



SUMMARY REPORT

Lifejacket Wear on Recreational Vessels

An observational study of skippers and passengers onboard vessels across NSW.

August 2023



Transport
for NSW

Taverner
RESEARCH GROUP



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Prepared by: Michael Trigwell

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Taverner Research Group | T +61 2 9212 2900 | W www.taverner.com.au

A Level 2, 88 Foveaux Street, Surry Hills, NSW 2010, Australia |

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1. EXECUTIVE SUMMARY

Project Background

Taverner Research was commissioned by Transport for NSW to undertake observation research across waterways in NSW to measure the prevalence of life jacket wear amongst skippers, passengers (including those being towed) on recreational vessels.

Previous studies of recreational lifejacket wear suggested that overall wear rates had improved but plateaued towards 2018. This study is the first field-based survey of lifejacket wear in NSW in the past five (5) years and is intended to provide estimates of recreational wearing rates of lifejackets across all NSW waterways, whether wearing a lifejacket is required by regulation or not.

Research Approach

This study was conducted between 1 December 2022 and 14 May 2023. During this period n=7,885 people onboard n=3,619 recreational vessels were observed.

Observations were conducted across five (5) key regions of NSW, Sydney and Central Coast, Coastal North, Coastal South, Inland Alpine and Inland non-Alpine covering 27 different waterways and 49 unique locations (37 on shore and 12 on water).

Observation sites were selected based on the expected number of vessels using the waterway and, in the case of on shore observation sites, the presence of suitable observation points away from launch and dock locations.

Key Findings

Two out of every five (40.5%) users of recreational vessels on NSW waterways were observed wearing a lifejacket.

In situations where life jacket wear is legally mandated the estimated wear rate was significantly higher (72%). This varied by different situations being towed (97%), being on a PWC (94%), crossing a bar (70%) and being alone on a small vessel (55%).

Lifejacket wear rates also differed by vessel type. The highest wear rates were observed for persons on a PWC/jet ski (94%), on paddlecraft (72%) or small sailing boats (63%). While wear rates were lowest for those users of motor cruisers (9%), large sailing yachts (15%) and open runabouts (32%).

Wear rates also differed significantly dependent on the estimated age of the person observed. Amongst children estimated to be 12 years or younger the wear rate was 78% across vessel types and locations, significantly higher than for those estimated to be older than 12 years (at 37%).

This report provides additional breakdowns of the overall wear rate and wear rate in mandatory situations (e.g. by gender, by region, vessel type and person's role).



2. PROJECT BACKGROUND AND OBJECTIVES

The Context

It is well recognised¹ that lifejackets help save lives when people are forced into the water as a result of a boating incident. Lifejacket wear is encouraged for all boating situations and there are many circumstances in which lifejacket wear is compulsory. These include for smaller vessels in certain high risk situations, all vessel crossing an ocean bar, all Personal Watercraft (PWC) users, all persons being towed behind a vessel and, in most situations, children under 12.

Recent incident data² shows that nearly 78% of recreational boating fatalities were likely due to drowning and that over 70% of drowning fatalities among people engaged in recreational boating were not wearing lifejackets. To achieve targets for reductions in the annual number of fatalities among users of recreational boating, the rate of lifejacket wearing has to be increased, including in situations where wearing of lifejackets is not legally mandated.

Previous studies of recreational lifejacket wear suggest that overall wear rates were only 9% in 2007 but had increased to 34% by 2013-14³. However, wear rates appeared to plateau in the 41% to 45% range in the period 2014-15 to 2017-18⁴. The present study is the first field-based survey of lifejacket wear in NSW since 2017-18 and is intended to provide estimates of recreational wearing rates across all NSW waterways, whether wearing a lifejacket is required by regulation.

Research Aims

The overall aim of the observational research was to “quantify on-water lifejacket wear rates on recreational vessels across NSW waterways”. Further to this aim, the research is expected to provide Transport for NSW with an evidence base to inform the policy, education and compliance interventions needed to raise lifejacket wear rates – both generally and in relation to specific vessel types, geographic areas and boating activities.

The study enabled wear rates to be estimated for particular sub-groups of recreational boating users and for different boating environments:

- By Region
- By Location type
- By Vessel type
- By Activity type
- Whether the vessel was underway (including drifting), at anchor or moored

¹ Cummings, P., Mueller, B.A., & Quan, L. (2011). *Association between wearing a personal floatation device and death by drowning among recreational boaters: a matched cohort analysis of United States Coast Guard data*. *Injury Prevention*, 17(3), 156-159.

² Transport for NSW analysis of recreational boating fatalities for 10 year period to 30 June 2022.

³ Data for 2007 from the report *Personal Flotation Devices Wear Rate Study 2007*. National Marine Safety Committee. Data from 2023-14 from a Transport for NSW observational study of lifejacket wear conducted over the five year period 2023-14 to 2017-18, with data collected by Sailing Australia.

⁴ Transport for NSW observational study of lifejacket wear conducted over the five year period 2023-14 to 2017-18, with data collected by Sailing Australia



2. PROJECT BACKGROUND AND OBJECTIVES

- By User Characteristics including ...
 - Whether a 'Skipper' (person driving, steering or propelling a vessel) or 'Passenger' (person not driving, steering or propelling a vessel)
 - Males versus Females
 - Age group – 'Children' (users judged to be aged under 12) versus 'Adults' (older users)



3. METHODOLOGY

The results presented in this report are from the observation of n=7,885 people onboard n=3,619 recreational vessels using waterways in NSW.

The study was conducted across 49 sites spanning metropolitan Sydney and regional NSW (inland and coastal) between 1 December 2022 and 14 May 2023.

Observations were generally conducted on Fridays, Saturdays and Sundays with occasional weekday observations conducted as necessary.

All observations were collected on tablet devices. Observers were outfitted with a pair of binoculars to provide improved vision of vessels and people on board at a distance.

After initial training, a pilot observation day was conducted on 1 December 2022 with two observers directed to observe the same vessels. This enabled identification of how well the observers understood the vessel type categories and if results were consistent enough to enable a single observer at other sites on most days.

The results of the pilot showed the difference between each observer was small, however duplicate observers were deployed for the first day at the majority of sites. The data from the duplicated observations has been excluded from the analysis and results in this report with the data from the observer who was on-site for the full fieldwork location having their data selected to be included for any day where duplicate data was captured.

3.1. VESSEL TYPES INCLUDED

The following vessel types were included in the study, however vessels that were launching or docking were excluded from observations. A brief description of the main observable characteristics of each vessel type is included.

Included Vessel Types

- Dinghies / tenders
 - Very small (2-3 metres in length, 1-2 people), open, oars or outboard
- Open runabout
 - Small (3-5 metres), open, maybe light canopy/screen, mostly single outboard, no side windows
- Cabin/'half cabin' runabout
 - Usually 4.5-7 metres, rego number, small half cabin for driver and maybe +1 person, single or twin outboard
- Motor cruisers
 - Large usually (7+ metres), rego numbers and often name, can stand in cabin, most have cooking and sleeping berths, usually inboard engine
- PWC (Personal Watercraft)/Jet ski



3. METHODOLOGY

- Small (< 4 metres), high speed, 1-3 people sitting or 1 standing, powered by hidden water jet engine
- Paddle craft
 - Kayaks or canoes, but also longer paddle-powered 'dragon boats', no motor, no sail, no oars. Some kayaks also have pedal power.
- Stand up Paddle Boards
 - Paddle or pedal powered, usually < 5 metres, fibreglass or inflatable, flat low profile, no engine, 1 sometimes 2 people standing or kneeling.
- Small sailing boats
 - Up to 5.5 metres, open, no engine, but not kite board or sailboard
- Large sailing yachts/catamarans
 - Usually > 5.5 metres, ballasted keels or tanks, don't rely on human weight for balance, most have cabins with side windows, might have outboard motor
- Ski and high speed racing vessels
 - Very streamlined, rego numbers, usually large outboard motor, around 5-7 metres, no cabin, very pointed bow, capable of very high speed
- Wakeboarding vessels
 - Streamlined but chunkier, inboard motor, 6-8 metres, no cabin but high vertical sides, most with superstructure; often set up for towing with board racks and speakers
- Other recreational vessel

Any vessel that was clearly a commercial vessel (e.g. displaying company names or logos, or being piloted by a person in uniform was excluded from being observed).

3.2. OBSERVATION TIMING

The observation fieldwork commenced on 1 December 2022 and continued until 23 April 2023 to ensure good coverage across the boating season. Additional fieldwork days were conducted between 28 April and 14 May 2023 to accommodate additional observations at bar crossings.

3.3. OBSERVATION LOCATIONS

Observation locations for the study were identified across five (5) key regions, namely:

- Sydney/Central Coast (on shore and on water)
- Coastal North (on shore and on water)
- Coastal South (on shore and on water)
- Inland Alpine (on water only)



3. METHODOLOGY

- Other Inland (on water only)

For on shore observations the observer identified a suitable location to be able to see vessels moving in multiple directions. Observers sometimes moved position throughout the day to ensure coverage of different areas of the waterway they were designated or if the number of vessels in that area were low.

For on water observations Taverner hired a boat and a skipper to pilot our observer around the designated waterway.

Table 1 **Sample per Region**

REGION	NUMBER OF WATERWAYS SAMPLED	TOTAL OBSERVER DAYS	VESSELS OBSERVED	PEOPLE OBSERVED
Sydney & Central Coast waters	5	16 (10 on shore and 6 on water)	1,500	3,191
Northern Coastal waters	10	23 (17 on shore and 6 on water)	925	1,898
Southern Coastal waters	6	17 days (11 on shore and 6 on water)	480	973
Inland Non-Alpine waters	4	12 (all on water)	480	1,238
Inland Alpine waters	2	6 (all on water)	234	585
TOTAL	27	76	3,619	7,885

Across the state, 27 different waterways/ locations were selected for observations, including 18 coastal/estuarine locations, three (3) open ocean locations, four (4) general inland locations and two (2) alpine locations. Selection criteria for these were based on the:

- Expected number of vessels using the waterway
- Presence of suitable observation points away from launch and dock locations (in the case of onshore locations)

Among these waterways/locations, observations were made from 37 specific shoreline sites (in addition to the on-water observation sites n=12).

Included in the observations were three (3) open ocean locations (one in each of the coastal regions). Bar crossing sites were a particular focus of the study, with 16 observation days conducted across 12 bar crossing locations (note a few vessels were observed ‘crossing the bar’ when the observer was either on the open ocean or in/near estuarine waters - these cases have been allocated to the activity ‘crossing the bar’, however are not counted in the 16 days allocated to bar crossing observations).

A breakdown of the number of vessels and people observed at each specific site can be found in section 6 on page 21 of this document.



3. METHODOLOGY

3.4. SAMPLE CHARACTERISTICS

The following tables (Table 2 and Table 3) show the distribution of the sample by different characteristics.

Table 2 **Vessel Sample Characteristics**

REGION	VESSELS OBSERVED	VESSELS OBSERVED %
VESSEL TYPE		
Open runabout	1,166	32%
Cabin/'half cabin' runabout	543	15%
PWC (Personal Watercraft)/Jet ski	466	13%
Paddle craft - Kayaks or canoes	336	9%
Dinghies / tenders	282	8%
Motor cruisers	174	5%
Large sailing yachts/catamarans	169	5%
Wakeboarding vessels	138	4%
Ski and high speed racing vessels	103	3%
Stand up Paddle Boards	90	2%
Small sailing boats	86	2%
Other recreational vessels	66	2%
ACTIVITY TYPE		
Fishing (angling)	493	14%
Crossing an ocean bar	442	12%
Towing a water skier, wakeboarder or similar (including paragliders)	152	4%
Racing	62	2%
Something else	2500	69%
ACTIVITY LEVEL		
Vessel is underway	3,133	87%
Vessel is drifting	252	7%
Vessel is at anchor or moored	234	6%
TOTAL	3,619	100%



3. METHODOLOGY

Table 3 Observed People Sample Characteristics

REGION	PEOPLE OBSERVED	PEOPLE OBSERVED %
AGE		
Child under 12	688	9%
Person 12 or older	7,038	89%
Can't say	159	2%
GENDER		
Male	5,596	71%
Female	1,942	25%
Can't say	347	4%
ROLE		
Skipper	3,502	44%
Passenger on board	4,142	53%
Passenger being towed	199	3%
Could not tell	42	1%
TOTAL	7,885	100%



4. NOTES ON HOW TO READ THIS REPORT

The Effect of Rounding

Where two or more responses have been combined the sum of the combination may be different (+/- 1%) to the sum of the individual items due to rounding.

Statistical Differences

Differences between groups are described as significant differences if they reached statistical significance using an error rate of $\alpha=0.05$. This means that if repeated independent random samples of similar size were obtained from a population in which there was no actual difference, less than 5% of the samples would show a difference as large or larger than the one obtained.

Given large observation numbers at the total sample level, small differences in results will be statistically significant.

The use of the term 'significant' throughout this report indicates statistical significance. The report may also use the terms 'more likely' and 'less likely' to indicate statistically significant differences.



5. MAIN FINDINGS

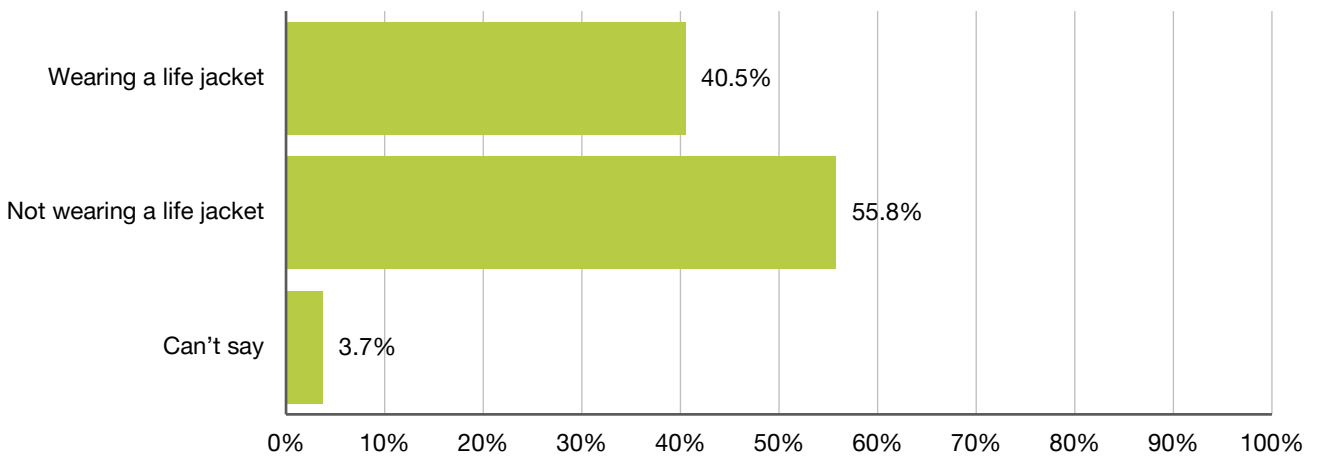
This section of the report shows charted and narrative commentary across key areas of observation during fieldwork.

5.1. LIFEJACKET WEAR RATE OVERALL

Two out of every five people (40.5%) observed during the observation period were observed wearing a lifejacket (see Figure 1).

Figure 1: **Overall Lifejacket Wear in NSW**

Base: n=7,885

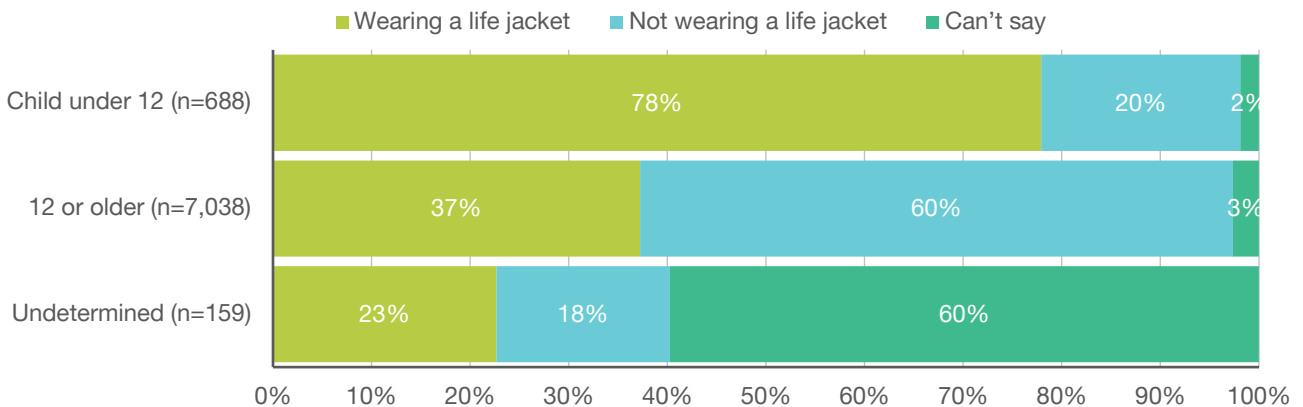


5.2. LIFEJACKET WEAR RATE BY AGE

Figure 2 shows that lifejacket wear amongst children (aged under 12 years) was significantly higher (at 78%) than amongst persons judged as 12 years of age or older (37%). This result suggests that children under 12 are more than twice as likely to be wearing a lifejacket than persons aged 12 or older.

Figure 2: **Lifejacket Wear in NSW by Age**

Base: n=7,885





5. MAIN FINDINGS

5.3. LIFEJACKET WEAR RATE BY GENDER

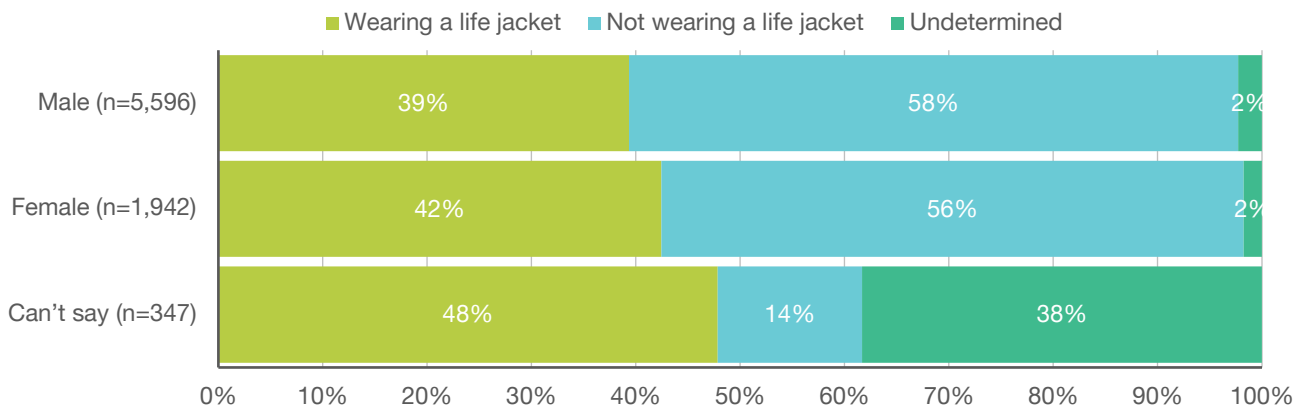
Across the total sample females (42%) were significantly more likely to be observed wearing a lifejacket than males (39%) – see Figure 3.

Gender was only a determining factor in lifejacket wear in a selection of regions:

- Sydney and Central Coast waters
 - Significantly higher amongst females (34%) than males (29%)
- Inland Non-Alpine waters
 - Significantly higher amongst females (46%) than males (34%)

Figure 3: **Lifejacket Wear in NSW by Gender**

Base: n=7,885



5.4. LIFEJACKET WEAR RATE BY VESSEL TYPE

All observers were trained to effectively categorise the type of vessel the people they were observing were on, however, as some vessel types can appear similar, vessel type categorisation wasn't necessarily perfect. To minimise categorisation errors, prior to commencing field work, observers were issued with a hardcopy set of illustrations showing a wide variety of examples within each vessel type category.

Lifejacket wear was significantly higher amongst those observed onboard personal watercraft (94%), paddle craft (72%), small sailing boats (63%) and dinghies/tenders (46%) – see Figure 4.

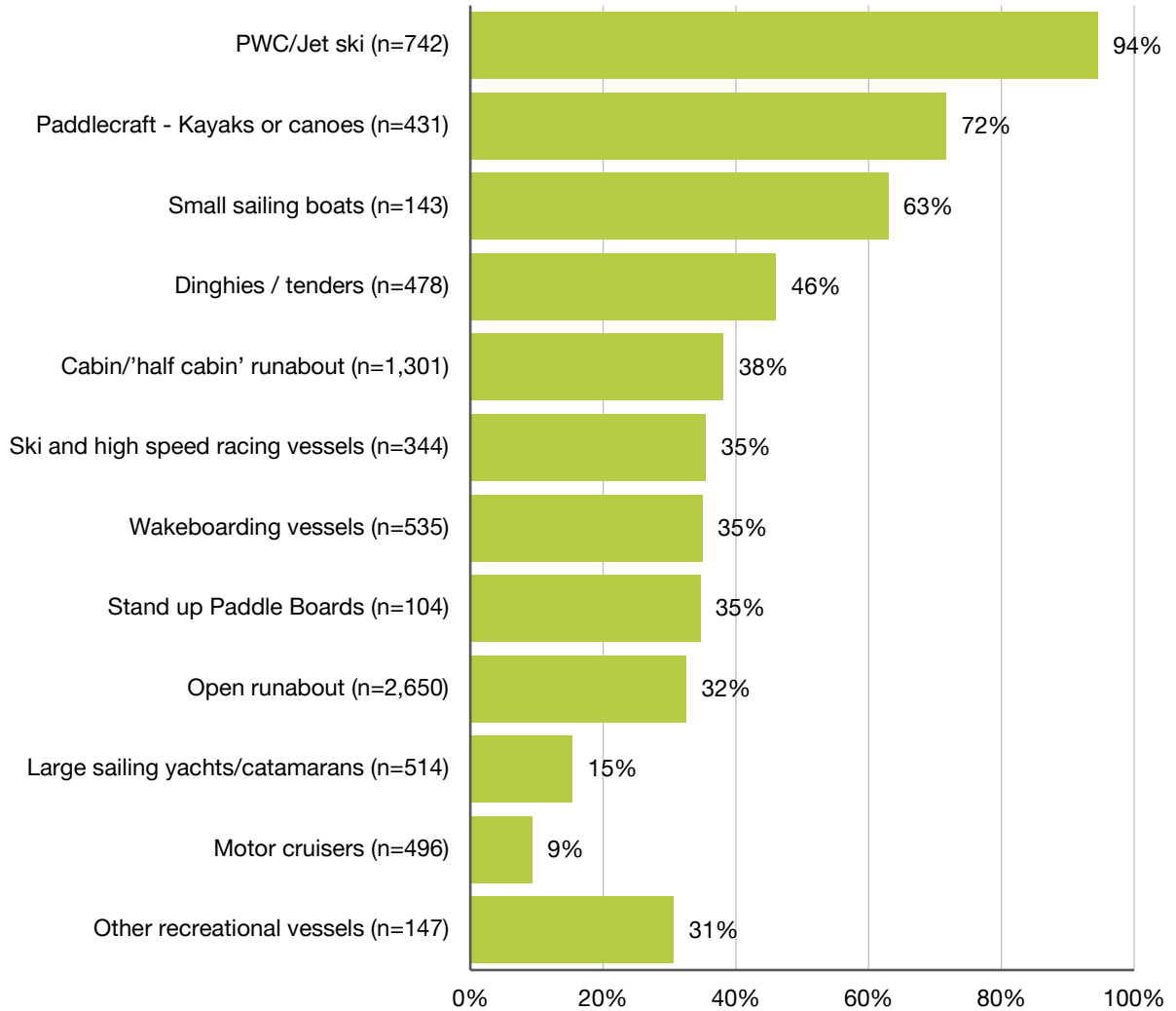
Typically the larger vessels, such as motor cruisers (9%) and large sailing yachts/catamarans (15%) had lower proportions of lifejacket wearing and smaller vessels had higher rates of lifejacket wearing - except open runabouts (32%) and stand up paddle boards (35%).



5. MAIN FINDINGS

Figure 4: **Lifejacket Wear by Vessel Type**

Base: n=7,885



5.5. LIFEJACKET WEAR IN MANDATORY SITUATIONS

Six different mandatory situations were able to be analysed from the data collected, these were:

- Vessels crossing a bar exit to the ocean
- Being alone in a small vessel
- Being a child aged under 12 years of age on a small or medium vessel
- Being in a small vessel on the open ocean or on alpine waters
- Being on a PWC or jet ski
- Being towed by another vessel (e.g. waterskiing, wakeboarding etc.)



5. MAIN FINDINGS

The lifejacket wear rate was calculated for each of these situations combined (n=3,242). The result was that in these mandatory situations a lifejacket was worn in only seven out of ten (72%) cases.

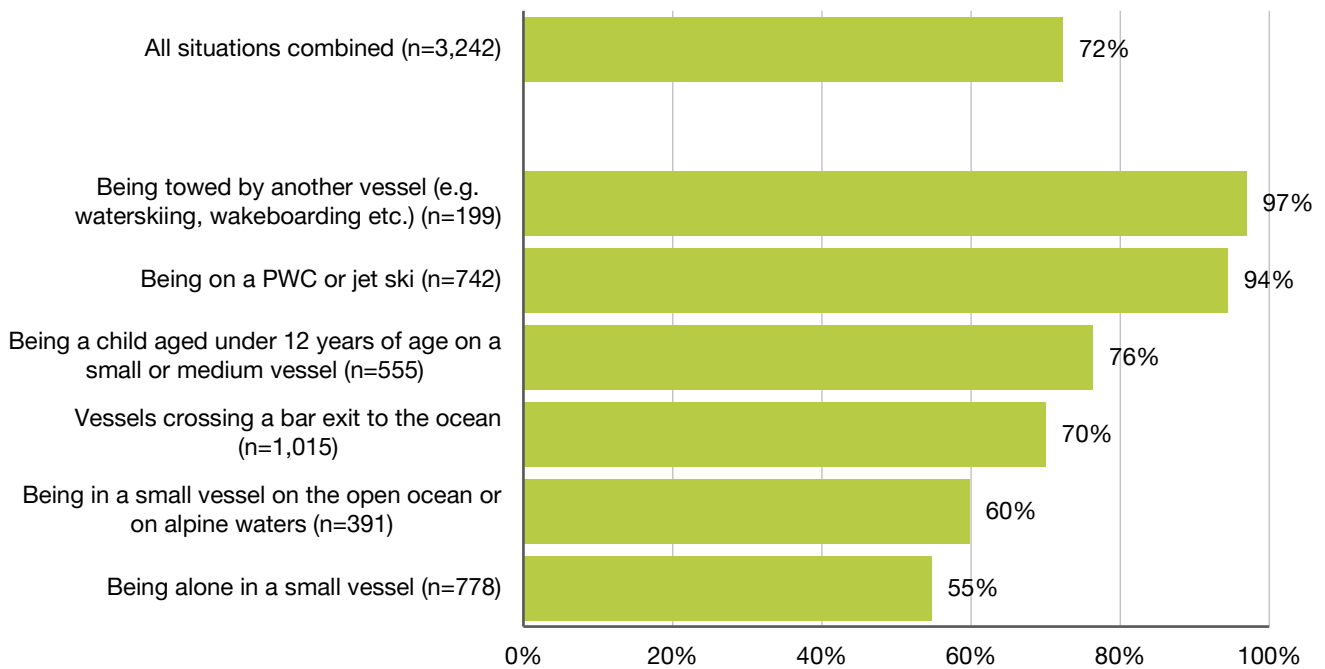
For those water users observed being towed or piloting a PWC or jet ski more than nine out of ten were observed wearing a lifejacket.

Lifejacket wear was lowest amongst those who were observed alone in a small vessel (50%) or those observed on a small vessel on the open ocean or in alpine waters (60%).

It should be noted that the results for mandatory lifejacket wear are only approximate for some of the situations examined – in particular, being a child under 12 on a small or medium vessel, being on a small vessel on the open ocean or alpine waters, being alone in a small vessel and for all situations combined. This is because key aspects of the lifejacket legislation are framed around vessel length rather than vessel type – and the relevant length cut-offs (4.8 metres and 8 metres) do not neatly align with the vessel categories examined in this study.

Figure 5: **Lifejacket Wear Rate in Mandatory Situations**

Base: n=3,242 (all people identified in a mandatory lifejacket situation)





5. MAIN FINDINGS

5.6. LIFEJACKET WEAR RATE BY REGION

While the observed wear rate within each region was likely influenced by the type of situations and the types of vessels prevalent in that region, the data still shows differences by region in certain mandatory situations. This is a possible predictor of lower or higher lifejacket wear across all activities within a region.

Lifejacket wear rates were significantly higher amongst those observed in Southern Coastal waters (63%), Inland Alpine waters (53%) and in Northern Coastal waters (44%) and significantly lower in Sydney and Central Coast waters (30%) – see Figure 6.

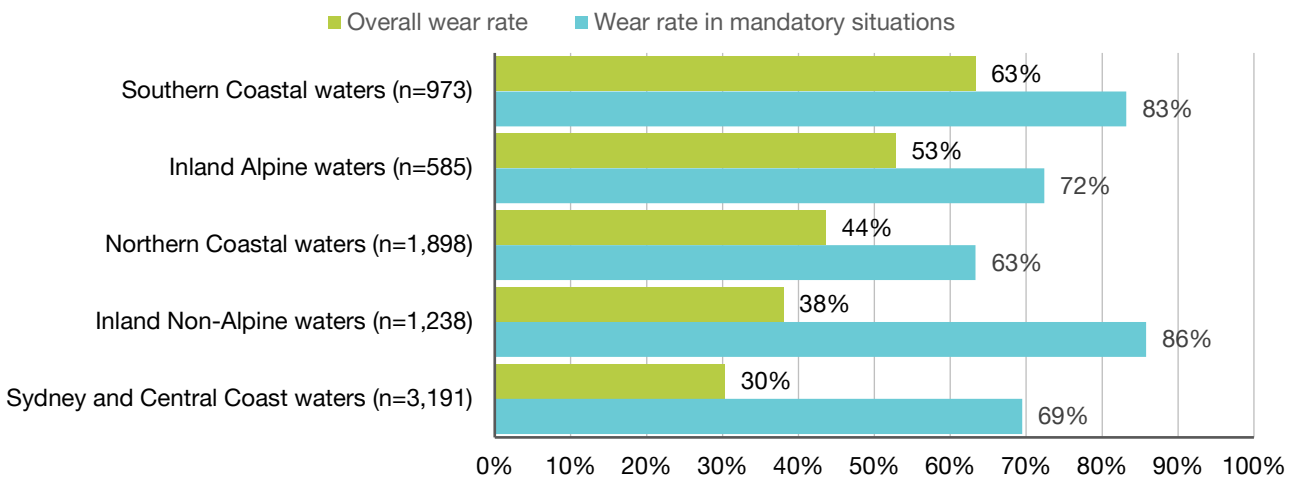
While the overall lifejacket wear rate on inland non-alpine waters was lower (38%) than in other regions, in mandatory situations people observed here were significantly more likely to be wearing a lifejacket than those in other regions (see Figure 6).

Along with the highest wear rate level in all situations, those observed on Southern Coastal waters also had a significantly high lifejacket wear rate in mandatory situations (83%).

Figure 6: **Lifejacket Wear Rate by Region**

Base: n=7,885 (overall wear rate)

Base: n=3,242 (all people in mandatory situations)



- The wear rate for mandatory situations on Northern Coastal waters were significantly lower (63%) compared to those from all other regions combined (77%). The data suggests the following issues of concern with respect to the Northern Coastal waters:
- 88% wear rate amongst PWC / jet ski riders compared to 97% amongst all other regions combined
- 70% wear rate amongst children in a small vessel compared to 79% amongst all other regions combined
- 61% wear rate amongst vessels crossing a bar compared to 85% amongst all other regions combined



5. MAIN FINDINGS

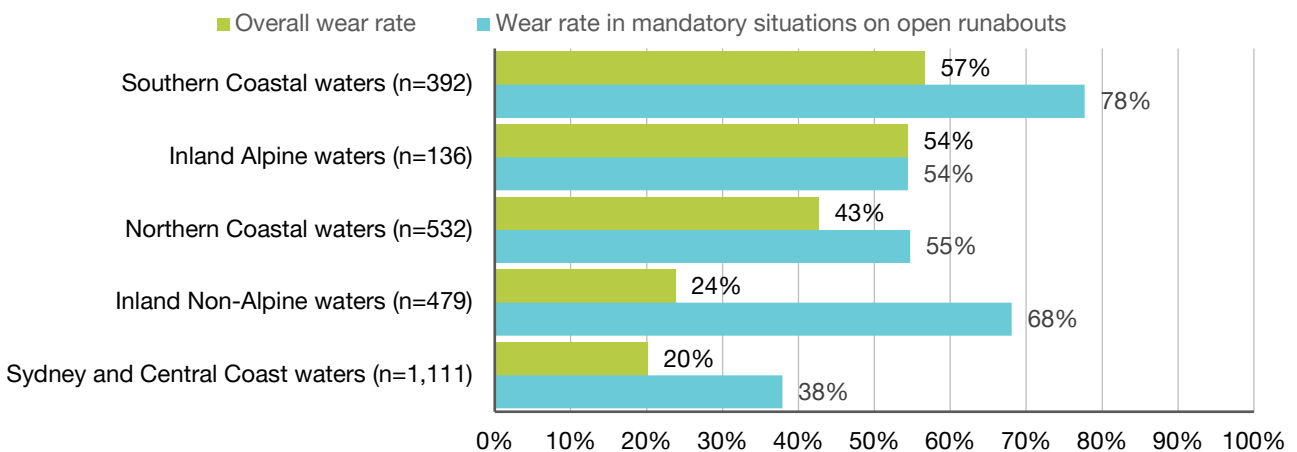
- 48% wear rate amongst single people in a small vessel compared to 57% amongst all other regions combined

By controlling for vessel type and analysing the lifejacket wear rate on open runabouts only, Figure 7 shows that the wear rate on Sydney and Central Coast waters remains significantly lower (at 20%) than for other regions. Analysing by open runabouts only removes any potential effect of variations in the mix of vessel types between regions. Such effects could be considerable given that certain vessel types have much higher (e.g. PWC) or much lower (e.g. motor cruisers) wear rates than average, and given that such vessel types are likely to be much more common in some parts of the state than others.

Figure 7: **Lifejacket Wear Rate by Region on Open Runabouts**

Base: n=2,650 (overall wear rate on open runabouts)

Base: n=1,056 (all people in mandatory situations on open runabouts)

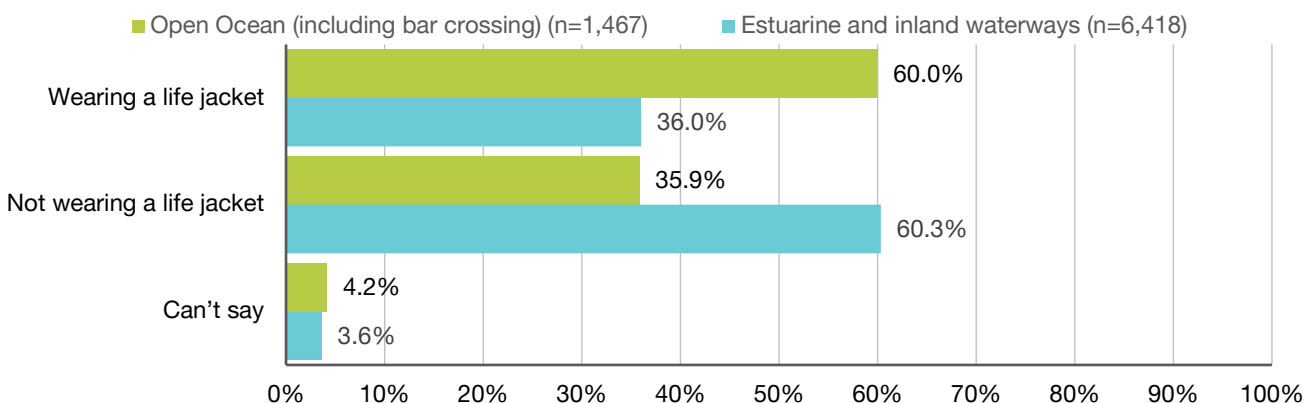


5.7. LIFEJACKET WEAR RATE ON OPEN WATERS

Observed lifejacket wear rates for people either on the open ocean or crossing a bar were significantly higher (60.0%) than those observed on other waterways (35.9%).

Figure 8: **Lifejacket Wear by Waterway Type**

Base: n=7,885





5. MAIN FINDINGS

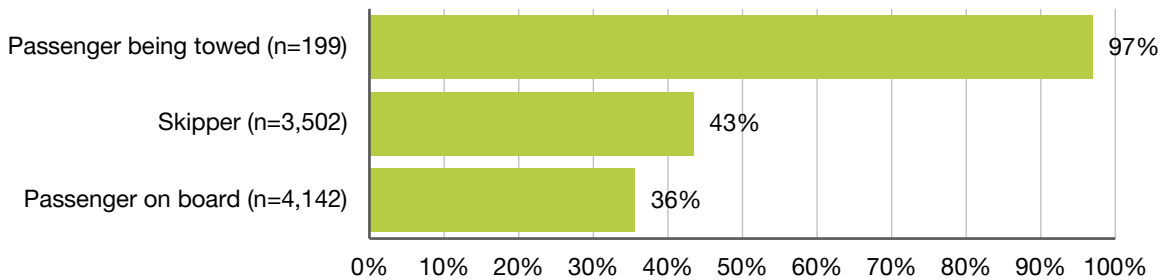
5.8. LIFEJACKET WEAR RATE BY ROLE

The role of the person being observed was categorised into one of three different categories.

Lifejacket wear rates were significantly higher amongst those being towed (97%), than both skippers (43%) and passengers on board a vessel (36%). However, skippers were significantly more likely to be observed wearing a lifejacket than passengers on board vessels (see Figure 9). The high wear rate amongst people being towed reflects the mandatory wear requirement for all towed persons.

Figure 9: **Lifejacket Wear Rate by Role**

Base: n=7,843 (excludes those where the role could not be determined)



Interestingly, the wear rate amongst passengers onboard (i.e. not towed) when the skipper was wearing a lifejacket was 92%, which was significantly higher than the 16% among passengers onboard when the skipper was not wearing one. This suggests that lifejacket wear behaviour by the skipper may have a positive influence on the lifejacket wearing behaviour of their passengers.



6. APPENDIX 1: SAMPLE BY OBSERVATION SITE

Table 4 **Wear Rate by Observation Site – Sydney & Central Coast Waters**

OBSERVATION SITE	LOCATION TYPE	OBSERVATION TYPE	VESSELS OBSERVED	PEOPLE OBSERVED	LIFEJACKET WEAR RATE
Pittwater	Estuarine waterway	On water	281	502	39%
Harbour - Balmoral Beach	Estuarine waterway	On shore	195	427	24%
Port Hacking - Lilli Pilli Baths	Estuarine waterway	On shore	169	383	47%
On ocean near Harbour Heads	Open ocean	On water	171	362	26%
Harbour - Ballast Point Park	Estuarine waterway	On shore	136	335	16%
Harbour - Bradleys Head	Estuarine waterway	On shore	69	188	11%
Botany Bay - Old Como Bridge	Estuarine waterway	On shore	95	187	45%
Botany Bay - Tom Ugly's Bridge	Estuarine waterway	On shore	96	182	46%
Botany Bay - Molineaux Point Lookout	Estuarine waterway	On shore	79	175	19%
Port Hacking - Gunnamatta Bay	Estuarine waterway	On shore	61	164	45%
Harbour - Clarke's Point Reserve	Estuarine waterway	On shore	70	147	16%
Port Hacking - Shiprock Aquatic Reserve - Turriell Point	Estuarine waterway	On shore	78	139	19%
TOTAL			1,500	3,191	30%

* Small sample size, treat result with caution



6. APPENDIX 1: SAMPLE BY OBSERVATION SITE

Table 5 **Wear Rate by Observation Site – Northern Coastal Waters**

OBSERVATION SITE	LOCATION TYPE	OBSERVATION TYPE	VESSELS OBSERVED	PEOPLE OBSERVED	LIFEJACKET WEAR RATE
Lower Clarence River, near Yamba	Estuarine waterway	On water	195	417	39%
Port Stephens – Sunrise Beach/Soldiers Point	Estuarine waterway	On shore	86	220	22%
Port Stephens – Nelson Bay beach	Estuarine waterway	On shore	77	164	38%
Brunswick River (Brunswick Heads) Near Marine Rescue Brunswick	Bar at exit to ocean	On shore	69	158	73%
Lake Macquarie –Wombal Reserve (Coal Point)	Estuarine waterway	On shore	66	129	21%
Hastings River – Town Beach Lookout (bar crossing)	Bar at exit to ocean	On shore	65	119	63%
Lake Macquarie – Swansea channel south side	Bar at exit to ocean	On shore	62	116	35%
Ocean off Port Stephens	Open ocean Bar at exit to ocean	On water	54	106	74%
Hastings River – east of Marine Rescue Port	Estuarine waterway	On shore	42	97	28%
Clarence River (Yamba) Wooli Park	Bar at exit to ocean	On shore	36	86	69%
Nambucca River (Nambucca Heads) V-Wall	Bar at exit to ocean	On shore	55	86	56%
Port Stephens – Jimmys Beach	Estuarine waterway	On shore	38	65	31%
Tweed River (Tweed Heads)	Bar at exit to ocean	On shore	27	49	71%
Hastings River – Settlement Point Road	Estuarine waterway	On shore	28	48	42%
Hastings River – McInherney Park*	Estuarine waterway	On shore	17	27	7%
Evans River (Evans Head) Foreshore near breakwall*	Bar at exit to ocean	On shore	6	9	78%
Lake Macquarie – Speers Point*	Estuarine waterway	On shore	1	1	0%
Hastings River – Hibberd Reserve*	Estuarine waterway	On shore	1	1	0%
TOTAL			925	1,898	44%

* Small sample size, treat result with caution



6. APPENDIX 1: SAMPLE BY OBSERVATION SITE

Table 6 **Wear Rate by Observation Site – Southern Coastal Waters**

OBSERVATION SITE	LOCATION TYPE	OBSERVATION TYPE	VESSELS OBSERVED	PEOPLE OBSERVED	LIFEJACKET WEAR RATE
Narooma – Southern breakwall ocean entrance (for bar crossing vessels)	Estuarine waterway Bar at exit to ocean	On shore	75	178	84%
Ocean off Batemans Bay	Open ocean Bar at exit to ocean	On water	86	177	83%
Batemans Bay	Estuarine waterway	On water	88	167	51%
Sussex Inlet - End of Nielson Lane	Estuarine waterway	On shore	57	126	56%
Sussex Inlet - Palm Beach/Sanctuary Point)	Estuarine waterway	On shore	42	86	44%
Sussex Inlet - Kingfisher Reserve (end of Island Point Road)	Estuarine waterway	On shore	30	43	58%
Shoalhaven – Orient Point foreshore reserve	Estuarine waterway	On shore	26	40	53%
Narooma - Quota Park (off Riverside Drive	Estuarine waterway	On shore	17	38	18%
Shoalhaven – Marine Rescue (bar crossing)	Bar at exit to ocean	On shore	21	38	63%
Shoalhaven – Nowra Public Wharf/ Mavromattes Reserve	Estuarine waterway	On shore	18	37	35%
Narooma - Princes Hwy Bridge (south end)*	Estuarine waterway	On shore	12	28	71%
Lake Illawarra (Warilla) Foreshore near breakwall*	Bar at exit to ocean	On shore	6	9	100%
Narooma - Point at north-western 'corner' of Lake View Drive*	Estuarine waterway Bar at exit to ocean	On shore	2	6	100%
TOTAL			481	973	63%

* Small sample size, treat result with caution



6. APPENDIX 1: SAMPLE BY OBSERVATION SITE

Table 7 **Wear Rate by Observation Site – Inland Alpine Waters**

OBSERVATION SITE	LOCATION TYPE	OBSERVATION TYPE	VESSELS OBSERVED	PEOPLE OBSERVED	LIFEJACKET WEAR RATE
Lake Jindabyne	Inland Waterways – Alpine	On water	153	384	55%
Blowering Dam	Inland Waterways – Alpine	On water	81	201	48%
TOTAL			234	585	53%

Table 8 **Sample by Observation Site – Inland Other Waters**

OBSERVATION SITE	LOCATION TYPE	OBSERVATION TYPE	VESSELS OBSERVED	PEOPLE OBSERVED	LIFEJACKET WEAR RATE
Lake Mulwala	Inland Waterways – Other	On water	235	643	43%
Copeton Dam	Inland Waterways – Other	On water	106	276	32%
Lake Windermere	Inland Waterways – Other	On water	106	255	35%
Wagga Wagga – Murrumbidgee River	Inland Waterways – Other	On water	33	64	34%
TOTAL			480	1,238	38%



7. APPENDIX 2: VESSEL TYPE BY SITE

The tables within this section show the number of the different types of vessels observed at each observation site within each region.



7. APPENDIX 2: VESSEL TYPE BY SITE

Table 9 Vessel Types by Observation Site – Sydney & Central Coast Waters

OBSERVATION SITE	OPEN RUNABOUT	CABIN/ HALF CABIN RUNABOUT	PWC	PADDLE-CRAFT	DINGHIES/ TEDNERS	MOTOR CRUISERS	LARGE SAILING YACHTS	WAKE-BAORD VESSELS	SKI & HIGH SPEED VESSELS	STAND UP PADDLE-BOARDS	SMALL SAILING BOATS	OTHER RECREATIONAL VESSELS
Pittwater	71	40	31	23	39	17	19	5	3	12	21	0
Harbour - Balmoral Beach	72	19	0	26	24	21	14	0	0	2	6	11
Port Hacking - Lilli Pilli Baths	55	10	68	2	19	3	1	0	0	2	0	9
On ocean near Harbour Heads	37	32	0	69	1	8	17	0	0	7	0	0
Harbour - Ballast Point Park	40	21	0	12	23	13	21	0	0	0	4	2
Harbour - Bradleys Head	10	9	0	0	5	18	22	1	0	0	4	0
Botany Bay - Old Como Bridge	37	5	35	4	12	1	0	0	0	0	0	1
Botany Bay - Tom Ugly's Bridge	39	12	35	1	5	1	0	0	0	0	0	3
Botany Bay - Molineaux Point Lookout	43	17	10	0	1	4	2	0	0	0	1	1
Port Hacking - Gunnamatta Bay	12	9	8	2	4	4	12	0	0	0	6	4
Harbour - Clarke's Point Reserve	26	5	0	0	11	17	7	0	0	0	2	2
Port Hacking - Shiprock Aquatic Reserve - Turriell Point	32	8	6	3	11	10	3	0	0	0	1	4
TOTAL	474	187	193	142	155	117	118	6	3	23	45	37



7. APPENDIX 2: VESSEL TYPE BY SITE

Table 10 Vessel Types by Observation Site – Northern Coastal Waters

OBSERVATION SITE	OPEN RUNABOUT	CABIN/ HALF CABIN RUNABOUT	PWC	PADDLE-CRAFT	DINGHIES/ TEDNERS	MOTOR CRUISERS	LARGE SAILING YACHTS	WAKE-BAORD VESSELS	SKI & HIGH SPEED VESSELS	STAND UP PADDLE-BOARDS	SMALL SAILING BOATS	OTHER RECREATIONAL VESSELS
Lower Clarence River, near Yamba	41	41	9	14	48	8	6	8	13	3	3	1
Port Stephens – Sunrise Beach/Soldiers Point	22	20	12	1	1	2	15	3	7	3	0	0
Port Stephens – Nelson Bay beach	16	12	19	8	2	8	5	4	2	1	0	0
Brunswick River (Brunswick Heads) Near Marine Rescue Brunswick	40	18	1	1	5	0	0	0	0	0	0	4
Lake Macquarie – Wombal Reserve (Coal Point)	21	11	9	6	0	5	4	4	4	1	1	0
Hastings River – Town Beach Lookout (bar crossing)	21	17	10	8	1	3	3	1	0	1	0	0
Lake Macquarie – Swansea channel south side	27	6	15	5	2	1	4	1	1	0	0	0
Ocean off Port Stephens	16	27	6	0	0	2	2	0	1	0	0	0
Hastings River – east of Marine Rescue Port	12	7	1	8	3	1	3	2	0	5	0	0
Clarence River (Yamba) Woolli Park	5	9	6	0	0	11	2	3	0	0	0	0
Nambucca River (Nambucca Heads) V-Wall	15	9	8	5	14	0	0	1	0	3	0	0
Port Stephens – Jimmys Beach	3	3	3	7	2	1	1	0	2	16	0	0
Tweed River (Tweed Heads)	5	3	0	1	1	3	1	0	0	0	14	0
Hastings River – Settlement Point Road	2	6	19	0	0	0	0	0	0	0	0	0
Hastings River – McInherney Park*	6	6	0	4	0	0	0	1	0	0	0	0
Evans River (Evans Head) Foreshore near breakwall*	2	0	3	0	1	0	0	0	0	0	0	0



7. APPENDIX 2: VESSEL TYPE BY SITE

OBSERVATION SITE	OPEN RUNABOUT	CABIN/ HALF CABIN RUNABOUT	PWC	PADDLE-CRAFT	DINGHIES/ TEDNERS	MOTOR CRUISERS	LARGE SAILING YACHTS	WAKE-BAORD VESSELS	SKI & HIGH SPEED VESSELS	STAND UP PADDLE-BOARDS	SMALL SAILING BOATS	OTHER RECREATIONAL VESSELS
Lake Macquarie – Speers Point*	0	0	1	0	0	0	0	0	0	0	0	0
Hastings River – Hibberd Reserve*	1	0	0	0	0	0	0	0	0	0	0	0
TOTAL	255	195	122	68	80	45	46	28	30	33	18	5



7. APPENDIX 2: VESSEL TYPE BY SITE

Table 11 Vessel Types by Observation Site – Southern Coastal Waters

OBSERVATION SITE	OPEN RUNABOUT	CABIN/ HALF CABIN RUNABOUT	PWC	PADDLE-CRAFT	DINGHIES/ TEDNERS	MOTOR CRUISERS	LARGE SAILING YACHTS	WAKE-BAORD VESSELS	SKI & HIGH SPEED VESSELS	STAND UP PADDLE-BOARDS	SMALL SAILING BOATS	OTHER RECREATIONAL VESSELS
Narooma – Southern breakwall ocean entrance (for bar crossing vessels)	19	51	1	0	0	4	0	0	0	0	0	0
Ocean off Batemans Bay	30	40	11	0	0	2	1	0	0	0	0	2
Batemans Bay	38	13	15	9	10	1	0	1	0	0	0	1
Sussex Inlet - End of Nielson Lane	24	10	8	1	6	3	1	2	1	0	0	1
Sussex Inlet - Palm Beach/Sanctuary Point)	17	5	2	5	3	0	0	0	1	0	5	4
Sussex Inlet - Kingfisher Reserve (end of Island Point Road)	9	1	4	7	3	0	0	1	1	3	1	0
Shoalhaven – Orient Point foreshore reserve	14	3	0	2	5	1	0	1	0	0	0	0
Narooma - Quota Park (off Riverside Drive	9	3	4	0	0	0	0	0	0	0	0	1
Shoalhaven – Marine Rescue (bar crossing)	13	2	6	0	0	0	0	0	0	0	0	0
Shoalhaven – Nowra Public Wharf/ Mavromattes Reserve	3	0	0	2	4	1	0	2	2	0	4	0
Narooma - Princes Hwy Bridge (south end)*	3	1	1	6	0	0	0	0	0	1	0	0
Lake Illawarra (Warilla) Foreshore near breakwall*	2	0	1	1	0	0	0	0	0	2	0	0
Narooma - Point at north-western 'corner' of Lake View Drive*	1	1	0	0	0	0	0	0	0	0	0	0
TOTAL	182	130	53	33	31	12	2	7	5	6	10	9



7. APPENDIX 2: VESSEL TYPE BY SITE

Table 12 Vessel Types by Observation Site – Inland Alpine Waters

OBSERVATION SITE	OPEN RUNABOUT	CABIN/ HALF CABIN RUNABOUT	PWC	PADDLE-CRAFT	DINGHIES/ TEDNERS	MOTOR CRUISERS	LARGE SAILING YACHTS	WAKE-BAORD VESSELS	SKI & HIGH SPEED VESSELS	STAND UP PADDLE-BOARDS	SMALL SAILING BOATS	OTHER RECREATIONAL VESSELS
Lake Jindabyne	20	11	21	37	2	0	3	23	13	11	9	3
Blowering Dam	37	2	0	18	1	0	0	12	8	3	0	0
TOTAL	57	13	21	55	3	0	3	35	21	14	9	3

Table 13 Vessel Types by Observation Site – Inland Other Waters

OBSERVATION SITE	OPEN RUNABOUT	CABIN/ HALF CABIN RUNABOUT	PWC	PADDLE-CRAFT	DINGHIES/ TEDNERS	MOTOR CRUISERS	LARGE SAILING YACHTS	WAKE-BAORD VESSELS	SKI & HIGH SPEED VESSELS	STAND UP PADDLE-BOARDS	SMALL SAILING BOATS	OTHER RECREATIONAL VESSELS
Lake Mulwala	79	5	61	2	1	0	0	53	16	3	4	11
Copeton Dam	50	8	8	14	2	0	0	6	14	4	0	0
Lake Windermere	55	5	7	14	1	0	0	2	14	7	0	1
Wagga Wagga – Murrumbidgee River	14	0	1	8	9	0	0	1	0	0	0	0
TOTAL	198	18	77	38	13	0	0	62	44	14	4	12



8. APPENDIX 3: OBSERVATION FRAMEWORK

Click or tap here to enter text.

Data to Be Entered During Each Vessel and Person Observation

SINGLE

Q1. REGION

SELECT THE REGION

1. Sydney and Central Coast waters
2. Northern Coastal waters
3. Southern Coastal waters
4. Inland Non-Alpine waters
5. Inland Alpine waters

IF Q1=1 GO TO Q2_1

IF Q1=2 GO TO Q2_2

IF Q1=3 GO TO Q2_3

IF Q1=4 GO TO Q2_4

IF Q1=5 GO TO Q2_5

SINGLE

Q2_1. LOCATION – REGION 1

SELECT THE LOCATION

1. Botany Bay - Molineaux Point Lookout
2. Botany Bay - Tom Ugly's Bridge
3. Botany Bay - Old Como Bridge
4. Harbour - Balmoral Beach
5. Harbour - Laings Point
6. Harbour - Bradleys Head
7. Harbour - Clarke's Point Reserve
8. Harbour - Ballast Point Park
9. Port Hacking - Lilli Pilli Baths
10. Port Hacking - Gunnamatta Bay
11. Port Hacking - Shiprock Aquatic Reserve - Turriell Point
12. Pittwater – on water
13. Brisbane Water
14. Cowan Creek
15. On ocean near Harbour Heads

GO TO Q3



8. APPENDIX 3: OBSERVATION FRAMEWORK

SINGLE

Q2_2. LOCATION – REGION 2

SELECT THE LOCATION

1. Hastings River – Town Beach Lookout (bar crossing)
2. Hastings River – east of Marine Rescue Port
3. Hastings River – Settlement Point Road
4. Hastings River – McInherney Park
5. Hastings River – Hibberd Reserve
6. Lake Macquarie – Speers Point
7. Lake Macquarie – Swansea channel south side (bar crossing vessels)
8. Lake Macquarie –Orient Point foreshore reserve
9. Lower Clarence/Yamba on water
10. Port Stephens – Jimmys Beach
11. Port Stephens – Nelson Bay beach
12. Port Stephens – Nelson Bay breakwater
13. Port Stephens – Sunrise Beach/soldiers Point
14. Port Stephens – Taylors Beach
15. Ocean off Port Stephens

GO TO Q3

SINGLE

Q2_3. LOCATION – REGION 3

SELECT THE LOCATION.

SHOALHAVEN INCLUDES CROOKHAVEN RIVER

SUSSEX INLET INCLUDES GEORGES BASIN

NAROOMA INCLUDES WAGONGA INLET

1. Batemans Bay (non-ocean) – on water
2. Narooma - Princes Hwy Bridge (south end)
3. Narooma - Quota Park (off Riverside Drive
4. Narooma - Point at north-western 'corner' of Lake View Drive
5. Narooma – southern breakwall ocean entrance (for bar crossing vessels)
6. Shoalhaven – foreshore near Ski Park (end of Rock Hill Road)
7. Shoalhaven –Marine Rescue (bar crossing)
8. Shoalhaven – Nowra Public Wharf/ Mavromattes Reserve
9. Shoalhaven – Orient Point foreshore reserve
10. Shoalhaven - River Road foreshore near Jerry Bailey Road



8. APPENDIX 3: OBSERVATION FRAMEWORK

11. Sussex Inlet - End of Nielson Lane
12. Sussex Inlet - Palm Beach/Sanctuary Point)
13. Sussex Inlet - Kingfisher Reserve (end of Island Point Road)
14. Ocean off Batemans Bay

GO TO Q3

SINGLE

Q2_4. LOCATION – REGION 4

SELECT THE LOCATION

1. Lake Mulwala – on water
2. Wagga Wagga – Lake Albert – on water
3. Wagga Wagga – Murrumbidgee River – on water
4. Copeton Dam – on water
5. Lake Windermere – on water

GO TO Q3

SINGLE

Q2_5. LOCATION – REGION 5

SELECT THE LOCATION

1. Blowering Dam – on water
2. Lake Jindabyne – on water

SINGLE

Q3. LOCATION TYPE

SELECT THE LOCATION TYPE

1. Open Ocean
2. Estuarine Waterways
3. Bar at exit to ocean
4. Inland Waterways – Alpine
5. Inland waterways - Other



8. APPENDIX 3: OBSERVATION FRAMEWORK

SINGLE

Q4. VESSEL TYPE – DISPLAY IMAGES WITH EACH CODE.

SELECT THE VESSEL TYPE. CHECK HANDOUT IF REQUIRED

1. **Dinghies / tenders** -
Very small (2-3 metres, 1-2 people) open, oars or outboard
2. **Open runabout** -
Small (3-5 metres) open, maybe light canopy/screen, mostly single outboard, no side windows
3. **Cabin/'half cabin' runabout** -
Usually 4.5-7 metres, rego number, small half cabin for driver and maybe +1, single or twin outboard
4. **Motor cruisers** -
large usually 7+ metres, rego numbers and often name, can stand in cabin, most have cooking and sleeping berths, usually inboard engine
5. **PWC (Personal Water Craft)/Jet ski** -
Small < 4 metres) high speed, 1-3 people sitting or 1 standing, powered by water jet hidden engine
6. **Paddlecraft** -
Kayaks or canoes, includes longer paddle powered 'dragon boats', no motor no sail, no oars. Some kayaks also have pedal power
7. **Stand up Paddle Boards** -
Paddle or pedal powered usually < 5 metres, fibreglass or inflatable, flat low profile, no engine, 1 sometimes 2 people standing or kneeling.
8. **Small sailing boats** -
up to 5.5 metres, open, no engine, but not kite board or sail board
9. **Large sailing yachts/catamarans** -
usually > 5.5 metres, ballasted keels or tanks, don't rely on human weight for balance most have cabins with side windows, might have outboard motor
10. **Ski and high speed racing vessels**
Very streamlined, rego numbers, usually large outboard motor, around 5-7 metres, no cabin, very pointed bow, capable of very high speed
11. **Wakeboarding vessels**
Streamlined but chunkier, inboard motor, 6-8 metres, no cabin but high vertical sides, most with superstructure; can be set up for towing with board racks and speakers
12. **Other** recreational vessels [SPECIFY]



8. APPENDIX 3: OBSERVATION FRAMEWORK

MULTI

Q5. ACTIVITY TYPE

SELECT THE ACTIVITY TYPE

1. Fishing (angling)
2. Crossing an ocean bar
3. Towing a water skier, wakeboarder or similar (including paragliders)
4. Persons being towed by a vessel (i.e., the water skiers or wakeboarders and possibly paragliders themselves)
5. Racing
6. Something else

SINGLE

Q6. ACTIVITY LEVEL

SELECT THE ACTIVITY LEVEL

1. Vessel is underway
2. Vessel is drifting
3. Vessel is at anchor or moored

SHOW Q7 AND Q8 ON A SINGLE SCREEN

TWO DIGIT NUMERIC

Q7. TOTAL NUMBERS

Total number of people on this vessel or being towed

IF UNSURE ENTER 99

2 DIGIT NUMERIC TEXT BOX

TWO DIGIT NUMERIC

Q8. NUMBER WEARING LIFEJACKETS

Total number of people on this vessel or being towed who are wearing a lifejacket

IF UNSURE ENTER 99

2 DIGIT NUMERIC TEXT BOX

SET UP LOOP WITH SEPS 1 TO 10.

SINGLE

Q9. PERSON ROLE

Is the person ...

1. A 'Skipper' (person driving, steering or propelling a vessel)
2. A Passenger' (person not driving, steering or propelling a vessel) on board



8. APPENDIX 3: OBSERVATION FRAMEWORK

3. A passenger being towed
4. Could not tell

SINGLE

Q10. PERSON SEX

Is the person ...

1. Male
2. Female
- Can't say

SINGLE

Q11. PERSON AGE GROUP

Is the person ...

1. Child under 12
2. 12 or older
3. Can't say

SINGLE

Q12. WHETHER WEARING LIFEJACKET

Is the person ...

1. Wearing a lifejacket
2. Not wearing a lifejacket
3. Can't say

SINGLE

Q13. ANOTHER PERSON TO OBSERVE

Is there another person to observe on this boat?

1. Yes
2. No

IF 2 IN Q13 EXIT LOOP AND GO TO NEXT RECORD

IF REACHED END OF LOOP GO TO NEXT RECORD

Q14. FINISH

1. Finished with this vessel

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Taverner Research Group

T +61 2 9212 2900 | W www.taverner.com.au

A Level 2, 88 Foveaux Street, Surry Hills, NSW 2010 |

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