

MICHIGAN MARINE SAFETY PROGRAM ASSESSMENT

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Abstract: Boating is critical to Michigan's quality of life and economy. In 1998, it was estimated that the 980,378 Michigan registered watercraft (all motorized or rental craft) logged 18.4 million boating days and spent \$635 million on boating trips in Michigan. An estimated 250,000 additional unregistered, non-motorized watercraft account for an additional 4.6 boating days. Boaters in Michigan had 343 reported boating accidents and 27 fatalities in 1999. The Michigan Marine Safety Grants program, established by law in 1967, provides a state match of 3:1 for county marine safety activities. This includes for marine law enforcement, search and rescue, water safety education, recovery of drowned bodies and boat livery inspections. In 2000, 80 of Michigan's 83 counties participated and the state provided \$3.1 million in state matching funds. In a 2001 assessment of marine safety efforts, regional meetings with sheriffs, a follow up mail survey of sheriffs and analysis of boating fatality records, boat registrations and marine safety actions were used to assess the program. A total of 611 county law enforcement personnel worked at marine safety tasks in 2000 and patrolled 66% of the state's inland lake acreage, all Great Lakes and connecting waters and 98 rivers and streams. Ninety-seven percent of participating counties were involved in marine safety education. Counties provided 52% of total marine expenditures, far above the state mandated state/county 3:1 match due to inadequate state funding. The Secretary of State annually takes

10% of all watercraft license revenue as overhead. It is recommended that instead of triennial registration with the Michigan Secretary of State, an annual licensing of boats be done by the Michigan Department of Natural Resources. This will reduce administrative overhead providing an additional \$800,000 for marine safety programs. Further, all watercraft used in Michigan should be licensed, including currently unregistered non-motorized private craft. Analysis of Michigan boating fatalities for 1997-2001 revealed that of the 133 fatalities, 49 (44.4%) occurred in non-motorized craft. Further, non-motorized craft use the same public water access sites now solely maintained by boat registrations and marine fuel taxes from motorized boaters.

Introduction

Safe recreational boating is vital to Michigan's economy and quality of life. In 2001, the US Coast Guard (US Department of Transportation 2003) reported that Michigan had 1,003,947 registered boats, more than any other state. This was 8% of the 12.8 million boats registered in the United States. In addition, Michigan does not register non-powered rowboats, canoes or kayaks unless they are available for rent. It is estimated that there are approximately 250,000 such non-registered craft, based on the proportion of non-motorized craft to motorized craft found in one of Michigan's neighbors, Minnesota, which registers all craft. There 25% of all registrations are for non-powered, private rowboats, canoes and kayaks. Michigan's most recent boating study (Lee 1999), estimated that the 980,378 craft registered in Michigan in 1998 accounted for 18.4 million boating days during that year, with 13.6 million on inland waters and 4.8 million on the Great Lakes. Those boating days resulted in \$635 million in trip expenditures within Michigan in 1998. Applying the annual average of 18.4 uses per registered craft to the estimated 250,000 non-registered craft provides an additional 4.6 million boating days in 1998. In total, there was an estimated 23 million boating days in Michigan in 1998.

Boating safety is an important issue both nationally and in Michigan. In 2001 the US Coast Guard (US Department of Transportation 2003) reported that there were 6,419 boating accidents. Of these accidents, there were 681 fatalities, with 471

(69%) in motorized craft, 199 (29%) in non-motorized craft and 11 (2%) in craft of unknown type. During that same year in Michigan, there were 299 (5% of US total) boating accidents resulting in 27 fatalities (4% of US total). Hence, Michigan has a smaller proportion of accidents and fatalities than it does registered craft. Of the Michigan fatalities 15 (56%) were in motorized craft and 12 (44%) were in non-motorized craft. In terms of boater days per fatality in Michigan, motorized craft had approximately 1 fatality per 1.2 million boater days. Non-motorized craft had approximately 1 fatality per 380,000 boater days. Compare it to a recreational activity some consider dangerous, hunting; the U.S. Fish and Wildlife Service (1998) reported that annually that there were approximately 18.4 million hunter days in Michigan. During 2001 the Michigan Department of Natural Resources (DNR) Law Enforcement Division reported that there were 2 hunting fatalities or 1 fatality per 9.2 million hunter days. Hence, considerable progress could be made in improving marine safety, especially in the area of non-motorized boating.

To promote boating safety, a marine safety program was initiated in 1967 under Michigan Public Act 303 of 1967. Administered by the DNR, the state program allocates a portion of boat registration revenue to participating county sheriff departments for:

- Marine safety patrol - Patrol on waterways to enforce marine laws
- Marine safety education - Classroom education including safety certification for those 12-15 and operators of personal watercraft born after December 31, 1978
- Search and rescue - Providing emergency services on the water for boaters reported lost or missing
- Body recovery - Recovery of drowned bodies
- Regatta patrol - Patrol at boating races, sailing events, etc.
- Complaint investigation - Follow up on citizen concerns regarding specific unsafe or illegal boating activity
- Livery inspection - Safety inspection of all rental craft on an annual basis
- Court appearances - Testifying in court during marine safety violation prosecutions

The funding is available on a matching basis with

the law specifying a match of up to 3:1 (state: county) dollars. The authors, through Michigan State University, were contracted by the Michigan DNR with additional support from the Michigan Agricultural Experiment Station to conduct an assessment of the Michigan marine safety grants program. The focus of this presentation concerns marine safety patrol, marine safety education and funding for marine safety.

Methods

The assessment of Michigan's marine safety program involved a number of information gathering techniques. A self-administered mail survey was sent to the county sheriff in each of the 80 Michigan counties (out of 83 total counties in Michigan) participating in the 2000 marine safety grants program. In addition, the authors held six regional meetings with Michigan county sheriff representatives, conducted a review of state and national marine safety literature and contacted ten other major boating states regarding their marine safety programs. Finally, the assessment also used the knowledge of the authors regarding funding and operation of other recreation law enforcement and safety programs in Michigan and elsewhere, including studies of snowmobile enforcement (Lynch 2000), studies of off-road vehicle enforcement (Nelson and Lynch 2001) and Nelson's 15-year tenure directing the Park Law Enforcement and Ranger Institute (a professional training program for recreation law enforcement personnel) at Michigan State University.

Findings and Management Recommendations

The results are segmented into patrol, safety education and funding findings and management recommendations. Of the 80 counties surveyed, 78 (98%) responded.

Patrol Findings

When asked about their county's marine safety patrol coverage of inland waters, in aggregate the counties reported that they patrolled 923 inland lakes accounting for 66% of all inland lake acreage of lakes greater than 10 acres during the summer of 2000. This amounted to 506,702 inland lake acres patrolled. In addition, 98 major rivers/streams were patrolled. In terms of the Great Lakes, 31 of the 32 Great Lakes coastal counties in the marine safety program patrolled Great Lakes waters. Marine safety patrol was conducted by a total of 611

officers during 2000, with 30% of the officers fully certified police officers and 70% appointed as marine deputies with a more limited law enforcement role and significantly less training than fully certified officers. Most counties (86%) participating in the program were actively cooperating with other marine safety entities. For cooperating counties, the most common partner was a conservation officer from the Michigan DNR Law Enforcement Division. Other partners included personnel from adjacent counties and the Michigan State Police. For Great Lakes coastal counties, the US Coast Guard, officials from adjacent states and Canadian marine safety officials were also important partners.

During regional meetings with sheriff representatives, participants were asked for patrol recommendations that would reduce fatalities. The two major recommendations were to target patrol and enforcement activities to violations that directly threaten safety and to increase patrol on weekday evenings and weekends. Key violations identified that directly threaten safety were:

- Inadequate personal floatation devices
- Operation in or near designated swimming areas
- Reckless operation
- Lack of required fire extinguisher
- Lack of navigational lights
- High speed operation in no wake zones, especially by personal watercraft operators

Patrol Recommendations

While there appears to be adequate spatial patrol coverage, temporal and intensity modifications are suggested. In particular, additional effort should be placed on patrolling when there is maximum boating pressure (weekends and after 5PM during the week). Further, patrol should focus directly on priority safety violations, such as those recommended by the sheriffs. For the equipment violations such as inadequate personal floatation devices, functional fire extinguisher and functional navigation lights, pre-launch safety checks performed at marinas, public boat launches, etc. would be cost effective and preventative. County marine safety personnel could also form effective partnerships with boating related civic organizations such as lake associations, watershed councils, power squadrons, etc. to jointly accomplish such preventative measures.

Education Findings

Of the 80 counties participating in the marine safety program, 78 provided one or more marine safety education classes in 2000. These classes lead to certification for youths 12-15 who desire to operate a registered watercraft without direct parental supervision. To gain certification, youth need to pass the Michigan proctored, on-site written safety examination at the conclusion of the class. In addition, classes also serve all adults who want to operate a personal watercraft by reducing insurance costs and meeting new (1999) marine safety education requirements that all personal watercraft operators born after December 31, 1978 have successfully completed a marine safety education course. In 2000, approximately 50,000 students were enrolled in marine safety instruction and a total of 43,705 were certified.

The marine safety education target is to educate 25% of all youth aged 12-15. As a surrogate, the Michigan Department of Education (<http://www.michigan.gov/mde>) reported that in 2001 there were 128,987 7th graders enrolled in public and charter schools. This does not include private schools. Hence, less than 8% of youth aged 12-15 were certified during 2000. Further, considering that approximately 10% of those certified were adults, the proportion of youth certified is even less than 8%.

While most other states with major boating programs and effort have adopted internet based educational materials, Michigan has been slow to do so. However, 90% of the sheriff departments responding to the survey supported the use of internet based education as one modality of marine safety education. Their rationale was that it provided information more conveniently to a larger audience, especially adults who may be uncomfortable taking a class with youth. However, there was no support for eliminating face-to-face classes as many sheriffs felt that the discussions and question and answer opportunities of a class enhance understanding and provide valuable clarification. Further, all supported continuation of proctored exams to actually grant certification. There was no support for internet based testing.

When asked in an open-ended format what could be done to improve marine safety education, most suggestions revolved around better use of

technology to disseminate marine safety information, including having teaching materials on DVD and CD, providing access to safety information over the internet and regularly updating teaching materials to remain current with and even anticipate changes in boating, thus new challenges in marine safety.

Education Recommendations

Making use of the internet to reach a broader audience with marine safety information appears to be a positive with little downside. In particular, it provides youth boaters and adult personal watercraft operators who are summer visitors to Michigan with ready access to information prior to visiting the state. Hence, upon arrival at their second home they can rapidly schedule their proctored test with the appropriate county sheriff with an excellent knowledge base, minimal impact on vacation time and strict adherence to marine safety certification requirements. The use of more advanced technology in teaching will also be helpful for gaining access to schools for marine safety education. The familiar use of computers, CDs and DVDs by officers teaching marine safety can enhance their status and the value of their message in the eyes of teens and fits with educators' efforts to better integrate technology into K-12 schools. It will also facilitate the accurate and rapid transfer of teaching materials between the Michigan DNR central clearinghouse for marine safety education and instructors across the state.

Funding Findings

Marine safety funding is predicated on need and available monies. The need for marine safety operations funding is assessed by a formula that considers the marine safety functions noted in the introduction. The major categories are patrol, education, search and rescue and related activities, administration and contractual services, supplies and materials (CSS&M). This does not include the need for capital improvements such as boats, motors, trailers and electronics and other small equipment. The authors recommended the following formula and estimate of operational funding need.

Patrol is assessed to be efficient and effective when 2% of the registered boating days are contacted annually. This is 2% of an estimated 13.6 million inland boating days (272,000) plus 2% of an

estimated 4.8 million Great Lakes boating days (96,000). Each inland contact takes 0.5 worker hour and each Great Lake contact takes 1.0 worker hour. The differential contact times are due to the necessity of two officers in a boat during a Great Lakes contact to enhance boating safety in potentially rough waters involving larger craft. This does not take into account the use of unregistered craft. Hence the minimum total patrol time need is 232,000 hours (136,000 inland hours + 96,000 Great Lakes hours).

To educate the target 129,000 youth annually, it is assessed that 0.5 hours per youth are needed, considering the typical class size and hours of instruction per class. Thus the annual need for marine safety education is 64,500 hours. The need for all other operation activities, such as search and rescue, is assessed to be what it was over the past 4 years based on a rolling annual average (12,000 hours). Aggregating all hours for patrol, education and other operations programs to 308,500 hours, administration is assessed to be 20% of that aggregate or approximately 62,000 hours. The total number of hours needed to conduct the marine safety program is then approximately 370,500 hours. Based on the average wage paid across Michigan for all marine safety personnel (\$19.33/hour) this amounts to almost \$7.2 million. In addition, CSS&M is estimated to be 21% of total wage costs, making the total cost \$8.6 million. Considering the 3:1 match of state to local monies noted in the marine safety legislation (PA 303 of 1967), this amounts to approximately \$6.4 million from the state and \$2.2 million from counties.

Based on surveys of county sheriffs and state financial records, the actual funding allocated for marine safety is considerably less than \$8.6 million and the proportion provided by counties is considerably more than 25%. Of 68 counties providing detailed budget information in the sheriff survey, total marine safety expenditures were \$5.7 million. Of this, 52% was county funds, 46% was DNR marine safety grant funds and 2% was from other sources such as civic organizations. State financial records indicate that on a statewide basis, marine safety grant funds provided a total of \$3.1 million to the 80 participating counties, slightly less than half the operational need based on the above needs formula.

Investigation of state funding sources for marine safety found that, of the \$9.3 million collected by the Michigan Secretary of State for boat registrations in fiscal year 2000, \$1.0 million (10%) was used for registration administration (overhead). By contrast, the Michigan off-road vehicle (ORV) licensing program, in which all ORVs ridden on public lands or frozen waters are required to be annually licensed by the Michigan DNR, operates on an overhead rate of 1.5% and through annual licensing provides a more current picture of active licensees. Licenses are sold through the state's electronic dealer network, available in many retail outlets 24 hours per day, 7 days per week. This is in contrast to the 45 hours per week the Secretary of State is open. If boats were licensed in the manner of ORVs, this would result in over \$0.8 million additional dollars for marine safety efforts.

Funding Recommendations

It is recommended that the marine safety operations program need as defined by the funding formula be fully met. This can be done in two ways. First all watercraft users should pay their fair share. This includes those who use currently unregistered craft. Those estimated 250,000 craft are three to four times more likely to be involved in a fatality than a motorized, registered craft, thus highlighting the need for marine safety education targeted at non-motorized craft users. Indeed, over the period 1997-2001 the US Coast Guard (US Department of Transportation 2003) reported that of Michigan's 133 boating fatalities, 44% were in non-motorized craft. In addition, the non-motorized craft boaters use the full range of marine safety and boating services including search and rescue, body recovery, etc. as well as public boat launching facilities purchased and maintained by boat registrations and Michigan marine fuel sales taxes in Michigan. While non-motorized craft boaters will not use and thus contribute to marine fuel sales, licensing of their craft is equitable and feasible. Considering the current cost of a 3-year registration for a square stern 16 foot canoe that occasionally uses an outboard motor of \$14, this amount divided by 3 (\$4.67) reduced by 1.5% overhead (.985 * \$4.67 = \$4.60) multiplied by the estimated 250,000 non-registered craft will provide \$1.15 additional million for marine safety and other boating related services such as public boat launch site maintenance and operation. It will also provide an accurate list of people and addresses

so currently non-registered craft users can be identified, providing opportunities to contact them in survey and other formats to determine their boating related needs and concerns.

Second, triennial boat registration should be converted to annual boat licensing in a manner similar to that for ORVs in Michigan. Licensing should be done through the DNR's electronic licensing network, providing point of sale data entry capture with the swipe of a driver's license, at many locations 24 hours a day, 7 days a week. This will annually provide approximately \$0.8 million additional dollars for marine safety and other boating related program costs.

Conclusion

Improving boating safety is an important and achievable goal. This assessment identifies methods to accomplish that goal through more targeted patrol and enforcement, use of available technology in education and significant new sources of funding through increased efficiencies in registration/licensing and equitable distribution of safety and management costs across the spectrum of boaters in Michigan.

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