



Section 8

Health Benefits of Non-Motorized Boating

8. Health Benefits of Non-Motorized Boating

This section summarizes the health effects of non-motorized boating. The information in this section draws on general research on the health benefits of physical activity and outdoor recreation, of which non-motorized boating is a subset. In addition, this section summarizes the energy output from a variety of non-motorized boating activities. Linking back to the primary data gathered for this study, this section also identifies the reasons why survey respondents participate in non-motorized boating.

This section is organized as follows:

- A. *Health Benefits of Physical Activity*
- B. *Health Benefits of Outdoor Recreation*
- C. *Physical Activity Levels of Non-Motorized Boating*
- D. *Reasons for Participating in Non-Motorized Boating.*

A. Health Benefits of Physical Activity

There is a large accumulating body of research documenting the health benefits of physical activity.¹ The Surgeon General recommends that adults participate in at least 30 minutes of moderate physical activity most days of the week.² Physical activity is defined as “any bodily movement produced by skeletal muscles that results in energy expenditure.”³

The majority of adults do not meet this recommendation, and the increase in physical inactivity in the United States is cited as a cause in the increasing prevalence of overweight and obese individuals in this country.⁴ Nationwide, over sixty percent of adults are overweight or obese.⁵ In 2002, 19 percent of Californians were considered obese, compared to 10 percent in 1990.⁶

Physical inactivity is a problem among all ages, but is of greatest concern for children and teenagers. A recent study found that in 2004, 28 percent of 10 to 15 year olds in California were overweight, and childhood obesity is leading to earlier onset of Type II diabetes.⁷

The negative health impacts of inactivity have economic repercussions as well. A report prepared for the California Department of Health Services estimated that in 2000, the direct and indirect costs of physical inactivity, obesity, and overweight in California were \$21.7 billion annually. This \$21.7 billion figure includes costs of medical care, worker’s compensation, and lost productivity.⁸ Over one-half of this total cost was due to physical inactivity.⁹



In 2005, California State Parks produced a report as part of the California Outdoor Recreation Planning Program, *The Health and Social Benefits of Recreation*.¹⁰ This report summarized the physical and mental health benefits of physical activity, and emphasized the importance of these benefits given the severe health problems that California faces, including obesity, diabetes, and cardiovascular disease. Moderate levels of physical activity have been linked to the following nine major categories of health benefits¹¹:

- Reducing obesity and controlling weight
- Controlling high blood pressure
- Reducing risk of heart disease and heart attack
- Reducing risk of Type II diabetes
- Reducing risk of colon cancer and breast cancer
- Reducing arthritis pain and disability
- Preventing osteoporosis
- Increasing life expectancy
- Reducing symptoms of depression and anxiety.

Recent studies are also finding that physical activity can help brain functions, and stave off the onset of Alzheimer's Disease and other cognitive disorders.¹²

The physical and health benefits of physical activity result from only moderate levels of physical activity. Studies have found that walking, or even undertaking household activities, for the recommended thirty (30) minutes per day results in health benefits.¹³

B. Health Benefits of Outdoor Recreation

Outdoor recreation is a subset of physical activity. One key to encouraging participation in physical activity is to make it fun; outdoor recreation, including non-motorized boating, can

do so. Many would argue that there are also additional psychic benefits from spending active time out-of-doors. As far back as the early 1900s, conservationist John Muir noted, "Thousands of tired, nerve-shaken, over-civilized people are beginning to find out that going to the mountains is going home; that wilderness is a necessity."¹⁴ Muir commented on what many have found themselves, and over 100 studies have documented,¹⁵ that outdoor recreation reduces stress and improves quality of life.

Those that participate in outdoor recreation are more satisfied with their quality of life than those that do not participate in outdoor recreation.¹⁶ While the social benefits of recreation are not as well studied as the physical benefits, there is growing recognition that parks and recreation opportunities strengthen communities, and provide positive alternatives to at-risk youth and senior citizens.¹⁷

The general trend in the country towards physical inactivity is also reflected in a decline in participation in outdoor activities among California youths. A survey of 605 California parents regarding summer youth activity for the Pacific Forest and Watershed Lands Stewardship Council found that 60 percent of parents said their children's interest in the outdoors is declining.¹⁸ One of the goals of the California State Parks report on recreation's health and social benefits was to provide park and recreation service providers and policymakers with a tool to help generate support for their programs that would counter this trend toward physical inactivity.

C. Physical Activity Levels of Non-Motorized Boating

The level of physical activity provided by the many types of non-motorized boating ranges from moderate to intense. Epidemiology and kinesiology researchers have developed a standard

Table 8.1
Comparative Metabolic Equivalent (MET) Values
for Selected Activities¹⁹

Activity	MET Value
1. Sitting quietly	1.0
2. Walking, moderate pace (3 mph)	3.5
3. Jogging (> 12 minute mile)	7.0
4. Running (9-minute mile)	11.0
5. Bicycling (general, leisure)	4.0
6. Swimming (laps, slow to moderate)	8.0
1. Canoeing or rowing (light effort)	3.5
2. Canoeing or rowing (moderate effort)	7.0
3. Canoeing or rowing (vigorous effort)	12.0
4. Kayaking	5.0
5. Sailing (boats and sailboards)	3.0

classification of the energy costs of human activities founded on the resting metabolic rate (the amount of energy one expends sitting quietly). This standardized system is based on METs (metabolic equivalent), the ratio of work metabolic rate to resting metabolic rate.²⁰

The MET physical activity classification system allows researchers to compare the relative level of physical activity among a wide variety of activities. A MET value of 3.0 for a particular activity, such as light effort canoeing, means that it requires three (3) times more energy expenditure for light effort canoeing than the amount of energy expenditure required to simply sit quietly.

One can extrapolate the general health benefits associated from a given amount of physical activity from one activity, such as walking, to another activity, such as non-motorized boating, based on the METs.²¹ Moderate physical activity is defined as an activity performed at an intensity of between 3 and 6 METs.²²

Table 8.1, above, provides the MET values for six common activities, and five non-motorized

boating activities. The table illustrates that paddling activities have similar levels of exertion to common forms of exercise such as walking, running, and bicycling. To put the range of MET values in perspective, the lowest MET value in the Compendium was for sleeping, at 0.9; and the highest MET value in the Compendium was for fast running (5:30 per mile pace), at 18.²³

Using METs as a means of comparison shows that even light effort paddling is equivalent to walking, the most basic form of moderate physical activity recommended by the Surgeon General and others. This comparison is supported by a study of the physiological effects of recreational kayaking, which found that recreational kayaking produces positive physiological benefits, including a sustained increase in heart rate.²⁴ This study found that “recreational kayaking is an acceptable form of physical activity to replace more traditional forms of exercise.”²⁵

While the more common types of paddling activities provide a moderate level of physical activity, some non-motorized boating activities are more vigorous. Rowing in sculls or shells is considered one of the best full-body workouts available.²⁶ Competitive rowers of all ages achieve a high level of fitness through non-motorized boating. Similarly, there are a number of other competitive non-motorized boating activities, such as kayak racing, surfski racing, sailboard racing, and outrigger canoe racing, which require a high level of fitness.

D. Reasons for Participating in Non-Motorized Boating

Non-motorized boaters in California responding to both the statewide random telephone survey, and active-user Internet survey, were asked to identify the reasons why they

participated in non-motorized boating. Respondents were allowed to list multiple reasons for participating in non-motorized boating, and most respondents identified at least three reasons.

Table 8.2, right, identifies the top ten reasons for participating in non-motorized boating for the statewide random telephone survey respondents.

Table 8.3, right, identifies the top ten reasons for participating in non-motorized boating for the active-user Internet survey respondents. In both tables, the percentages sum to over 100 percent because of multiple responses. The most frequently identified reasons for participating in non-motorized boating, for both surveys, supports the notion that non-motorized boating, as a form of recreation, can provide physical and mental health benefits to participants.

A very significant 24 percent of non-motorized boaters in the statewide random survey participated in non-motorized boating for fitness. Among active-user survey respondents, an even higher 81 percent participated in non-motorized boating for fitness. Clearly, non-motorized boating is an important source of physical activity and fitness for a large number of participants.

Table 8.2
Reasons for Participating in Non-Motorized Boating, Statewide Random Telephone Survey (2006) (n=288)

Reason for Participating	Percent of Respondents
1. For recreation	46%
2. For leisure and relaxation	40%
3. To enjoy nature	38%
4. For fitness	24%
5. To participate in another activity*	24%
6. As a family activity	23%
7. For the physical and/or mental challenge	14%
8. As a social activity	11%
9. Because it is convenient and easy	11%
10. Because it is non-polluting (no gasoline)	10%

* Fishing, hunting, scuba diving, snorkeling, photography, camping, bird-watching, etc.

Table 8.3
Reasons for Participating in Non-Motorized Boating, Active-User Internet Survey (2006) (n=1,518)

Reason for Participating	Percent of Respondents
1. For recreation	92%
2. For the physical and/or mental challenge	82%
3. To enjoy nature	82%
4. For fitness	81%
5. For leisure and relaxation	76%
6. As a social activity	72%
7. As a family activity	37%
8. For competition	33%
9. To participate in another activity*	18%
10. While camping	2%

* Fishing, hunting, scuba diving, snorkeling, photography, bird-watching, etc.

Section 8 Endnotes

- ¹ In addition to the documents cited in this section, and the numerous references cited within those documents, the Outdoor Industry Foundation (OIF) web page, <http://www.outdoorindustryfoundation.org/youth.toolkit.research.html>, provides links to over twenty (20) government and scientific reports on the obesity epidemic, the necessity of physical activity, and the psychological benefits of nature.
- ² U.S. Department of Health and Human Services. *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity* (Rockville, Maryland: U.S. Department of Health and Human Services, 2001).
- ³ Russell R. Pate, et al. "Physical activity and public health, a recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine." (*Journal of the American Medical Association*, Volume 273, Number 5, February 1, 1995, p.402).
- ⁴ U.S. Department of Health and Human Services, 2001.
- ⁵ California State Parks, *The Health and Social Benefits of Recreation* (Sacramento, California: California State Parks, March 2005).
- ⁶ California State Parks, 2005.
- ⁷ Danielle McNamara. "Kids on front line in weight battle." (*The Sacramento Bee*, June 25, 2007, p.B1).
- ⁸ David Chenoweth. *The Economic Costs of Physical Inactivity, Obesity, and Overweight in California Adults: Health Care, Workers' Compensation, and Lost Productivity* (North Carolina, Chenoweth & Associates for the California Department of Health Services, April 2005).
- ⁹ Ibid.
- ¹⁰ California State Parks, 2005.
- ¹¹ California State Parks, 2005; and Centers for Disease Control and Prevention. "Physical activity for everyone: trails for health." (Centers for Disease Control, <http://www.cdc.gov/nccdphp/dnpa/physical/trails.htm>).
- ¹² Mary Carmichael. "Health for life: stronger, faster, smarter." (*Newsweek*, March 26, 2007, p.38).
- ¹³ Personal communications with Michael Pratt, Director Division of Nutrition and Physical Activity, Centers for Disease Control and Prevention, June 5, 2006 and July 16, 2007; and Russell R. Pate, et al., 1995.
- ¹⁴ California State Parks, p.20.
- ¹⁵ Ibid.
- ¹⁶ Ibid.
- ¹⁷ Ibid.
- ¹⁸ M.S. Enkoji. "Great outdoors not so great among teens, survey finds." (*The Sacramento Bee*, October 3, 2006, p.A3).
- ¹⁹ Ibid.
- ²⁰ Barbara Ainsworth, et al. "Compendium of physical activities: classification of energy costs of human physical activities." (*Medicine and Science in Sports and Exercise*, 1993, p.71).
- ²¹ Pratt, July 16, 2007.
- ²² Russell R. Pate et al., 1995.
- ²³ Ainsworth, 1993.
- ²⁴ Heidi Pederson and Molly Samuelson. "The Physiological Effects of Recreational Kayaking." (*Journal of Undergraduate Kinesiology Research*, Volume 1, 2005, p.30).
- ²⁵ Ibid., p.37.
- ²⁶ Lauren Young. "A different stroke." (*Business Week*, June 11, 2007, p.72).