Hydro MicroScreen™ ROI Report for the Fruit & Vegetable Processing Industries

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Introduction

Fruit and vegetable processors use a lot of water, and that water can contain a range of organic and inorganic materials—including grit, soil, stalks, peel, husks and seeds.

Treating and disposing of this wastewater represents a significant cost of operations.

With ever-increasing demands on production, however, fruit and vegetable processing plants are often constrained by space or by existing wastewater treatment options and are limited in their ability to address water use as a way to improve profitability.

Our technologies can help you to reduce wastewater treatment costs, protect expensive downstream processes, increase your by-product recapture, and help you to reuse your water faster and more efficiently.

This sample report illustrates what level of increased profitability and ROI a fruit or vegetable processing business could expect to achieve by installing a Hydro MicroScreen™ system.

Operating Parameters

Having operated our technologies at a range of farms, processing plants and canning facilities in the US we have selected parameters for the ROI model that represent a reasonable average facility.

- Daily hours of operation: 1–10
- Average treatment volume: 80–300 gpm
- TSS: 0-6,000 mg/l
- BOD: 0-6,000 mg/l

These numbers are indicative only, however, as all operating conditions are different—you can visit our **online ROI calculator** to calculate your own savings.

Caveats

Our cost and cost savings calculations are based on observed sewer discharge costs and operational cost measurements taken from fruit and vegetable processing plants in the US.

Some necessary assumptions have been made in order to simplify calculation.

The cost savings only take into account sewer discharge costs—secondary cost benefits such as increased efficiency, water and waste recycling and reuse, reduced maintenance etc have not been factored into the calculations, so are additional to these numbers.

Scenarios

Scenario 1: Savings versus hours of operation

Average flow rate: **120 gpm**

TSS level: **2,500 mg/l**

BOD level: **2,700 mg/l**

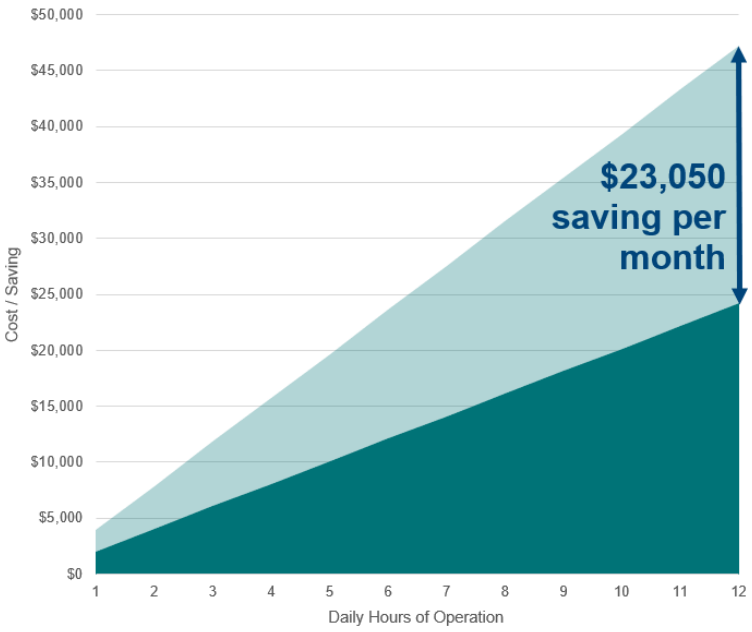
Daily hours of operation: **1–12**

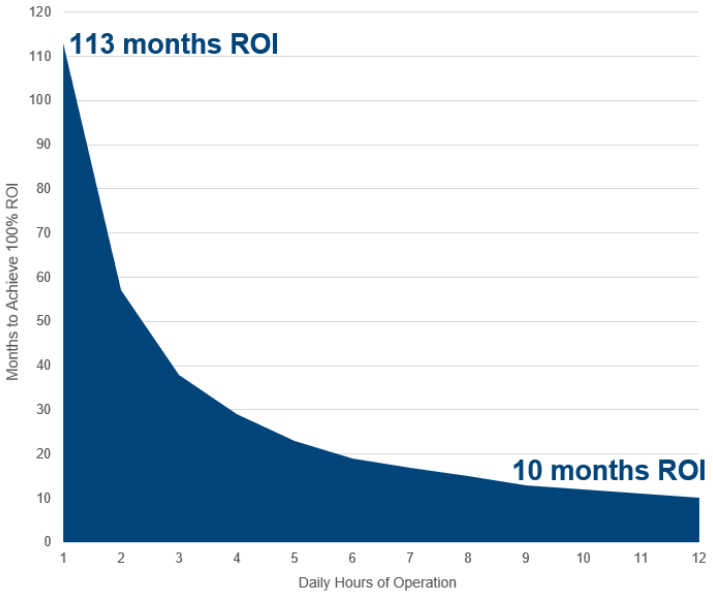
For this model we selected an average flow rate of 120 gpm, and influent TSS and BOD levels of 2,500 mg/l and 2,700 mg/l, which were representative conditions at a US carrot processing plant that we tested, and we varied the daily hours of operation in order to examine the effect of different operational periods.

Daily operation hours ranged from 1 hour per day to 12 hours per day.

Under these conditions the cost of discharging untreated effluent to the sewer ranges from $3,938 per month to $47,259 per month.

In this model if a plant were to install a single Hydro MicroScreen™ treatment unit then it could make savings on sewer disposal costs from **$1,921** per month to as much as **$23,050** per month, with the unit potentially achieving 100% ROI in as little as 10 months if operated for 12 hours a day.





Monthly savings: **$1.9K–$23.0K**

Yearly savings: **$23.0K–$276.6K**

Scenario 2: Savings versus volume of treatment flow

Average flow rate: **80–300 gpm**

TSS level: **2,500 mg/l**

BOD level: **2,700 mg/l**

Daily hours of operation: **10**

For this model we assumed that the plant would operate the treatment equipment for 10 hours a day, and we retained the same levels of TSS and BOD as in Scenario 1.

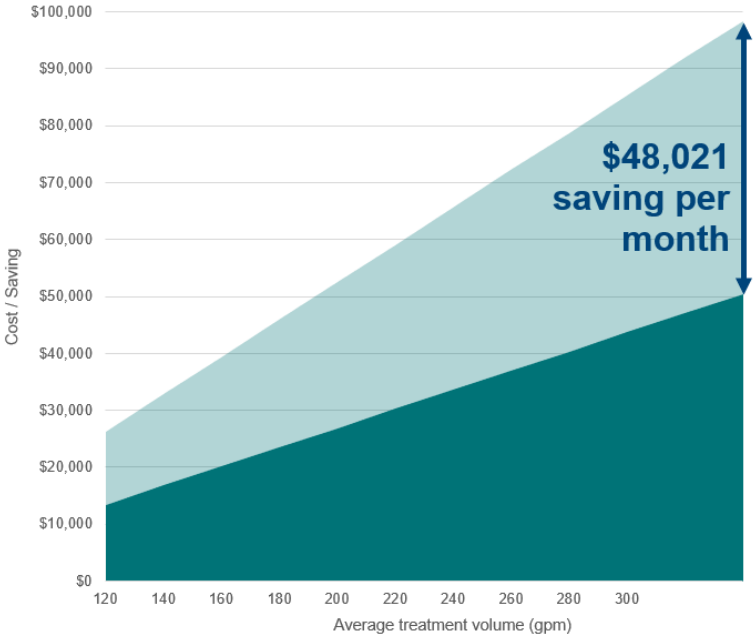
We varied the average volume of influent to be treated, in order to look at the effect of different flow capacities that plants might face.

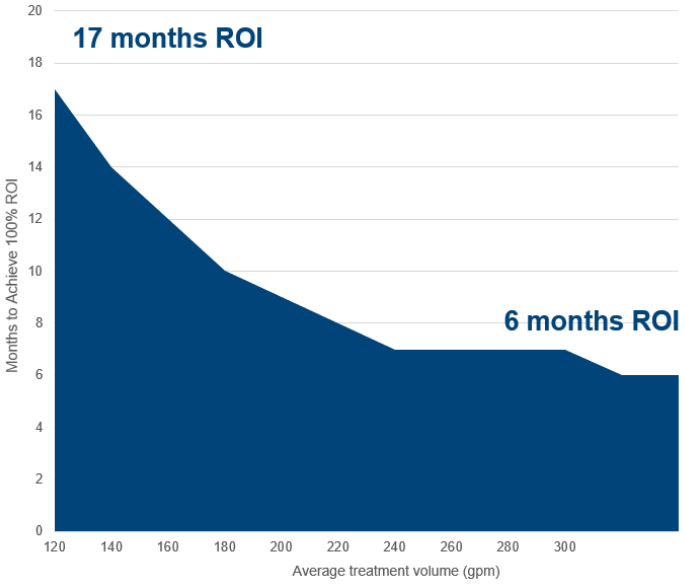
We modeled flows in the range of 80 gpm to 300 gpm.

In this scenario the cost of discharging untreated effluent to the sewer ranges from $26,255 per month to $98,456 per month.

Under these conditions, if a plant were to install a Hydro MicroScreen™ treatment unit then it could cut the cost of sewer disposal by **$12,806** per month to as much as **$48,021** per month.

In this scenario, under the highest flow conditions, the unit would deliver 100% ROI in around 6 months.





Monthly savings: **$12.8K–$48.0K**

Yearly savings: **$48.0K–$576.2K**

Scenario 3: Savings versus influent loading level

Average flow rate: **200 gpm**

TSS level: **500–6,000 mg/l**

BOD level: **500–6,000 mg/l**

Daily hours of operation: **10**

In the final scenario we set the daily hours of operation at 10 and the average influent volume at 200 gpm.

We varied the TSS and BOD influent levels from 500 mg/l to 6,000 mg/l in order to illustrate the impact of different influent loading rates on costs and potential savings.

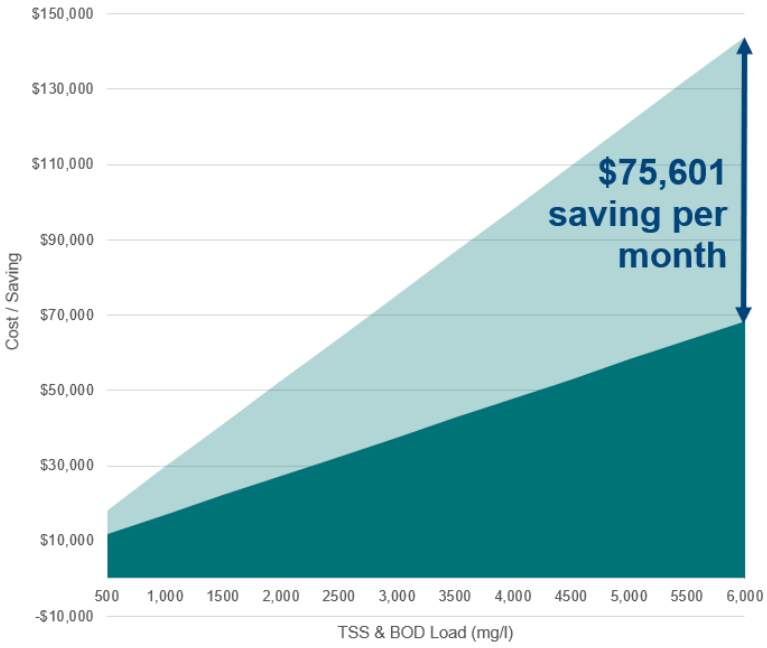
With these parameters the cost of discharging untreated effluent to the sewer ranges from $18,139 per month to $144,051 per month.

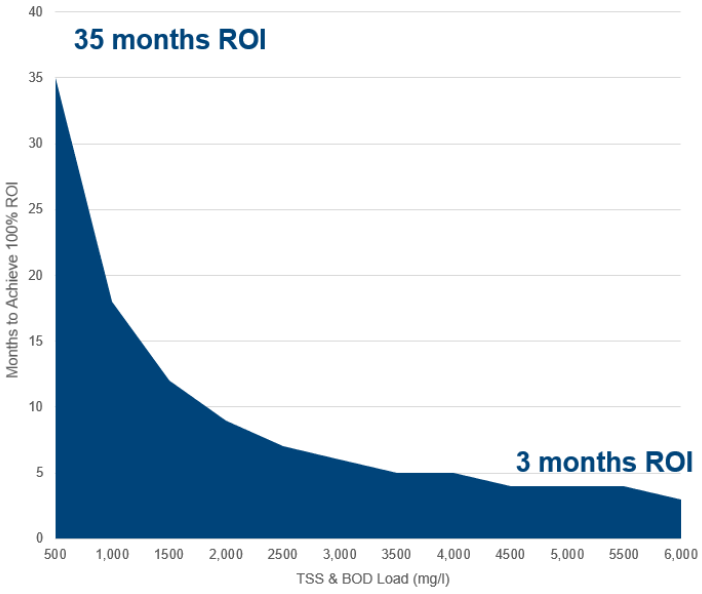
In this scenario, if a plant were to install a Hydro MicroScreen™ treatment unit then it could cut the cost of sewer disposal by **$6,300** per month at the lowest influent levels and by **$75,601** per month at the highest.

In this scenario, under the highest levels of TSS and BOD loading, the unit would achieve 100% ROI in around 3 months.

Monthly savings: **$6.3K–$75.6K**

Yearly savings: **$75.6K–$907.2K**





Conclusion

Based on the model, sewer discharge costs increase linearly in line with increased operational use, flow and TSS/BOD loading. This is probably unsurprising, as these costs are a function of the TSS and BOD in the effluent that is discharged—and the more a plant's treatment system is operated and the higher the influent concentrations and the flows that it has to handle, the more effluent that it will discharge.

What might be more surprising, however, is that the savings increase linearly also. Each Hydro MicroScreen™ system is optimized for a plant's specific operating conditions, meaning that it continues to screen influent effectively up to maximum flow rates and loading levels.

What this means is that as the inputs increase, so does the output—and the cost savings therefore scale accordingly.

This suggests that those fruit and vegetable processing facilities with heaver loading rates, flows or hours of operation are likely to see greater benefits from inserting a treatment system such as this into their operational processes.

It's important to note some aspects not captured by the calculations within this model, but which also improve profitability.

Firstly, recovered material may be reused—we are aware of fruit and vegetable processors that sell on recovered materials for use in pet food, and others that reuse it as fertilizer. Secondly, treated water may be recycled and reused for activities such as clean in place.

Finally, greater removal of BOD and TSS reduces the loading on further downstream treatment systems such as dissolved air flotation (DAF), thereby increasing the treatment efficiency of the plant overall.

Learn more

To learn more about how Hydro International technologies can help fruit and vegetable processors to improve profitability search **Hydro International Fruit & Vegetable** online or visit **hydro-int.com/fruit-vegetable**.

To find out how much your facility could save, visit **microscreenroicalculator.hydro-int.com**.

If you'd like to speak to an expert, visit **hydro-int.com/contact-us** to find your nearest representative.