

## Weed Wacking 101

### Introduction

The Papakeechee Protective Association initiates a program every summer to control the weed population in Papakeechee Lake. In addition to other activities an association member is normally hired to run a harvester on the lake to cut weeds and compensated at a nominal hourly rate of \$14 per hour.

Terry Radtke and I have collaborated on gathering the information in this document to provide some input to the PPA Board of Directors for the purposes of evaluating future options for lake weed cutting and disposal.

### Background

The PPA weed harvester is an old machine that utilizes two custom pontoons for flotation and is equipped with dual paddle wheels, one on each side. A small internal combustion piston engine powers a hydraulic pump and distribution system which, through the control of multiple valves, can be used to drive the paddles independently as well as the cutter head and two 4 foot wide conveyors. All of the controls, engine and fuel tank are located on a central platform so the driver can control the machine. The harvester requires at least 1.5 feet of water to operate in and is able to move across the lake at 4 miles per hour under calm conditions when empty. The machine uses about 1 gallon of gasoline per hour of operation.



Figure 1: The venerable Ron Corson in action on the venerable harvester.

The weed cutting machinery consists of a squared off U shaped cutter head at the very bow of the harvester backed up with two conveyer belts. The cutter head can be raised and lowered relative to the water surface so it can be held above the water or lowered any amount down to 5 feet deep. One of the conveyers is located immediately behind the cutter head so that, as the cutter is operating and the harvester moving ahead slowly, the cut weeds fall onto it and are carried away from the cutter head towards the center of the boat. At the aft end of the forward conveyer the weeds are dropped off onto the second conveyer.

The aft conveyer can be run independently to move the weeds all the way off the stern of the harvester. In practice the aft conveyer is only powered intermittently. It is held stationary while weeds are cut at the bow and moved aft to the center of the harvester under the pilot/power station. The weeds are deposited on the aft conveyer building up a small pile. The operator then powers the aft conveyer shortly to move the pile out of the way of additional weeds so that a new pile can be built up. Then the aft conveyer is again moved, and so on, until it is full of weeds.

At this point the harvester is full of cut weeds and must be emptied before further cutting can take place. The operator must drive it fully loaded to a suitable dump site to off load the weeds. Perhaps "voyage" is a better description of the process. Once the harvester is emptied the operator then returns to the cutting area or moves to a new area to continue cutting.

Based on years of experience with the machinery and the process the harvester holds 4,000 pounds of wet cut weeds when full. Its speed is reduced to perhaps 2 miles per hour and it needs as much as 2 feet of water for flotation when full of weeds. In years of light weed growth, 20 hours of weed cutting has been required to cut 10 or 15 loads of weeds. In years when weed growth has been heavy, 200 hours of weed cutting has been required to cut 100 loads of weeds. Thus annual weed harvest varies between 60,000 and 400,000 pounds of wet weeds.

### **Estimated Cost of Weed Off Loading from the Harvester**

Terry Radtke constructed a hand drawn lake map showing the areas of weed harvesting and the sites that have been used for a number of years for off loading them. The dump sites have been selected to be as far from homes as possible (50 to 100 yards) and as near as possible to the cutting areas. Five sites are marked on the map.

An excel spreadsheet analysis was constructed using the cutting areas defined on the map and the 5 sites described as: Behind DNR, Hiawatha E, Hiawatha W, SE Islands, Inlet. Estimates of dump time were made considering the round trip transit time and the time to actually off load the weeds at the site. The estimates varied by cut site depending on its proximity to its nearby dump site. Time estimates did not include actual weed cutting time since that would be the same no matter how we evacuate weeds either removal from property or dumping locally. However, the amount of weeds cut at each site have an effect of dumping time as some cutting sites have more weeds than others and so the number of dump loads varies accordingly. Because the amount of weeds cut each year varies wildly it is impossible to arrive at an unequivocal annual cost estimate for weed removal. To arrive at an estimate an annual yield of 200,000 pounds was assumed. This is somewhere between the 60,000 and 400,000 pounds estimated to be the lower and upper limits of annual harvest.

The labor cost of weed off loading at the 5 sites worked out to be \$1,026.67. Adding the cost of fuel based on the hours necessary for off loading brings the total cost to \$1,217.33 using 5 nearby dump sites.

An excel spreadsheet analysis was constructed using the cutting areas defined on the map but only one dump site: the boat ramp at the east end of the dam near the PPA building. Estimates of dump time were made considering the round trip transit time and the time to actually off load the weeds at the site. The estimates varied by cut site depending on its proximity to the boat ramp dump site. As before, time estimates did not include actual weed cutting time. As with multiple dump sites the number of loads varies for off loading because the amount of weeds cut varies with the cutting site.

The labor cost of weed off loading at the boat ramp site worked out to be \$3,056.67. Adding the cost of fuel based on the hours necessary for off loading brings the total cost to \$3,625.63 using a single dump site at the boat ramp. So, rounding off to the nearest hundred dollars, the increase in labor and fuel cost is approximately \$2,400 for a representative year of weed cutting.

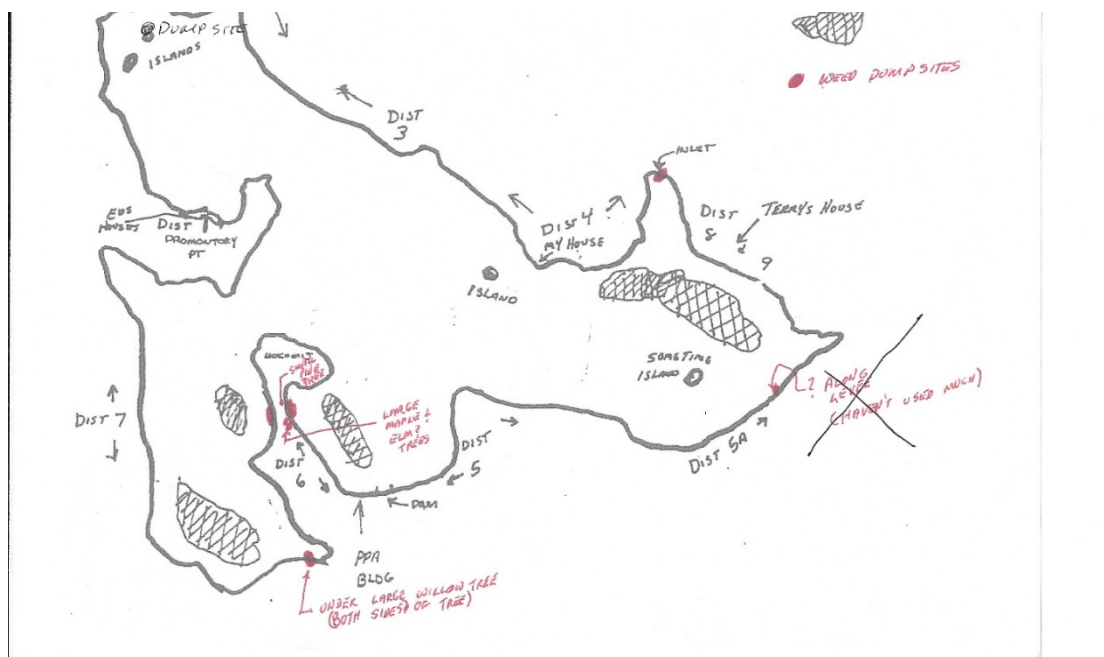


Figure 2: Cross hatched areas are weed cutting areas; associated dump sites are marked on the lakeshore.

### Haulage from the Boat Ramp

Carrying the analysis further, it was assumed that after getting the cut weeds onto the shore they would need to be loaded into some kind of receptacle for short term storage and then removal. A shore conveyor 14.5 feet long and 22 inches wide can be rented for about \$885 for a four week period according to one internet site. A roll off dumpster sized 8 feet by 22 feet can be rented for \$699 for a 10

day period. One possible solution to the removal of the weeds from PPA property is to rent a shore conveyor and a dumpster several times during the summer. How often and how many times this would be necessary has not yet been estimated. However, depending on how many times they are needed the cost could approach \$10,000.

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