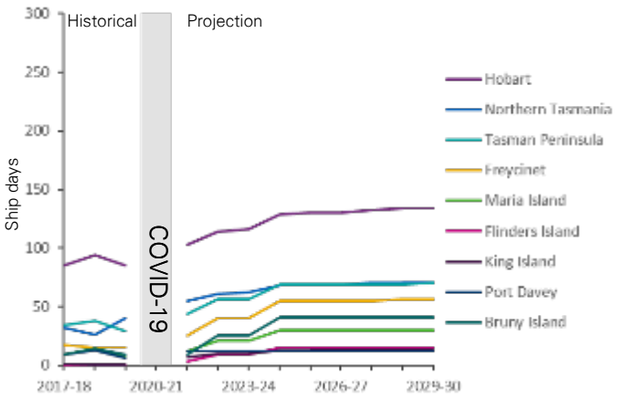
Scenario 2 – ship days by vessel



Key points:

- As new expedition ships are brought into the market, there is a period of growth before stabilising.
- Ship days for other vessel types remain in line with Scenario 1.

Scenario 2 – ship days by region



Key points:

- Hobart sees the highest increase as it is assumed that expedition vessels will be homeported.
- Northern Tasmania (incl. Burnie) and Tasman Peninsula (incl. Port Arthur) continue to be popular destinations, however there is an increase in visits to Inspection Head and other anchorages as alternatives to the main ports.

Scenario 3 - Global trend of increasing ship size

Scenario 3 – Global trend of increasing ship size

- Ships are replaced by larger ships as they reach 30 years of age.
- Average passengers number per vessel increase
- No major change from this season's port bookings going forward in other segments.

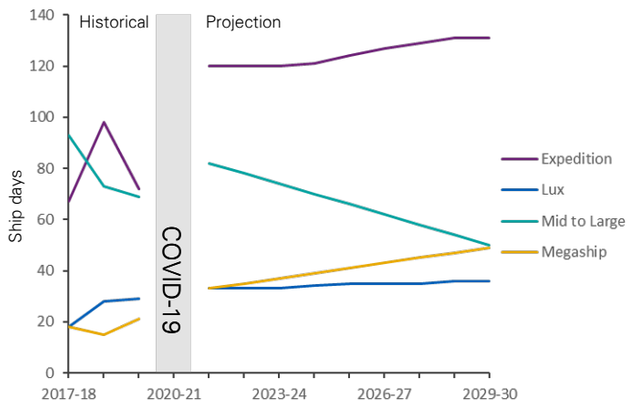
The third scenario examines the effects if ship days followed the global industry trend towards increasing ships size. This is mainly geared towards the trend of larger ships continuing to get bigger. Historically, a vessel with 3,000 to 4,000 passengers was considered a megaship. In recent years however, there are more megaships being built with the capacity of 5,000 to 6,000 passengers.

As ships get larger, it is assumed that some mid to large ships are slowly being phased out as older ships are being retired, and replaced with new megaships. This is not to say that all mid to large vessels are being replaced by megaships, but rather more megaships visit Tasmania. Mid to large ships will continue to be an important sector for Tasmania under this scenario and consultations have indicated to us that cruise ships will continue to service this sector.

The rate of replacement of large vessels is based on the age and composition of the fleet currently servicing Tasmania. Specifically, large ships are replaced by megaships as they reach an age of around 30 years. This translates to a replacement rate of about two ships per year and the effect is demonstrated in the first chart, where a decline in ship days by mid to large vessels is matched by an increase by megaships. Expedition and luxury vessels continue to follow the current trend as set out in the first scenario.

Under this scenario, Hobart will continue to see growth in ship days, however the other two major ports will see a decline. Burnie, in particular, will see far fewer ship days as the port does not cater for megaships. Port Arthur also sees a decline as megaships only stop there less than 20 per cent of the time, compared to over 30 per cent for mid to large ships.

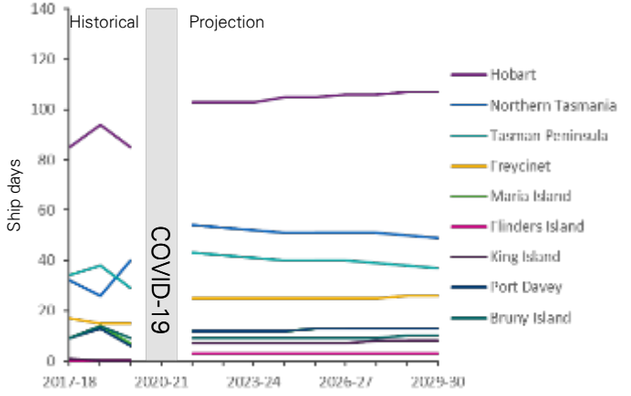
Scenario 3 – ship days by vessel



Key points:

- Mid to large ships slowly decline, which is mirrored by growth in megaships.

Scenario 3 – ship days by region



Key points:

- Hobart, Port Arthur and Burnie are still the three main ports. Freycinet continues to be popular for scenic cruising by both megaships and mid to large ships.

Note: This scenario implicitly assumes that growth in passenger demand matches the increased supply offered by higher capacity megaship. As a result, the number of passengers visiting Tasmania would increase.

Scenario 4 - Luxury and expedition ships prioritised

Scenario 4 – Luxury and expedition ships prioritised

- Tasmania's tourism market strengthens focus on quality over quantity and per passengers spending is emphasised
- No major change from this season's port bookings going forward in expedition and luxury segment.

This scenario aims to increase Tasmania's focus on expedition and luxury vessels. As a result, limitations on mid to large and megaship days are introduced. Specifically, this scenario tests a cap of 20 visits per port per year for mid to large ships, while stopping megaships visits entirely. Both of these restrictions are assumed to come into effect in the 2021-22 cruise season, effectively limiting cruise activity post-COVID-19.

The ship days by vessel show that megaship ship days drop to zero. Mid to large vessels port visits stabilise at around 60 visits are year. Expedition and luxury vessels continue to follow the trends from Scenario 1.

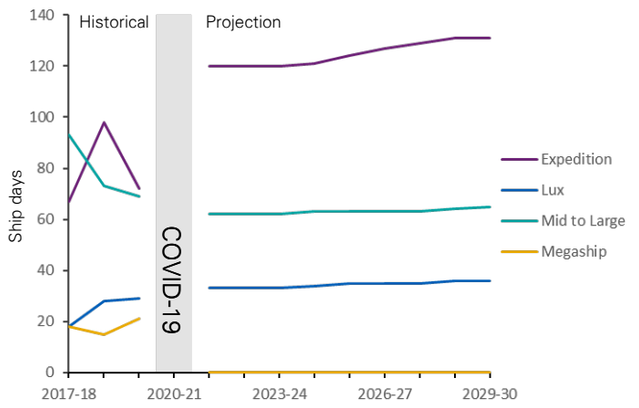
This scenario has the largest reduction on ship days to Hobart, which will see a sharp decline to Scenario 1. In total, ship days to Hobart still sum to over 60, but mid to large ships would only account for 20 of those visits and there would be no megaships. Thus most ship days would be expedition and luxury vessels.

Burnie would also see a drop in overall visits as mid to large vessels would average around 25 visits a year without the cap. Burnie would not be affected by the reduction in megaships.

For Port Arthur, calls by mid to large vessels average around 16 a year in the projection period, so the cap would not limit visits. The reduction in visits compared to Scenario 1 is due to a reduction in megaships.

As Hobart is the mandatory first port of call, a cap here could have further reaching effects on calls to other ports as itineraries become less flexible.

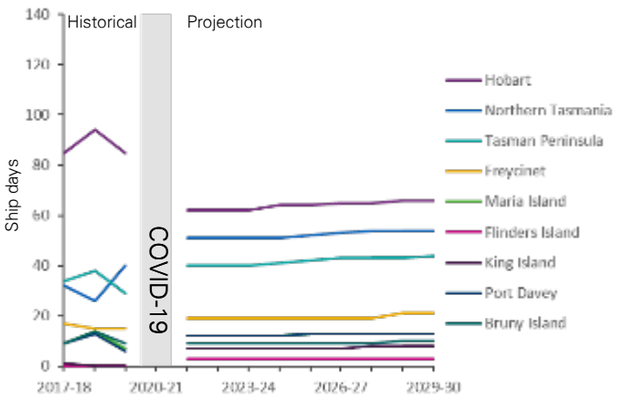
Scenario 4 – ship days by vessel



Key points:

- Megaships ship days are restricted from 2021-22.
- Mid to large vessel ship days stabilise at 60, reflecting the cap of 20 ship days at each of Hobart, Burnie and Port Arthur.

Scenario 4 – ship days by region



Key points:

- Hobart is most affected, as it is affected by both the cap on mid to large ships and the ban on megaships.
- Burnie has more luxury ships and no megaships, so the drop is not as pronounced.
- Port Arthur is affected by the limitations on megaships, but mid to large vessel ship days remain below the cap and thus not impacted.

Scenario 5 - Focus on expedition and luxury ships

Scenario 5 – Focus on expedition and luxury ships

- Tasmania's tourism market is all about quality over quantity and per passengers spending is maximized
- No major change from this season's port bookings going forward in expedition and luxury segment.

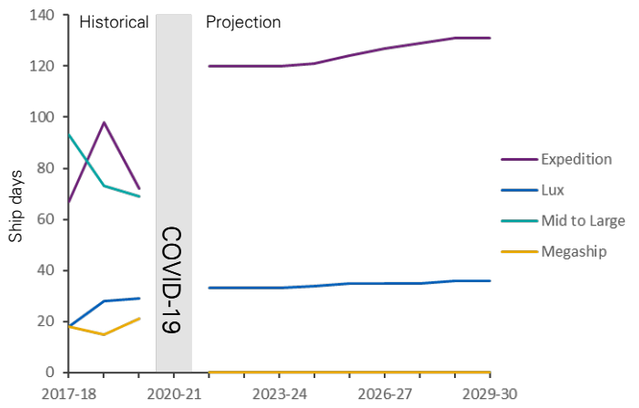
This scenario continues to build on Scenario 4, testing the results if Tasmania only allows expedition and luxury ships to visits its ports.

It assumes that Tasmania would focus on expedition and luxury ships from 2021-22 onwards and mid to large ships and megaships would not return to Tasmania post-COVID. The luxury and expedition vessels ship days reflect the projections from Scenario 1.

All three major ports would be heavily affected by this change. Neither Hobart, Burnie or Port Arthur return to number of visits experienced before COVID-19 as visitation from the expedition and luxury ships cannot make up for the shortfall.

Freycinet also sees a drop in visits, although these ships would be scenic cruising rather than having passengers disembark.

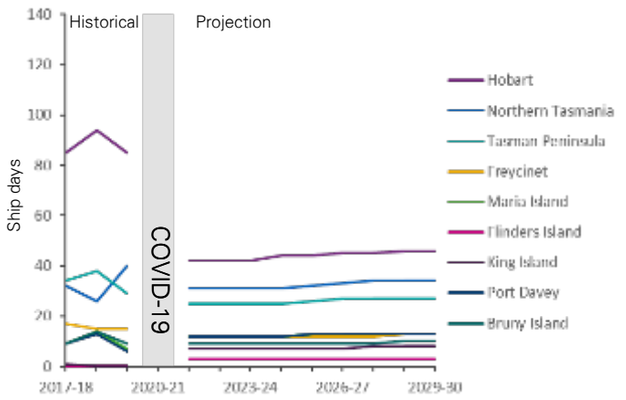
Scenario 5 – ship days by vessel



Key points:

- Megaships and mid to large ships drop to zero in 2021-22 when expedition and luxury ships are assumed to be the priority.

Scenario 5 – ship days by region



Key points:

- Ship days to Hobart would decline by over 60 per cent from an average of 90 visits per year to about 30.

Note: There are some visits to regional anchorages such as King Island, Port Davey and Bruny Island. These are exclusively from expedition ships.

Value proposition estimates

Introduction

As the purpose of the study is to assess the value proposition of cruise ships across economic, environmental and social factors, it is necessary to establish some overarching assumptions that can be applied when calculating the net present value (NPV) for each scenario.

Under each scenario, there is an estimate of ship day days for each year in the evaluation period. The net benefits per year are calculated and then a discount rate of seven per cent is applied to estimate the total net benefits of cruise ships over the evaluation period.

Item	Study assumptions	Source
Evaluation period	2020-21 to 2029-30 (10 years inclusive)	Study assumption
Real discount rate	7%	Australian Government, Office of Best Practice Regulation (2020)
Base year	2020-21	Study assumption
Price year	2020-21 (December 2020)	Study assumption

Discounting and the discount rate

When estimating benefits and costs into the future, it is important to discount them so that all monetary values are in the 'present value'. Discounting reflects the view that a dollar received in the future is worth less than a dollar today. Present values allow for decisions to be made in the present about initiatives that have costs and benefits in the future.

Applying discount rates is best practice and the standard discount rate used in Australia is currently seven per cent.

Quantification approach

In estimating the net benefits of each scenario, all the factors discussed thus far are brought together. Below is a high level summary of the quantification methodology, with the process in more detail illustrated on the following slide.

1a Estimate the parameters

The first section of this report outlined the factors included in this assessment, detailing key assumptions and associated estimation approaches (see slides 27-60). The outcome of this was an estimate of the monetary benefits for every factor for each port and vessel type.

1b Project the port visit days for each scenario

Next, five scenarios were developed and the ship days estimated for each of them over the 10 year evaluation period (see slides 61-70). The ship days were similarly disaggregated by port and vessel type.

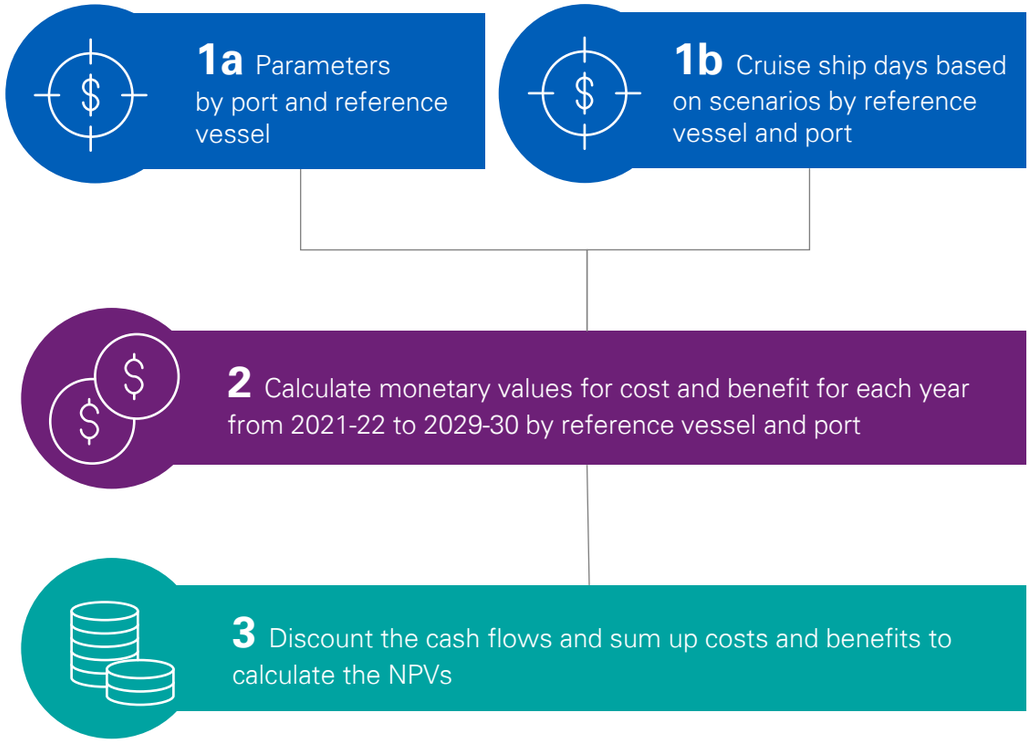
2 Calculate the monetary benefits

This section is the result of combining the outputs of step 1. Each ship day projected for a scenario for a given vessel in a given year is multiplied by the estimated (monetised) benefits for that vessel and port. In this way, the costs and benefits for each scenario year by vessel type and port were estimated.

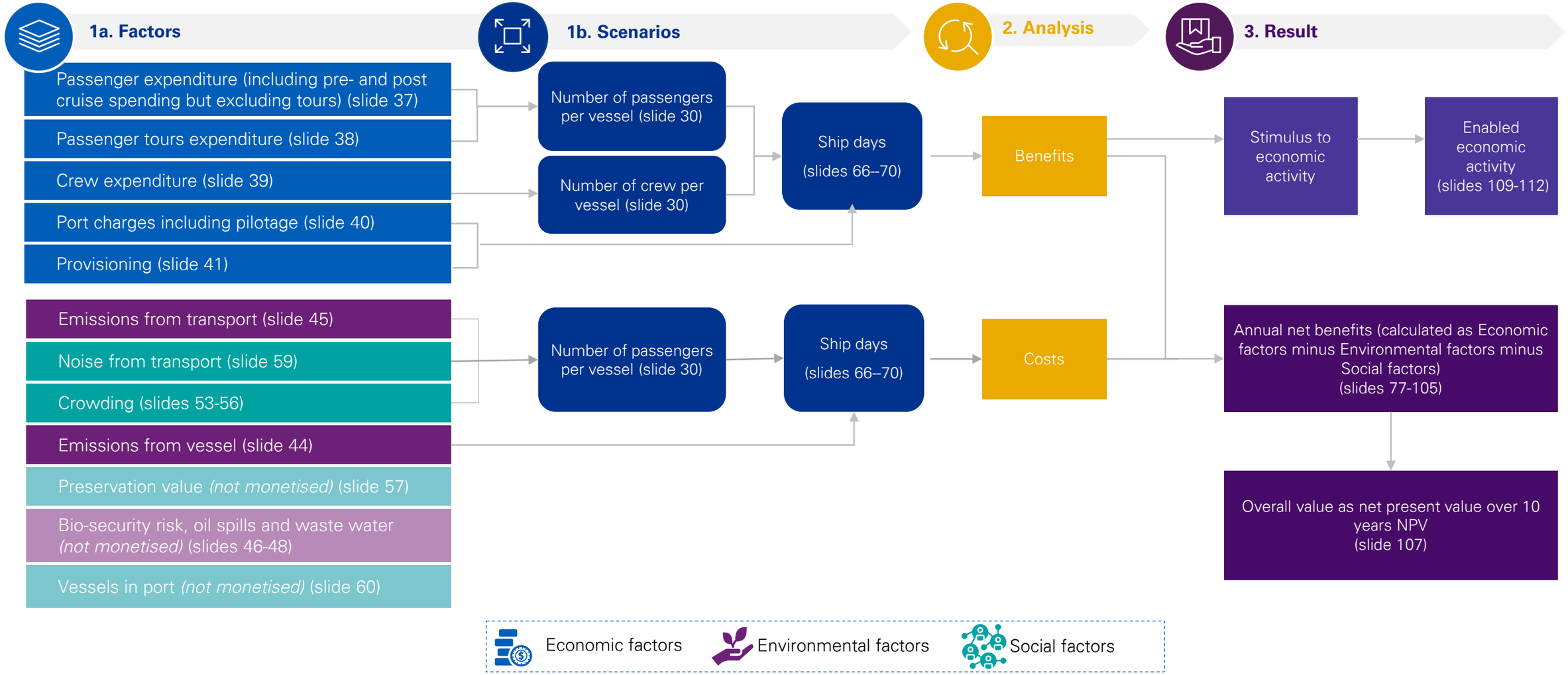
3 Calculate the NPV

Once the cost and benefits are estimated for each model year, the discount rate is applied to the annual values. Then the total costs and benefits across the evaluation period can be summed together resulting in the net present value (see slides 76-105).

Quantification method



Quantification process



Methodology of detailed economic impact in Hobart and Burnie

To further breakdown the benefits in Hobart and Northern Tasmania including Burnie, key relevant economic, environmental, and social benefits were localised by allocating them to inner, intermediate, and outer regions. These areas were determined by considering the travel distance from the port, as seen in slides 35 and 36.

The inner region is defined as within 30 minute walking distance from the port. With only city tours available in this region, as shown on earlier slides, the impacts allocated are port charges, passenger expenditure on retail and hospitality, passenger expenditure pre and post cruise, crew expenditure, and vessel emissions in port.

Hobart Tours	Participation rate	Tour price	Isochrones
Hobart City tour	14%	$642	30 min walking
Bonorong	13%	$155	30 min drive
Bonorong & Richmond	11%	$110	30 min drive
Richmond	9%	$90	30 min drive
Bonorong & Winery & Richmond	8%	$175	30 min drive
Boutique Wine tours	8%	$90	30 min walking
Bonorong & Mt Field	8%	$270	90 min drive
Mt Wellington	8%	$75	30 min drive
Mt Field/Russel Falls & Richmond	6%	$143	30 min drive
Richmond & Winery	5%	$100	30 min drive
Tahune Airwalk	**4%**	**$170**	**90 min drive**
Mt Field/Russel Falls	**2%**	**$148**	**90 min drive**
MONA	1%	$116	30 min drive
Other	6%	$182	NA

Representing the travel horizon of half day tours, the intermediate region is defined as within a 60 minute drive from the port. Slide 35 shows that in Hobart, these would include tours such as MONA and Mount Wellington. With benefit streams that could be applicable to both outer and intermediate regions, the impacts were distributed and weighted by either tour prices or visitation, in order to allocate the benefits to the region:

- Tour price weighted visitation is applied when the benefit stream is driven by price, such as passenger expenditure on tours.
- Visitation is applied when the benefit stream is driven by the number of passengers going to that region and is calculated through their participation rate on tours. Factors weighted by visitation are bus noise cost, bus emission cost and crowding cost.

The outer region is defined as within a 60 to 90 minute drive from the port, and represents the reach of full day tours such as the Cradle Mountain tour from Burnie. These tours participation rates and prices relative to those of the intermediate region are used for allocating benefits to this region.

Burnie Tours	Participation rate	Tour price	Isochrones
Wings Wildlife Park	30%	$108	60 min drive
Burnie highlights tour	8%	$670	30 min walking
Devonport highlights	8%	$132	60 min drive
Gunns Plains tour	7%	$110	60 min drive
Tasting tour	5%	$144	30 min drive
Cradle Mountain	**4%**	**$268**	90 min drive
Gunns Plains tour & Leven Canyon	4%	$105	60 min drive
Rhododendron Gardens	3%	$127	30 min drive
Leven Canyon	1%	$325	60 min drive
Other	8%	$226	NA

Scenario 1: Projection of historical and recent trends

Scenario 1 - Total ship days

The map displays the total ship days for each vessel type across the evaluation period for Scenario 1. From this it is possible to derive the likely frequency that a vessel of the associated class visiting Tasmania would visit a given port or region.

For example, a mid to large ship would (almost) always visit Hobart, but only some of them would visit Burnie and/or Port Arthur. This results in 377 mid to large ship days in Hobart, compared to 226 in Burnie and just 142 in Port Arthur.

Similarly with expedition vessels, Freycinet, Port Davey and Maria Island all see about the same number of ship days, amounting to about half of those expected for Hobart.

The total number of ship days over the evaluation period under this scenario is assumed to be 2,532.

The map also shows the environmentally sensitive areas (in purple) to illustrate the regions which would be most affected by cruise ships in terms of nature and wilderness preservation costs (for details see slide 58). This is particularly the case round Port Davey, Freycinet, King Island and Flinders Island, all of which are most heavily visited by expedition vessels.

Region definitions

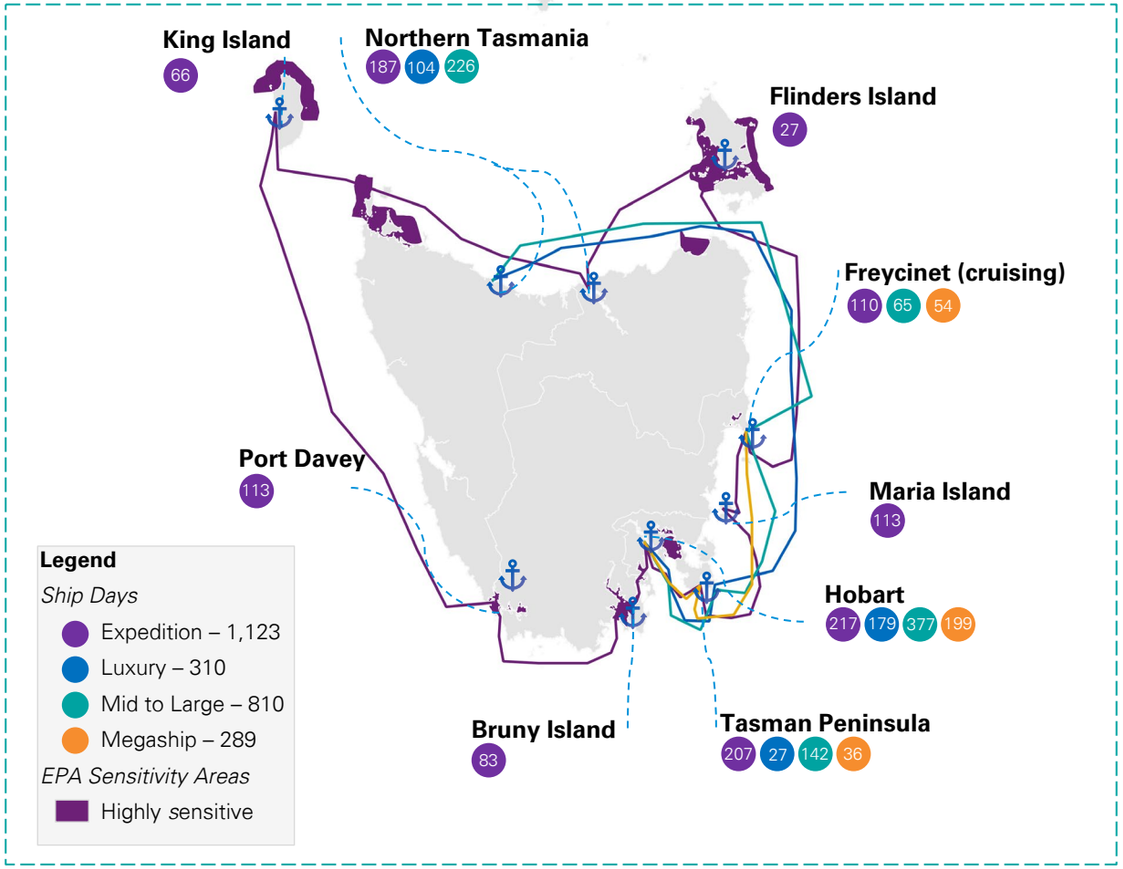
Northern Tasmania includes: Burnie, Port Stanley, Devonport and Inspection Head

Hobart includes Hobart, and Woodbridge and Huon River

Freycinet includes Wineglass Bay, Coles Bay, Bicheno, Swansea, and other Freycinet National Park anchorages

Tasman Peninsula includes Port Arthur and other Tasman Peninsula anchorages.

Total ship days over the evaluation period by region



Scenario 1 - Benefits and costs per voyage (weighted average)

Benefits and costs for a typical voyage

Base on total ship days by vessel and by port in each scenario, a weighted average calculation can be made to estimate the benefits and costs for a typical visit made to Tasmania.

In Scenario 1, the net benefit per voyage is highest for the mid to large vessels and lowest for the expedition ships. Visiting a limited number of main ports, mid to large vessels have a relatively large passenger base which sees passenger expenditure far outweigh any social and environmental costs. While expedition passengers may spend more per passenger, the relatively few passengers per ship and the focus on remote destinations sees a lower net benefit per voyage.

Megaships, while having a large passenger base, have a lower spend per passenger than mid to large or luxury ships. This explains the relatively lower net benefit per voyage for megaships.

Net benefits per passenger per voyage (undiscounted)	Expedition	Luxury	Mid to large	Megaship
Passengers on board	86	605	2,041	3,430
Economic contribution	$3,498	$712	$324	$153
Environmental costs	-$142	-$48	-$56	-$34
Social costs	-$211	-$7	-$4	-$2
Net benefits	**$3,145**	**$657**	**$264**	**$117**

Results are displayed for a typical voyage (weighted average) for each type of vessel under Scenario 1.

Net benefits per voyage (undiscounted)	Expedition	Luxury	Mid to large	Megaship
Economic contribution	**$300,854**	**$430,476**	**$662,015**	**$524,740**
Port Charges incl. pilotage	$18,596	$38,507	$113,133	$104,332
Pax expenditure pre/post cruise	$60,217	$0	$0	$0
Pax expenditure on tours	$75,697	$114,641	$67,848	$54,983
Pax expenditure (retail and hospitality)	$43,412	$221,091	$409,264	$270,571
Crew expenditure	$869	$13,782	$33,813	$31,064
Provisioning	$102,063	$42,454	$37,958	$63,789
Environmental costs	**-$12,222**	**-$28,879**	**-$113,750**	**-$115,631**
Bus emissions	-$9	-$24	-$90	-$78
Vessel emissions	-$12,213	-$28,855	-$113,661	-$115,553
Social costs	**-$18,126**	**-$4,167**	**-$8,435**	**-$6,330**
Crowding costs	-$18,120	-$4,149	-$8,367	-$6,271
Bus noise costs	-$7	-$18	-$68	-$59
Net benefits	**$270,506**	**$397,431**	**$539,830**	**$402,779**

Scenario 1 - value contribution overview

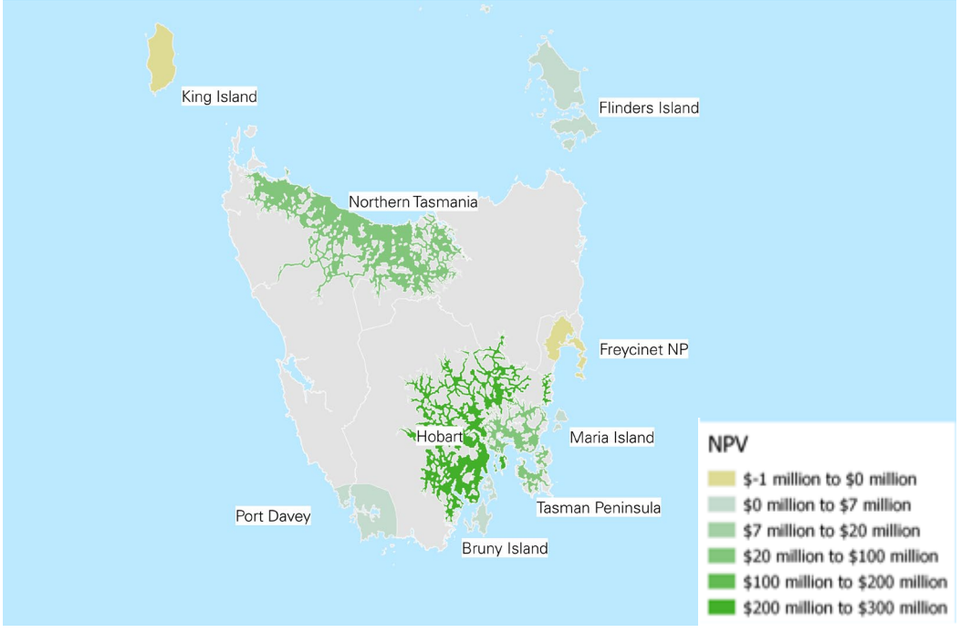
Total benefit ($ millions)

Results are displayed as a net present value (NPV) at a 7% discount rate. Evaluation period is from 2020-21 to 2029-30

	Expedition	Luxury	Mid to large	Megaship	Total
Economic contribution	**$47.0**	**$55.4**	**$179.6**	**$75.2**	**$357.3**
Port Charges incl. pilotage	$2.9	$5.0	$30.7	$15.0	$53.5
Pax expenditure pre/post cruise	$9.4	$0.0	$0.0	$0.0	$9.4
Pax expenditure on tours	$11.8	$14.8	$18.4	$7.9	$52.9
Pax expenditure (retail and hospitality)	$6.8	$28.5	$111.1	$38.8	$185.1
Crew expenditure	$0.1	$1.8	$9.2	$4.5	$15.5
Provisioning	$15.9	$5.5	$10.3	$9.1	$40.8
Environmental costs	**-$1.9**	**-$3.7**	**-$30.9**	**-$16.6**	**-$53.1**
Bus emissions	$0.0	$0.0	$0.0	$0.0	$0.0
Vessel emissions	-$1.9	-$3.7	-$30.8	-$16.6	-$53.0
Social costs	**-$2.8**	**-$0.5**	**-$2.3**	**-$0.9**	**-$6.6**
Crowding costs	-$2.8	-$0.5	-$2.3	-$0.9	-$6.5
Bus noise costs	$0.0	$0.0	$0.0	$0.0	$0.0
Net benefits	**$42.2**	**$51.2**	**$146.5**	**$57.7**	**$297.6**

The results shown on this slide present the overall findings for Scenario 1. This scenario sees net benefits of $297.6 million over the evaluation period. The economic benefits, generated predominantly around the urban areas, outweigh the social and environmental costs. The more remote areas, such as King Island, Flinders Island and Freycinet National Park tend to have net negative impacts, mainly due to crowding and vessel emissions. Mid to large ships, which have the largest share of ship days also make up the largest share of the benefits.

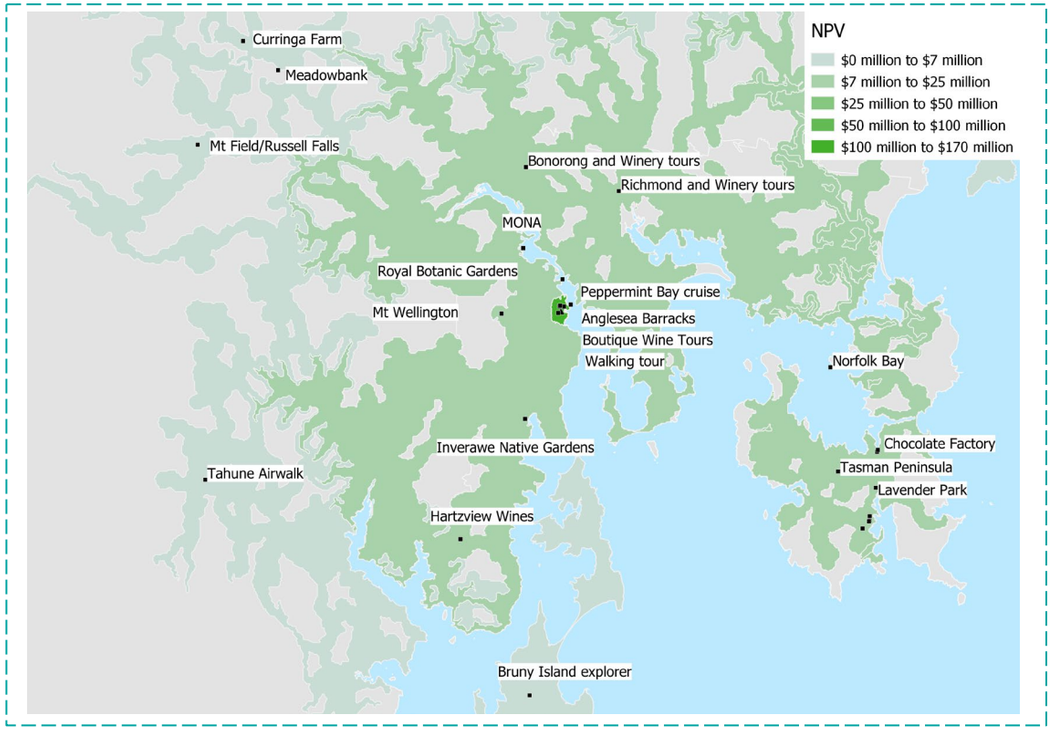
Net benefit by region



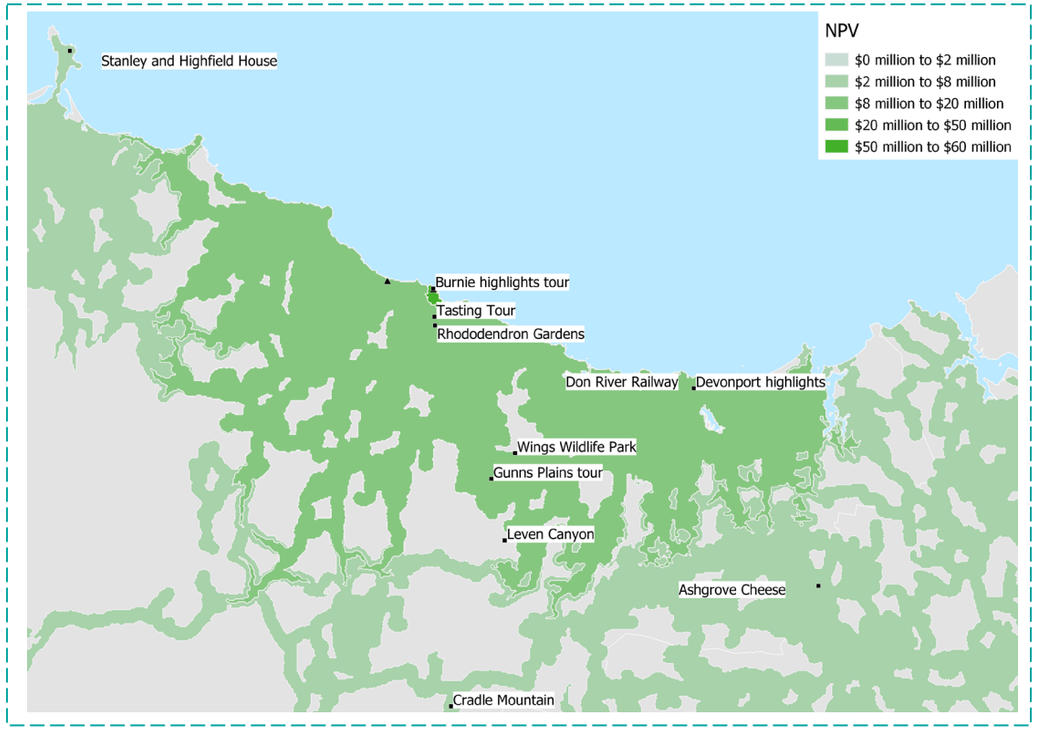
Scenario 1 - passenger spending patterns

Under Scenario 1 the majority of ship days are associated with visits from mid to large or expedition vessels. The regions for the maps below have been defined by the travel time from port thresholds developed in slides 35 and 36. In Hobart and Northern Tasmania (centred on Burnie), the inner region generates the most economic benefits through port charges, crew expenditures, and passenger expenditure on shore. In Hobart, the outer region generates $4 to $5 million in benefits through tour expenditures and the intermediate region in Hobart generates around $14 to $15 million in benefits. In Northern Tasmania, the intermediate region generates around $7 to $9 million benefits, primarily through tour expenditure. There are very few tours associated with the outer region of Northern Tasmania and hence the outer region of Northern Tasmania generates lower benefits at around $2 to $4 million.

Hobart

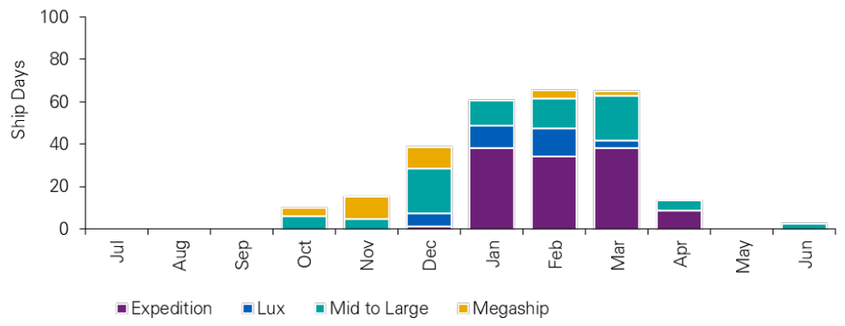


Northern Tasmania



Scenario 1 - benefit seasonality in a typical year

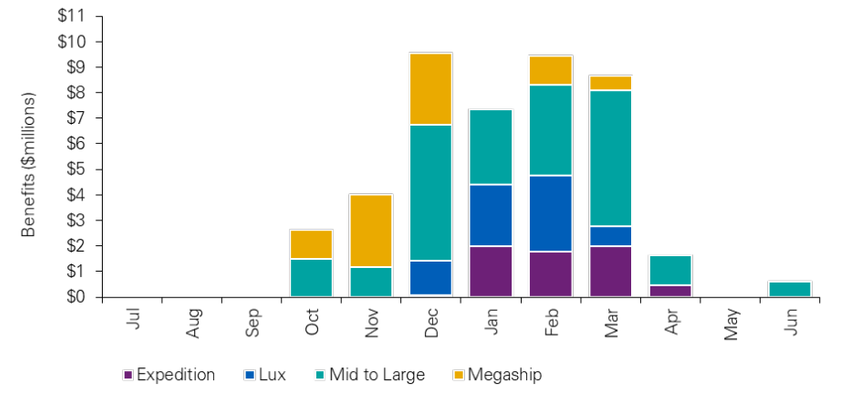
Ship days (based on 2022-23) - all ports



The majority of cruise visits are from expedition and mid to large ships.

- **Ship days to all ports start from:** October.
- **Ship days to all ports peak:** January to March.
- **Market segment description:** Mid to large ships and megaships start their visitation season in October, followed by expedition ships and luxury ships in December. The January to March peak season applies to all market segments, except for megaships. They tend to have the highest visitation frequency in November and December, dropping off from December.
- **After the peak season:** only expedition and mid to large ships visit Tasmania in April and June.

Net benefit (based on 2022-23) - all ports



Mid to large vessels generate the majority of the benefits

Applying the seasonal pattern to the net benefits presented above, the contribution of each market segment can be determined:

- Mid to large ships generate about half of the benefits. While expedition ships account for almost half of the ship days, their net benefit contribution is relatively small.
- Total benefits peak in December in contrast to the peak of visitations in February. This is because there are more mid to large ships and megaship days in December, compared to February which has more expedition visits.

Scenario 2: Local increase in expedition ships

Scenario 2 - Total ship days

This map shows the total number of ship days under Scenario 2 over the evaluation period. The increase in expedition vessels within Tasmania has been reflected in their increased number of ship days. With two more expedition ships deployed to Tasmania conducting at least 12 cruises each season, associated ship days under this scenario are substantially higher than Scenario 1.

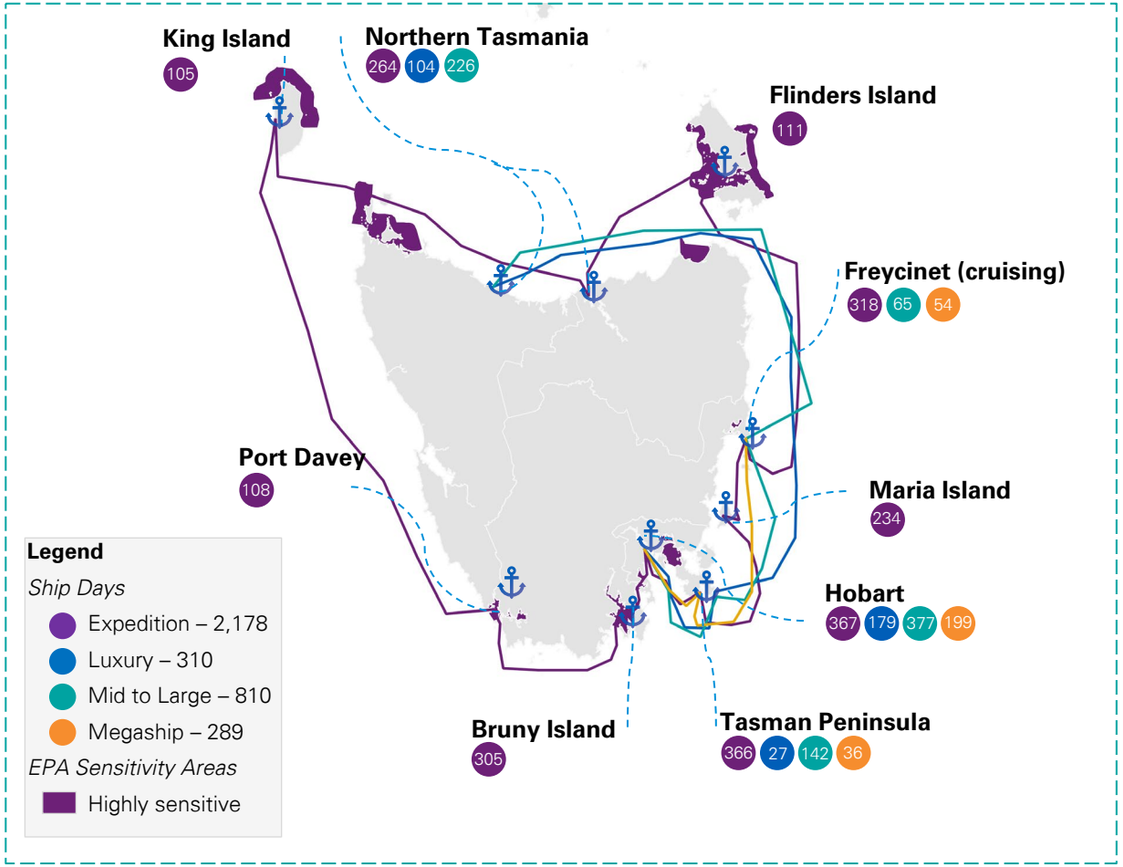
The higher ship days impacts the main ports as well as some the smaller anchorages, which would see a large increase in the number of expedition ship days. Vessels would be homeported in Hobart and would in turn increase visitation numbers in these popular anchorages. Many of these anchorages are located in areas that the EPA identifies as environmentally sensitive (Tasmania EPA LISTmaps, 2021).

It is important to note that based on consultation findings, Port Davey remains a restricted area to additional operators and does not experience the same increase in expedition ship days as the rest of Tasmania.

Luxury, mid to large and megaship volumes remain unchanged compared to Scenario 1.

The total number of ship days over the evaluation period under this scenario is assumed to be 3,587.

Total ship days over the evaluation period by region



Scenario 2 - Benefits and costs per voyage (weighted average)

Benefits and costs for one typical voyage

The net benefit for a typical voyage under Scenario 2 is displayed in the table. When compared to Scenario 1, only the profile for expedition vessels has changed. Ship days for the other vessel types do not change in this scenario so the net benefit per voyage remains the same.

For expedition vessels, the deployment of two additional vessels to Tasmania under this scenario results in more ship days. Crucially, the ports and anchorages visited by the additional vessels varies as compared to the expedition vessels already cruising in Tasmania. For example, based on stakeholder consultations, it is assumed that the new vessels would not be able to visit Port Davey.

In this scenario, pre and post-cruise passenger expenditure is higher than Scenario 1. This is because this scenario assumes that the additional expedition vessels will be home-ported at Hobart. In contrast, Scenario 1 is based on historical ship days, which includes some expedition vessels (such as Ponant) who do not homeport at Hobart. As such, the pre and post-cruise expenditure increases in this scenario.

Net benefits per passenger per voyage (undiscounted)	Expedition	Luxury	Mid to large	Megaship
Passengers on board	86	605	2,041	3,430
Economic contribution	$3,680	$712	$324	$153
Environmental costs	-$162	-$48	-$56	-$34
Social costs	-$225	-$7	-$4	-$2
Net benefits	**$3,293**	**$657**	**$264**	**$117**

Results are displayed for a typical voyage (weighted average) for each type of vessel under Scenario 2

Net benefits per voyage (undiscounted)	Expedition	Luxury	Mid to large	Megaship
Economic contribution	**$316,475**	**$430,476**	**$662,015**	**$524,740**
Port Charges incl. pilotage	$18,247	$38,507	$113,133	$104,332
Pax expenditure pre/post cruise	$75,934	$0	$0	$0
Pax expenditure on tours	$84,936	$114,641	$67,848	$54,983
Pax expenditure (retail and hospitality)	$34,648	$221,091	$409,264	$270,571
Crew expenditure	$646	$13,782	$33,813	$31,064
Provisioning	$102,063	$42,454	$37,958	$63,789
Environmental costs	**-$13,905**	**-$28,879**	**-$113,750**	**-$115,631**
Bus emissions	-$10	-$24	-$90	-$78
Vessel emissions	-$13,895	-$28,855	-$113,661	-$115,553
Social costs	**-$19,335**	**-$4,167**	**-$8,435**	**-$6,330**
Crowding costs	-$19,328	-$4,149	-$8,367	-$6,271
Bus noise costs	-$7	-$18	-$68	-$59
Net benefits	**$283,235**	**$397,431**	**$539,830**	**$402,779**

Scenario 2 - value contribution overview

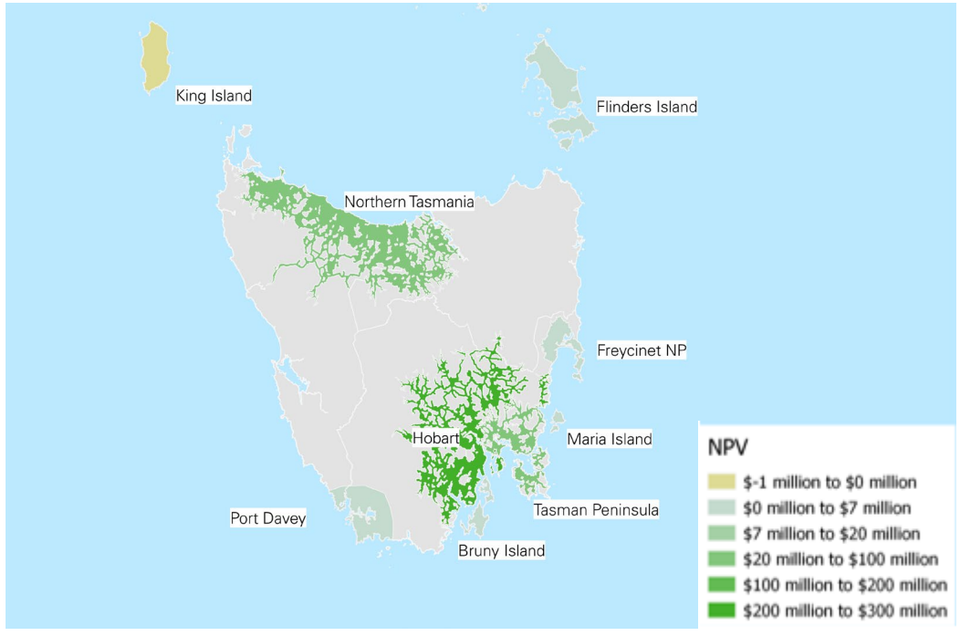
Total benefit ($ millions)

Results are displayed as a net present value (NPV) at a 7% discount rate. Evaluation period is from 2020-21 to 2029-30

	Expedition	Luxury	Mid to large	Megaship	Total
Economic contribution	**$81.8**	**$55.4**	**$179.6**	**$75.2**	**$392.1**
Port Charges incl. pilotage	$4.7	$5.0	$30.7	$15.0	$55.3
Pax expenditure pre/post cruise	$19.7	$0.0	$0.0	$0.0	$19.7
Pax expenditure on tours	$22.0	$14.8	$18.4	$7.9	$63.1
Pax expenditure (retail and hospitality)	$8.9	$28.5	$111.1	$38.8	$187.2
Crew expenditure	$0.2	$1.8	$9.2	$4.5	$15.6
Provisioning	$26.3	$5.5	$10.3	$9.1	$51.2
Environmental costs	**-$3.6**	**-$3.7**	**-$30.9**	**-$16.6**	**-$54.8**
Bus emissions	$0.0	$0.0	$0.0	$0.0	$0.0
Vessel emissions	-$3.6	-$3.7	-$30.8	-$16.6	-$54.7
Social costs	**-$5.0**	**-$0.5**	**-$2.3**	**-$0.9**	**-$8.7**
Crowding costs	-$5.0	-$0.5	-$2.3	-$0.9	-$8.7
Bus noise costs	$0.0	$0.0	$0.0	$0.0	$0.0
Net benefits	**$73.2**	**$51.2**	**$146.5**	**$57.7**	**$328.6**

Scenario 2 has a net benefit of $328.6 million over the evaluation period. This is higher than Scenario 1 because this scenario sees an overall increase in the number of ship days from the increase in expedition cruises. Visually, there is very little change in the regional distribution of benefits compared to Scenario 1 because expedition vessels have a relatively low overall impact. This is the case even though expedition ship days are almost twice as high as Scenario 1.

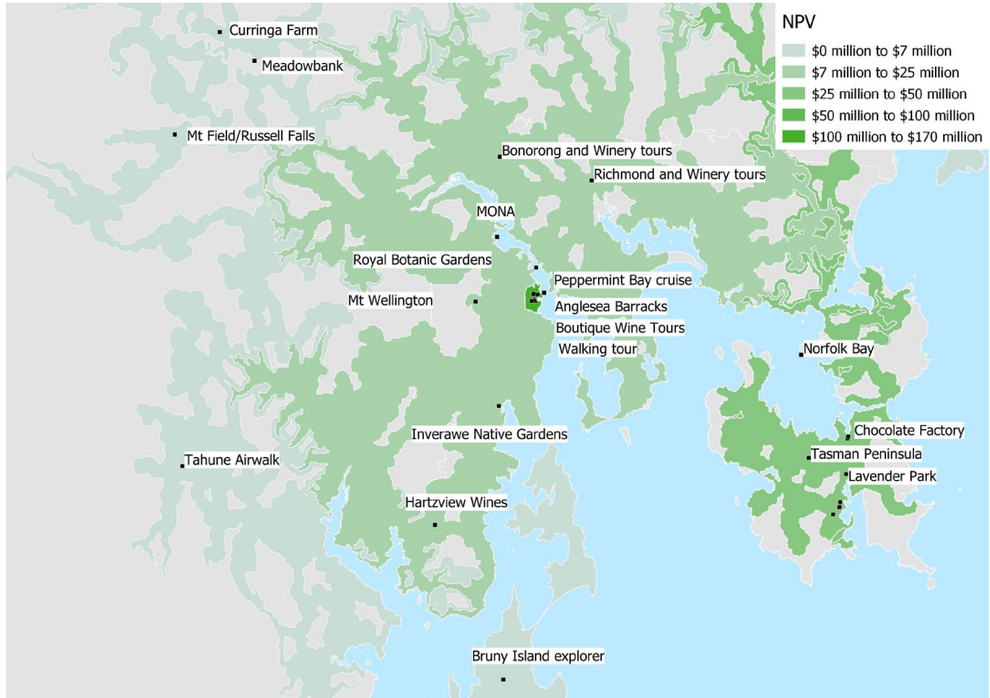
Net benefit by region



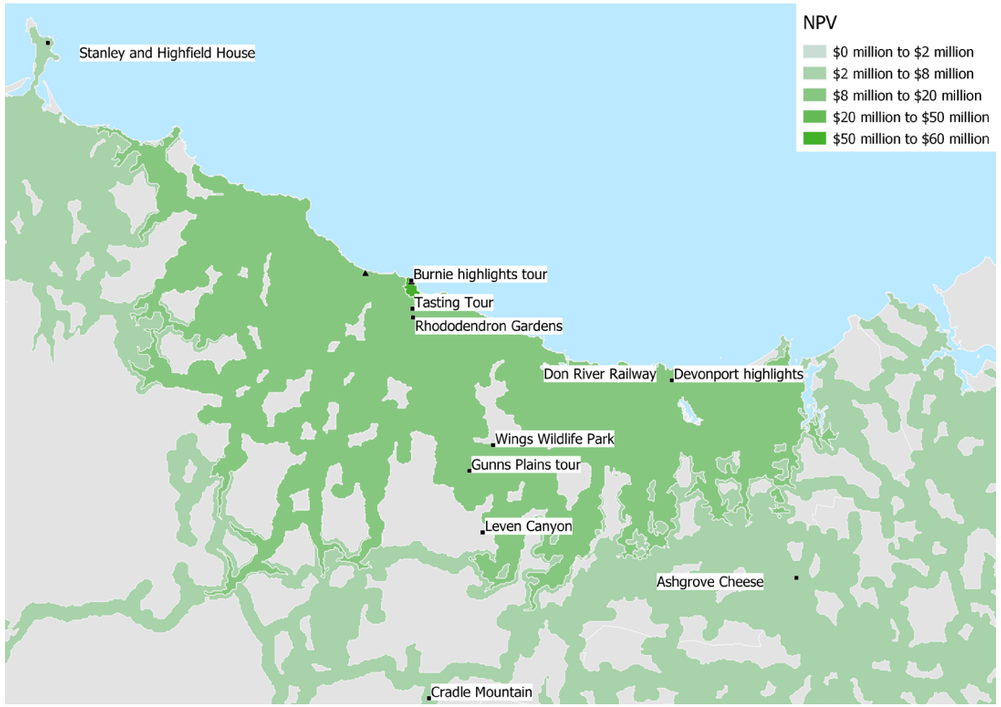
Scenario 2- passenger spending patterns

For Scenario 2, in all three regions in Hobart, the maps show a higher expenditure compared to Scenario 1. Generally, expedition passengers have a higher pre and post cruise expenditure, as well as higher expenditure on tours as the cruise focuses on the destination as the experience. In Northern Tasmania, there is an increased benefit of $1 million compared to Scenario 1 in the inner and intermediate region. This is also due to a higher tour expenditure from expedition passengers, and with most tours concentrated in the intermediate region.

Hobart

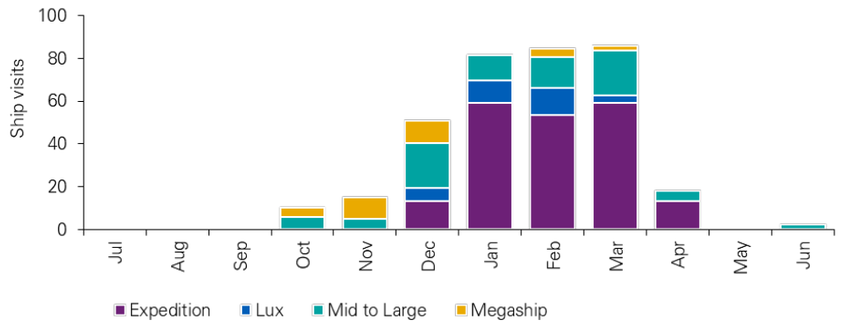


Northern Tasmania



Scenario 2 - benefit seasonality in a typical year

Ship days (based on 2022-23) - all ports

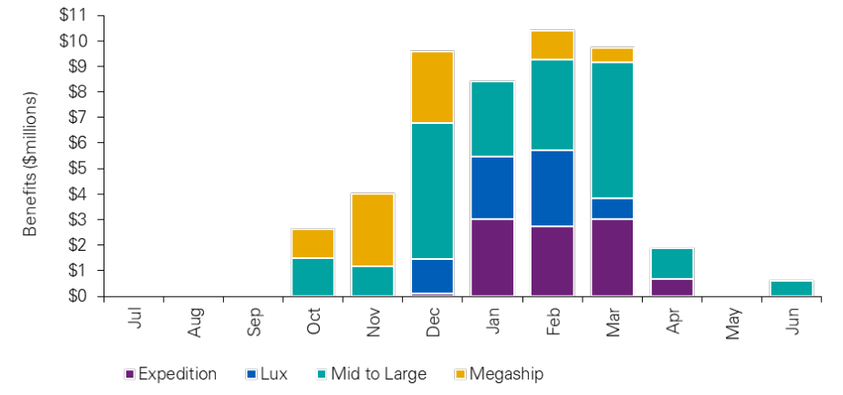


Expedition have the largest share of ship days.

The majority of cruise visits are from expedition and mid to large ships.

- **Ship days to all ports start from:** October.
- **Ship days to all ports peak:** January to March.
- **Market segment description:** While the seasonality for expedition ships is the same as Scenario 1, there is a large increase in ship days, particularly from January to March. During the expedition ships' peak season, expedition ship days are expected to increase from around 40 ship days per month to around 60 ship days per month relative to Scenario 1. The other vessel segment visits remain unchanged to Scenario 1.

Net benefit (based on 2022-23) - all ports



Net benefits from expedition ships increase compared to Scenario 1, but are still far outweighed by those of the larger cruise ships.

Compared to Scenario 1, the overall contribution of each market segment sees little change.

- Expedition ships' net benefit contribution is still relatively small due to the passenger capacity. Mid to large ships generate almost half the benefits during the overall peak season from December to March.
- Total benefits peak in February, which sees fewer expedition visits than January and March, although all three months see a similar number of visits overall.

Scenario 3: Global trend of increasing ship size

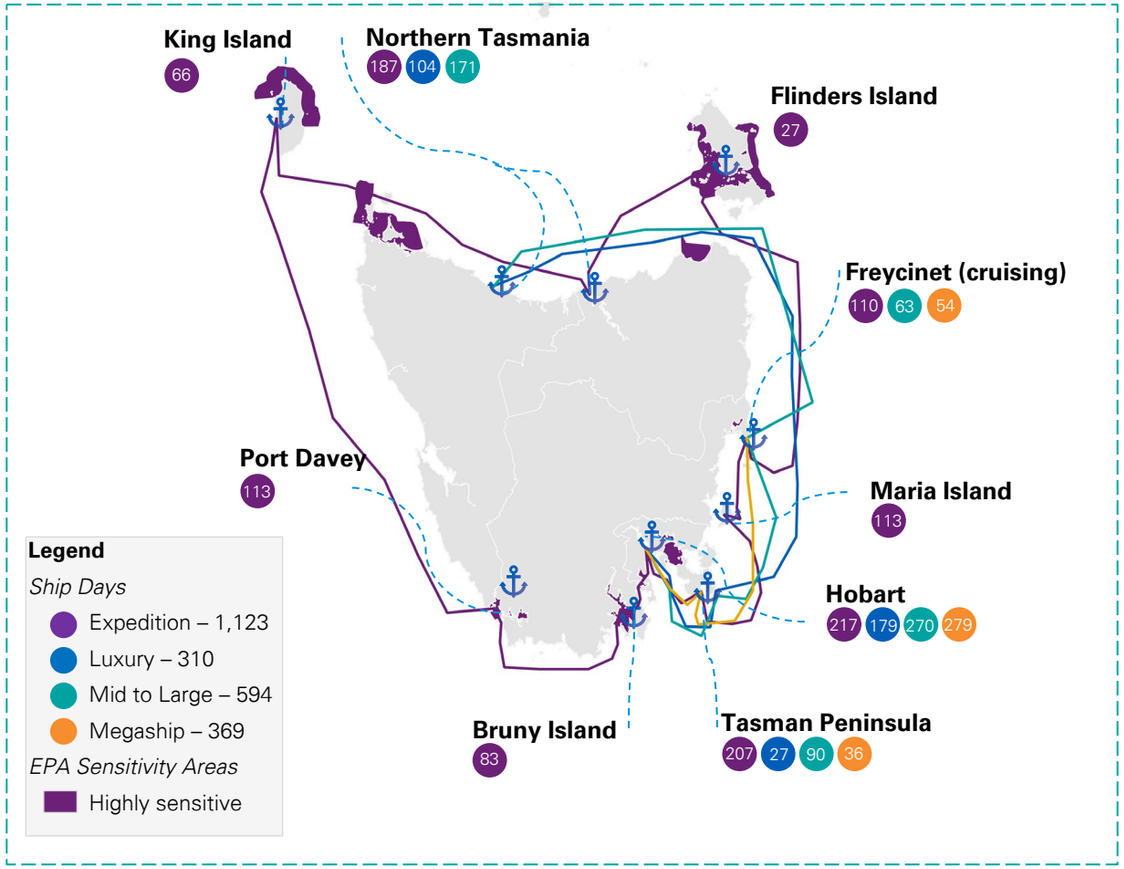
Scenario 3 - Total ship days

This map shows the total number of annual ship days under Scenario 3 in over the evaluation period. Hobart sees fewer mid to large ship days than Scenario 1 but this is balanced by an increase in megaship days. In comparison, Port Arthur and Burnie see lower ship days because megaships are less likely to frequent these ports. In particular, this trend would impact Burnie as the port is currently unable to cater for megaships.

There is very no change in expedition and luxury ship visits compared Scenario 1.

The total number of ship days over the evaluation period under this scenario is assumed to be 2,396.

Total ship days over the evaluation period by region



Scenario 3 - Benefits and costs per voyage (weighted average)

Benefits and costs for one typical voyage

Under this scenario, the share of megaship ship days increases at the expense of mid to large vessels, although mid to large vessels will continue to make up a large part of the Tasmanian cruise market.

The net benefit per voyage to Tasmania sees minimal change for megaships and mid to large ships when compared to Scenario 1. This is because the visitation patterns of each vessel type do not change.

This scenario sees no change in expedition and luxury vessel typical voyage, and the net benefits are the same as Scenario 1.

Net benefits per passenger per voyage (undiscounted)	Expedition	Luxury	Mid to large	Megaship
Passengers on board	86	605	2,041	3,430
Economic contribution	$3,498	$712	$325	$150
Environmental costs	-$142	-$48	-$56	-$32
Social costs	-$211	-$7	-$4	-$2
Net benefits	**$3,145**	**$657**	**$265**	**$116**

Results are displayed for a typical voyage (weighted average) for each type of vessel under Scenario 3

Net benefits per voyage (undiscounted)	Expedition	Luxury	Mid to large	Megaship
Economic contribution	**$300,854**	**$430,476**	**$663,300**	**$513,428**
Port Charges incl. pilotage	$18,596	$38,507	$114,875	$103,270
Pax expenditure pre/post cruise	$60,217	$0	$0	$0
Pax expenditure on tours	$75,697	$114,641	$65,692	$47,472
Pax expenditure (retail and hospitality)	$43,412	$221,091	$410,714	$268,437
Crew expenditure	$869	$13,782	$34,061	$30,460
Provisioning	$102,063	$42,454	$37,958	$63,789
Environmental costs	**-$12,222**	**-$28,879**	**-$114,177**	**-$109,989**
Bus emissions	-$9	-$24	-$94	-$73
Vessel emissions	-$12,213	-$28,855	-$114,082	-$109,917
Social costs	**-$18,126**	**-$4,167**	**-$8,357**	**-$5,891**
Crowding costs	-$18,120	-$4,149	-$8,286	-$5,836
Bus noise costs	-$7	-$18	-$71	-$55
Net benefits	**$270,506**	**$397,431**	**$540,766**	**$397,548**

Scenario 3 - value contribution overview

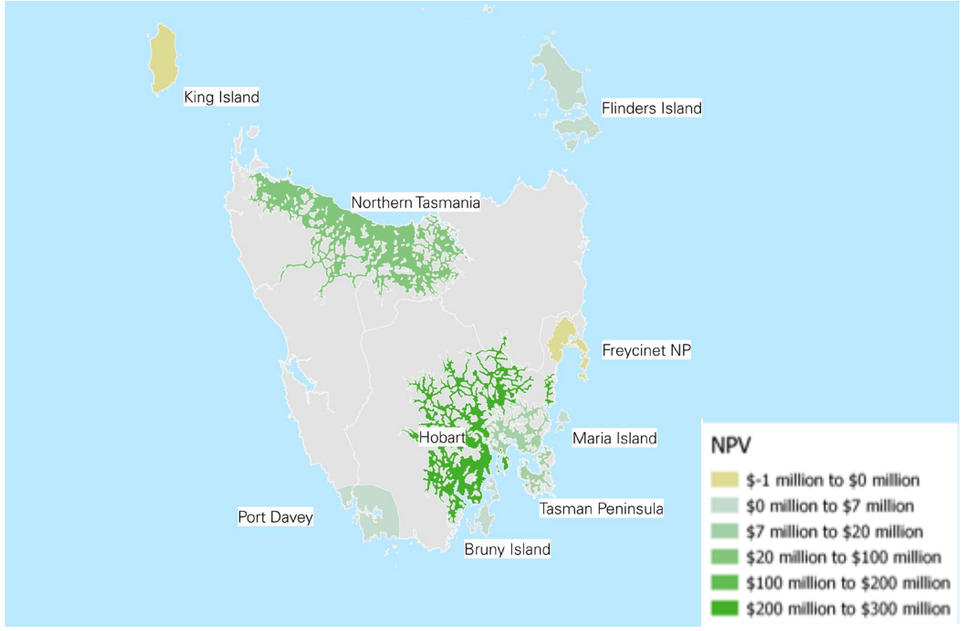
Total benefit ($ millions)

Results are displayed as a net present value (NPV) at a 7% discount rate. Evaluation period is from 2020-21 to 2029-30

	Expedition	Luxury	Mid to large	Megaship	Total
Economic contribution	**$47.0**	**$55.4**	**$133.5**	**$100.7**	**$336.6**
Port Charges incl. pilotage	$2.9	$5.0	$23.0	$20.3	$51.2
Pax expenditure pre/post cruise	$9.4	$0.0	$0.0	$0.0	$9.4
Pax expenditure on tours	$11.8	$14.8	$13.3	$9.3	$49.2
Pax expenditure (retail and hospitality)	$6.8	$28.5	$82.6	$52.6	$170.5
Crew expenditure	$0.1	$1.8	$6.8	$6.0	$14.7
Provisioning	$15.9	$5.5	$7.6	$12.5	$41.6
Environmental costs	**-$1.9**	**-$3.7**	**-$23.0**	**-$21.6**	**-$50.2**
Bus emissions	$0.0	$0.0	$0.0	$0.0	$0.0
Vessel emissions	-$1.9	-$3.7	-$22.9	-$21.6	-$50.1
Social costs	**-$2.8**	**-$0.5**	**-$1.7**	**-$1.2**	**-$6.2**
Crowding costs	-$2.8	-$0.5	-$1.7	-$1.1	-$6.2
Bus noise costs	$0.0	$0.0	$0.0	$0.0	$0.0
Net benefits	**$42.2**	**$51.2**	**$108.8**	**$78.0**	**$280.2**

Scenario 3 has a net benefit of $280.2 million over the evaluation period, which is slightly lower than Scenario 1. The increase in megaships ship days and corresponding reduction in mid to large ship days sees an overall reduction in the NPV. This is because passengers in the mid to large class bring slightly higher economic benefits (higher expenditure) with fewer of the disbenefits, such as higher levels of crowding or vessel emissions.

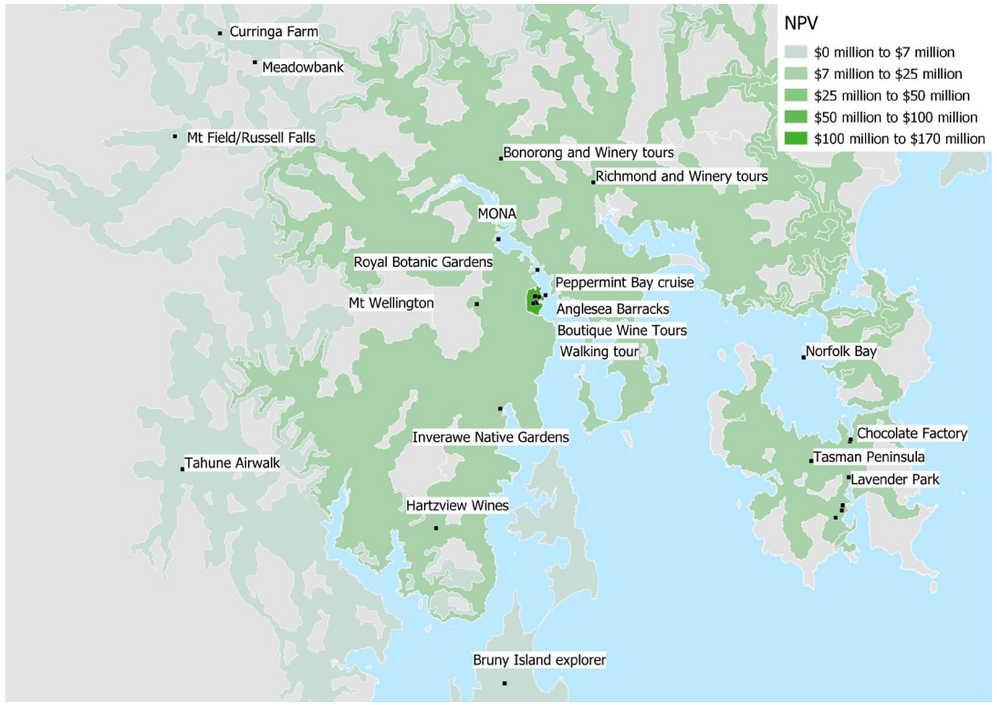
Net benefit by region



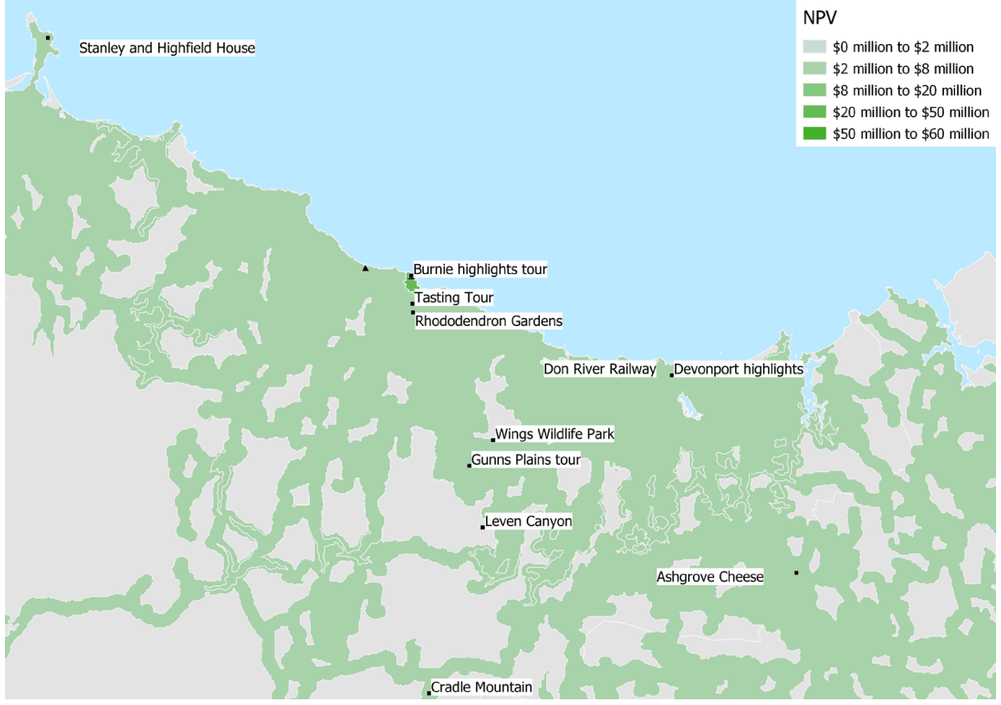
Scenario 3 - passenger spending patterns

Scenario 3 shows the spending patterns following the global trend of increasing ship size. The benefit impacts are relatively similar to Scenario 1 in Hobart and Burnie. It is worth noting that currently Hobart and Burnie mainly have mid to large and megaships visiting, hence this scenario is similar to Scenario 1. There are less economic benefits relative to Scenario 1, as passengers from larger ships tend to spend less on tours.

Hobart

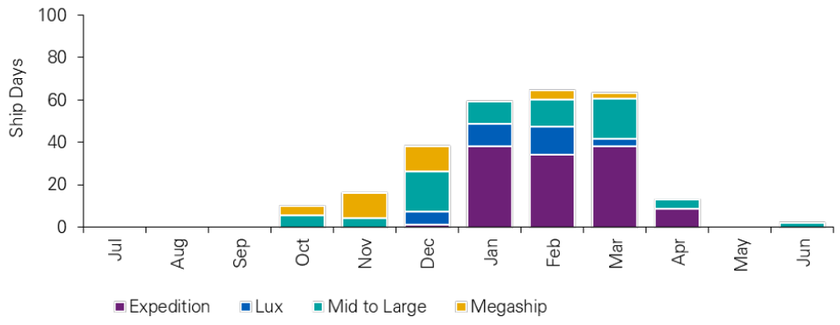


Northern Tasmania



Scenario 3 - benefit seasonality in a typical year

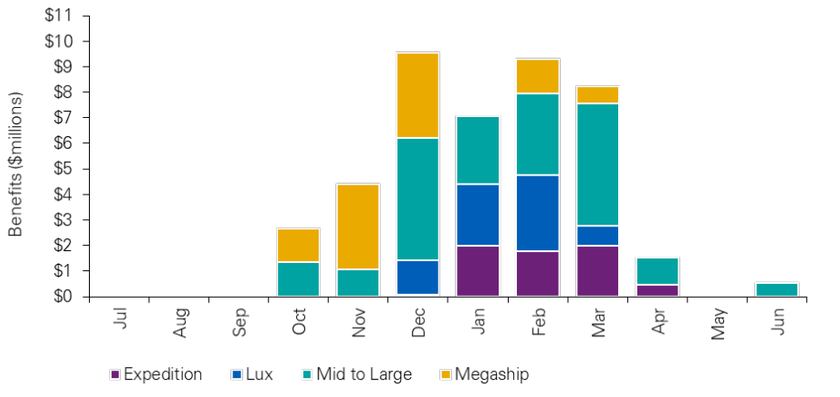
Ship days (based on 2022-23) - all ports



Even with a reduction in mid to large ships in favour of megaships, expedition and mid to large remain the dominant segments.

- **Ship days to all ports start from:** October.
- **Ship days to all ports peak:** January to March.
- **Market segment description:** Relative to Scenario 1, there are a few more megaships visiting and some mid to large ships phasing out. As the global trend of increasing ship size will slowly ramp up, the associated increase in larger ships will not be visible until later years. Megaships are assumed to continue to follow its seasonality pattern of having the highest visitations in November and December, and drop off after.
- **After the peak season:** only expedition and mid to large ships visit Tasmania in April and June.

Net benefit (based on 2022-23) - all ports

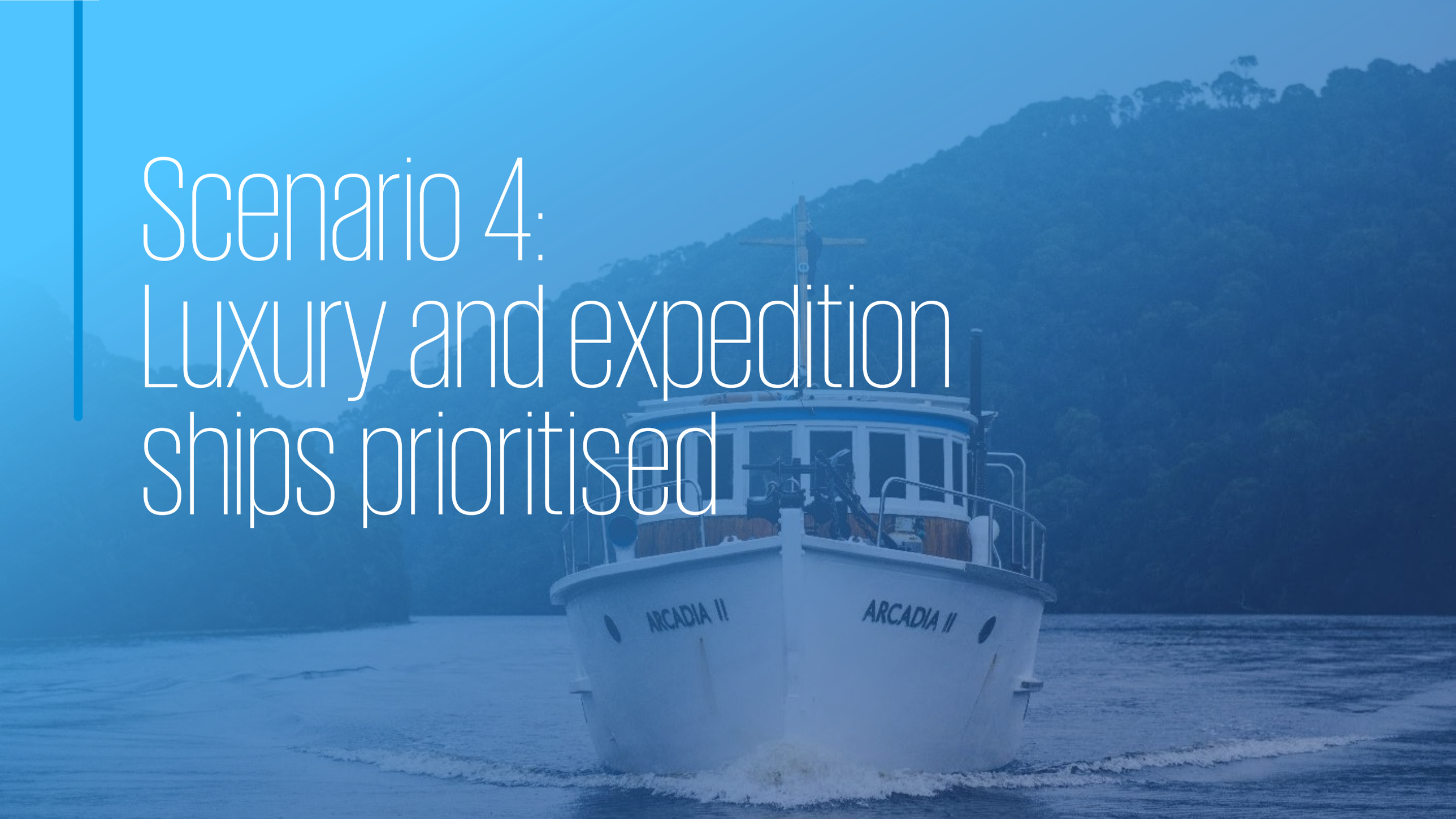


The increase in benefits from megaships, particularly in November and December, is offset by a decrease in benefits from mid to large ships.

The benefits are slightly lower than Scenario 1.

- Mid to large ships generate $2 million less benefits compared to Scenario 1 as some of this segment is replaced by megaships
- The increase in megaship visits results in an increase in $1.5 million in benefits compared to Scenario 1.
- The highest benefits is again seen in December where there is a highest number of mid to large and megaships combined.

Scenario 4: Luxury and expedition ships prioritised



Scenario 4 - Total ship days

This map shows the total number of ship days under Scenario 4 across the evaluation period. It investigates the impact of prioritising the expedition and luxury ships, which results in a reduction in ship days for mid to large ships and megaships. Megaships would no longer visit Tasmania, and ship days for mid to large ships would be capped. However, this scenario does not project any increase in ship days for luxury or expedition vessels. As a result, overall ship days would be lower than Scenario 1.

This could have further reaching effects as Hobart is the only Tasmanian port able to receive international cruise ships. A restriction imposed on ship days for a given vessel type, particularly larger vessels that tend to travel internationally, has the potential to create demand bottlenecks, and itineraries could become less flexible.

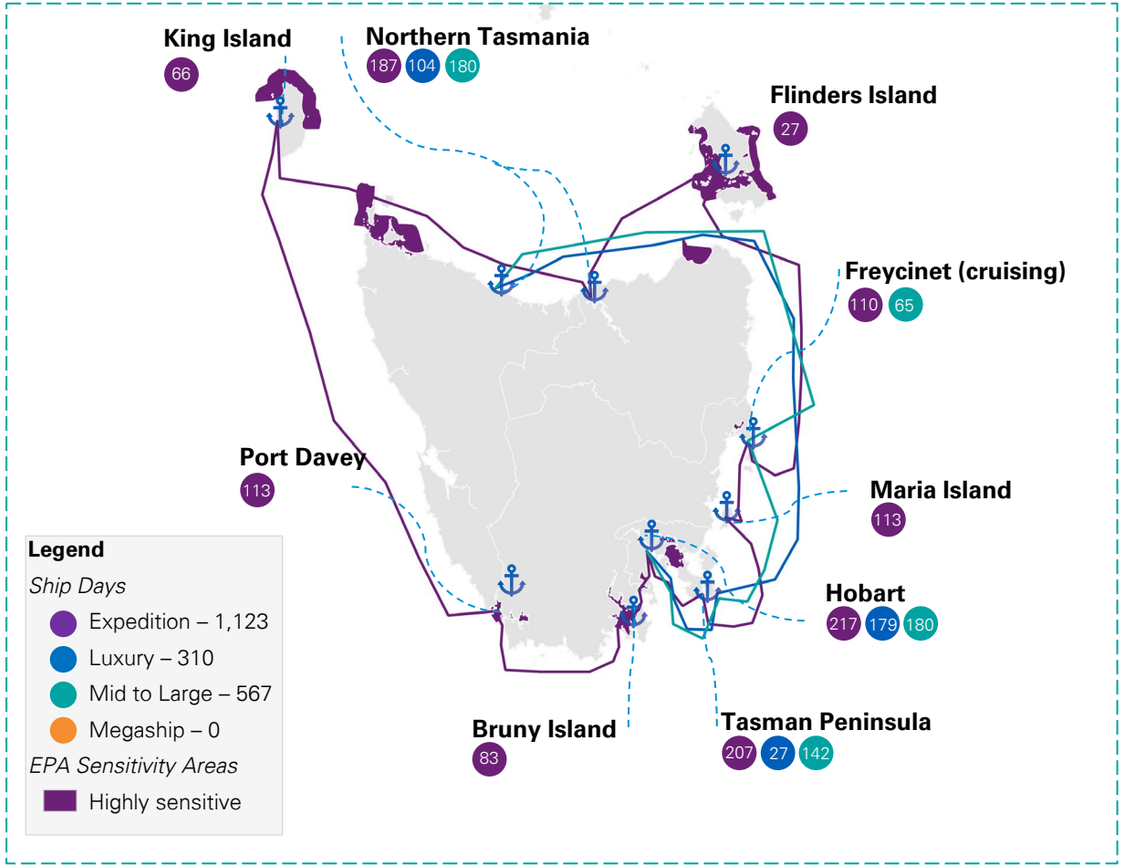
Burnie is only affected by the cap on mid to large ships as it is already unable to cater towards megaships. However, the cap does reduce the number of ship days to Burnie for mid to large ships to just 20 per year, which would otherwise be higher.

Port Arthur is less affected, as the annual cap on mid to large ships exceeds its annual mid to large ship days.

Scenario 4 has similar numbers of ship days as Scenario 1 for the regional ports and anchorages. This is expected as they currently do not see mid to large ships or megaships and would hence be unaffected by the policy.

The total number of ship days over the evaluation period under this scenario is assumed to be 2,000.

Total ship days over the evaluation period by region



Scenario 4 - Benefits and costs per voyage (weighted average)

Benefits and costs for one typical voyage

Although there is a cap of 20 mid to large ships per port, the net benefits per voyage increases substantially compared to Scenario 1. This is result of the cap of 20 ship days per year. Without the cap, Hobart would see almost twice as many visits as Burnie. With the cap, both ports see 20 visits. As a consequence, when averaging out the ship days for a typical voyage, a mid to large ship is assumed to visit both Burnie and Hobart 100 per cent of the time. In reality, this might not be the case, with some mid to large ships visiting just Burnie and some visiting just Hobart, but the overall net benefit would be the same, as the cap of 20 ship days at each port is still reached.

Port Arthur is not affected by the cap as it is not projected to have more than 20 mid to large ships in Scenario 1. However, as a ratio compared to ship days in Hobart, it would be frequented more often in typical voyage of a mid to large ship Scenario 4 than Scenario 1.

The net benefit for a typical voyage is reduced to zero for megaships as this vessel type would not visit Tasmania under this scenario.

Expedition and luxury vessel will have the same net benefits as Scenario 1 as its ship days are assumed to remain the same.

Net benefits per passenger per voyage (undiscounted)	Expedition	Luxury	Mid to large	Megaship
Passengers on board	86	605	2,041	3,430
Economic contribution	$3,498	$712	$417	$0
Environmental costs	-$142	-$48	-$80	$0
Social costs	-$211	-$7	-$6	$0
Net benefits	**$3,145**	**$657**	**$331**	**$0**

Results are displayed for a typical voyage (weighted average) for each type of vessel under Scenario 4

Net benefits per voyage (undiscounted)	Expedition	Luxury	Mid to large	Megaship
Economic contribution	**$300,854**	**$430,476**	**$851,279**	**$0**
Port Charges incl. pilotage	$18,596	$38,507	$145,995	$0
Pax expenditure pre/post cruise	$60,217	$0	$0	$0
Pax expenditure on tours	$75,697	$114,641	$105,092	$0
Pax expenditure (retail and hospitality)	$43,412	$221,091	$517,774	$0
Crew expenditure	$869	$13,782	$44,460	$0
Provisioning	$102,063	$42,454	$37,958	$0
Environmental costs	**-$12,222**	**-$28,879**	**-$162,321**	**$0**
Bus emissions	-$9	-$24	-$132	$0
Vessel emissions	-$12,213	-$28,855	-$162,190	$0
Social costs	**-$18,126**	**-$4,167**	**-$12,680**	**$0**
Crowding costs	-$18,120	-$4,149	-$12,580	$0
Bus noise costs	-$7	-$18	-$99	$0
Net benefits	**$270,506**	**$397,431**	**$676,278**	**$0**

Scenario 4 - benefit value contribution overview

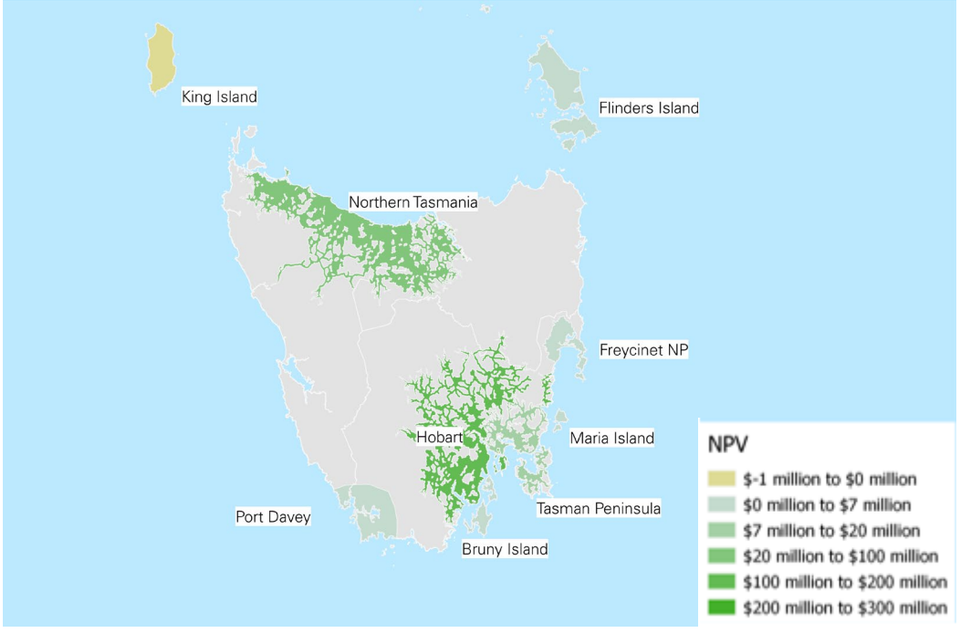
Total benefit ($ millions)

Results are displayed as a net present value (NPV) at a 7% discount rate. Evaluation period is from 2020-21 to 2029-30

	Expedition	Luxury	Mid to large	Megaship	Total
Economic contribution	**$47.0**	**$55.4**	**$110.8**	**$0.0**	**$213.2**
Port Charges incl. pilotage	$2.9	$5.0	$19.0	$0.0	$26.9
Pax expenditure pre/post cruise	$9.4	$0.0	$0.0	$0.0	$9.4
Pax expenditure on tours	$11.8	$14.8	$13.7	$0.0	$40.2
Pax expenditure (retail and hospitality)	$6.8	$28.5	$67.4	$0.0	$102.7
Crew expenditure	$0.1	$1.8	$5.8	$0.0	$7.7
Provisioning	$15.9	$5.5	$4.9	$0.0	$26.4
Environmental costs	**-$1.9**	**-$3.7**	**-$21.1**	**$0.0**	**-$26.7**
Bus emissions	$0.0	$0.0	$0.0	$0.0	$0.0
Vessel emissions	-$1.9	-$3.7	-$21.1	$0.0	-$26.7
Social costs	**-$2.8**	**-$0.5**	**-$1.6**	**$0.0**	**-$5.0**
Crowding costs	-$2.8	-$0.5	-$1.6	$0.0	-$5.0
Bus noise costs	$0.0	$0.0	$0.0	$0.0	$0.0
Net benefits	**$42.2**	**$51.2**	**$88.0**	**$0.0**	**$181.5**

Scenario 4 has a net benefit of $181.5 million. The limits imposed on mid to large and megaship visits means that visits from these vessel types are reduced and as a result, the net benefit for this scenario reduces by 40 per cent compared to Scenario 1. This is reflected in the map below, where benefits are lower, particularly in the south east.

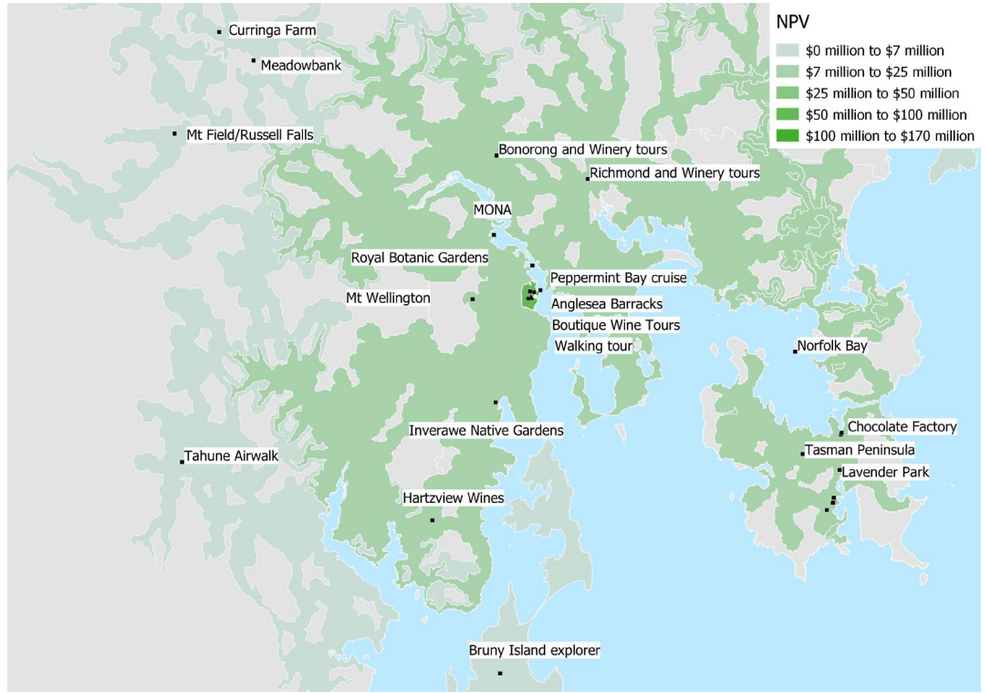
Net benefit by region



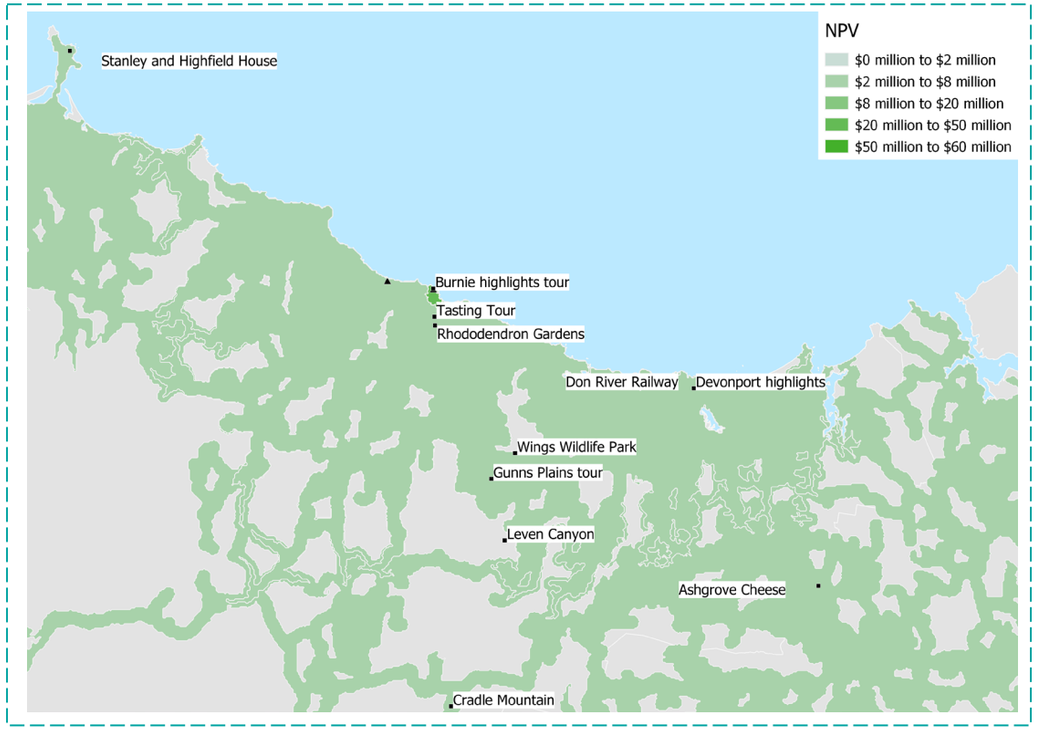
Scenario 4 - passenger spending patterns

Scenario 4 has drastically lower benefits than Scenario 1. With limitations on mid to large cruise ships and no megaships, Hobart will be greatly affected and Hobart's inner region will only generate $67 million compared to $152 million in Scenario 1. With fewer larger ships visiting Tasmania, revenue from port charges, crew expenditure, passenger expenditure, provisioning with Tasmania products will all decrease. Undoubtedly, costs associated with passengers such as crowding and emissions will also decrease, but a much smaller latitude compared to the change in economic factors. Northern Tasmania will not be affected as much since they only receive megaships on the rare occasion, and mainly comprise of luxury ship and some mid to large visits. The inner region sees $1 million more in benefits under Scenario 4 than Scenario 3, but the intermediate and outer regions remain approximately the same.

Hobart

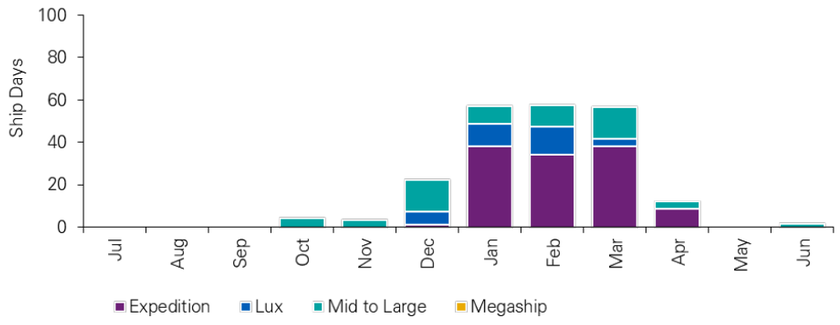


Northern Tasmania



Scenario 4 -seasonality in a typical year

Ship days (based on 2022-23) - all ports

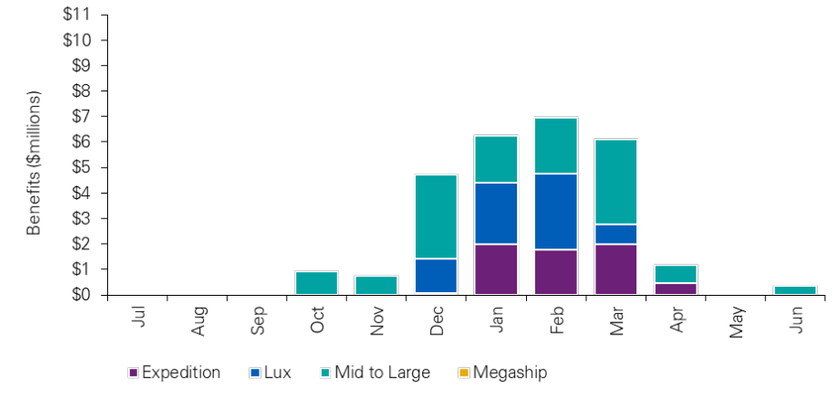


Expedition vessels comprise of the majority of all cruise ship days.

There are no visits from megaships

- **Ship days to all ports start from:** October.
- **Ship days to all ports peak:** January to March.
- **Market segment description:** Mid to large ships start their visitation season in October, followed by expedition ships and luxury ships in December. There is a decrease in the mid to large ship days compared to Scenario 1, and no megaships.

Net benefit (based on 2022-23) - all ports



Mid to large vessels continue to generate the majority of the benefits, even with reduced ship days.

With fewer visits from larger ships, the overall net benefits has halved compared to Scenario 1.

- Less fluctuation during the peak season; the net benefit remains at around $5 million to $7 million per month from December to March.
- Even with the reduction in mid to large ship days, they still make up the majority of benefits across the cruise season. prior and after the peak season.
- The contribution from expedition ships remains small.

Scenario 5: Focus on expedition and luxury ships

Scenario 5 - Total ship days

This map shows the total number of ship days across the evaluation period under Scenario 5. Tasmania would only allow expedition and luxury ships to visit its ports and anchorages.

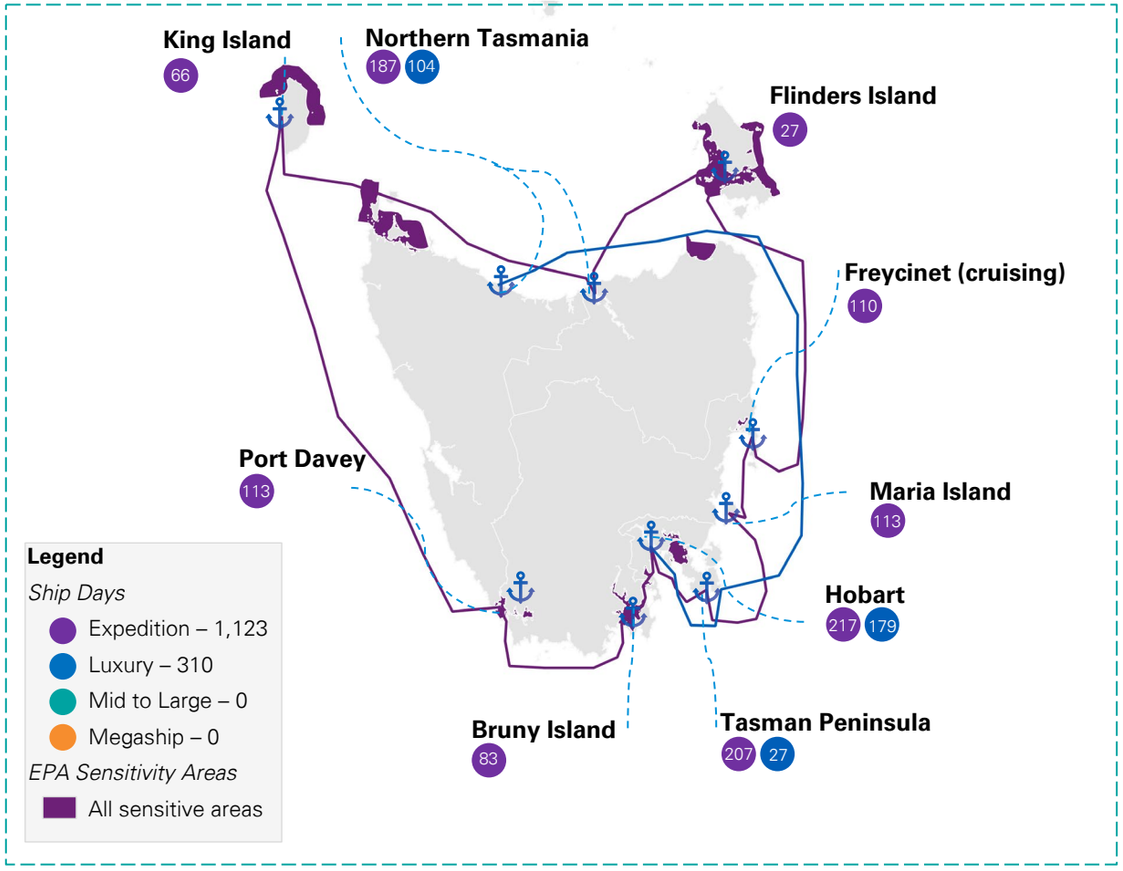
While the overall number of ship days would decrease since there would be no mid to large or megaships visiting, the total number of expedition and luxury ships remain unchanged. This means that all three major ports would be affected by this change and see an overall decrease in ship days.

Similarly, Freycinet sees a reduction in overall ship days with no large ships cruising in the area.

The visits to regional anchorages like Maria Island, Flinders Island, King Island, Port Davey and Bruny Island would remain relatively stable. They did not see non-expedition ship days under Scenario 1 and would thus remain unaffected by the removal of mid to large cruise and megaships.

The total number of ship days over the evaluation period under this scenario is assumed to be 1,433.

Total ship days over the evaluation period by region



Scenario 5 - Benefits and costs per voyage (weighted average)

Benefits and costs for one typical voyage

Scenario 5 focuses exclusively on expedition and luxury vessels. This assumes that larger vessels would not visit Tasmania at all. As a result, net benefits per voyage for mid to large and megaships would be zero.

For expedition and luxury vessels, it is assumed that the projected forecast of ship days will remain the same as under Scenario 1 scenario.

Net benefits per passenger per voyage (undiscounted)	Expedition	Luxury	Mid to large	Megaship
Passengers on board	86	605	2,041	3,430
Economic contribution	$3,498	$712	$0	$0
Environmental costs	-$142	-$48	$0	$0
Social costs	-$211	-$7	$0	$0
Net benefits	**$3,145**	**$657**	**$0**	**$0**

Results are displayed for a typical voyage (weighted average) for each type of vessel under Scenario 5

Net benefits per voyage (undiscounted)	Expedition	Luxury	Mid to large	Megaship
Economic contribution	**$300,854**	**$430,476**	**$0**	**$0**
Port Charges incl. pilotage	$18,596	$38,507	$0	$0
Pax expenditure pre/post cruise	$60,217	$0	$0	$0
Pax expenditure on tours	$75,697	$114,641	$0	$0
Pax expenditure (retail and hospitality)	$43,412	$221,091	$0	$0
Crew expenditure	$869	$13,782	$0	$0
Provisioning	$102,063	$42,454	$0	$0
Environmental costs	**-$12,222**	**-$28,879**	**$0**	**$0**
Bus emissions	-$9	-$24	$0	$0
Vessel emissions	-$12,213	-$28,855	$0	$0
Social costs	**-$18,126**	**-$4,167**	**$0**	**$0**
Crowding costs	-$18,120	-$4,149	$0	$0
Bus noise costs	-$7	-$18	$0	$0
Net benefits	**$270,506**	**$397,431**	**$0**	**$0**

Scenario 5 - benefit value contribution overview

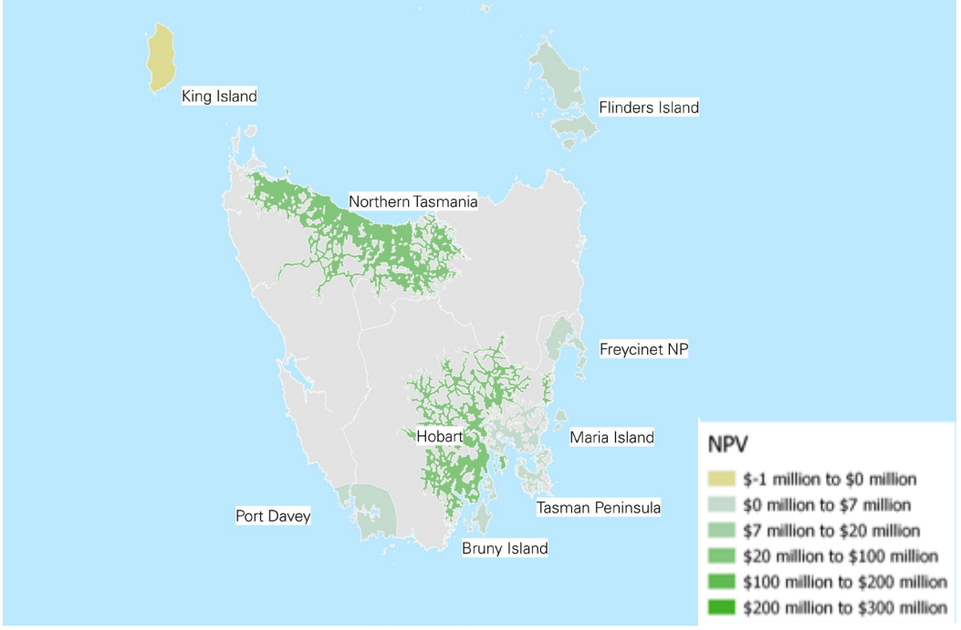
Total benefit ($ millions)

Results are displayed as a net present value (NPV) at a 7% discount rate. Evaluation period is from 2020-21 to 2029-30

	Expedition	Luxury	Mid to large	Megaship	Total
Economic contribution	**$47.0**	**$55.4**	**$0.0**	**$0.0**	**$102.4**
Port Charges incl. pilotage	$2.9	$5.0	$0.0	$0.0	$7.9
Pax expenditure pre/post cruise	$9.4	$0.0	$0.0	$0.0	$9.4
Pax expenditure on tours	$11.8	$14.8	$0.0	$0.0	$26.6
Pax expenditure (retail and hospitality)	$6.8	$28.5	$0.0	$0.0	$35.2
Crew expenditure	$0.1	$1.8	$0.0	$0.0	$1.9
Provisioning	$15.9	$5.5	$0.0	$0.0	$21.4
Environmental costs	**-$1.9**	**-$3.7**	**$0.0**	**$0.0**	**-$5.6**
Bus emissions	$0.0	$0.0	$0.0	$0.0	$0.0
Vessel emissions	-$1.9	-$3.7	$0.0	$0.0	-$5.6
Social costs	**-$2.8**	**-$0.5**	**$0.0**	**$0.0**	**-$3.4**
Crowding costs	-$2.8	-$0.5	$0.0	$0.0	-$3.4
Bus noise costs	$0.0	$0.0	$0.0	$0.0	$0.0
Net benefits	**$42.2**	**$51.2**	**$0.0**	**$0.0**	**$93.4**

Scenario 5 has a net benefit of $93.4 million. This is the lowest NPV of all scenarios. Mid to large and megaships are assumed to no longer visit Tasmania, and thus a large part of the net benefit estimated under Scenario 1 would not be generated. On the map, this translates to much lower net benefits in the urban areas in Tasmania's south east and Northern Tasmania.

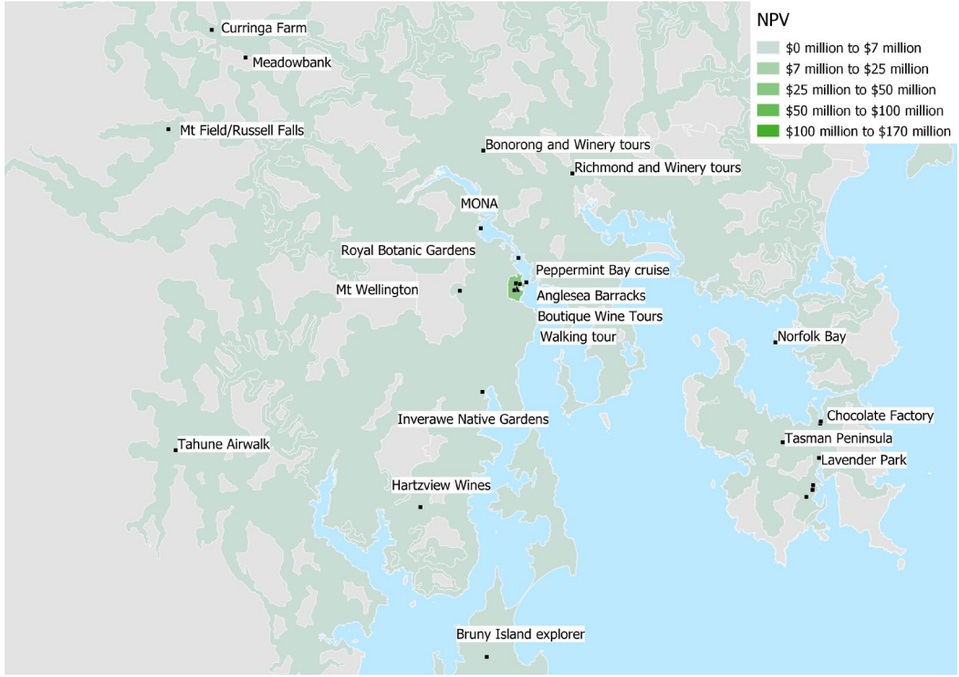
Net benefit by region



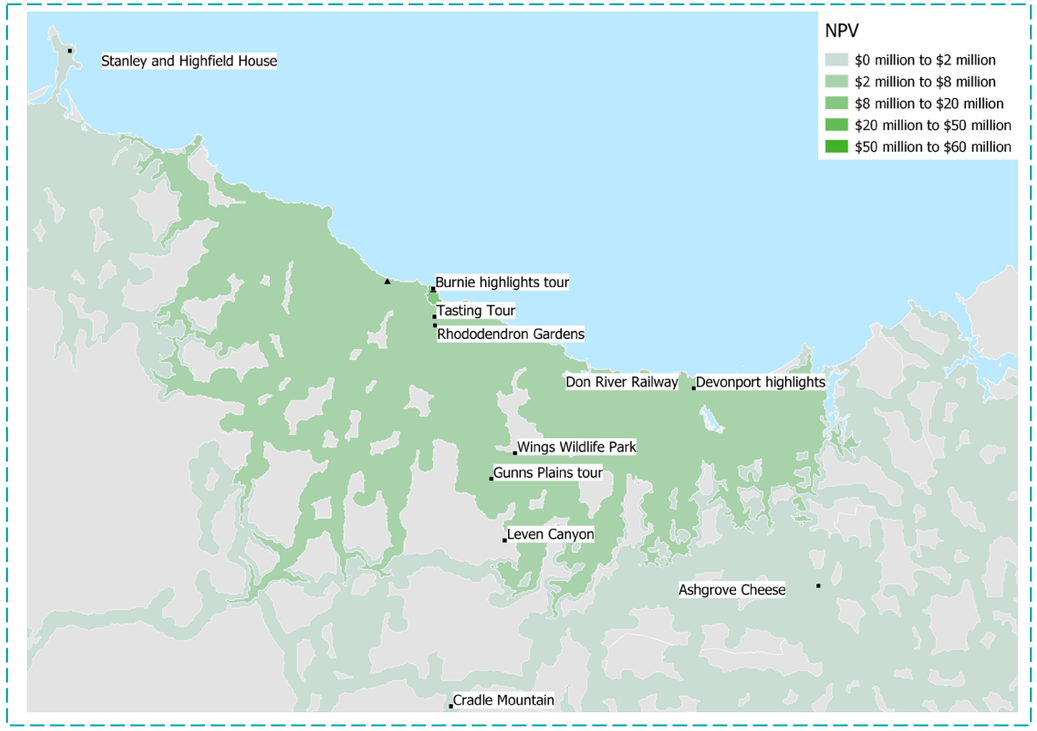
Scenario 5 - passenger spending patterns

Scenario 5 assumes an exclusive focus on expedition and luxury vessels. Similar to Scenario 4, Hobart is greatly affected in the intermediate and outer region, with benefits approximately halving from Scenario 1. However, in this scenario, Hobart's inner region's benefits have also decreased by around $40 million because of a further decrease in port charges revenue, passenger expenditure, and crew expenditure. Northern Tasmania would also have lower benefits overall, although with a $25 million decrease the impact is not as severe as Hobart. With fewer ship days, Northern Tasmania would see lower revenue from passenger expenditure amongst other benefit streams, similar to Hobart. Similarly, the outer and intermediate regions' benefits drop to $1 to $2 million primarily due to the lower visitation numbers.

Hobart

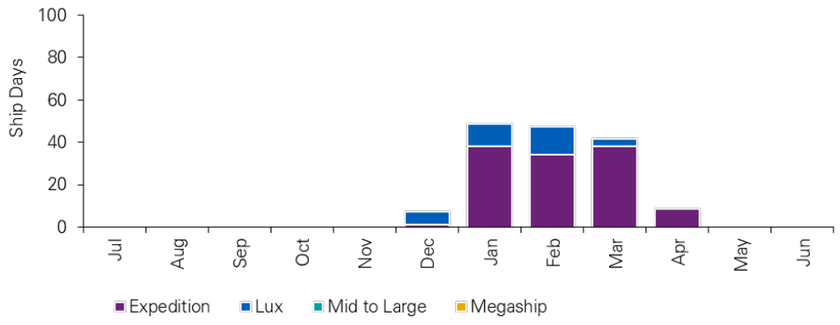


Northern Tasmania



Scenario 5 -seasonality in a typical year

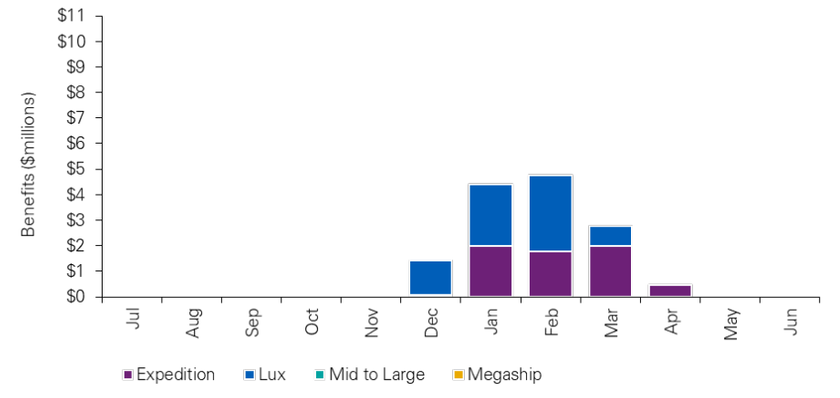
Ship days (based on 2022-23) - all ports



Expedition ships make up the majority of ship days with only a few luxury ships. There are no mid to large or megaships.

- **Ship days to all ports start from:** December.
- **Ship days to all ports peak:** January to March.
- **Market segment description:** With a focus on expedition and luxury ships, there would be no mid to large and megaships visiting Tasmania. Luxury ships start their visitation season first in December for four months, followed by expedition ships in January.

Net benefit (based on 2022-23) - all ports



Net benefits from luxury ships are much higher than expedition ships and make up the majority cruise benefits across the season.

Scenario 5 has the lowest benefits because of the reduced ship days of larger ships.

- Since expedition ships have a very small contribution to net benefits, the majority of the benefits are generated by luxury ships. The net benefits peak in February at around $5 million because this is the peak visitation of luxury ships.
- With no luxury ship visitation in the shoulder months of November and April, the net benefits are negligible in these months.

Results summary

Overview of results

Positive net benefits of cruise visits to Tasmania are expected under all five scenarios considered in this study. However, it is useful to compare and contrast the results at an overall level and individual triple bottom line level.

To begin at the overall level, Scenario 2 produces the highest NPV, estimated at $328.6 million over the next ten years, which is higher than Scenario 1 by $31 million (or 10 per cent). However, this is based on a significant increase in expedition vessels. Under Scenario 2 there are an additional 1,055 (or 42 per cent) more ship days. While this provides an increase in economic benefits, it has lower net benefit per ship day.

In this way, it is also useful to refer to the ratio of NPV to ship days (shown in the last column of the table). For instance, Scenario 3 shows that while the number of ship days declines when compared to Scenario 1, the net economic benefit per ship day is the same. For Scenario 3, this means that while less ships would visit overall, the net economic benefit is not significantly impacted (albeit there are impacts at a regional level).

At an overall level, Scenario 4 and 5 produce the lowest NPVs. At a disaggregated level, the environmental impacts are reduced significantly when compared to Scenario 1 (due to no mid to large and megaships). However, while these costs are reduced, the reduction in economic impacts is significantly higher.

The social costs remain relatively similar across all scenarios.

Scenario Number	Scenario Name	Economic Benefit	Environmental Impact	Social Impact	Net Benefit (NPV)	Total ship days (10 years)	Ratio of NPV per ship day
1	Projection of historical and recent trends	$357.3m	-$53.1m	-$6.6m	**$297.6m**	2,532	$0.12m
2	Local increase in expedition ships	$392.1m	-$54.8m	-$8.7m	**$328.6m**	3,587	$0.09m
3	Global trend of increasing ship size	$336.6m	-$50.2m	-$6.2m	**$280.2m**	2,396	$0.12m
4	Luxury and expedition ships prioritised	$213.2m	-$26.7m	-$5.0m	**$181.5m**	2,000	$0.09m
5	Focus on expedition and luxury ships	$102.4m	-$5.6m	-$3.4m	**$93.4m**	1,433	$0.07m

Qualitative factors

Assessing qualitative factors for a typical voyage

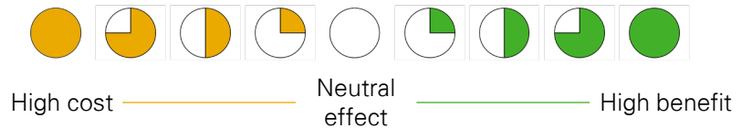
The overview of results provided on the previous slide focusses on the monetisable factors. For a comprehensive value proposition, the four qualitative factors should also be considered. The table on the right shows the likely relative order of magnitude across the qualitative and monetised factors. These ideograms show the relativity of the effect of each factor across vessel categories. They are not directly comparable across factors. That is, a high benefit in one factor is not necessarily cancelled out by a high cost in another.

For example, for the preservation value, expedition vessels would expect to see much higher costs than the other vessel types, hence it has a fully coloured yellow ball. This is because they focus on visiting pristine natural areas often classified as highly sensitive by the EPA (Tasmania LISTmaps, 2021). Nevertheless, overall they are expected to have a net benefit.

For the visual amenity of vessels in port, consultations have indicated that the perception and thus direction of the effect is highly dependent on the port. As a result, this factor has been classified as having a neutral effect.

For bio security and oil spills, the costs are either rated as 'neutral effect' or 'low cost' because the likelihood of such events is extremely low.

Legend



Results are displayed for a typical voyage

Monetised factors	Expedition	Luxury	Mid to large	Megaship
Economic contribution				
Environmental costs				
Social costs				
Qualitative factors				
Oil spills and waste water				
Bio security				
Preservation				
Vessels in port (visual amenity)				
Net benefits				

Economic activity

Enabled economic activity methodology

The total enabled economic activities are composed of the direct stimulus generated by cruise ship activities and the expected flow-on effects. Production flow-on effects are anticipated to be generated by the suppliers to the economic activity taking place in Tasmania.

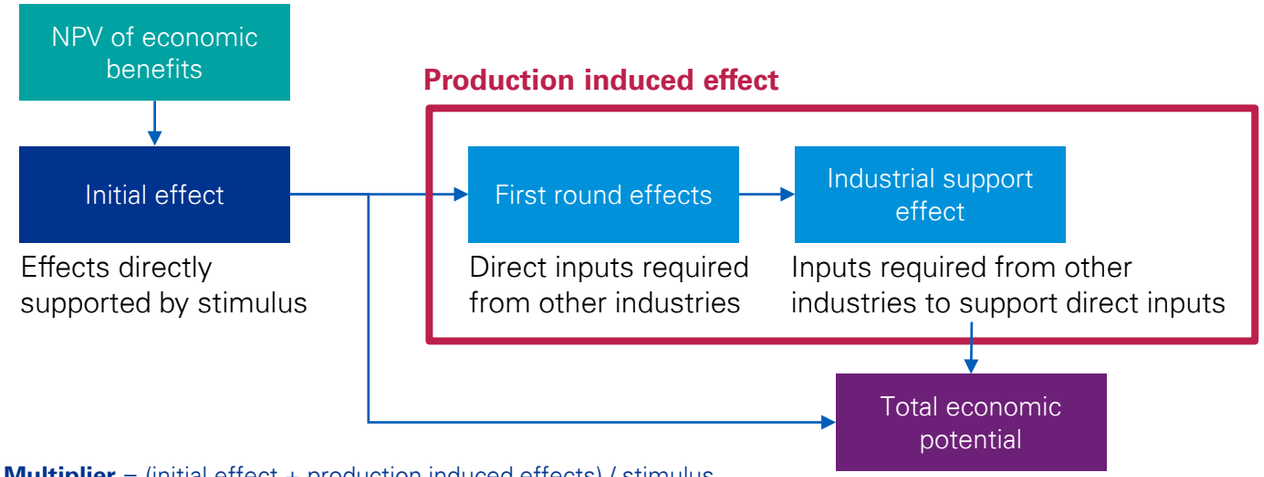
The study estimates the economic activity generated in Tasmania based on the expected port charges, cruise passenger and crew expenditure and provisioning. Social and environmental impacts are not considered in this analysis. The economic stimulus is driven by ship day scenarios and the associated expenditure estimates (shown in the previous section). They are then applied to input-output (IO) multipliers to derive flow-on effects.

The economic contribution analysis estimates the gross impacts and does not take potential interactions with new or existing impacts into account. Nor does it consider redistribution effects of activity to Tasmania.

Direct economic stimulus + Production flow on effect = Economic contribution

The multipliers associated with a stimulus should not be interpreted as additional creation, but rather the amount 'supported by' cruise expenditure. For example, the expenditure might support ten jobs, but those jobs could already exist or may substitute for existing jobs in other sectors.
Given the simplification of the economy in IO models, the multipliers should be used with caution and should be interpreted as a point estimate within a broader range of possible values rather than as an accurate prediction.

Deriving economic potential



Multiplier = (initial effect + production induced effects) / stimulus

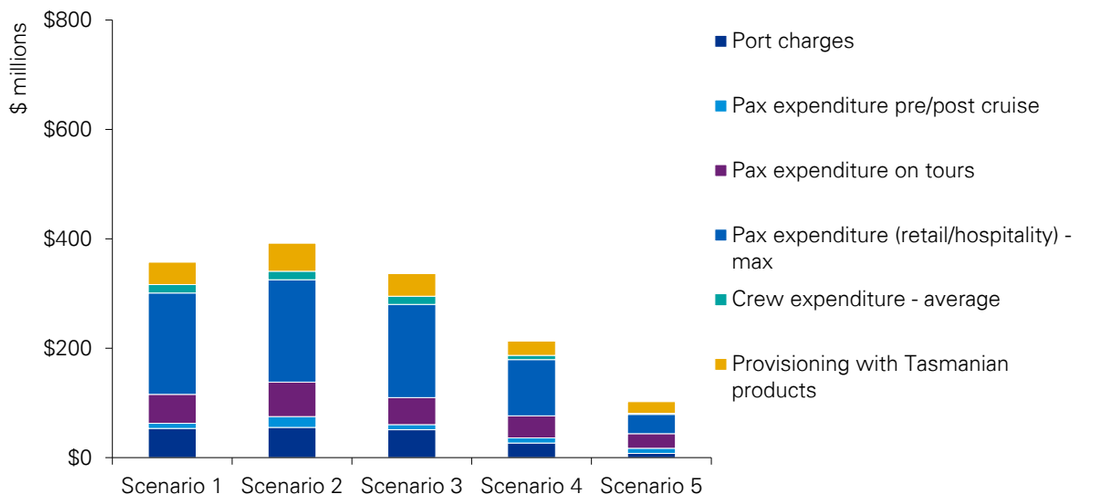
Input-output models (IO model) are used to estimate the impact of a stimulus on the economy as a whole. It is a simplified representation of the economic structure, with 114 different industries and their forward and backward linkages represented in a table. When a stimulus is applied to a particular industry, then the flow on impacts to other industries can be assessed. At an industry level, multipliers for output, value-added, income and employment can be derived from the IO model.

The figure above shows the flow of effects through the IO model. Initial effects are those outputs and employment increases resulting directly from a stimulus in a particular industry. In the case of cruise ships in Tasmania, this would be the economic activity generated by the tourists and crews. This industry receives inputs from other industries, creating the first round effects. In turn, these industries are supplied by further industries, creating the industrial support effect.

These effects are aggregated to create the IO multipliers. In this way, the effects of a stimulus are modelled as they flow through the simplified economy in the IO model.

Deriving economic potential enabled by cruise visits

Direct stimulus by activity
($ million; net present value over ten years discounted at 7 per cent)

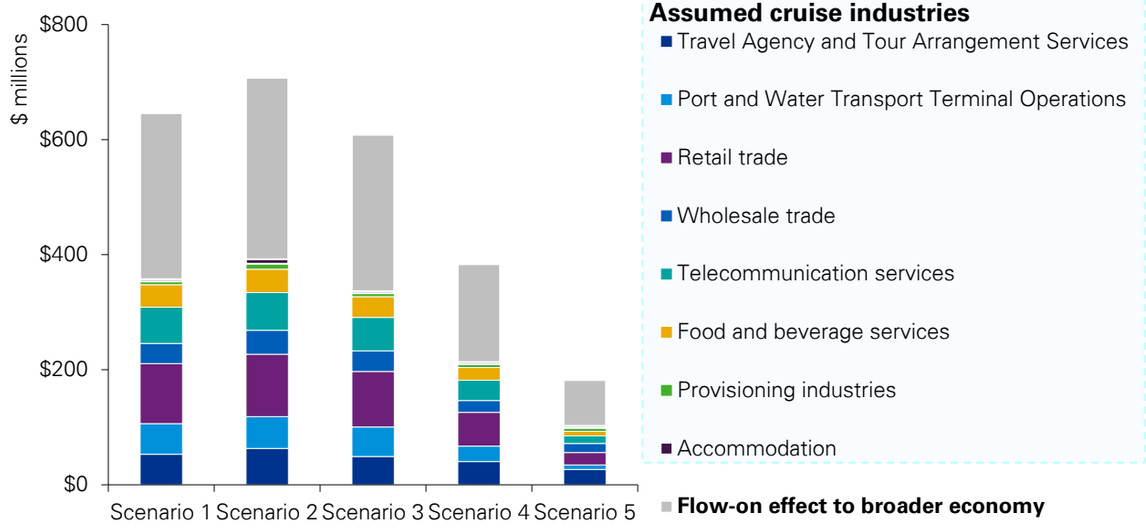


The direct economic stimulus is mostly driven by passenger expenditure and port charges, followed by provisioning and crew expenditure.

Scenario 2 (local increase in expedition vessels) generates the highest direct economic impact of almost $400 million. Scenario 5 (focus on expedition and luxury ships) has the lowest direct impact of about $100 million.

The activities on the chart above can be mapped to the most relevant IO table industries. These are listed as 'cruise industries' in figure on the right.

Total enabled economic potential
($ million; net present value over ten years discounted at 7 per cent)

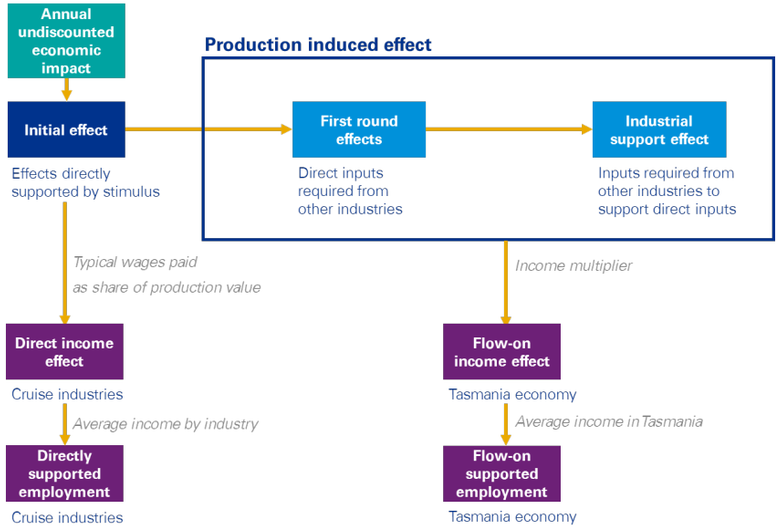


The chart shows total direct and flow on economic activities by industry. The flow on effect by cruise ships almost match the direct impact so the total economic potential is around double the initial stimulus. Scenario 2 is estimated to have almost $700 million of total enabled economic activity. Scenario 5 could have a total economic impact of about $180 million.

The main industries enabled by cruise ship activities are Port and Water Transport Terminal Operations, Accommodation, Travel Agency and Tour Arrangement Services and Wholesale trade. The Travel Agency and Tour Arrangement Services industry has the largest economic impact, driven by tour expenditure, followed by the Accommodation industry.

Potential jobs supported by cruise visits

Employment impact analysis



The figure above shows the direct and flow-on impact on potential supported employment. The analysis focusses on the Tasmanian economy and excludes cruise line employment. Initial stimulus from cruise ship activities would have a direct income effect on each of the key industries.

The direct income effect is estimated by applying the typical wages paid as share of production value to the initial stimulus. The direct supported employment (FTE jobs) are estimated by applying the average annual incomes of the relevant industries.

The flow-on effect is derived by applying the income multiplier to the production induced effect. The flow-on employment impact is then estimated by applying Tasmanian's average annual wage level.

Average annual potential jobs supported (FTE) – based on assumed industry breakdown

Potential jobs	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Travel Agency and Tour Arrangement Services	65	74	63	49	33
Port and Water Transport Terminal Operations	15	15	15	8	2
Retail trade	98	101	96	57	20
Wholesale trade	24	28	25	14	11
Telecommunication services	13	13	13	7	3
Food and beverage services	38	39	38	22	8
Provisioning industries	3	4	3	3	3
Accommodation	2	4	2	2	2
Flow-on effect to broader economy	137	146	135	82	38
Total direct and flow on impact	**396**	**426**	**390**	**245**	**120**

The average annual potential supported jobs of Scenarios 1, 2 and 3 are similar at around 400 FTE jobs. Scenarios 4 and 5 would support less employment.

Specifically, a cap on the larger cruise ships could have a detrimental effect on employment in Tasmania. In Scenario 5, this could lead to less than a third of employment supported when compared to Scenario 1.

Among the most likely affected industries, Retail trade and Travel Agency and Tour Arrangement Services industries would likely see the largest decrease in employment.

Insights and opportunities

Insights and opportunities

Several insights and opportunities have been identified from this study, and focus primarily on changing areas such as cruise ship itineraries, Tasmanian products, tours and onshore events. Additional detail of key opportunities is provided on subsequent slides.

Area of Interest	Insights and opportunities
Cruise Ship Itineraries 	• Luxury and "premium" mid to large ships are able to generate large benefits without the drawbacks of both exploration and megaship cruise vessels. • Longer stays could increase the geographic extent of visitor benefits as multi-day tours could become an option for passengers. • Extending the cruise ship season beyond the typical October to April would benefit local operators. However, cruise lines did not indicate much interest for this in the near future.
Tasmanian Products 	• Provisioning with Tasmanian products currently appears to be driven primarily by passengers' suggestions. A consolidated marketing effort could increase cruise lines' awareness and interest in stocking Tasmanian products.
Tours 	• The luxury oriented segment in particular has a preference for tailored, exclusive tours. However, there appear to be limited offerings in Hobart and southern Tasmania.
Onshore Events 	• P&O Cruises currently offer a Dark MOFO themed cruise with a two night stay in Hobart and an all inclusive MONA and Dark MOFO experience (P&O, 2020). Silversea also offers a range of onshore experiences such as an exclusive performance by a world renowned opera singer in a Melbourne concert hall (Silversea, 2019). • There is potential for further events like these be held in Tasmania, featuring local talent and encouraging passengers to explore the city.
Active management of important and sensitive remote sites	• The management of Macquarie Island as a cruise destination provides an example of how Tasmania could balance cruise impacts with benefits in other remote areas.

Opportunities in provisioning

Increasing cruise ships provisioning with Tasmania products stems from two key opportunities; homeporting and turnarounds in Hobart, and supplying the broader cruise industry nationally.

Cruise ships visiting and homeporting in Tasmania

Stakeholder consultations indicated that cruise ships resupply at either their homeport, their turnaround port or both. For example, a cruise from Sydney to Perth would resupply at both Sydney and Perth, even if the homeport is Sydney. Inherently, this would result in those cruise ships sourcing supplies locally from NSW and WA where appropriate. Given this, there is an opportunity to increase the supply of Tasmanian products on cruise ships by increasing the number of vessels that are homeported or turnaround in Hobart. Cruise lines have expressed interest in deploying vessels to Tasmania in the future, particularly expedition vessels where passengers are more likely to request local produce on board.

Linked to this are cruise ships that visit Tasmania on transit. Anecdotally, passengers who visit Tasmania are more likely to request local produce on board, particularly products that Tasmania is known for such as seafood and wine. Some cruise ships are already purchasing and loading such products when visiting Hobart in transit.

Supplying the broader industry

The cruise market in Australia is substantial and there is an opportunity to increase Tasmania's integration into cruise lines' supply chains for cruises that do not visit Tasmania. Cruise lines have suggested that Tasmania products may not feature strongly in their supply chains because they are relatively more expensive. However, a consolidated marketing effort by Tasmanian producers could increase awareness of local commodities and bring about investment. In particular, targeting the luxury and premium cruises would align with Tasmania's reputation for high-end, quality produce.

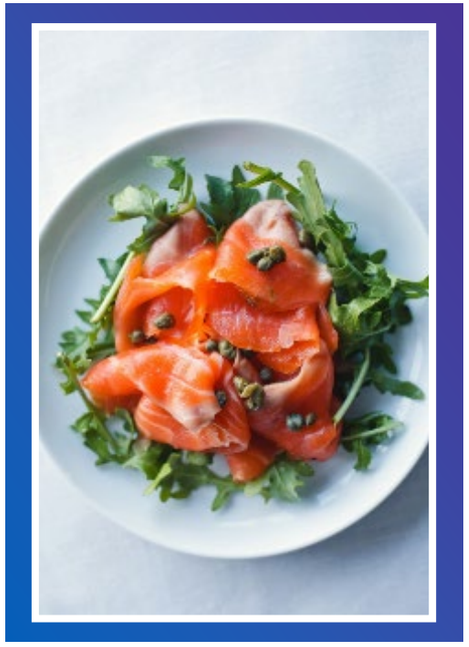


Image from Tourism Tasmania visual library

Image from Tourism Tasmania visual library

Social opportunities

Caps, stops and mandatory staggering are potential options to overcome crowding costs from cruise ships.

Popular destinations around the world have capped the number of cruise ship or the size of the cruise ship they will allow. Limiting or disallowing larger vessels will reduce crowding impacts.

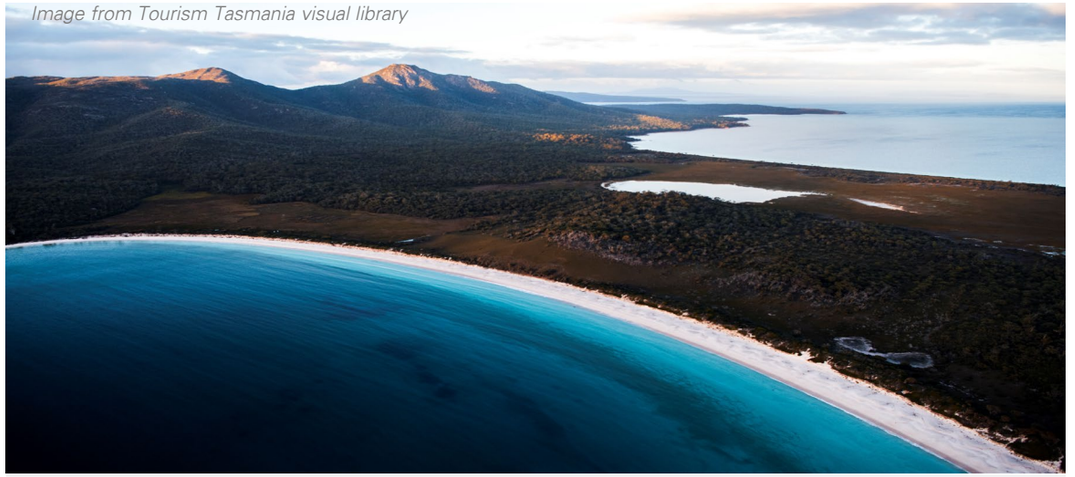
Similar approaches have been taken in parts of Tasmania. For example, Flinders Island has an agreement that no marketing will be undertaken and that the visitor limit is 100 cruise passengers at any one time. Port Arthur only accepts one mid to large or megaship ship at a time to limit the number of visitors at the historic site or Deal Island currently limit visit to a maximum of 30 passengers on the island at a time. A wider roll-out of such measures possibly aligned to general visitation levels could reduce crowding pressures.

The analysis in this study suggests however, that cruise visitors might only be the most visible indicator for Tasmania's increase in popularity as a tourist destination and the perceived increase in crowding a result of growing visitor numbers in general.

Communication may resolve key crowding issues

The cruise season coincides with the peak holiday season. Further, daily visitor peaks from cruise lines are concentrated in the middle of the day which again coincides with the general visitor peak. Collaborations with cruise lines to inform tourist sites of their arrival, could go a long way to managing the impacts of cruise passenger crowding. As an example, consultation with King Island indicated that once clear communication with the cruise lines about arrivals times were established, the experience for cruise passengers and local hosts was improved.

Image from Tourism Tasmania visual library



Most stakeholders agreed that if they know the cruise ship schedules in advance, crowding becomes more manageable and no longer poses as a serious issue.

New markets for shore excursion products

Shore excursions can manage crowding by disbursing cruise visitors while also promoting regional expenditure. For example, Tasmania North Coast have developed shore excursion products which are being directly promoted to cruise lines. Tourism organisations designing such tours can limit visitations to particularly popular sites by setting group sizes.

While promising in less established markets, implementing this non-invasive way of managing crowds, could prove challenging in markets with existing tour offerings such as Hobart or Burnie.

Macquarie Island Case Study

Macquarie Island is an example of how effective management can preserve nature and generate revenue for government at the same time. The island has strict visitor guidelines to ensure the protection of wildlife, environment, and the quality of experience expected by visitors. These include:

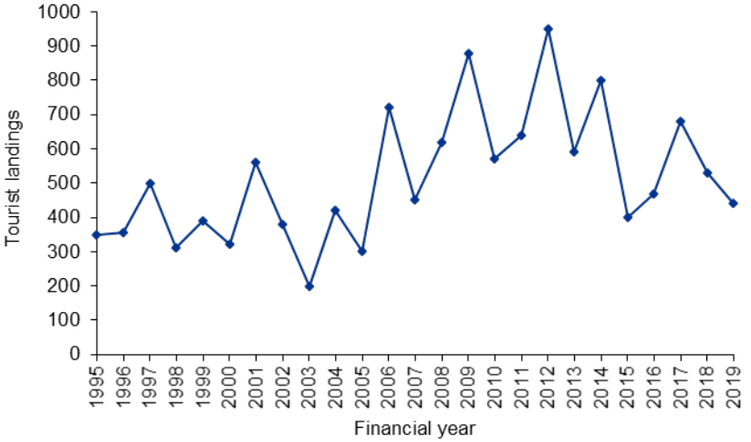
- A maximum of 200 visitors per ship
- A maximum of 12 ships per financial year with a cap of 1,000 total visitors
- Up to 2 ships can enter the Reserve per financial year for small boat cruising
- Up to 2 yachts can enter the Reserve per financial year for shore visits
- All ships must provide a current 'Ship Sanitation Control Exemption Certificate' demonstrating that the ship is free of marine invasive species
- Strict shore visit times and allocation of up to two days on which shore visits may take place
- Small boats must at all times regulate their course and speed to minimise wildlife disturbance
- Restricted tourism management areas to provide visitors to view on wildlife, vegetation, geological formations, natural landscapes and historic sites.

From 1995 to 2019, there were on average 64 passengers visiting Macquarie Island per ship, the maximum and minimum being 84 and 44 passengers per ship respectively. In the last five years, there was an average of eight ships visits a year. Tourist visits are managed through expression of interest forward booking systems. Where possible, Tourist Visit applications can be approved 18 months in advance. Tourist visits may still be allocated after this process providing visitor quota per season is not exceeded and there is no clash with a known ship day timetable. The above process resulted in relatively constant tourist landings overt the past 15 years, minimising environmental and social risks.

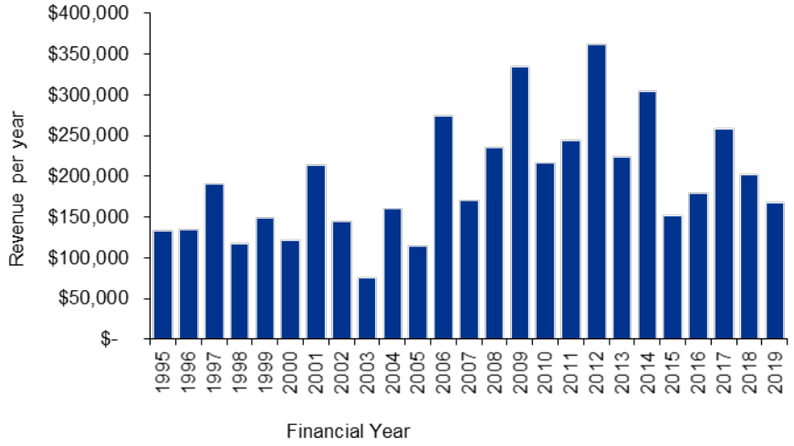
Other than the strict visitor guidelines, there is also a Visitor Impact Management fee of $380 (incl. GST) per person (PWS, 2020). The revenue from the management fee is shown in the top right graph. In the last five years, revenue has averaged almost $200,000 per year, and costing around $130,000 to manage. The revenue is used for the management and promotion of the reserve, which includes the provision of additional staff, facilities to protect the environment, visitor risk monitoring programs, interpretation materials and facilities, management orientated research, administration costs, and other management and promotional programs related to the reserve.

This model could be applied in other highly sensitive areas which are also potentially popular cruise destinations. This report has shown that some areas that are currently being visited by cruise ships, particularly Port Davey and Freycinet, see net disbenefits. Introducing a fee for cruise visits that reflects this disbenefit could then be used to mitigate the identified negative impacts.

Annual visitors to Macquarie Island



Revenue from Visitor Impact Management fee per year



Source: PWS (2020) and data from stakeholder consultations.

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