Developing Economic and Financial Benchmarks for Mechanizing Northwest Vineyards

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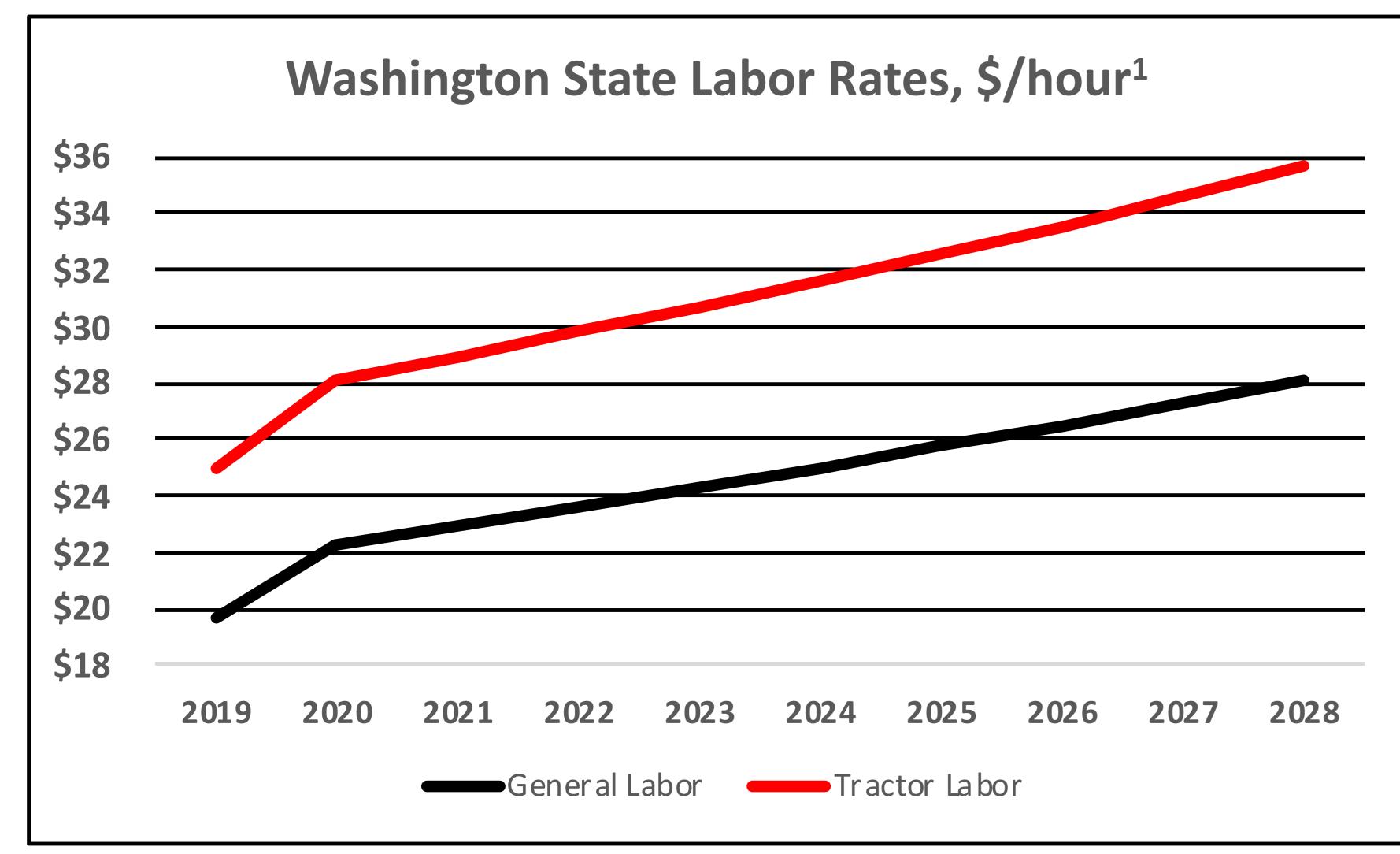2020 CONVENTION & TRADE SHOW | EMBRACING OPPORTUNITY

Acknowledgements

Funding: Washington State Wine Commission and the Erath Family Foundation

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(OR) Daniel Fey & Joel Myers

University Cooperators: Qin Zhang (WSU) and Patty Skinkis (OSU)

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Washington State Labor Rates, $/hour[1]

General Labor — Tractor Labor

[1]Labor rates include a 35-45 percent mark up for employee benefits, including worker's compensation, unemployment insurance and other overhead expenses.
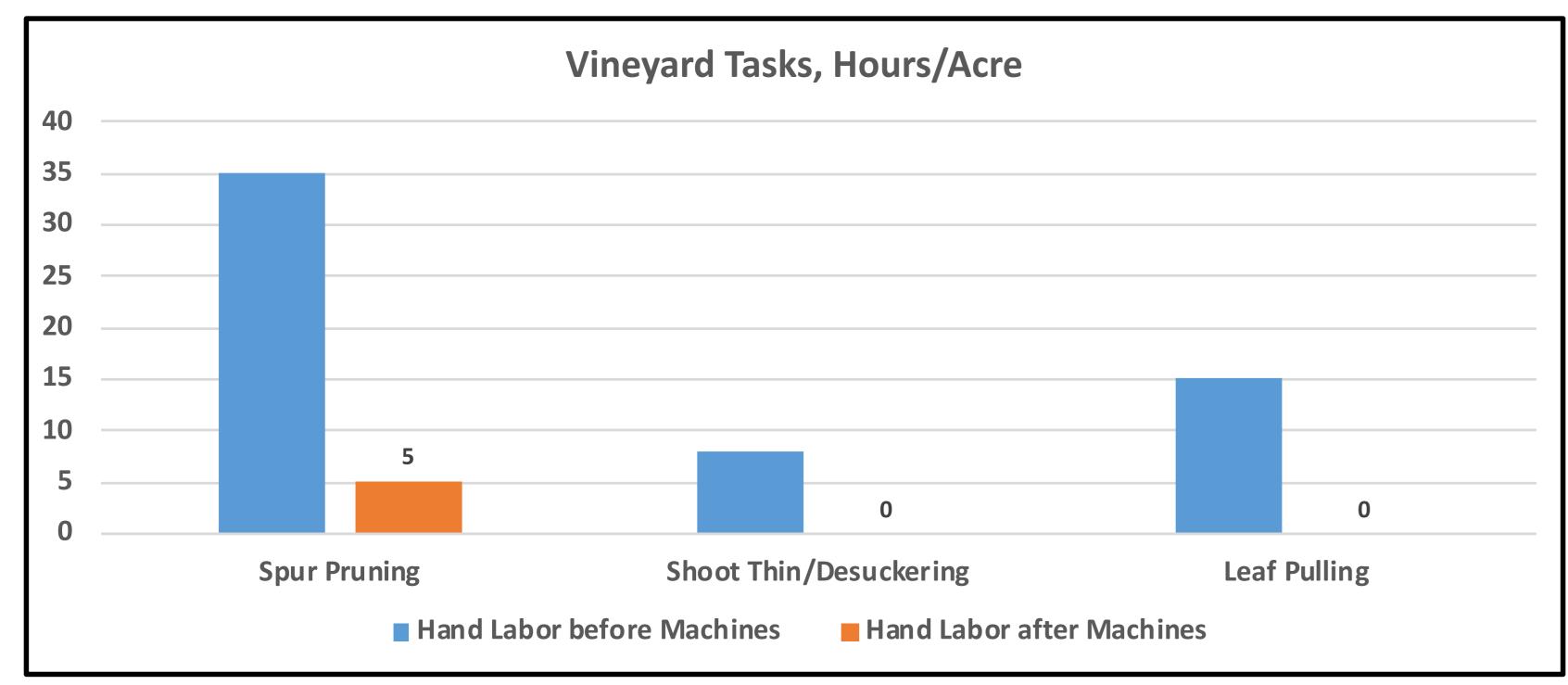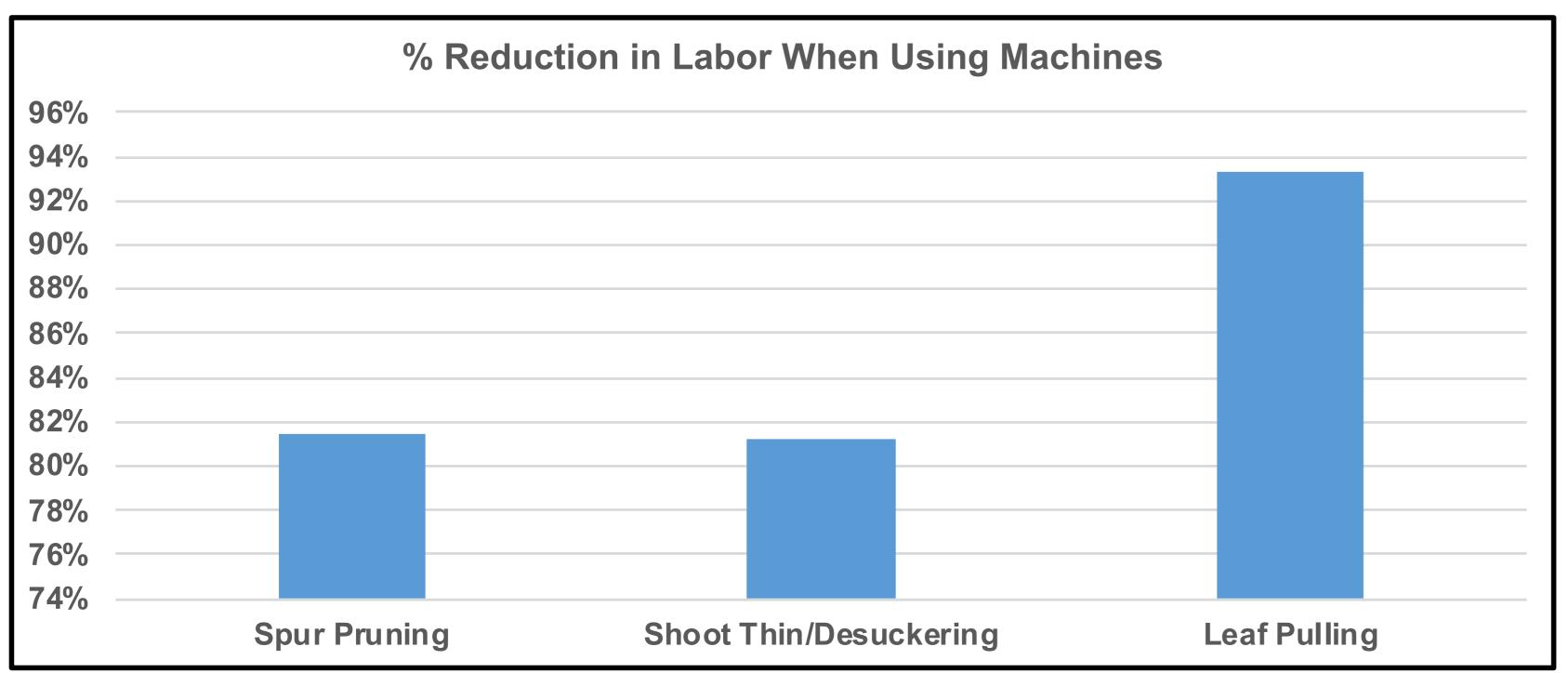
The Issues

1) Industry has several vineyard tasks that require many hours of hand labor and a large labor force.

2) Experiencing increased labor costs.

3) Diminishing workforce.

Potential Solutions

1) Mechanization of vineyard tasks.

2) Reorganizing staff roles to achieve efficient operations.

3) The H-2A program.

4) Combination of the above.

Vineyard Tasks, Hours/Acre

% Reduction in Labor When Using Machines

Project Goals

1) <u>Assess the profitability and feasibility</u> of current labor-saving machines.

2) <u>Preserve and enhance fruit and wine quality</u> while using automation.

Project Objectives

1) <u>Identify vineyard tasks that would generate the ROI</u> by integrating mechanization.

2) <u>Determine the financial requirements</u> to purchase machines by farm size and the minimum acreage required to make the investment feasible.

Procedures

Objective 1:

1) Identify <u>two representative vineyard operations</u> in Washington based on acreage to conduct an economic and financial feasibly analysis

2) Use OSU's Wine Grape study and Washington industry costs as the basis for each vineyard operation.

3) <u>Identify vineyard tasks</u> that require significant labor inputs that can be reduced or eliminated by using mechanization.

4) <u>Determine the economic value</u> of using mechanization based on the net present value of each orchard task.

Vineyard Size	Purchase[1]	Custom Hire[2]
100-acre Operation		
- Precision pruner	$30,000	$ 80/ac
- Shoot thin/desuckering	32,000	NA
- Leaf Pulling	30,000	65/ac
- Harvest	210,000	400/ac
500-acre Operation		
- Pellenc	$252,000	
- Precision pruner	60,000	80/ac
- Harvest	158,000	400/ac

[1]Equipment was evaluated as a separate operation, on its own merits, not combining equipment operations with one power unit.
[2]Custom hire refers to hiring someone to perform the vineyard task.

Procedures

Objective 2:

5) <u>Determine the number of acres a machine can adequately cover</u> based on a window of time to optimize fruit quality and production.

2) <u>Determine the liquidity and solvency impacts</u> to a representative vineyard operation in the industry.

<u>Time During Season to Complete Each Vineyard Task</u>

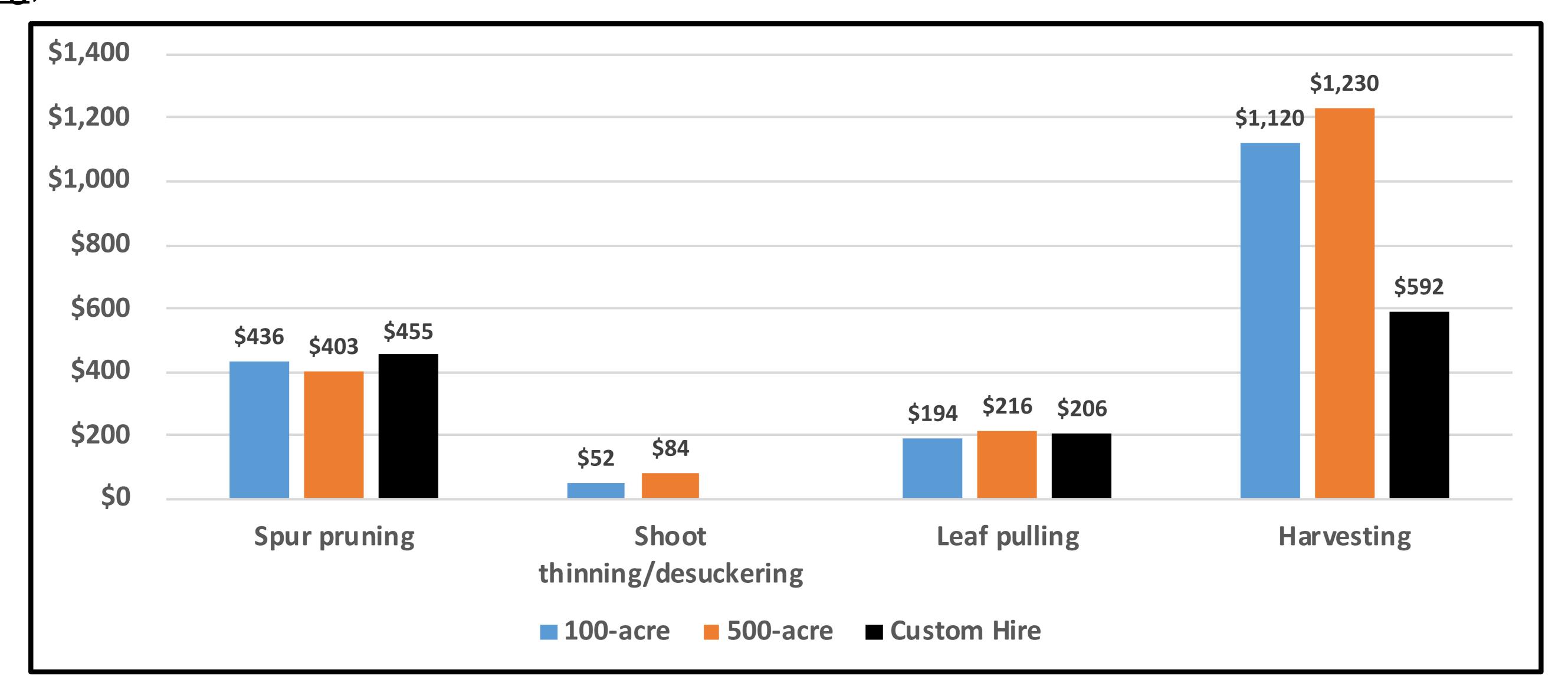| Task	Weeks or Acre(s)/Hour
Pruning	12-weeks
Shoot thin/desuckering	4-weeks
Leaf pulling	5-weeks[3]
Harvest	1-acre/hour[4]

[3]If adjusting for crop load then it becomes two to three weeks or less, depending on grape variety.

[4]Variety dependent, but a general rule.

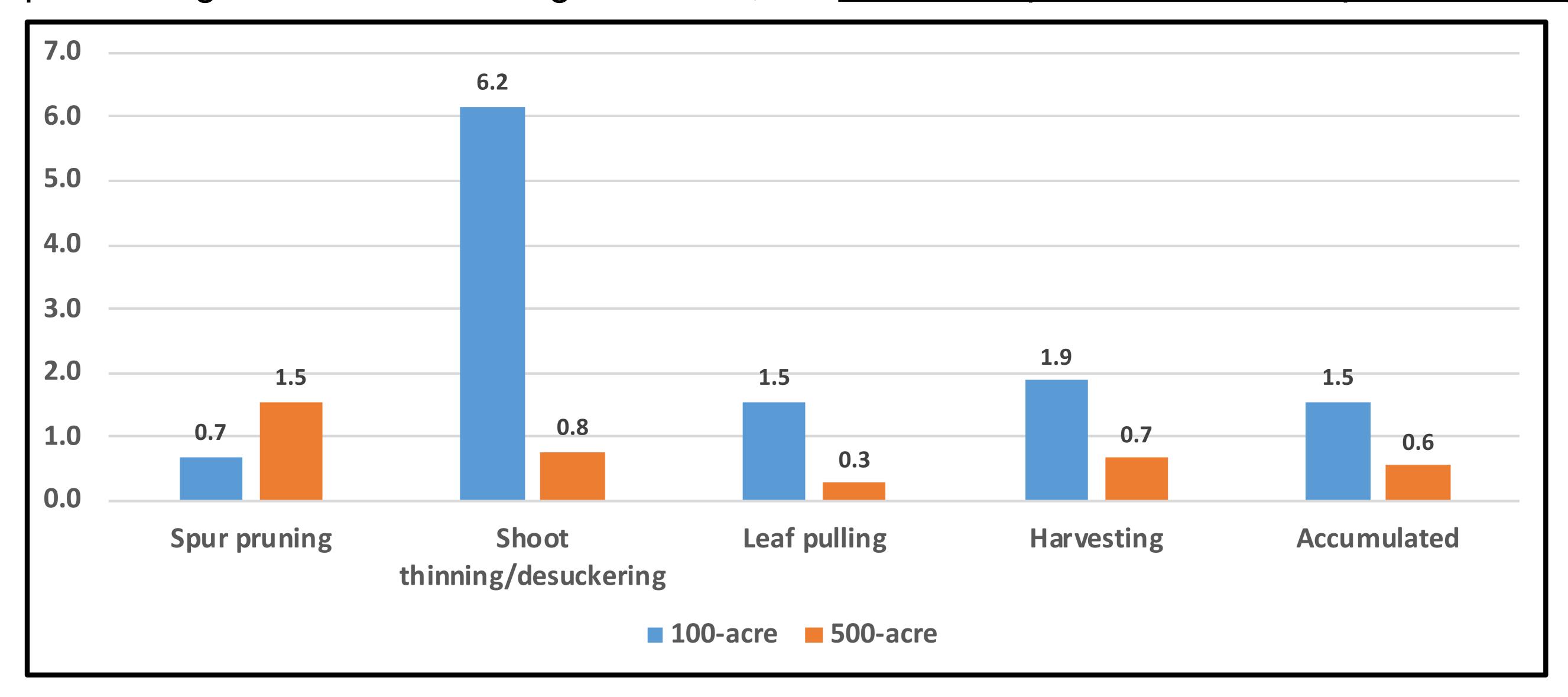# Profitability Results: Net Present Value of Net Returns of Mechanization When Compared to Hand Labor, Including Custom Hiring Operation ($/acre/yr)

1. Mechanizing vineyard tasks are <u>more profitable than hand labor</u>, using a 6% discount rate.
2. Purchasing equipment would be <u>more profitable than custom hiring tasks, except for pruning and leaf pulling</u>, which have similar results as custom hire.
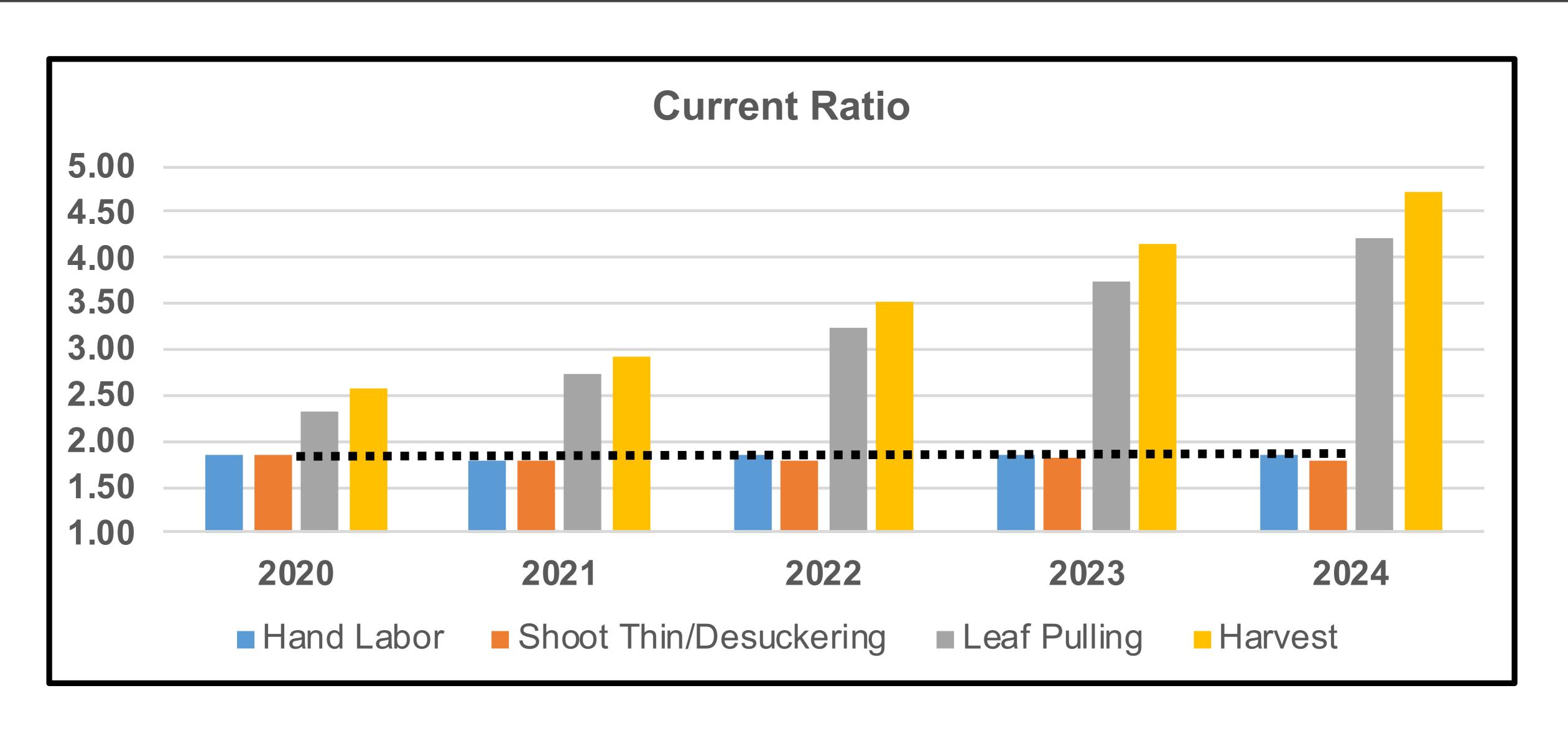
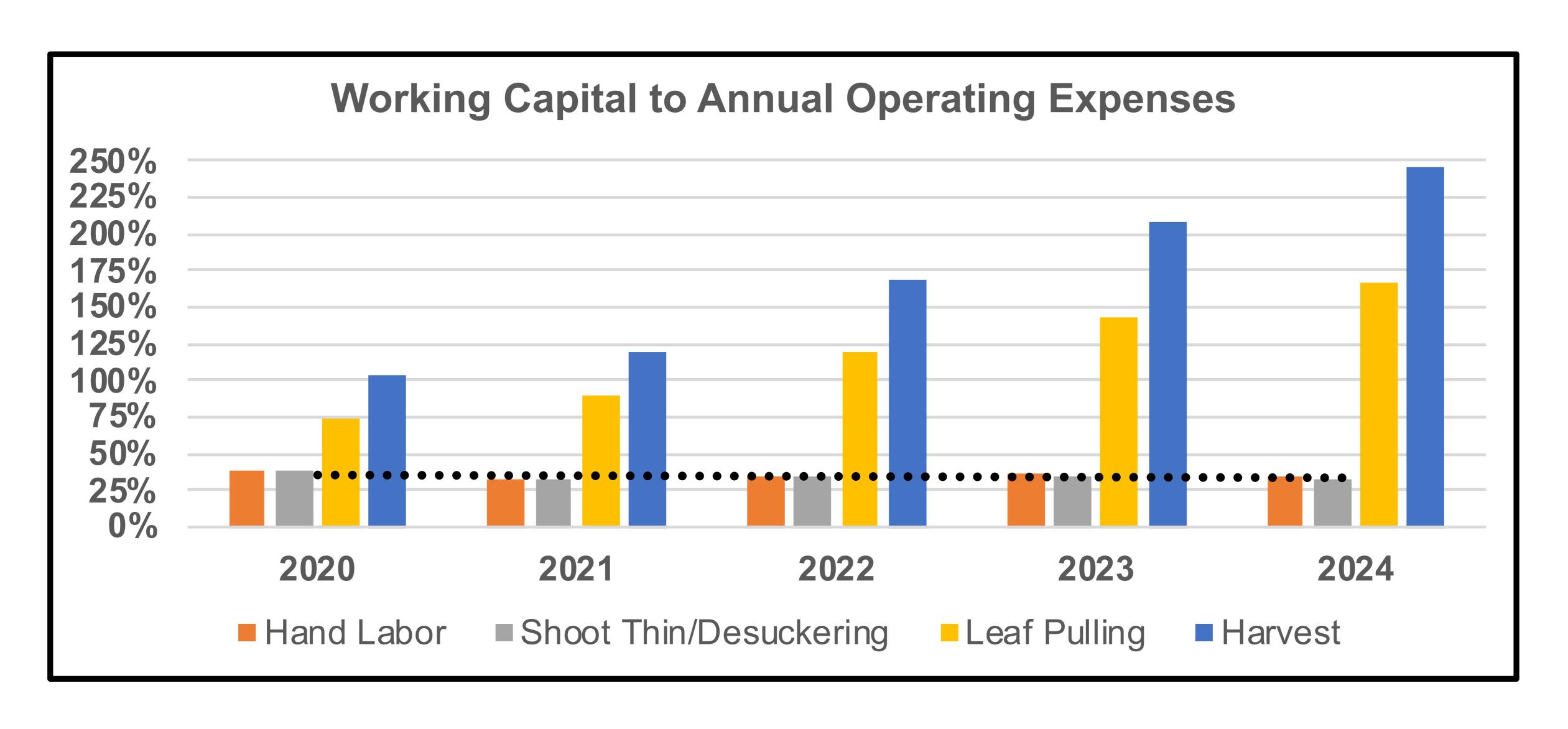# Profitability Results: Payback Period to Purchase Machines

1. Purchasing machines for a <u>100-acre operation require financing outside of annual cash flows</u>, except for pruning. The 500-acre machine has <u>less than a year payback period except pruning</u>.
2. When purchasing all four labor-saving machines, the <u>100-acre operation would require financing</u>.

Feasibility Results – 100-acre Vineyard (Financial Impacts of Purchasing Equipment)

Feasibility Results – 100-acre Vineyard (Financial Impacts of Purchasing Equipment)

Working Capital to Annual Operating Expenses

Feasibility Results – 100-acre Vineyard (Financial Impacts of Purchasing Equipment)