



Marine Safety Inquiry Report



Capsize and loss of kayaks off Anglesea
Tuesday 3 May 2016



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Release date: 3 August 2016



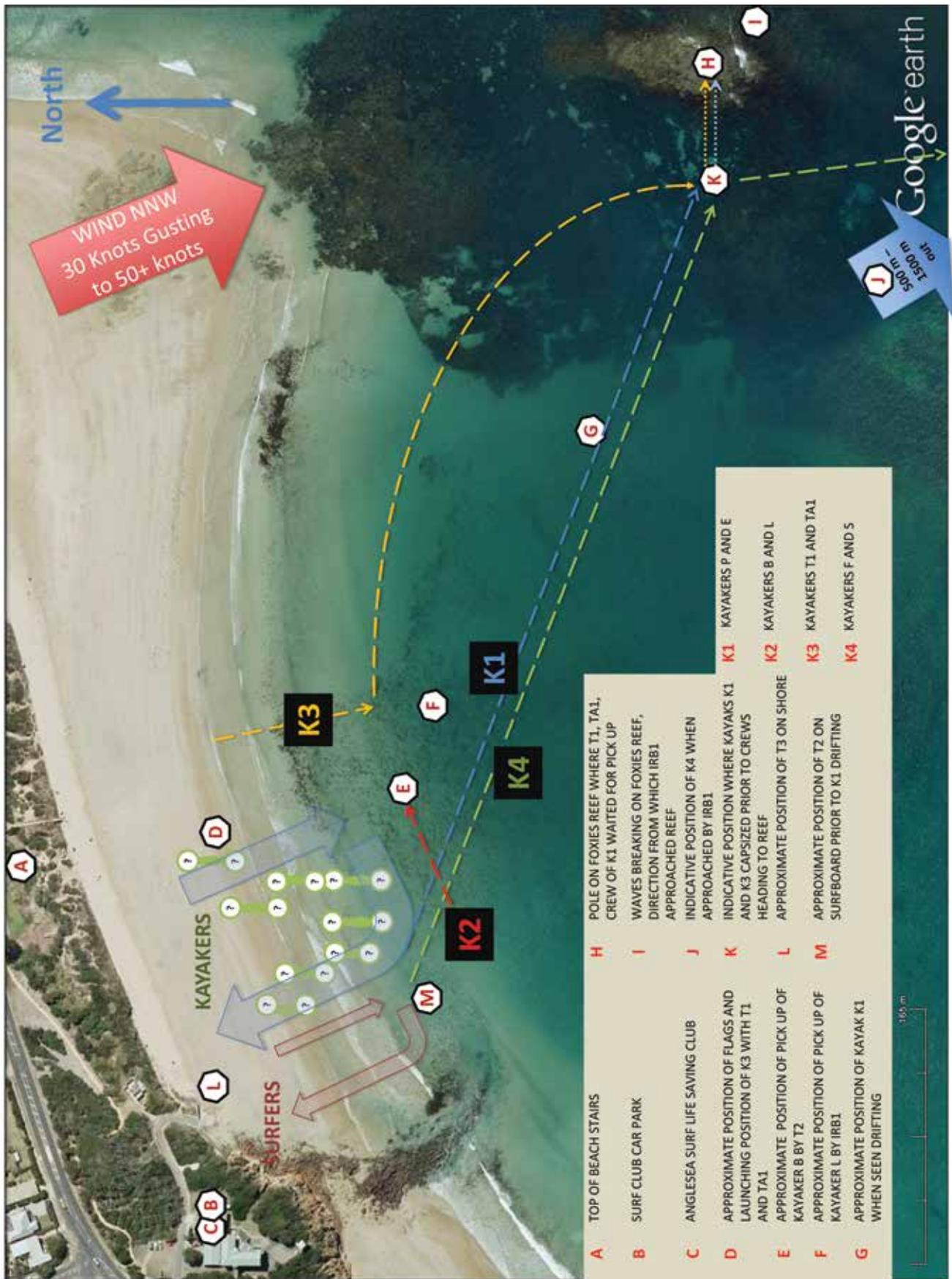
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Summary of events

1. On Tuesday 3 May 2016 students from Brauer College, Warrnambool were engaged in a kayaking activity at Anglesea beach. Figure 1 summarises the event.
2. Nine kayaks and associated safety equipment had been hired, however one kayak had a missing bung and was not used.
3. Weather conditions included a NNW wind blowing offshore from Anglesea Beach at an average speed of 30 knots, gusting to 50 plus knots. Visibility was clear and temperatures around 15 degrees.
4. At approximately 0900hrs seven double kayaks were put in the water in the sheltered part of Anglesea beach adjacent to the surf life saving club. One kayak was left on the beach for staff to access if needed. The intention was to carry out an activity involving paddling out beyond the surf break, turning and riding a wave back in.
5. Some students preferred to surf and a surfing activity was started adjacent to the kayaking.
6. During the activity one kayak with two students drifted to the left of the designated area and capsized just outside the surf break. The occupants of this sea kayak had difficulty getting back into the sea kayak. The two kayakers found it impossible to paddle against the 30 knot wind back into shore.
7. A second kayak capsized outside the surf break within the designated area.
8. Teachers monitoring the activity on shore saw the kayak that was drifting away and called both activities to a close using hand signals. Kayakers and surfers headed to the beach.
9. Two teachers commandeered a kayak and safety equipment and paddled out to try to assist the drifting kayak.
10. Two students in another kayak also saw the drifting kayak and decided to assist.
11. Thus there were three kayaks beyond the surf break. None of the pairs of kayakers was able to make headway against the winds and return to shore including the kayakers attempting to rescue the initial drifting kayak.
12. A private surf school was setting up at the beach and the instructors were members of the Anglesea Surf Life Saving Club.
13. These instructors, along with other Club members instigated a recovery of the kayakers. Eventually a pair of inflatable rescue boats (IRBs) was used to retrieve the kayakers. An IRB retrieved one kayaker from the capsized kayak near the surf break. The second kayaker from the capsized kayak was retrieved by a teacher on a surf board.
14. Two of the three drifting kayaks - the initially drifting one and the one carrying the teachers - capsized adjacent to Foxies Reef and all four occupants swam to the reef and stood adjacent to and hanging on to a vertical pole. They were recovered by the IRBs.
15. The two students in the kayak which went to aid of the initially drifting kayak drifted up to a nautical mile beyond Foxies Reef and were recovered by an IRB.
16. All kayakers returned safely to shore. There were no injuries although some were cold. The first aider from the surf club and the teachers organised showers and hot drinks and monitored their recovery.

Figure 1 - Overall view of incident.



Causal factors identified

- Wind strength – average winds were about 30 knots, gusting to a maximum of 59 knots.
- Wind direction – wind direction was NNW resulting in an offshore wind at Anglesea beach beyond the shelter of land.
- Activity drifting outside sheltered area – the kayak that originally drifted outside the sheltered area and entered the offshore wind affected zone.
- Inability to paddle against wind – no kayakers were able to paddle back to shore.
- Supplied vessel characteristics – the kayaks used were two seat (double) sit on top kayaks with the hulls having a relatively high exposure to the wind. The relatively short waterline length makes these craft slower and requires more paddler effort compared to sea kayaks and surf skis.
- On-vessel team work – double kayaks with two persons need both team members to be strong paddlers experienced at working together to perform well in the unsheltered conditions.
- Inadequate contingency plan to recover kayaks/kayakers in difficulty – any self-rescue plan the organisers had formed relied on using kayaks which put the rescuers in the same position as those drifting away.

Powers to carry out an inquiry into the incident

17. The Director, Maritime Safety, as delegate of the Director, Transport Safety (**Safety Director**), has chosen to conduct an inquiry into the events summarised above (**the Inquiry**) pursuant to section 264 of the *Marine Safety Act 2010* (Vic) (**MSA**).
18. For the purpose of conducting the Inquiry, the Director, Maritime Safety sub-delegated the relevant powers and functions of the Safety Director to two Transport Safety Officers (**TSOs**) on 24 May 2016.

Scope of the inquiry

19. Under section 264(1) of the MSA, the Safety Director may conduct an inquiry into a marine safety matter.
20. A 'marine safety matter' is defined in section 3 of the *Transport Integration Act 2010* (Vic) to include:
 - (a) an incident involving a vessel that resulted in, or that had the potential to result in, the death of, or injury to, any person, or in damage to, or the loss of, the vessel or any other vessel, or to any other property or equipment, and includes, for example:
 - (i) any accident involving a vessel;
 - (ii) any incident involving a vessel in which there is evidence of systematic safety deficiencies;
21. The scope of the Inquiry includes:
 - (a) inquiring into the incident by verifying the facts underpinning the incident
 - (b) collating the findings of fact into an interim report by 17 June 2016, to be provided to the certain specified individuals and organisations with a minimum of 28 days for the individuals and organisations to respond, if they wish to do so.
 - (c) considering any systemic safety management issues including, but not limited to the existence and/or efficacy of:
 - a. risk management systems and/or frameworks, accountability and risk ownership
 - b. risk assessment, identification and mitigation guidelines, policies and/or procedures
 - c. training
 - d. risk monitoring, reporting and review.
 - (d) providing a report to the Director, Maritime Safety by 31 July 2016 setting out the findings of fact, the conclusions reached with respect to the incident and recommendations for further action.

Inquiry summary

22. The TSOs conducted the following activities as part of the Inquiry.

3 May 2016	Transport Safety Victoria (TSV) notified of incident.
6 May 2016	TSOs interviewed four persons involved in the rescue of persons on 3 May.
1 June 2016	TSOs received requested documentation from Brauer College via the Department of Education and Training.
2 June 2016	TSOs interviewed two teachers and the principal of Brauer College.
8 and 11 June 2016	TSOs received requested information from the supplier of the kayaks and other equipment.

Department of Education and Training's safety guidelines

23. The kayaking activity was carried out by Brauer College under relevant Safety Guidelines for Education Outdoors provided by the Department of Education and Training, Victoria (DET).
24. These Guidelines include guidance for a number of water based activities including:
- canoeing and kayaking
 - sea kayaking
 - surfing.
25. The Guidelines are organised under a number of common headings. While many of these headings relate to important safety matters, headings of particular relevance to the Inquiry include:
- water environment
 - location
 - communication
 - weather
 - student skills
 - equipment
 - staff experience and qualifications
 - supervision
 - common risks
 - specific risks.
26. Brauer College regarded the Guidelines as guidance information, not requirements which were mandatory.
27. A completed risk assessment was required under the Guidelines.

¹ <http://www.education.vic.gov.au/about/news/archive/Pages/advanceschl.aspx>

Brauer College

28. The staff and students involved in the sea kayaking activity on 3 May 2016 came from Brauer College, Warrnambool.
29. The students were engaged in a program called Advance which “engages students in education by helping them participate in recognised training courses and community projects that develop their communication, project management and teamwork skills”.¹
30. This particular Advance program used the activities associated with surf life saving for its framework. The course was linked to Surf Life Saving Victoria, particularly utilising the facilities and surf life saving clubs at Warrnambool and Port Fairy. The course was run over two semesters and the incident occurred during the second semester.
31. All students had qualified to a Surf Life Saving Australia Bronze Medallion standard and had attained this qualification during the course.
32. Students were accompanied on the camp at Anglesea by three teachers (T1, T2 and T3) and a teacher assistant TA1. T1 was the Advance course co-ordinator and the camp leader.
33. T1, T2 and TA1 were qualified to a Bronze Medallion standard.
34. Teachers T1 and T2 were experienced physical education teachers who had run a number of outdoor activity camps including a surf camp to Bondi as part of the Advance course.
35. Students appeared to have a great respect for their teachers and pride in the Advance program.
36. The teachers and students appear to have a strong team bond and willingness to assist each other.
37. The Advance program offers valuable leadership and personal development opportunities.
38. The teachers interviewed were co-operative and it was clear that the safety of their students was paramount.

Brauer College’s internal processes and compliance with Department of Education and Training guidelines

39. In order for an activity to go ahead involving Brauer College students a number of internal processes and documentary sign offs must be completed.
40. The teacher coordinating the activity is responsible among other things for:
 - ensuring that the DET Guidelines are taken into account
 - completing an activity risk assessment required by the DET Guidelines
 - ensuring staff-student ratios set by the Guidelines for activities are met
 - preparing and administering student consent forms signed by parents
 - ensuring suitably qualified staff are rostered
 - ensuring activity forms are provided to the school principal and school council who have to provide sign-off for the camp and activities. There is no requirement to provide documentation showing that the Guidelines were taken into account and a risk assessment completed. A checklist is submitted to the principal and school council marking that the requirements had been completed.
41. The principal of Brauer College stated that the Guidelines were considered guidance material and it was not mandated that they had to be fully complied with.
42. Discussions with the teacher in charge and one of his colleagues revealed that:
 - they viewed the Guidelines as guidance
 - there were items within the Guidelines which had to be met such as student-teacher ratios
 - the risk assessment was seen as important and that one had been completed.
43. Examination and discussion of the risk assessment provided as being the one used for the camp revealed that:
 - the initial risk assessment had been carried out as a group activity by the outdoor education staff at the College in 2012
 - each teacher had their own copy of the risk assessment that they updated individually
 - the risk assessment appeared to be based on the Guideline for surfing which does not include the hazard wind strength. This hazard is listed in the risk assessments for the canoeing and kayaking and for sea kayaking activities.

Kayak hire

44. The kayaks were supplied by a company specialising in guided adventure activities. The company also hires kayaks and other equipment to organisations, and is based at Anglesea.
45. The company has a history of hiring equipment to Brauer College since approximately 2005 - 2006. This was the first time they had supplied kayaks.
46. The kayaks were supplied on a trailer on a bare boat basis, that is, they were supplied without any personnel. The safe use of the kayaks was seen as the responsibility of the staff of Brauer College.
47. Items supplied by the company were:
 - nine sit on top two person kayaks. This style of kayak provides:
 - i. a sealed hull that provides integral buoyancy
 - ii. an increased air draft and thus windage compared to traditional sea kayaks
 - iii. footholds which cater for a range of person sizes
 - iv. short waterline length which provides for a less efficient hull compared to longer vessels of similar displacement.
 - 18 double bladed paddles
 - 18 personal flotation devices type 2 or 3
 - 18 helmets.



Figure 2 - Bottom of kayak, keel provides increased directional stability and helps reduce leeway (drift under the influence of wind)



Figure 3 - Sit on top kayak supplied to Brauer College. Note capacity for two persons. Sit on top style of kayak is of a sealed hull configuration that provides integral buoyancy without the need for additional buoyancy.



Figure 4 - Double bladed paddle



Figure 5 - Helmet



Figure 6 - Personal flotation devices

48. The hiring of unpowered vessels is subject to the *Marine Safety Domestic Commercial Law Act 2012 (Cwth)*.
49. The equipment was reported by T1 to be in good condition with the exception of one of the kayaks that had a bung missing and subsequently was not used.
50. The kayaks were supplied on a trailer at the Anglesea Surf Life Saving Club on the evening of Monday 2 May 2016.
51. The arrangements were for Brauer College to have use of the equipment for 24 hours and that it would be picked up on Tuesday afternoon.
52. The owner of the company stated that he had supplied a safety briefing that consisted of a verbal conversation between himself and the teachers. From memory he believed it was a chat about conditions and where the boats would be left for retrieval depending on where they decided to take them out.

The incident

53. The incident involved students and teachers of Brauer College and incident responders who were off duty members of Anglesea Surf Life Saving Club.

54. The following table summarises the persons involved.

Role	Code	Actions during incident	Report Received and/or interviewed
Teacher in charge	T1	Managed activities from beach. Boarded kayak K3	Report and interview
Teacher	T2	In water on surf board. Recovered kayaker B	Report and interview
Teacher	T3	On shore	Report
Teacher assistant	TA1	Boarded kayak K3	Report
Student	P	In kayak K1	Report
Student	E	In kayak K1	Report
Student	L	In kayak K2	Report
Student	B	In kayak K2	Report
Student	F	In kayak K4	Report
Student	S	In kayak K4	Report
Other students (12)			Report
Responder	R1	First aid on shore	Interview and statement
Responder	R2	Driver IRB1	Interview and statement
Responder	R3	Crew IRB1	
Responder	R4	Driver IRB2	Interview and statement
Responder	R5	Crew IRB2	
Observer	O1	Observer at top of stairs	Interview and statement

55. An incident chronology is contained in Appendix 1.

Incident outcomes

56. No persons were injured.
57. Four kayaks and eight paddles were lost and have not been recovered.

Student qualifications and experience

58. All students had been working in the Advance education program for one and a half semesters and were trained to Surf Life Saving Australia's Bronze Medallion standard.
59. The Bronze Medallion does not include any training to address the competency of a person to paddle single or double kayaks.

Teacher qualifications and experience

60. Four teaching staff were in attendance at the camp. Teachers T1 and T2 and teachers assistant TA1 were trained to Surf Life Saving Australia's Bronze Medallion standard.
61. The bronze medallion training provides limited training on interpreting weather and is not designed as a qualification to supervise kayaking groups.
62. Teachers T1 and T2 each have many years of experience as PE teachers including the management of outdoor education activities.
63. Under the sea kayaking guideline there is a requirement for the instructors to hold a sea kayaking qualification or equivalent or have completed an 'Equivalent documented experience in lieu of certification / accreditation' form. None of the teachers held the qualification.
64. Teachers T1 and T2 and TA1 were members of local surf life saving clubs in Warrnambool and Port Fairy.
65. Teachers T1 and T2 stated that they had not consumed alcohol, prescription or non-prescription drugs.

Pre incident actions

66. Prior to any kayaking on the morning of the incident a meeting was held to discuss the activity. While weather was discussed amongst other matters there is no record of the meeting and it was not conducted using any checklist to ensure that the widest possible range of hazards could be identified.

Additional facts

Weather forecasts and warnings - Bureau of Meteorology (BOM)

67. BOM is the primary source for the development of weather information in Australia.
68. BOM had issued forecasts that included gale warnings.
69. Anglesea is within BOM's Central Coast region.
The forecasts and warnings that were issued during the 48 hours prior to the incident for the Victorian Central Coast are listed in Appendix 2.
70. All forecasts and warnings contain the following standard preface:
Please be aware wind gusts can be 40 percent stronger than the averages given here, and maximum waves may be up to twice the height.
71. All forecasts and warnings contain the following standard note at the end of the forecast:
Check the latest Coastal Waters Forecasts for information on wind, wave and weather conditions for neighbouring coastal zones.
72. The forecasts indicated on Sunday afternoon that northwesterly winds of 25 to 35 knots were forecast for Tuesday.
73. From 0510 Monday the forecasts included a gale warning for Tuesday. Wind directions in the gale warnings were consistent at northwesterly and wind speeds increased from estimates on Monday of 30-40 knots to estimates in Tuesday's forecast of 35-45 knots.
74. Forecasts issued by BOM are available on its website www.bom.com.au.
75. BOM weather information was also re-broadcast via a number of mobile phone applications.

Means used by staff of Brauer College to obtain weather information

76. Staff of Brauer College accessed the following weather sites via applications on mobile phones on the morning of the event:
 - weatherzone.com.au
 - eldersweather.com.au
 - emergency.vic.gov.au.
77. Each of these applications and websites re-formats and re-broadcasts weather information initially supplied by the BOM.
78. Each of the applications and websites contain links to the weather warnings.
79. Despite accessing weather information via these applications staff of Brauer College did not identify the gale warnings issued by BOM on the day of the incident or those issued on Monday 2 May.

Weather and prevailing conditions

80. The closest BOM weather reporting station is at Aireys Inlet, approximately 9.2 kilometres from the Anglesea Surf Life Saving Club. Aireys Inlet is the common reference used for estimating when assessing weather at Anglesea.
81. The following table and figure summarise the weather observations at Aireys Inlet for early 3 May 2016. The shaded area illustrates the timeframe from the pre-breakfast surf until the incident had been resolved at 1000hrs.

Time	Air temperature in degrees Celsius	Wind speed in knots	Speed of maximum wind gust in last 10 minutes in knots	Wind direction in 16 compass points
0430	15.2	22	40	NNW
0500	15.1	22	38	NNW
0530	15.2	27	45	NNW
0600	15.3	27	48	NNW
0630	15.3	29	47	NNW
0700	15.5	29	52	NNW
0730	15.4	30	52	NNW
0800	15.4	30	45	NNW
0830	15.7	33	49	NNW
0900	16.2	30	46	NNW
0930	16.7	30	48	NNW
1000	16.7	32	52	NNW
1030	16.1	28	45	NNW
1100	16.9	31	53	NNW
1030	16.1	28	47	NW
1200	17.4	28	44	NNW

Table 1 - Observation weather data from Aireys Inlet 3 May 2016 (BOM)

Weather observations recorded
at Aireys Inlet 3 May 2016
(Source : Bureau of Meteorology)

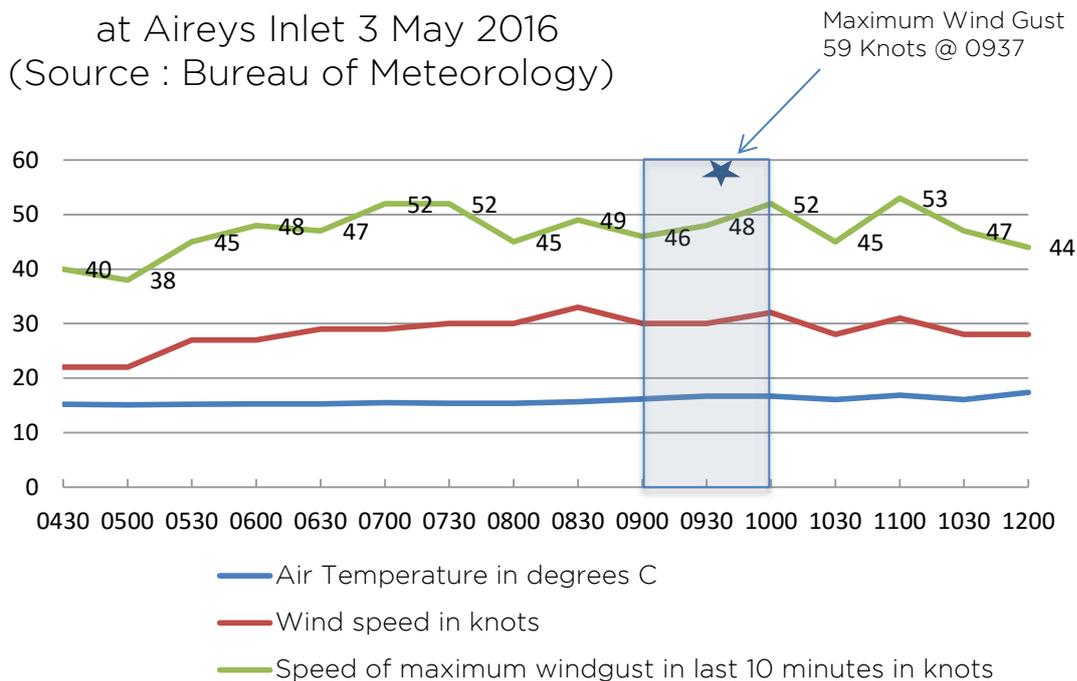


Figure 7 - Plot of weather observations, shaded area indicates the approximate timeframe of kayaking activity (0900-1000) The highest gust recorded by BOM was 59 knots at 0937hrs (BOM)

82. The weather observation data from Aireys Inlet shows that:

- there was a consistent wind speed of approximately 30 knots blowing from 0700 until 1200
- the wind direction was from the north-north west (NNW)
- wind gusts during this period were generally peaking at between 45 and 53 knot
- the highest recorded gust was 59 knots at 0937, during the sea kayaking activity
- the air temperature rose from 15.5 degrees Celsius at 0700 to 16.7 degrees at 1000.

Wind speed and wind pressure

83. Wind pressure varies in proportion to the square of the wind speed. This means that as the wind speed doubles the wind pressure goes up four times.

84. For example a paddler travelling at a given speed in a 10 knot wind will need to paddle against a force against him which has increased by four times to maintain the speed if the wind increased to 20 knots.

85. It is the wind pressure which must be overcome by a paddler to make headway when paddling into the wind.

Shelter provided by the cliffs and dunes at Anglesea beach

86. The predominant wind was from the NNW.

87. The following figure indicates the way in which the cliffs near the Surf Life Saving Club buildings and the dunes at Anglesea beach provide an area of relatively sheltered waters under a NNW wind.

88. It also indicates the lack of protection provided by the land at the mouth of the Anglesea River.

89. The sea kayaking activity was carried out close to the surf life saving club at the western end of the beach.



Figure 8 - Photograph of Anglesea beach indicating the effect of the cliffs and dunes in providing a 'wind shadow' when a NNW wind is blowing (SLSV)

Sea state at Anglesea beach on 3 May 2016

90. The predominant wind was from the NNW which created an offshore wind.
91. When sighted from the shore the sea looked deceptively calm.
92. This is illustrated by the following image taken by a Brauer College student about 0615 on the 3 May 2016 at or close to the Anglesea Surf Life Saving Club.



Figure 9 - Photograph taken by Brauer College student 3 May 2016 looking east (Brauer College)

Tide at Lorne on 3 May 2016

93. The tide height at Lorne at 0900 was 1.58 metres on the ebb two hours after high tide which was at 1.95 metres.²
94. Predominant wind was from the NNW, that is, offshore.

Findings

95. Figure 10 illustrates the incident.
96. The centre of the diagram represents the point of 'loss of control' which is the event. The event is defined as the 'kayaks and kayakers unable to return to the shore'. Three of the kayaks were unable to return while one capsized on the way in.
97. This bow-tie model shows key aspects about the event with the causes on the left hand side and outcomes on the right. Various event defences and event mitigations either side of the centre point are the risk controls/defences to either prevent the event or to mitigate the outcomes.
98. Failed or absent defences identified are contributing factors to the outcome.
99. The outcome of the event was the need to be rescued by an external party.
- The actual outcome was successful by pure chance alone as IRB qualified off duty surf lifesaving club members were able to access and deploy IRBs.
 - Had off duty surf lifesavers not been available the alternative means of rescue would have been external and dependent upon:
 - i. successfully calling the emergency services in an area of poor phone reception
 - ii. the time taken for the emergency services to be activated and respond.
100. A number of other potential outcomes were prevented by successful or partial mitigations.
101. The diagram illustrates the parties, processes or procedures where a failed defence or mitigation is located and/or who is responsible to manage the defence or mitigation. The effectiveness of a control is reduced if it is not fully implemented, maintained, observed or understood. These parties, processes or procedures are the:
- kayak hirer – where a control relies on or partially relies upon the quality and or suitability of the equipment provided
 - student – where a control relies on or partially relies on the experience, skill, physical attributes, decision-making or competence of a student
 - teacher – where a control relies on or partially relies on the experience, skill, physical attributes, decision-making or competence of a teacher
 - school – where a control relies on or partially relies on the oversight of the school, particularly its oversight that the requirements of DET are met
 - risk assessment – where a control relies on or partially relies on the appropriateness and comprehensiveness of the risk assessments undertaken including hazard identification, risk classification and suitability and appropriateness of the identified risk controls
 - Departmental Guidelines – where the control relies on awareness of comprehension of application of the Guideline. The Guideline performs a role as the underlying safety management system for these kind of activities and is only as effective as its implementation.

²Tidal Information – Bureau of Meteorology

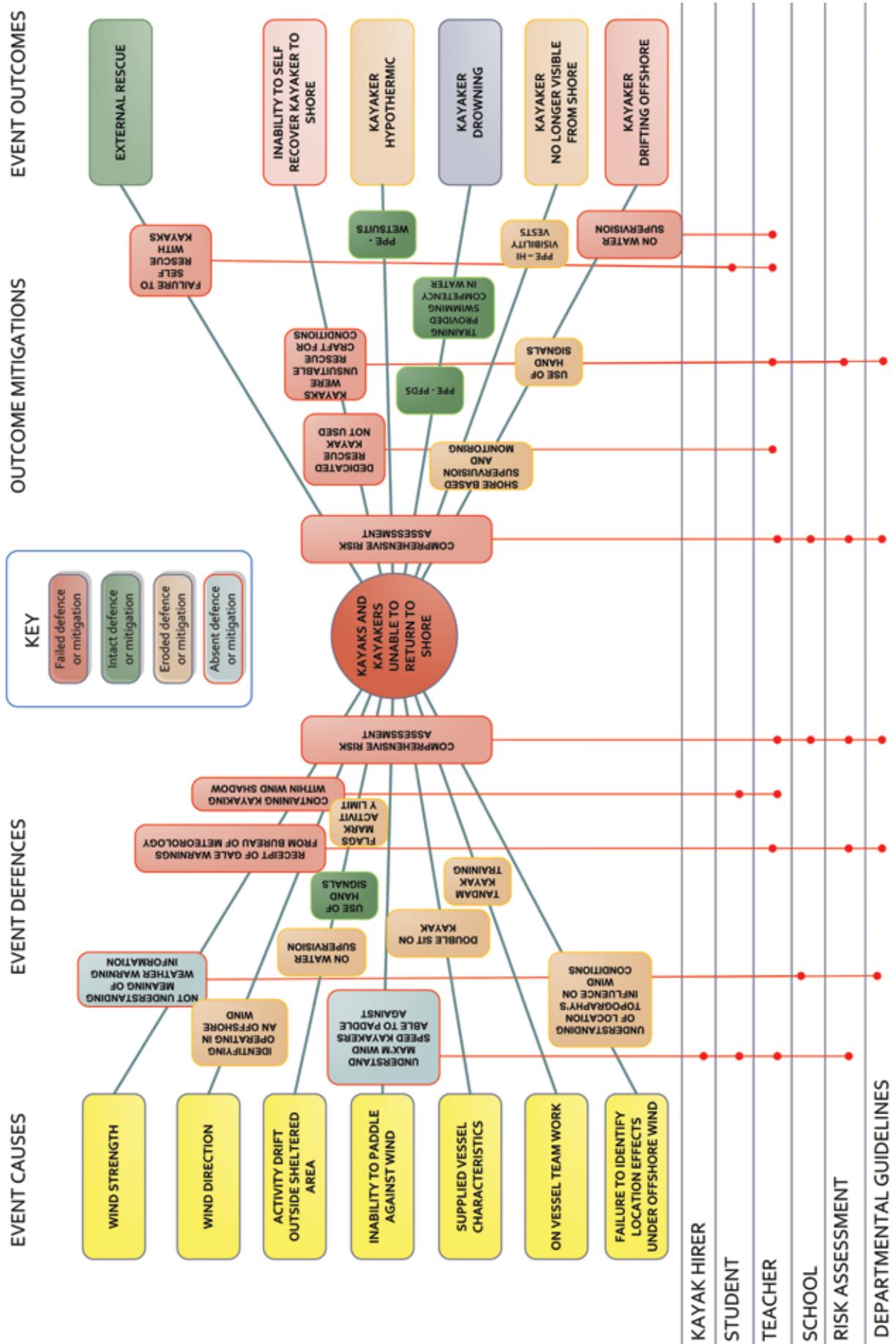


Figure 10 - Incident Bow-Tie illustrating potential causes of the incident, possible outcomes, event defences and outcome

Event causal and contributing factors

102. Causal and contributory factors are listed in the following table.

Causal/Contributing Factor Identification	Factor	Commentary
Causal factor 1	Wind strength	<p>Based on weather observations made by BOM at Aireys Inlet, outside the sheltered area of the beach in the wind shadow cast by the cliffs and dunes, the wind was blowing at a mean speed of around 30 knots, gusting to around 52 knots with peak gusts of 59 knots.</p> <p>The pressure exerted by a wind is proportional to wind speed squared, therefore the pressure (and by implication force to paddle against) at 30 knots is 9 times the pressure of a 10 knot wind.</p>
Contributing factor 1A	Not understanding the implication of marine weather warning information	<p>The coordinating teacher had limited knowledge of the definitions of wind strength used in coastal and high seas warning and Victorian marine forecast areas.</p> <p>Understanding the implications of a gale warning requires knowing what BOM defines as a gale, '34 knots to 47 knots' and if not familiar with the implications of knots how to convert knots to kph.</p> <p>It also requires knowing which BOM forecast area you are located in. Although Anglesea is on the Surf Coast BOM forecasting area for Anglesea is Central Coast which extends from Cape Otway to Wilsons Promontory.</p> <p>Having a clear understanding of the BOM wind strength definitions and the forecast zone in which you are located is essential to making an informed assessment of the risk the warning presents.</p> <p>On the morning of the incident the prevailing mean wind speed was approximately 30 knots or 55.5 kilometres an hour.</p> <p>The maximum recorded gust was 59 knots or 110 kilometres an hour.</p>
Contributing factor 1B	Not receiving the gale warning provided by BOM	<p>Despite a gale warning for the Central Coast being provided by BOM during each forecast from 0510 Monday, the supervising staff did not know that a gale warning was in existence.</p> <p>The staff utilised a number of phone applications and websites which re format and re broadcast BOM forecast information. They did not however check the applications or website for warnings which were available on each application.</p>
Contributing factor 1C	Not containing kayaking within wind shadow	Kayak K1 drifted from the wind shadow.

Causal/Contributing Factor Identification	Factor	Commentary
Contributing factor 1F	Apparent change in wind conditions due to location or time	<p>Many students reported increases in wind speed. It is unclear whether they experienced wind speed change due to leaving the wind shadow (changing location) or whether it was due to gusts (increased wind at their location).</p> <p>However the steady state wind as recorded at Aireys Inlet was 30 knots (55.5 kilometres an hour) and this speed is extremely difficult for any paddler to make way against.</p>
Causal factor 2	Wind direction	<p>The wind was blowing from a NNW direction. This for Anglesea main beach presents an offshore wind.</p> <p>Outside the reasonably sheltered conditions within the wind shadow created by the land mass, the sea looked reasonably safe from the land.</p> <p>Blowing offshore the wave faces were not visible from land. The sea was confused with spume and swirls created by the wind restricting visibility.</p>
Contributing factor 2A	May not have identified that it was an offshore wind	<p>It's difficult for a person to visually assess wind direction.</p> <p>Visual observations of the weather were carried out prior to the activity from the club balcony and were monitored from the beach during the activity.</p> <p>It is unclear whether this hazard was specifically identified, however the activity was confined to the sheltered portion of the beach which implies awareness of the issue.</p>
Causal factor 3	Activity drifted outside sheltered area	<p>The sea kayaking and surfing activities were carried out at the sheltered end of the beach. Beyond the immediate area around the surf life saving club and particularly towards the mouth of the Anglesea River there was no shelter and the full force of the wind would have been felt.</p> <p>When restricted to areas within the wind shadow the kayaking activity was successfully completed.</p> <p>However, for reasons unclear one kayak - K1 - drifted outside this sheltered area.</p>
Contributing factor 3A	On water supervision	<p>T2 was on the water supervising both surfing and sea kayaking activities from a surfboard. This put him in a position close to or between the activities. This may have reduced his ability to supervise the kayaks at the leeward or eastern end of the kayak activity and prevent K1 from drifting off.</p>
Causal factor 4	Inability to paddle against wind	<p>Kayakers in K1, K3 and K4 found it impossible to paddle against the offshore wind.</p> <p>It must be noted that the vast majority of kayakers in the best equipment will have difficulty making headway against a 30 knot wind.</p>

Causal/Contributing Factor Identification	Factor	Commentary
Contributing factor 4A	Failure to understand the maximum wind speed kayakers are able to paddle against	<p>There no evidence to suggest that any kayaker that ended up outside the wind shadow was able to paddle against the wind.</p> <p>No kayaker appeared to understand the maximum wind in which they personally, and/or they in conjunction with the type of kayak, were able to successfully paddle against.</p>
Causal factor 5	Supplied vessel characteristics	<p>Vessels with high windage and short waterline length are more difficult to use in the prevailing conditions on 3 May.</p> <p>The double sit on top kayaks used had a short waterline length. Although this design provides stability it requires more effort by the paddlers to make headway than that of a double sea kayak or surf ski with a longer waterline length.</p> <p>Paddle craft compared to other craft such as surf boards and rescue board are particularly vulnerable to the effects of high winds as the paddlers torso provides a larger area for the wind to affect. The combination of large surface area and prevalent offshore wind made it harder for the kayakers to get back to shore.</p>
Causal factor 6	On-vessel team work	<p>There is a dependency on teamwork when operating in pairs.</p> <p>In addition to managing the conditions, operating the kayaks in pairs relies on both students functioning as a team and maintaining balance to enable the kayaks to be paddled.</p> <p>Paired students are likely to stick together when in trouble when individually one may have been able to get ashore.</p> <p>To be successful, particularly in demanding conditions, a double kayak crew must be experienced and understand the roles of each crew member.</p> <p>The experience levels of the kayakers is unknown, double kayaking per se does not form part of the Surf Life-Saving Bronze Medallion training the Advance program is based on.</p> <p>It is likely the kayakers had varying double kayak experience levels.</p>
Causal factor 7	Inadequate contingency plan to recover kayaks/ kayakers in difficulty	<p>The vessel in difficulty recovery plan to use kayaks to rescue kayaks was ineffective for the conditions.</p>

Causal/Contributing Factor Identification	Factor	Commentary
Contributing factor 7A	Intended use of sit on top kayaks as recovery vessel	<p>As the kayakers were unable to make any headway in the prevailing conditions, they were therefore made inadequate for rescuing any person in the circumstances.</p> <p>A choice of self rescue with the kayaks may have been suitable for the relatively low wind speeds inside the break.</p> <p>The choice of kayaks as a rescue craft relied upon the teachers being able to paddle both craft back to shore with or without the assistance of what could be an incapacitated student.</p> <p>In this case even with the students and teachers paddling they were unable to make headway into the prevalent wind.</p> <p>Additionally, using a double kayak to assist students also in a double kayak requires that upon reaching the kayak the student's kayak is not damaged and paddles are present to allow the teachers to each take charge of a kayak and for the students to be able to assist in paddling it ashore.</p>
Contributing factor 7B	Lack of planning to ensure availability of adequate resources suitable for the conditions	<p>Dedicated rescue kayak not used.</p> <p>Although the bronze medallion training provided the students with appropriate training to participate in the activity, all rescue plans need to take into account assisting ashore an incapacitated student.</p> <p>Although rescue boards were used the day prior to supervise surfing activities the rescue boards were not brought down to the beach on the day of the incident. These rescue boards may have proved to be more effective as rescue craft due to the low windage.</p> <p>The preferable and most appropriate craft available to be on stand by for the conditions was an IRB with competent driver and crew.</p> <p>While IRBs may have been available via the surf life saving club no arrangements were made for their use. The details of surf life saving qualifications provided does not show the teachers holding the required qualifications to operate an IRB.</p>

Causal/Contributing Factor Identification	Factor	Commentary
Causal factor 8	Not developing a fully comprehensive risk assessment for the activities carried out	<p>A desk-top risk assessment including the requirements of the Guideline and including additional hazards identified by brainstorming and completed with adequate risk controls should be carried out before the camp.</p> <p>The surfing risk assessment used as the basis for the sea-kayaking activity meant that an important hazard relating to wind strength was not assessed. The correct risk assessment tool within the Guidelines should be used for each activity.</p> <p>An additional formal risk assessment on site prior to the activity was not completed. However, while there was no documented process for assessing conditions on the day, many considerations were taken into account. The use of hazard checklists or similar would improve the quality of this discussion.</p>
Causal factor 9	Not fully meeting DET Guideline	<p>While flawed (see below), the DET Guideline provides the basic safety management system for the camp and activity. Full compliance would reduce the likelihood of an adverse outcome.</p> <p>Instead of working through the Guideline the teachers relied upon their experience running similar activities. Both T1 and T2 had run activities in the surf at other beaches and camps in previous years.</p>

Comments on the Department of Education and Training's guidelines for on water activities

103. The Department provides guidance material tools online for schools and teachers to follow when planning and carrying out outdoor activities.³ (Guidelines)

104. This material includes specific guidelines for the following activities which relate to the incident:

- canoeing and kayaking
- sea kayaking
- surfing
- swimming.

105. Additional guidelines exist for other on-water activities:

- rafting
- sailing
- scuba diving
- water skiing
- wind surfing.

106. While the following discussion relates to the first three activities the findings equally apply to the Guidelines for the other activities.

107. Each of the Guidelines has a list of headings:

- Activity
- Description
- Water environments
- Location
- Communication
- Weather
- Transportation
- Equipment and clothing
- Clothing
- Student skills
- Identification
- Touring
- Staff
- Experience and qualifications
- Supervision
- Overnight excursions
- Informed consent
- First aid
- Definitions
- Risk Assessment – General
- Risk Assessment – Activity specific.

³ Safety Guidelines for Education Outdoors *Department of Education and Training*.www.education.vic.gov.au

108. The Guidelines are specified based on the activity. For the water-based activities it is often defined by the vessel involved. While this classification system provides a simple means to identify which Guidelines should apply it can lead to hazards being unidentified. For example, when developing this camp the surfing risk assessment was used which does not include a wind strength component whereas the sea kayaking risk assessment does. Risk assessment location-specific hazards which may apply regardless of the activity may not be identified if the specific activity Guideline has not identified them.
109. The desk-top risk assessment required by the Guideline is the only formal assessment of risk in the process. There is no requirement for a formal pre-activity risk assessment. One involving a checklist, to be carried out immediately prior to the activity, would provide a last minute opportunity to re-assess the hazards posed by the actual location, immediate weather conditions and forecasts.
110. As the Guideline is regarded as guidance material only it is easy to meet the Guideline requirements for activity A and then assume that activity B does not need to be independently assessed.
111. There appears to be a lack of training – or a lack of time available to staff for training - regarding the Guideline, including the risk assessment.
112. The Guideline is the Department’s primary risk management tool. Many parts of the Guidelines detail controls for safety risks. These include:
- water environments
 - location
 - communication
 - weather
 - equipment
 - clothing
 - student skills
 - identification
 - touring
 - staff
 - experience and qualifications
 - supervision
 - overnight excursions
 - first aid
 - definitions
 - risk assessments.

As risk controls each item needs to be assessed and complied with prior to the activity listed taking place. For camps involving more than one activity each of the applicable activity Guidelines should be assessed. There should be additional school oversight to ensure the process has been followed.

113. The Guidelines should be clear regarding suitable student-staff ratios when more than one activity of differing types are carried out simultaneously.
114. We note that the suitability of other DET aquatic activity guidelines have been brought to the attention of DET in the past including requests for review.⁴ There is merit in reviewing all aquatic and boating related guidelines, particularly as many different types of aquatic and boating activities are often conducted in the similar locations and consequently share similar risk profiles.

In reviewing the Guidelines, particular attention should be given to the section that allows supervising staff to document alternative qualifications, experience or expertise in lieu of activity specific certification or accreditation.⁵ Additionally, the review should consider whether it is appropriate that approval of alternative qualifications, experience or expertise in lieu of activity specific certification or accreditation can be adequately assessed and approved by teachers, principals or school councils that do not have a high level of understanding as to the nature of risks of the activity or the teachers documented alternative qualification and experience.

⁴ Life Saving Victoria Draft Proposal: School Policy Advisory Guide (DET) Guidelines

⁵ DET Proforma of Staff Qualifications/Experience

Actions to be considered to address systemic issues identified

	Action to be considered	Responsible person
1	Remove the 'for guidance' nature of the DET Guidelines and make them mandatory.	DET
2	Provide training on the DET Guidelines.	DET / schools
3	Provide training on the development and implementation of risk registers and risk controls to school staff responsible for managing outdoor activities.	DET / schools
4	Specifically include BOM as the required source for weather information.	DET
5	Specifically require school staff responsible for managing outdoor activities to monitor the BOM site for coastal weather utilising the specific marine web page and to use tools such as Meteye to monitor weather at specific locations.	DET
6	Provide training in the use of the BOM website to school staff responsible for managing outdoor activities.	DET / schools
7	Provide training to school staff responsible for managing outdoor activities on weather terminology.	DET / schools
8	Ensure that any marine activity risk assessment includes reference to: <ul style="list-style-type: none"> • appropriate rescue/recovery contingency arrangements • appropriate location hazards including understanding of the effects of weather • appropriate staff-student ratios when carrying out multiple activities. 	DET
9	Examine the introduction of prescriptive limits on marine activities. For example, the maximum wind speeds for an activity which is appropriate to the skill level of the participants and location of the activity.	DET
10	Review all the aquatic activity Guidelines with activity experts to ensure they address the risks presented by these activities.	DET / TSV / LSV
11	Review in-house camp planning with particular emphasis on third person oversight from within the school of risk assessments and Guideline compliance.	Schools
12	Implement formal pre-activity risk assessments using a 'take 5' or similar approach. These should be documented as part of the school's records. This could be achieved by developing and implementing a suitable risk assessment, complemented by training and aligned with any review of the Guidelines.	DET / schools
13	Communicate findings of the report to clubs, associations and organisations that run similar activities.	TSV
14	DET should take into consideration Safety Guidelines published by Australian Canoeing.	DET
15	DET should review the process of allowing staff to document and assess alternative qualifications and experience or expertise in lieu of activity specific certification or accreditation. ⁶	DET

⁶ DET Proforma of Staff/Qualifications/Experience

	Action to be considered	Responsible person
16	DET should review whether it is appropriate that approval of alternative qualifications, experience or expertise in lieu of activity specific certification or accreditation can be adequately assessed and approved by teachers, principals or school councils that do not have a high level of understanding of the risks of a particular activity.	DET

The overall aim of these actions must be to establish and embed the concepts of active risk assessment and management in the planning and conducting of on water activities as part of a safe culture, not merely for administrative compliance.

Appendix 1 - Incident chronology

This persons involved in the incident are listed below.

The chronology of the incident was derived from reports provided by, interviews with and statements provided, by the people involved as listed in the table below.

Role	Code	Actions during incident	Report received and/or interviewed
Teacher in charge	T1	Managed activities from beach. Boarded kayak K3	Report and interview
Teacher	T2	In water on surf board. Recovered kayaker	Report and interview
Teacher	T3	On shore	Report
Teacher assistant	TA1	Boarded kayak K3	Report
Student	P	In kayak K1	Report
Student	E	In kayak K1	Report
Student	L	In kayak K2	Report
Student	B	In kayak K2	Report
Student	F	In kayak K4	Report
Student	S	In kayak K4	Report
Other students (12)			Report
Responder	R1	First Aid on shore	Interview and statement
Responder	R2	Driver IRB1	Interview and statement
Responder	R3	Crew IRB1	
Responder	R4	Driver IRB2	Interview and statement
Responder	R5	Crew IRB2	
Observer	O1	Observer at top of stairs	Interview and statement

Action	Details
Conditions - prior to surfing activity	<p>T1 rose at 0615 and assessed the conditions of beach. The conditions were very similar to the previous day.</p> <p>R2 stated "It was bad at 7am when I woke up and decided it was not suitable for a surf".</p> <p>O1 had paddled his sea kayak from Point Roadknight to Foxies Reef and on to Red Rock early in the morning. "The wind was strong, there was no clear line where the wind was turbulent... it was not consistent".</p> <p>O1 checked the weather in relation to running his surf class prior to 0900. The consistent breeze had increased from earlier in the morning and the surf school changed its activity from surfing to body boarding to keep within the surf break. Note: This activity was taking place in the less sheltered part of the beach towards Foxies Reef.</p>
Morning surf activity - starts	<p>Conditions were assessed as suitable for surfing before breakfast. T3 and TA1 went surfing with eight students.</p>
Conditions - middle surf activity	<p>Conditions while surfing were similar to the day before and nothing teachers or the other students were unused to.</p> <p>T2 checked weather online using eldersweather.com.au for a weather update which forecasted a change for late morning.</p> <p>He also checked emergency.vic.gov.au for any incidents/warnings and did not see any warnings that had been issued.</p>
Breakfast	<p>TA1, T3 and students returned to the clubhouse after their morning surf for breakfast. After breakfast students got changed for the sea kayaking activity.</p>
Conditions - start of surfing and kayaking	<p>Students and teachers believed the sea was calm enough and conditions safe enough to sea kayak adjacent to the surf life saving club where they proposed to go kayaking.</p> <p>T1 "(surfers) were able to paddle into the wave and over the top of the wave with their skills reasonable, ...they were able quite easily to get out to a wave to turn around to surf to come back in".</p> <p>R1 on the beach at the time said "I would have had no concerns with surf club members being involved in an activity like this inshore of the break, however the wind behind the break was very strong and the spray and chop was obscuring our sight of those kayaks".</p> <p>T1 and T2 checked weather on phones, no change was expected until after 1000hrs</p>
Selection of activities offered to students	<p>T1 and T2 said to the students that they could go surfing and swimming if they did not want to go kayaking.</p>
Beach safety briefing	<p>Students wearing wetsuits were fitted with helmets, life jackets and pink high-vis tops.</p> <p>Students were instructed to remain towards the surf club end of the beach and were to turn around at the back of the breaking waves and attempt to ride the waves to shore. Students were told to keep away from the rocks and only go out as far out as they needed to avoid being flipped by waves.</p> <p>The eastern limit of the activity (at the river mouth end of the beach) was marked by some flags being put up by the surf school.</p> <p>Students were instructed on important safety guidelines and how to use the kayaks, how to paddle, not to paddle behind another kayak and not to return to shore while others were paddling out.</p> <p>Students were also informed about the winds and told the weather wasn't supposed to pick up until 1000hrs.</p>
Students enter water	<p>Students enter the water.</p>

Action	Details
Kayakers experience start – first group heading out	<p>The kayaker’s activity was to paddle out beyond the break and paddle back in on a wave.</p> <p>Eight kayaks went out with 16 kayakers. The conditions were generally described as pretty flat and fine.</p> <p>Most kayakers seemed to be able kayak out through break and return without any issues.</p>
Kayakers experience start – first group returning to shore	<p>Two kayakers stated that it was a bit of a struggle getting in, “it probably took us 5 times as long to get back in than getting out”.</p>
Teachers monitor activity	<p>Teachers continued to monitor the conditions.</p> <p>T2 was sitting on his board out the back of the break waiting for surfers and kayak paddlers to make it through the waves.</p> <p>T1, TA1 and T3 were on the shore monitoring students and directing them towards the surf club side of the shore, TA1 was at the eastern end of the activity near the stairs.</p>
Conditions - middle of surfing and kayaking	<p>As R1 was walking down the ramp to the beach, R1 noticed a number of kayaks in the water.</p> <p>R1 described four kayaks off the boat ramp, quite sheltered by the height of the land, two kayaks further out having difficulty making headway in breaking waves and offshore wind and two kayaks further out in line with the beach stairs having difficulty making headway in breaking waves and offshore wind.</p> <p>Given the conditions, R1 was a little surprised to see them out there.</p> <p>R2 noticed one kayak in line with Foxies Reef about 300 meters off shore towards east end of beach.</p> <p>R2 described conditions as winds were “howling” offshore, Waves were messy – about 4-5 feet high and waves very blown out and not clean. The surf was around one to one point five (1-1.5) meters with sets coming through at about two (2) meters height at the front of the waves.</p> <p>From his position on the beach he estimated the wind to be very gusty with a speed of around 25-30 kph (13-16 knots) and gusting to 60Kph (32 knots).</p>
Kayaking students swap over	<p>Students returned and there was some swapping of kayakers.</p> <p>Some students chose to go surfing in lieu of continuing kayaking and T2 monitored both activities from the break on his board.</p>
Kayakers experience start – second group heading out	<p>P and E went out and one said, “let me catch my breath that was hard work”.</p>
Kayakers experience start – second group returning to shore	<p>Students described the conditions getting harder.</p> <p>“it was very hard to paddle into the winds and we ended up losing balance and tipping the kayak”.</p> <p>“Everyone was having fun at the start the winds were windy but alright to paddle against. But the winds did pickup and got very strong O and Q got into shore just in time”.</p> <p>“Q took lead with commands and realised that we (Q and O) were getting pushed out further, Q and O did not stop paddling and we made it back to shore”.</p> <p>“Two kayaks behind the breaking waves struggling to make headway in the offshore wind”.</p>
Teachers request students move	<p>Teachers were directing them towards the surf life saving club end of the beach.</p> <p>A group of students were too far left of the surf life saving club so were signalled to paddle back towards the surf club using known life saving hand signals that the group had learned.</p>

Action	Details
Kayak 2 capsizes B and L in water	“We tried to get back on the kayak but the wind was too strong”.
B and L unable to paddle to shore	<p>B and L were blown quickly out beyond the breaking waves and then K2 was tipped by the wind.</p> <p>B fell out of the kayak and L was still in the kayak.</p> <p>The force of the wind blew B back into shore. T2 paddled B back in on his surf board, while L was getting pushed further out into the ocean.</p>
Return to shore signal issued	T1, T2, T3, TA1 raised hands to indicate it was time to return to shore and re-group in front of the surf club on the beach, students also signalled for all the students to get out of the water.
Surfers experience end - returning to shore	The surfers were the first to get in and it took the rest of the kayakers a while longer.
Kayakers experience end - returning to shore	<p>Kayakers experienced an apparent wind change and that it was much more difficult to return to the beach.</p> <p>At the point where the wind changed most people were on the beach but two boys E and P were caught out and swept out to sea.</p> <p>“The wind did pick up a bit but even before the wind picked up it was still very hard to paddle back in”.</p> <p>“About 20 minutes in the wind picked up and the teachers told us to come in so we could re-group”.</p> <p>“It was then I realised the wind had picked up”.</p> <p>“As we got about 100 metres out the wind really started to pickup and a few people got tipped off their kayaks because of the wind”.</p> <p>“It was clear to see the winds had gotten very strong very quickly”.</p> <p>T2 “the wind began to get stronger further out to sea and became very gusty”.</p> <p>T3 “the wind began to get stronger further out to sea”.</p> <p>“We were all having fun sea kayaking. We got out past the breaking waves and decided to turn around and come back in. As soon as we decided to turn around the wind picked up”.</p> <p>“We were called back in to the beach because the conditions were starting to get a little rough”.</p> <p>“In an instant the wind picked up and the people who were already a fair way out were swept out even more”.</p> <p>“Everything was going smoothly and everything was fine until the wind changed earlier than forecasted”.</p>
Conditions - end of surfing and kayaking activity	<p>At this stage inside the break the waves were about a metre in height at the surf club end of the beach diminishing towards the river end. At the river mouth behind wave break there where white caps.</p> <p>The wind was strong, the wind was affecting the swell breaking in the Bay about 200-300 metres offshore beyond the break.</p>
B rescue	<p>B who had capsized out of K2 was assisted to shore by T2 using his surfboard. T2 had paddled out on his surf board and B swam in with T2 after he knew L had been picked up.</p> <p>“When B and T2 got in B was chirpy and didn’t have a worry in the world and not at any point in time was anyone on the beach freaking out everyone was calm and wasn’t thinking of the worst that could happen”.</p>

Action	Details
E and P capsize in water	<p>E and P in K1 had started to paddle back in but were going nowhere when a wave came and cleaned them up and they ended up in the water.</p> <p>P went and got the kayak and E had the paddles.</p> <p>Those onshore could see kayaks bobbing up and down far from the beach, so far out you could barely see them.</p>
E and P spotted	<p>T1 noticed E and P had capsized in K2 and had their arms raised displaying the signal for assistance required.</p>
F and S respond in kayak	<p>Half way back to shore F and S noticed E and P only had one paddle so F and S agreed they would go and help them.</p>
T1 and TA1 respond in kayak	<p>TA1 and T1 grabbed kayak K3 which had got to shore and dragged it along the beach towards the river mouth.</p> <p>TA1 and T1 ran to J and G and asked for their gear.</p> <p>As J and G came in T1 and T2 took our kayak and went to save the boys who were floating out to sea.</p> <p>They retrieved some safety gear from kayakers and went to the aid of E and P.</p>
F and S get to E and P	<p>As F and S got close to E and P they found E's missing paddle floating about 20m away and got it to E.</p>
T1 and TA1 get to E and P	<p>T1 and TA1 paddled out but the wind had picked up, pushing E and P further out to sea. E was holding onto the upturned kayak and P was about 15 m from the kayak in the water.</p> <p>TA1 got out of K3 and assisted E to turn K1 upright, TA1 and E then got into K1.</p> <p>T1 helped P get into K3.</p>
T1 and P, TA1 and E unable to paddle to shore	<p>K3 and K1 began paddling for shore, the wind had really picked up paddling was really tough, winds were just too strong and they could not get in.</p> <p>T1 was signalling to the beach to be rescued by waving his paddle at intervals.</p> <p>T1 and P, TA1 and E started to paddle back to shore but a wave came and tipped them all into the water.</p>
F and S unable to paddle to shore	<p>After F and S got to K1 and K3 they found it too hard to turn and paddle into the wind and were blown out to sea.</p> <p>"In the end we got swept out about another 200 m until we saw an IRB getting towed down the beach, then we knew we were all right".</p>
T1 and P, TA1 and E in water near reef	<p>When they surfaced T1 kept them calm and directed them to a pole that was sticking out of Foxies Reef.</p>
T1 and P, TA1 and E in water swim to reef	<p>T1 instructed all to swim the short distance to the pole.</p>
T1 and P, TA1 and E hold onto pole	<p>T1 and P, TA1 and E held onto this pole, they could stand up on the reef so that their heads were out of the water. It was only when a wave came that they had to take a breath and brace themselves.</p> <p>The tide was close to high but just going out.</p> <p>At the pole there were some breaking waves on the seaward side.</p>
IRB1 responds	<p>R1 and R2 who were instructing at the surf school organised IRB1 to be taken from the surf club down to the beach and launched.</p> <p>R3 arrived from the surf school to be the crew member with R2 on IRB1.</p>

Action	Details
IRB1 rescue of L	IRB1 passed T2 who was in the process of assisting B to the beach on his surfboard and headed for L who had been separated from kayak K2.
IRB1 rescue of TA1 from reef	IRB1 then headed out to Foxies Reef. Conditions were too rough for IRB1 to reach the persons directly. IRB1 circled to the seaward side and asked for a strong swimmer to be rescued first. R3 swam in with a rescue tube and brought TA1 back to IRB1. R3 then returned to the reef.
IRB1 rescue of F and S	F and S from K1 had by this stage drifted between 500 m and 1500 m beyond Foxies Reef. They were spotted by IRB1 who elected to go to their assistance. IRB1 picked up F and S and went back towards Foxies Reef.
IRB2 responds	R4 and R5 arrived and launched the second IRB from the base of the ramp. They proceeded through the breaking waves to Foxies Reef.
IRB2 rescue of T1, E and P and R3 from reef	IRB2 went to the pole on Foxies Reef and picked up the remaining people from the reef.
IRB1 heads to shore	IRB1 came back to the beach.
IRB2 heads to shore	IRB2's motor was working hard. The return into the wind involved travelling 500 m parallel to the beach before it could head in. IRB2 returned to shore.
IRB1 and IRB2 arrive on shore rescue complete	Both IRBs returned at around the same time to the beach. All students and teachers, including those who had been retrieved from the reef and water were safe and out of the water. From K1 initially drifting off to return of the IRBs to the beach took about 20 minutes.
Patient assessment - first aid	Students were offered first aid by R1 and were monitored all morning by teachers to ensure they were warm and comfortable.

Appendix 2 – Bureau of Meteorology Coastal Waters Forecast for Victoria Central Coast area

Weather forecasts for the Central Coast broadcast by the Bureau of Meteorology Sunday 1 May 2016 to Tuesday 3 May 2016 (BOM)

Date and Time	Forecast
0512 EST Sunday 1 May 2016	<p>Forecast for Tuesday 3 May</p> <p>Winds: Northwesterly 25 to 35 knots tending westerly 25 to 30 knots during the afternoon.</p> <p>Seas: 2.5 to 4 metres.</p> <p>Swell: Westerly 2.5 to 4 metres, increasing to 4 to 6 metres during the morning.</p> <p>Weather: Cloudy. 80% chance of showers.</p>
Issued at 4:40 pm EST on Sunday 1 May 2016	<p>Forecast for Monday 2 May</p> <p>Strong Wind Warning for Monday for Central Coast</p> <p>Winds: Westerly 20 to 30 knots turning northwesterly 25 to 30 knots early in the morning.</p> <p>Seas: 2 to 3 metres.</p> <p>Swell: Westerly 2 to 3 metres. Swell: East to northeasterly around 1 metre in the far east.</p> <p>Weather: Partly cloudy. 50% chance of showers offshore, 30% chance elsewhere.</p> <p>Forecast for Tuesday 3 May</p> <p>Winds: Northwesterly 25 to 35 knots turning westerly 30 to 35 knots in the early afternoon.</p> <p>Seas: 2.5 to 3 metres, increasing to 3 to 4 metres in the far east.</p> <p>Swell: Westerly 2.5 to 4 metres, increasing to 4 to 6 metres during the morning.</p> <p>Weather: Cloudy. 80% chance of showers.</p>
Issued at 5:10 am EST on Monday 2 May 2016	<p>Forecast for Monday 2 May until midnight</p> <p>Gale Warning for Monday for Central Coast</p> <p>Winds: Northwesterly 20 to 30 knots, reaching up to 35 knots offshore at night.</p> <p>Seas: 2 to 3 metres, increasing to 3 to 4 metres in the east around midday.</p> <p>Swell: Westerly 2 to 3 metres. Swell: East to northeasterly around 1 metre in the far east.</p> <p>Weather: Partly cloudy. 40% chance of showers offshore, 20% chance elsewhere.</p> <p>Forecast for Tuesday 3 May</p> <p>Gale Warning for Tuesday for Central Coast</p> <p>Winds: Northwesterly 30 to 40 knots turning westerly in the late morning and early afternoon. Seas: 3 to 4 metres, decreasing to 2.5 to 3 metres during the morning. Swell: Westerly 2.5 to 4 metres, increasing to 4 to 6 metres during the morning.</p> <p>Weather: Cloudy. 80% chance of showers.</p>

Weather forecasts for the Central Coast broadcast by the Bureau of Meteorology Sunday 1 May 2016 to Tuesday 3 May 2016 (BOM)

Date and Time

Forecast

Issued at 4:42 pm EST on Monday 2 May 2016

Forecast for Monday 2 May until midnight

Gale Warning for Monday for Central Coast

Winds: Northwesterly 25 to 35 knots.

Seas: 2.5 to 4 metres.

Swell: Westerly 2 to 3 metres.

Weather: Mostly clear.

Forecast for Tuesday 3 May

Gale Warning for Tuesday for Central Coast

Winds: North to northwesterly 30 to 40 knots turning westerly in the late morning before easing to 20 to 30 knots during the evening.

Seas: 3 to 5 metres.

Swell: Westerly 2.5 to 4 metres, increasing to 4 to 6 metres during the morning.

Weather: Cloudy. 95% chance of showers.

Issued at 4:42 pm EST on Monday 2 May 2016

Forecast for Monday 2 May until midnight

Gale Warning for Monday for Central Coast

Winds: Northwesterly 25 to 35 knots.

Seas: 2.5 to 4 metres.

Swell: Westerly 2 to 3 metres.

Weather: Mostly clear.

Forecast for Tuesday 3 May

Gale Warning for Tuesday for Central Coast

Winds: North to northwesterly 30 to 40 knots turning westerly in the late morning before easing to 20 to 30 knots during the evening.

Seas: 3 to 5 metres.

Swell: Westerly 2.5 to 4 metres, increasing to 4 to 6 metres during the morning.

Weather: Cloudy. 95% chance of showers.

Issued at 5:10 am EST on Tuesday 3 May 2016

Forecast for Tuesday 3 May until midnight

Gale Warning for Tuesday for Central Coast

Winds: Northwesterly 35 to 45 knots turning westerly 30 to 40 knots in the early afternoon.

Seas: 3 to 5 metres.

Swell: Westerly 2 to 4 metres, increasing to 4 to 6 metres during the afternoon.

Weather: Cloudy. 95% chance of showers.

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