

BOATING CARRYING CAPACITY

DETERMINATION AND JUSTIFICATION

The Problem

The subject of Boating Carrying Capacity is an important issue that presently hinders many states in their ability to accurately determine and justify recreational use of public water-bodies. The issue is very controversial and subjective, with various user groups having entirely different views on the subject. Some states have worked at developing a carrying capacity formula with mixed results. Complicating factors have been local objections to boating limitations and questioning of the methods used to obtain these limits. The State of Connecticut never developed a process to address the carrying capacity issue. This omission has left us vulnerable when the subject was raised at public hearings and meetings during our efforts to construct a launch on or regulate/deregulate state water-bodies. In addition, the issue of “boat overcrowding” has often been cited by residents who wish to have restrictions placed on the number, type or size of boats allowed on a particular water body. Without a clear, justifiable process in place, it is difficult to provide a counter argument.

In an attempt to develop just such a process, the following method is proposed which focuses on scientific and physical factors and does not entertain the subjectivity of personal prejudices, sentiments or preferences. This formula can be applied to all lakes, ponds or rivers in the state and uses the water-body size and current regulations in conjunction with accepted standards of speed, distance and safe spacing between vessels.

The Calculation Process

The Boating Carrying Capacity calculation begins by taking the total lake acreage and subtracting 10%. This 10% represents the “Unusable Surface Area” and accounts for swim areas, moorings, docks, shallow areas and any other portions of the water-body which are generally inaccessible to vessel traffic.

The remaining acreage (90%), called the “Usable Surface Area”, is then divided by the “Cumulative Acreage”. This factor comes from a standard chart (below) which was developed by dividing all boats into four general categories based on vessel type, propulsion and speed. A category’s average speed was used to calculate the distance covered in a given time: 5 minutes. This distance is then divided by the length of an elongated acreage dimension of 100’ x 435.6’ to obtain the “Acres Used” per Vessel. The acre width of 100 feet also represents a standard buffer zone and desired separation distances for vessels on waters allowing high-speed operations.

“Cumulative Acreage” is obtained by adding the “Acres Used per Vessel” of all categories allowed on a given water-body. For example, if a lake has no restrictions, all category figures would be combined giving a total of 45 acres. A pond with a “No Motors” restriction would allow only non-motorized categories and would have a “Cumulative Acreage” of 5 acres.

Vessel Categories	Speed	Distance Covered in 5 minutes	Divided by Acre Length (435.6’)	Acres Used per Category
High Speed/Water Skiing	30 MPH	13,200 feet	30.30	30 acres
Small Motor/Electric	10 MPH	4,400 feet	10.10	10 acres
Sailboat	4 MPH	1,760 feet	4.04	4 acres
Canoe/Kayak/Rowboat	1 MPH	440 feet	1.01	1 acres

The result is then multiplied by the “Spacing Factor” which is based on the assumption that several boats may be using the same acre at the same time. It is calculated by using the “Vessel Categories” allowed and the minimum desired spacing between vessels. The minimum desired spacing ensures safe and comfortable operation between different boat categories and is inversely proportionate to the number of “Vessel Categories” allowed. The more categories, the larger the required spacing and therefore a smaller factor. For example, a lake with high-speed traffic should have approximately 100 foot spacing between vessels whereas a pond with a “No Motors” restriction would only need approximately 25 foot spacing

between boats. The “Spacing Factor” is determined by multiplying the number of Vessel Categories by the number of boats in an acre width of 100 feet. Sailboats and Canoes/Kayaks/Rowboats use the same Spacing Factor because they are similar with regard to safety concerns. The result of applying this factor to the Carrying Capacity calculation is the “Vessels in Use - Carrying Capacity”.

<u>Vessel Categories</u>	<u>Desired Spacing</u>	<u>Vessel Categories</u>	<u>Boats/Acre Width</u>	<u>Spacing Factor</u>
High Speed/Water Skiing	100 feet	4	x	1 = 4
Small Motor/Electric	50 feet	3	x	2 = 6
Sailboat	25 feet	2	x	4 = 8
Canoe/Kayak/Rowboat	12 feet	1	x	8 = 8

Not all vessels present on or around a water-body are in use at the same time. The percentage of boats in use and not docked, moored or beached is reportedly estimated to be only 10% of the total number of vessels present. The 10% figure is based on previous vessel survey observations on some Connecticut Lakes. The total number of vessels present represents the “Total Carrying Capacity”. This number is determined by multiplying the rounded figure of “Vessels in Use-Carrying Capacity” by 10.

EXAMPLES:

Coventry Lake

378 acres

-38 Unusable Surface Area - 10%

340 Usable Surface Area

÷45 Cumulative Acreage

7.5

x 4 Spacing Factor

30.2 = 30 Vessels in Use-Carrying Capacity

x 10

300 Total Carrying Capacity

Avery Pond (8 MPH limit)

50.6 acres

- 5.06 Unusable Surface Area

45.54 Usable Surface Area

÷15 Cumulative Acreage

3.04

x 6 Spacing Factor

18.24 = 18 Vessels in Use-Carrying Capacity

x 10

180 Total Carrying Capacity

Boat Launch Size Determination

The size of proposed and existing State boat launches throughout Connecticut has always been a controversial subject. The Department periodically receives comments from public officials and residents that a particular launch is either too large or to a lesser extent, too small. These statements are not based on any studies or research data but on personal sentiments and preferences.

The following chart determines “Boat Launch Parking Capacity” based on the water-body’s “Vessels in Use-Carrying Capacity” and the shoreline development/congestion at the time of initial construction. The construction date is important because many water-bodies had State boat launches constructed before intense shoreline development and these launches should not be blamed for present overcrowded conditions. The chart uses a decreasing scale of percentages in 25% increments with shoreline development being inversely related to the size of boat launch parking areas. However, to ensure the public’s right to use these waters, the size of a State boat launch should not be less than 25% of the “Vessels in Use-Carrying Capacity”. Also, “Boat Launch Parking Capacity” should never exceed the “Vessels in Use-Carrying Capacity”, since most boats from a launch will be in use as compared to shoreline residences.

Using Coventry Lake Example: Vessels in Use-Carrying Capacity = 30

<u>Shoreline Development/Congestion</u>	<u>% of Vessels in Use</u>	<u>Boat Launch Parking Capacity</u>
0 - 5%	100	30
6 - 25%	90	27
26 - 50%	75	23
51 - 75%	50	15
76 - 100%	25	8