

Canadian Safe Boating Council Personal Flotation Device (PFD) Study

Highlights From SMARTRISK Background Research Paper Regarding Mandatory PFD Wear Legislation in Canada

CSBC Action Plan



Background

- In May 2001, CSBC struck a Lifejacket/PFD Taskforce to examine advisability of advocating for legislation concerning mandatory PFD use for recreational boaters in small craft
- In October 2002, the taskforce contracted with SMARTRISK, a national injury prevention organization, to develop a background research paper summarizing best available evidence pertaining to mandatory lifejacket/PFD use
- This background paper would then be used to inform a position paper on the topic of mandatory PFD wear by the taskforce

Objectives

- To determine whether or not:
 - there is a problem that needs to be addressed
 - mandatory PFD use is likely to address the problem
 - it is possible to successfully work toward such a regulatory solution
 - there is evidence that such legislation could be successfully implemented

Methodology

- Is there a problem?
 - general data relating to boating-related drowning deaths in Canada collected and analyzed
 - incidence rates of drowning related to boating and PFD use collected and compiled from a number of sources
 - economic burden associated with boating-related drowning deaths modeled

Methodology (cont'd)

- Would mandatory PFD wear address the problem?
 - research relating to PFD use and efficacy examined
 - literature re efficacy of other non-legislative efforts summarized
 - efficacy of mandatory PFD legislation in other jurisdictions reviewed
 - survey of international experts conducted
 - efficacy of seatbelt and bicycle helmet legislation examined

Methodology (cont'd)

- Is future legislation mandating PFD use feasible?
 - current statutes and case law summarized
 - interviews conducted with policy makers, researchers, drowning prevention advocates, international experts and other stakeholders re opportunities and barriers
- Could it be implemented?
 - literature re public attitudes conducted
 - public opinion poll conducted

Key Research Findings

Magnitude of the Problem

- Average of 140 recreational boaters drown every year (may underestimate by 43% due to misclassification)
- 64% of drowning victims were fishing or power-boating
- 60% drownings associated with small open powerboats or canoes

Magnitude of the Problem (cont'd)

- **61%** recreational boating drownings occurred on a lake, **25%** in a river and **15%** in the ocean
- **17%** involve **multiple drowning victims**, with an average of **2.9 deaths per incident**
- **34%** of drownings occurred after the boat **capsized**
- **20%** after the victim fell **overboard**
- **13%** after the boat became **swamped**

Magnitude of the Problem (cont'd)

- Canada has a **higher** drowning rate and boat ownership than the **U.S.**, **Scotland**, **France**, and **U.K.**
- Canada has a lower drowning rate and boat ownership than Norway and Finland



Key Risk Factors

- Males (90% recreational boating drownings)
- Aboriginals (3% population, 11% boating deaths)
- Swimming ability not strong predictor (14% who drowned in 1999 weak/non-swimmers)
- Water temperature
 - 1% drownings in Canada in 1999 in water above 20 °C
 - water colder than 20 °C in boating season

Key Risk Factors (cont'd)

- Wind, waves, lighting
- Alcohol
 - detected in 31% of all victims
 - suspected in 7% victims
- Operator competency
 - 84% US fatalities in 2000 had no training
- Recklessness and poor judgment
- **Not wearing PFD**
 - 89% drowning victims
 - 1 in 4 cases, PFD onboard but not worn



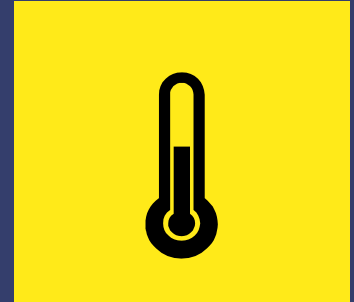
Efficacy of PFDs for Preventing Drownings

- PFDs and lifejackets have enough buoyancy, and some capability to turn wearer onto his/her back
- **2 in 3 boaters feel safe if PFD within reach**, and think it can be put on in an emergency
- Unrealistic: like trying to buckle car seat belt before a crash



Efficacy of PFDs for Preventing Drownings (cont'd)

- Why is it unrealistic?
 - immersions are sudden
 - winds and waves
 - boats without engine kill mechanism may continue on, with PFD aboard
 - most importantly cold water shock
- **Conclusion: PFDs are only effective if worn**



Drowning Close to Shore

- Based on data collected between 1991 and 2000, 41% of those who were boating and drowned were within 2 meters of shore. An additional 22% were within 2 – 15 meters of shore



Incidence of PFD Usage

- Estimates range from:
 - **21%** (observational) to **47%** (self-reports) for adults
 - **85%** children aged 5 or less
 - **70%** children 6-9
 - **37%** teens
- Estimates range from:
 - kayaks **95%**
 - personal watercraft (PWCs) **92%**
 - canoes **63%**
 - non-motorized fishing boats **58%**
 - utility / skiffs **42%**



Incidence of PFD Usage (cont'd)

- If one person on-board wears a PFD, others more likely to do so. **20%** of boaters would not wear PFD if **no one else on-board** wearing one
- Children more likely to wear a PFD if an adult on-board is wearing one (**95%** vs. **65%**)
- **58%** boaters would wear a PFD if operator did
- **89%** would wear a PFD if asked by operator
- **88%** always carry a PFD for each passenger on-board but only **52%** insist that they are worn



Barriers to Wearing a PFD

5 common perceptions:

- Low risk of drowning
- PFDs restrict movement / interfere with activities
- PFDs are uncomfortable
- PFDs are unattractive
- PFDs are a sign of fear

Efficacy of Methods to Increase PFD Wear

- **Small Vessel Regulations** require carriage of PFDs but only 1 in 5 adults wear them
- **Operator competency requirements** based on CCG – accredited test, but may not influence PFD wear rates
- Numerous **social marketing / educational campaigns** conducted to increase PFD wear rates, but no significant behavioural changes

Efficacy of Methods to Increase PFD Wear (cont'd)

- Many programs and incentives to stimulate PFD usage. Some anecdotal evidence re: positive impact, but no evaluation
- Making **insurance** dependent upon wearing a PFD could have positive effect, but uncertain

Efficacy of Methods to Increase PFD Wear (cont'd)

- To encourage PFD wear:
 - number of approved colours expanded
 - light-weight, less bulky designs available
 - inflatables can be used for rowing and paddling
- But low awareness of these changes and unknown effect on wear rates
- **Conclusion: current methods are not enough to increase PFD wear significantly**

The Case for PFD Legislation

- Seat belt usage has increased dramatically following introduction of legislation
- Bicycle helmet wear rates have increased dramatically in B.C and Halifax
- Legislation would assist courts in identifying passengers' versus owners' negligence in incidents

The Case for PFD Legislation (cont'd)

- Only U.S. and Australia have mandatory PFD wear legislation
 - U.S., 40 states have some type of PFD wear legislation
 - Australia, 2 states have some type of PFD wear legislation
- No formal evaluation of efficacy, but preventive indicators

Efficacy of PFD Legislation

- NASBLA reps from 5 states with PFD legislation stated that **deaths and injuries have declined** since legislation enacted
- **Prior to legislation**, PFD wear rates in Tasmania were already relatively high (**49% for adults, 88% of children**), yet **after legislation**, compliance is about **95%** (respondent to on-line survey)

The Case for PFD Legislation (cont'd)

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 - Australia, 2 states have some type of PFD wear legislation
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Barriers and Opportunities for PFD Legislation in Canada

- **International boating / drowning experts** provided input re. barriers and methods of facilitating PFD legislation:

Key Barriers:

Government resistance

Lack of public support or pressure (personal freedoms)

Absence of champions bringing attention to issue

Key Facilitators:

Champions

High profile drowning incidents

Developing support amongst:

- policy makers (presentations highlighting drowning stats & personal stories)
- boaters (consultation sessions)

Barriers and Opportunities for PFD Legislation in Canada (cont'd)

- **Canadian policy makers, advocates, researchers, law enforcement, boating organization representatives** provided input re. support for PFD legislation in Canada, barriers and methods of facilitating legislation
- **Conflicting viewpoints re:**
 - **public resistance**
 - **statistical evidence**
 - **feasibility of enforcement**
 - **current political context** favourable?

Barriers and Opportunities for PFD Legislation in Canada (cont'd)

- Agree re need for:
 - support
 - communications and targeted public education campaigns
 - champion
- Mixed support for legislation

Likely Public Response to PFD Legislation in Canada

Public Response to PFD Legislation in Other Jurisdictions

- All NASBLA reps from **U.S.** states with PFD legislation surveyed claimed that the general public has been either **very supportive (57%)** or somewhat supportive (43%)
- **Tasmanian** respondent indicated that general public has been **very supportive** of PFD legislation in spite of fact that only 39% supported legislation for adults before law enacted

Past Canadian Research

- Various Canadian surveys found **support** for PFD legislation **ranged from 23% to 62%**. Opposition to legislation ranged from 11% to 38%

Likely Public Response to PFD Legislation in Canada (cont'd)

Public Opinion Poll

- Support for PFD legislation **for all occupants on-board was very strong:**
 - varied from 70% for pontoon boats to 87% for PWCs
- Few supported PFD legislation for children only:
 - ranged from 2% for PWCs to 9% for powered runabouts/ cruisers
- **Opposition to PFD legislation was minimal:**
 - ranged from 5% for PWCs and sailboats to 7% for pontoon boats, rowboats / dinghies, fishing boats / utility boats / skiffs

Likely Public Response to PFD Legislation in Canada (cont'd)

Public Opinion Poll

- **The vast majority claim they would comply with legislation if it were enacted:**
 - varied from 84% for pontoon boats to 93% for PWCs
- A small segment would wear a PFD under certain circumstances (e.g. poor weather)
 - ranged from 5% for PWCs to 10% for pontoon boats
- **Very few claimed they would defy PFD legislation:**
 - ranged from 2% for PWCs to 5% for fishing boats / utility boats / skiffs

General Conclusions

- Boating related drownings warrant action
- PFD wear is the risk factor to address to prevent these drownings
- Mandatory wear legislation is the intervention to employ to increase PFD wear
- Such legislation should be feasible in Canada

Recommendations

- The PFD Task Force, and the Canadian Safe Boating Council as a whole, work toward mandatory PFD wear legislation
 - develop action plan, identify champion
 - consult stakeholders
 - develop communications strategy
 - conduct research

CSBC Conclusions

- PFD Task Force recommended

“That CSBC membership accept the Background Research paper Regarding Mandatory PFD Wear Legislation in Canada that was written and presented by SMARTRISK and develop and implement an action plan based on the building of stakeholder consensus to advocate for the required wearing of PFDs/lifejackets by boaters while on the water.”
- Approved unanimously CSBC AGM, September 27, 2003

CSBC Action Plan

- Communicate report findings to stakeholders from boating organizations, manufacturers, government agencies and public to:
 - raise awareness of drowning and boating related fatalities
 - communicate link between cold water shock and need for flotation devices

CSBC Action Plan (cont'd)

- Build consensus to advocate for compulsory wearing in all open recreational vessels less than 6m in length, while under way
- Ensure government policy-makers are informed of need to address problem, opportunity to reduce fatalities and ongoing activities of CSBC
- Obtain voluntary commitment from organizations and individuals to wearing of PFDs on their boats

Organizational Commitment regarding the wear of personal flotation devices (PFDs)

- (Name of Organization) recognizes that wearing a PFD when recreational boating plays a valuable role in preventing drowning.
- (Name of Organization) commits to promoting the policy that all occupants of any open recreational vessel that is under the control of one of our members, wear an appropriate PFD at all times when the vessel is underway. Please find attached a copy of our policy.
- (Name of Organization) represents (number and type of boaters and location – local, regional, national)
- (Name of Organization) supports the introduction of a regulation making compulsory wear of PFDs in open recreational vessels while underway mandatory in Canada.
(identify any limitations on this support, e.g. only for non-power-driven vessels, children under 12 etc.)

Individual Commitment regarding the wear of personal flotation devices (PFDs)

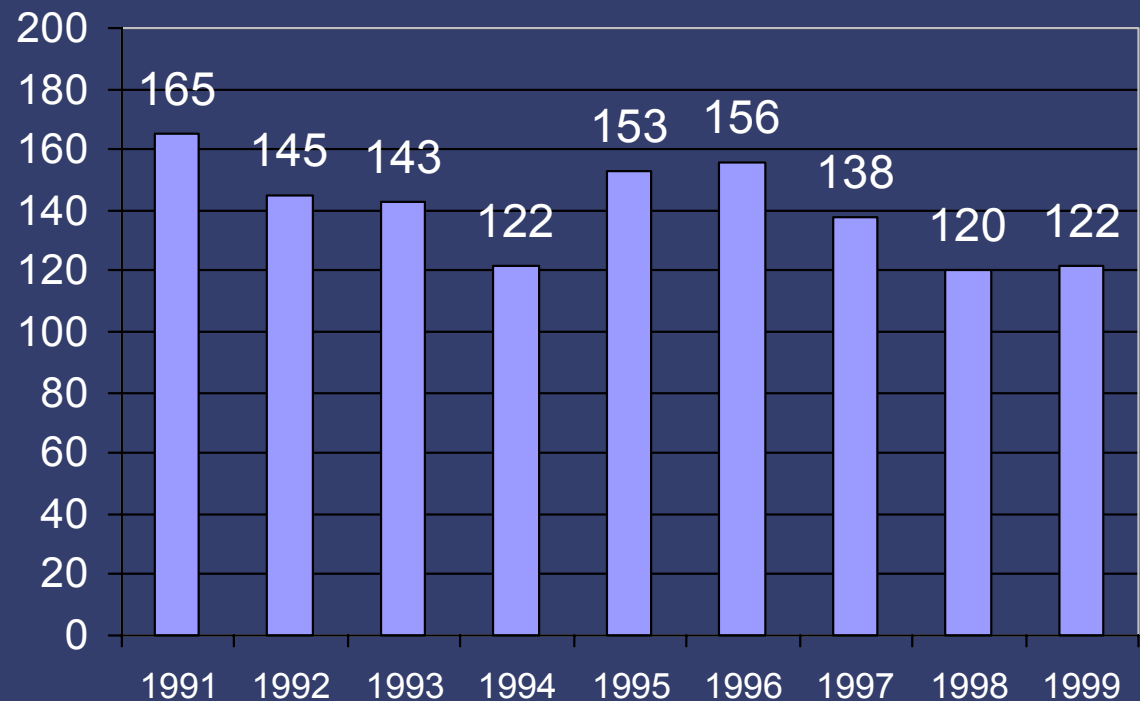
- I recognize that wearing a PFD when recreational boating plays a valuable role in preventing drowning.
- I commit to ensuring that all occupants of any recreational vessel that is under my control, wear an appropriate PFD at all times when the vessel is underway.
- I would support the introduction of a regulation making compulsory wear of PFDs in open recreational vessels while underway mandatory in Canada.
(identify any limitations on this support, e.g. only for non-power-driven vessels, children under 12 etc.)



Magnitude of the Problem (cont'd)

- An average of **140** recreational boaters drown every year in Canada
- This may **underestimate** the true number of drowning deaths by up to **43%** due to misclassification of drownings

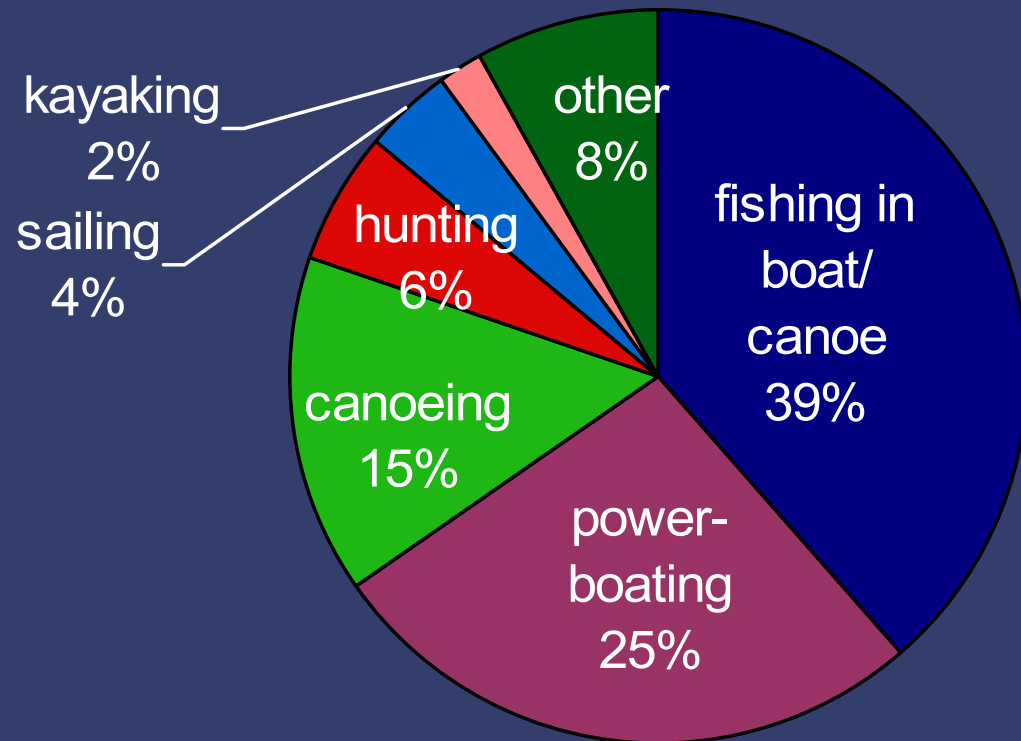
Recreational Boating Drowning Deaths in Canada 1991-1999



Magnitude of the Problem (cont'd)

- Drowning victims were typically engaged in **fishing or power-boating** when the incident occurred

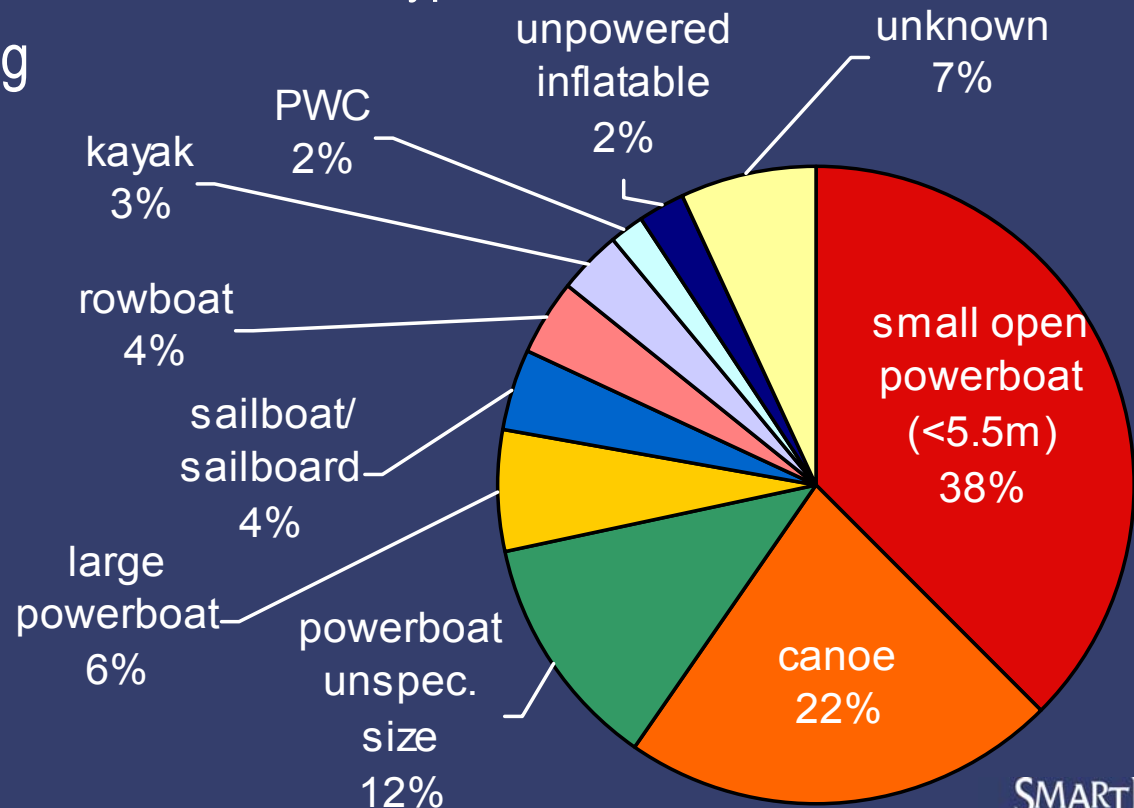
Recreational Boating Drowning Deaths in Canada
By Activity 1991-1999



Magnitude of the Problem (cont'd)

- Most recreational boating drowning fatalities were associated with **small open powerboats** or **canoes**

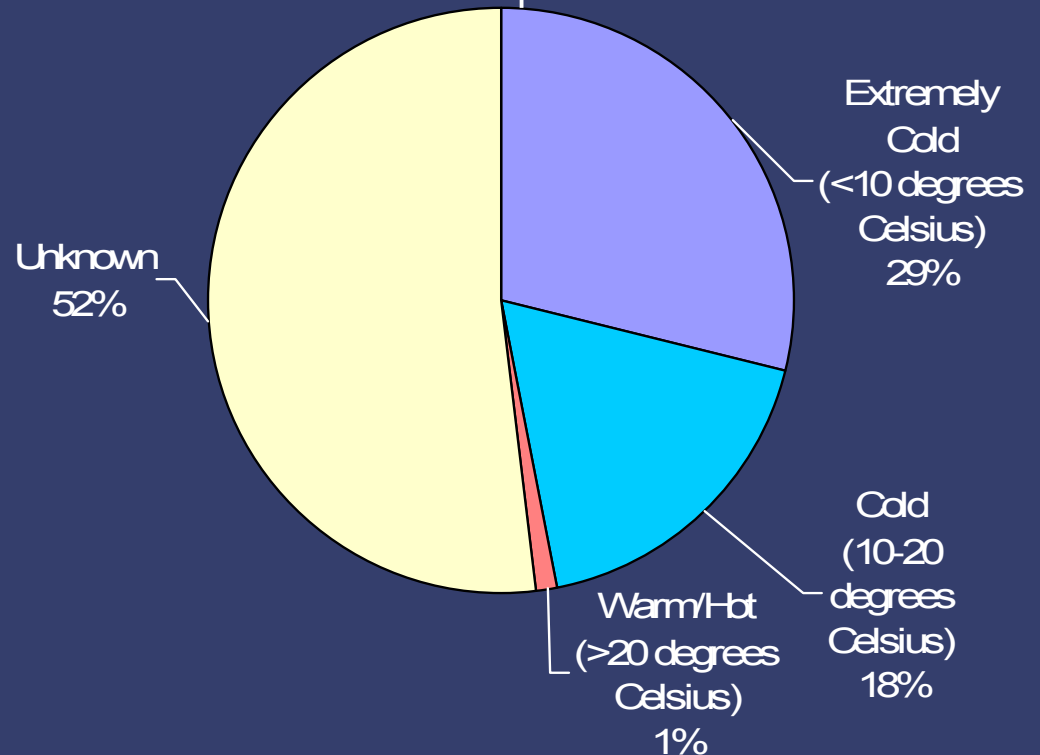
Recreational Boating Drowning Deaths in Canada By Type of Boat 1991-1999



Water Temperature

- Water temperature has a significant influence;
- Only **1%** of recreational boating drownings in Canada in 1999 occurred in warm water **above 20°C**
- Water temperatures in Canada in boating season are colder than 20°C

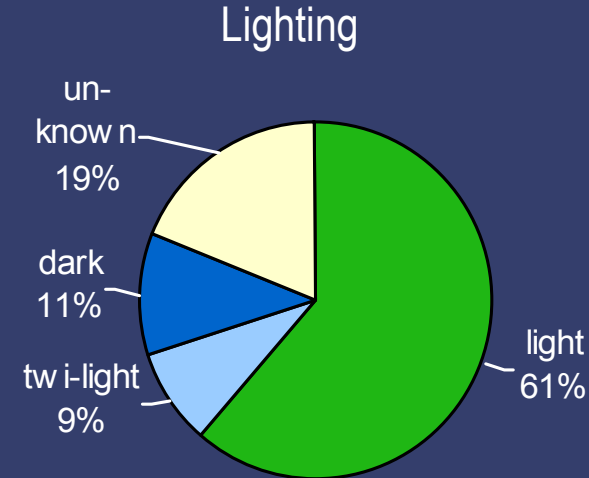
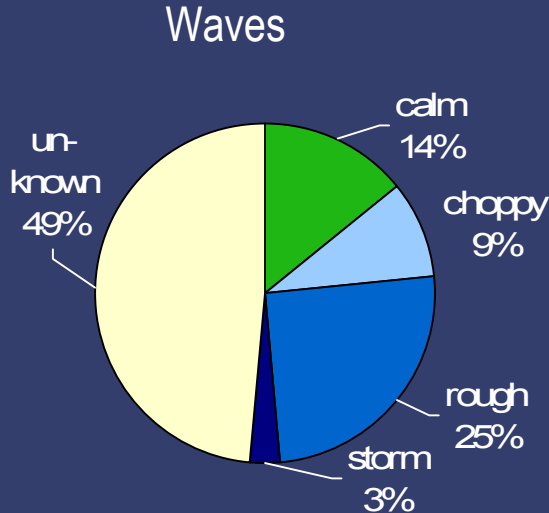
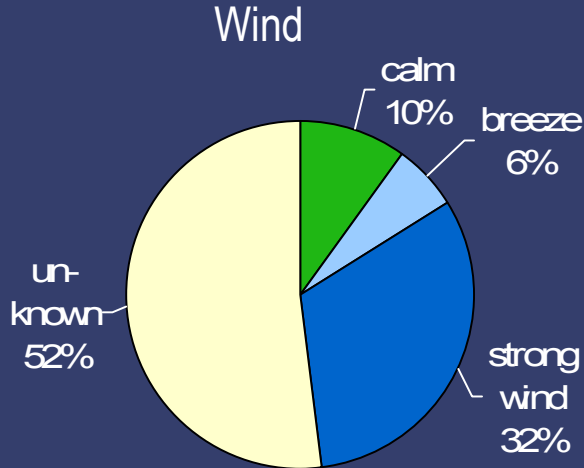
Recreational Boating Drownings in Canada by Water Temperature 1999



Environmental Factors

- **32%** of drownings occur during **strong wind**
- **28%** occur during **rough or stormy waves**
- **20%** occur during **twilight or after dark**

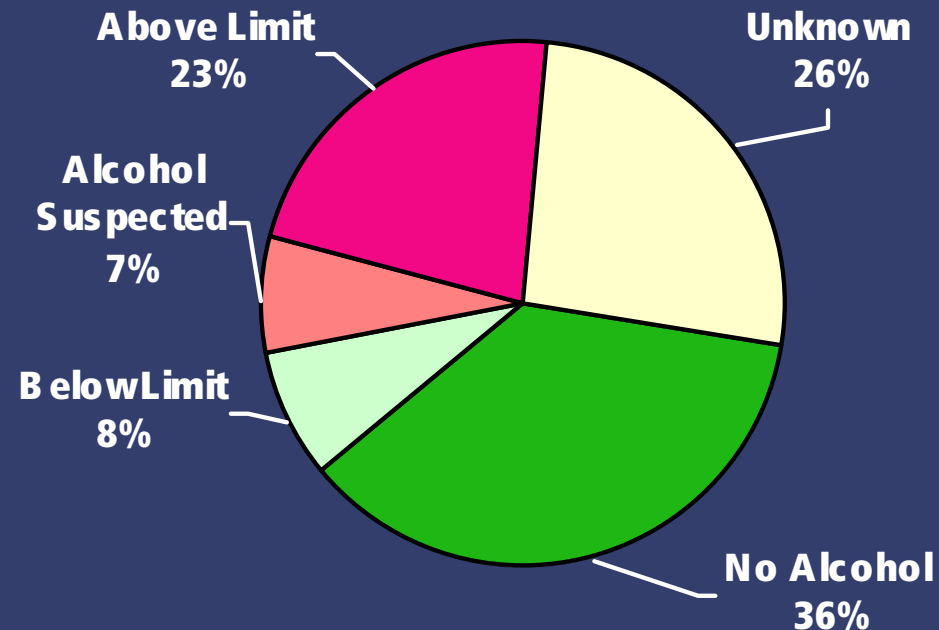
Recreational Boating Drownings in Canada by Wind, Wave, Lighting, 1999



Alcohol

- Alcohol continues to contribute to a large proportion of drownings:
 - detected in **31%** of all victims
 - suspected in another **7%** of cases.
 - BAC is unknown for a significant proportion, so alcohol may be a factor in a greater proportion of drownings.

Blood Alcohol Levels for Recreational Boating Drownings in Canada 1996-2000



Recklessness and Poor Judgment

- Recklessness and poor judgment are a contributing factor in many drownings:
 - **10% overloaded** the boat
 - **8%** of drowning victims **stood** in the boat
 - **8%** were involved in a **collision**
 - **6%** made an **abrupt turn**
 - **6%** operated an **unsafe boat**
 - **6% fell overboard**
 - **2%** were **speeding**
 - **2% stood to urinate**

Cold Water

- Cold water will produce following physiological changes in **first 3 minutes** of immersion:
 - dramatic rise in **heart rate** and **blood pressure** can lead to **heart attack or stroke** in those with pre-existing conditions
 - uncontrollable **hyperventilation** causes muscle spasms, dizziness, sensation of suffocation, and feelings of panic, confusion
 - **inability to hold breath** can lead to aspiration of water
- This **cold shock** phase likely accounts for majority of drowning deaths in water below 15°C

Seat-Belt Usage

- **Seat-belt usage** has increased dramatically following the introduction of legislation (in 1976 and 1977 for ON, QC, SK, BC):
 - before legislation: **20-30%** (ON, QC, SK, BC)
 - in first year after legislation: **60-70%** (ON, QC, SK, BC)
 - for several years after first year of legislation: **40-50%** (ON, QC, SK, BC)
 - after enforcement efforts increased: **65%** (ON)
 - current: **90%** (national)



Bicycle Helmet Wear

- **Bicycle helmet** wear rates have increased dramatically in **B.C.** following the introduction of legislation in 1996:
 - before legislation: **60%**
 - 3 years after legislation introduced: **75%**
- Similar results were observed in **Halifax** after bicycle helmet legislation was introduced in 1997:
 - before legislation: **36%**
 - year legislation introduced: **75%**
 - year after legislation introduced: **86%**
 - 2 years after legislation introduced: **84%**



The Case for PFD Legislation

- **The United States**

- **40 states** have some type of PFD wear legislation
 - only for **children** (age varies from 6-17 by state)
 - some dependent upon whether vessel is underway
 - some dependent upon whether in enclosed space
 - some dependent upon size of vessel
- In March 2002, a **new Federal statute** was created requiring children <13 to wear a PFD in vessels of any size. Federal law does not supersede state laws

The Case for PFD Legislation

- **Australia**

2 states have some type of PFD wear legislation

- Victoria - children < 10 years, while vessel underway, not in enclosed cabin
- Tasmania - all ages, vessels < 6 metres, while under power, not in enclosed space

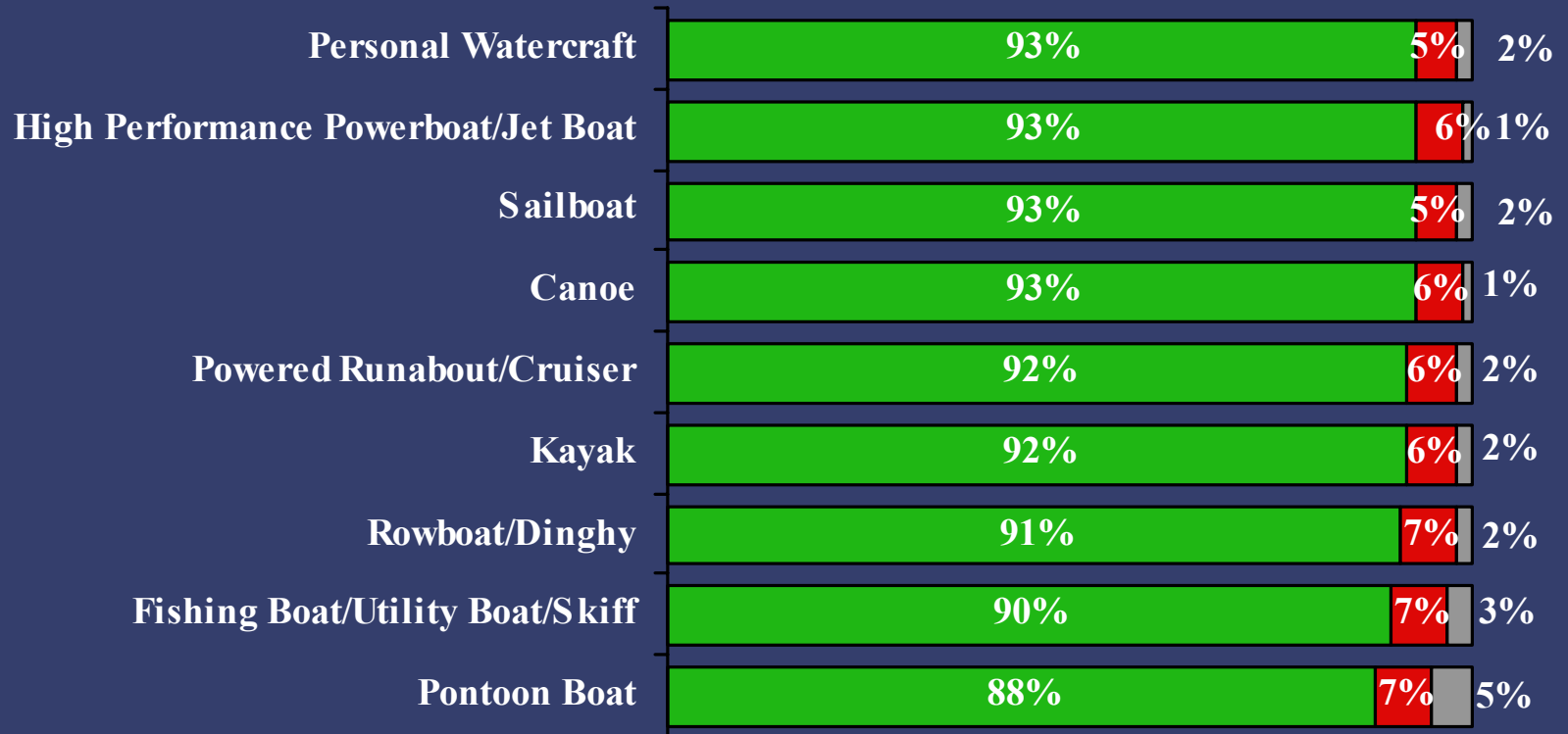
Efficacy of PFD Legislation

- USCG study of PFD **wear rates** concluded that PFD wear rates are directly **proportional to mandatory wear laws**
- The rate of **child drownings** in states with PFD wear laws (1.22/ 1,000 accidents) is **lower** than states without PFD wear laws (1.31 / 1,000 accidents)
- 22 NASBLA reps from states with PFD legislation responded to SMARTRISK's on-line survey and **50% believe PFD wear rates have increased considerably** since legislation enacted, 50% believe PFD wear rates have increased slightly

Support for PFD Legislation

- Overall, **mixed in terms of support for creating PFD legislation**
 - **most in favour of PFD legislation of some sort.** Some in favour of legislation for specific circumstances (e.g. depth of water, weather conditions, time of year, type/size of vessel)
 - others concerned with difficulty of enforcing legislation with exemptions
 - none advocated legislation for children only
 - some argued for greater enforcement of current laws
- Also **divided in terms of prospects for creating PFD legislation**, with some suggesting it is feasible within two years, others less optimistic

Level of Support for PFD Legislation

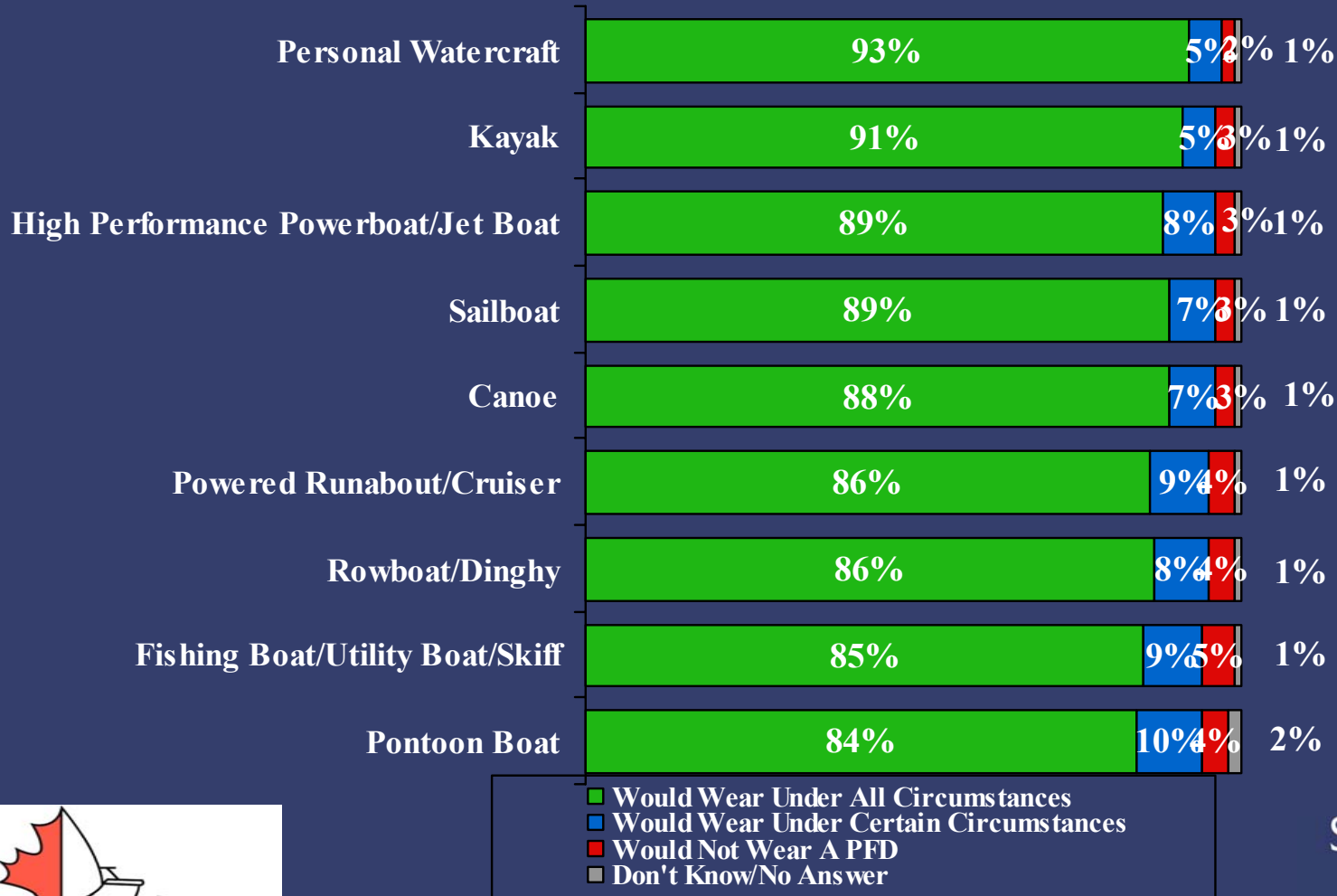


■ Support Legislation of Some Sort

■ Opposed to Legislation of Any Sort

■ Undecided

Hypothetical Compliance with PFD Legislation for Small Watercraft



Communications Strategy

- Develop a communications strategy including:
 - a position paper arguing for mandatory wear legislation
 - briefing notes based upon the position paper
 - new communications vehicles for the public and policy makers about issues not currently widely understood (e.g. Cold Shock, New Styles of PFDs, etc.)
 - identifying stakeholders that should be updated on new developments in the study of drowning
 - including media representatives in any coalitions that would work toward legislation
 - assess the feasibility of hosting a future World Congress on Drowning as a way to raise the public profile for the issue

Research

- Evaluate existing legislation (e.g. Tasmania)
- Investigate why Canada's drowning rate differs from other countries
- Closer examination of social marketing campaigns from the perspective of behaviour change
- How do those at highest risk for drowning approach boating? Are there effective techniques for changing their approach?
- What was outcome of mandatory operator proficiency? Enforcement successful? Boaters compliant?

Cold Water

- Cold water will produce following physiological changes in **first 3 minutes** of immersion:
 - dramatic rise in **heart rate** and **blood pressure** can lead to **heart attack or stroke** in those with pre-existing conditions
 - uncontrollable **hyperventilation** causes muscle spasms, dizziness, sensation of suffocation, and feelings of panic, confusion
 - **inability to hold breath** can lead to aspiration of water
- This **cold shock** phase likely accounts for majority of drowning deaths in water below 15°C

Cold Water

- Cold water will produce the following physiological changes **after 3-30 minutes** of immersion:
 - **ability of muscles to contract, grip strength**, and **manual dexterity** deteriorate rapidly. Can make it impossible to don and buckle a flotation device, pull themselves out of water, etc.
 - **swimming ability** deteriorates quickly (even amongst “expert” swimmers) as controlling breathing and coordinating breathing with swimming strokes become difficult, and swimmer assumes a more upright position to keep mouth clear of water, leading to inefficient swim strokes
 - swimming increases rate of body cooling 40%

Cold Water

- Cold water will produce following physiological changes **after 30 minutes** of immersion:
 - core body temperature drops
 - speed of drop depends on water temperature, body mass, body fat, clothing insulation, agitation of water, diet prior to immersion
 - **hypothermia** once body's temperature drops from 37 to 35°C
 - physical and mental capabilities decline
 - lapse into **unconsciousness** and drown
 - **cardiac arrest**