



Potential Costs and Returns for Growing Satsumas in North Florida

Citrus

Owari Satsuma

On

Swingle Citrumelo

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Acknowledgements

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Input from growers

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Satsuma Background

Scientific name: *Citrus unshiu* Marcovitch

Type of mandarin

Like other citrus, originated in Asia.

Satsuma trees brought to U.S. from Japan in the late 1800s.

Widespread in North Florida & other southeastern states by early 1900s.



Satsuma Characteristics

Cold hardy, especially when grafted on trifoliate rootstocks.

Relatively disease/pest resistant, but still susceptible to citrus scab, leaf minor, and potentially Huanglongbing (citrus greening) and others.

Considered seedless (0-6 seeds), easy to peel, and good eating quality.

Fruit harvested in October through December.

Does not ship as well as most other citrus.

Satsuma Markets

National average on-tree prices for tangerines and mandarins in recent years: \$0.27/lb to \$0.43/lb (mostly from California).

Florida average PHD price for fresh market tangerines in 2015: \$0.29/lb

Not widely available in national markets.

Local/regional markets may have potential for higher prices, but possibly higher marketing costs.

Retail satsuma prices: \$1.00 to \$2.00/lb for 3-lb or 5-lb bags.

Budget Assumptions

10-acre grove in North Florida

Owner managed

145 trees per acre (15'x20' or 12' x 25')

Microsprinkler irrigation & freeze protection

30-year productive lifespan with no major losses from disease or freeze



Initial Investments

Estimate: \$18,030 per acre, not including land cost

Includes:

Land prep
Electric hookup
8" well & pump with VFD
4" well & pump
Equipment shed
Fuel tank
Backup generator*
Irrigation system

Utility vehicle/ATV
Tractor (60 hp)
Fertilizer spreader
Rotary cutter/mower
Herbicide boom sprayer
Air-blast sprayer
Hand sprayer & tank
Trailer
Safety equipment/gear & hand tools

Grove Establishment & Maintenance

Planting & grove care operating costs (not including fixed overhead or interest):

Establishment (non-bearing) Years
per acre

- Year 1: \$3,198
- Year 2: \$1,445
- Year 3: \$1,500

Young Bearing Years (Years 4-8),
per acre: \$1,830

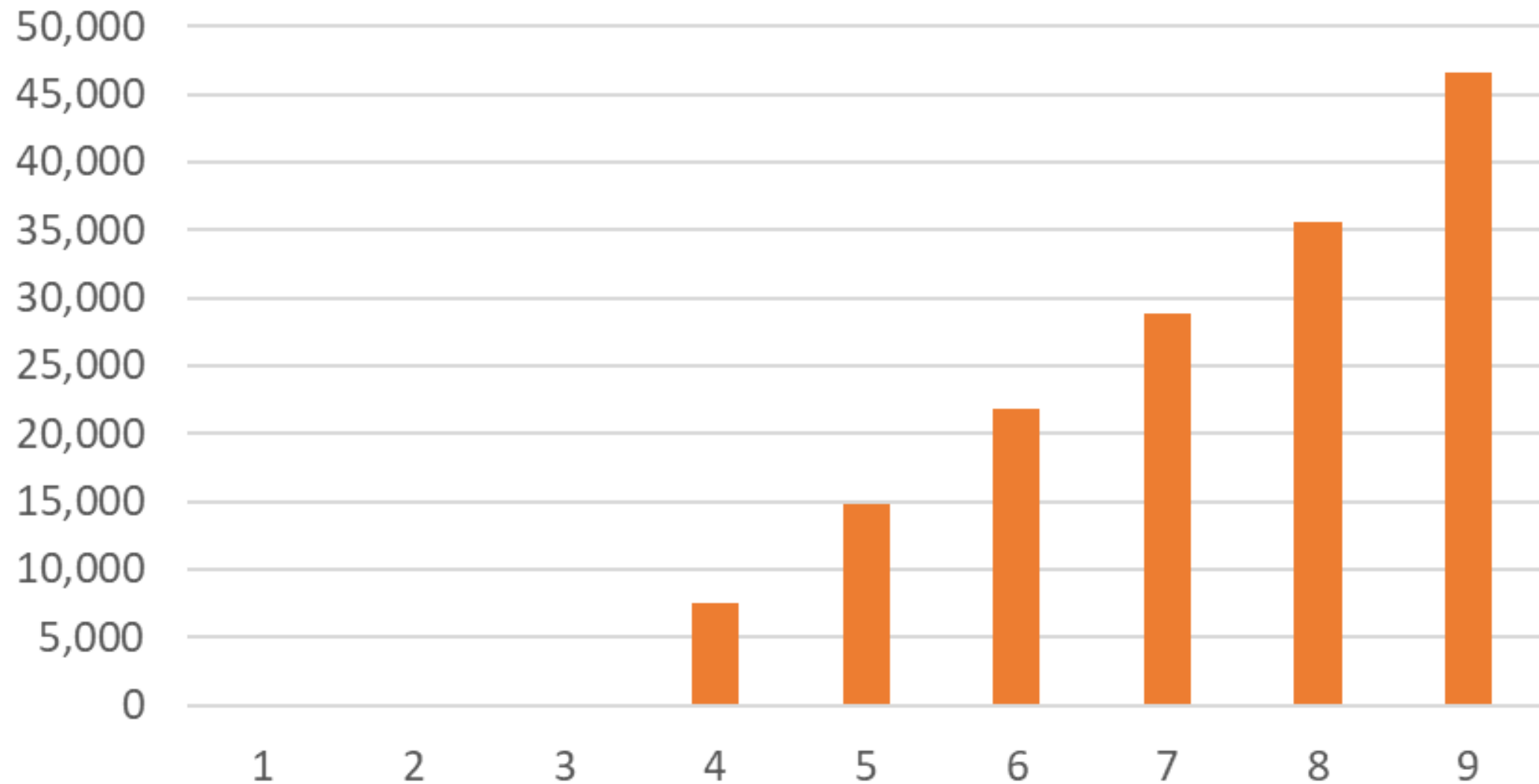
Mature Bearing Years (Years 9+),
per acre: \$2,007



Harvest Yield by Year

| YIELD AND NUMBER OF TREES BY TREE AGE AND GROVE YEAR | | | | | | | | | | | |
|--|--------------------------|-------------------------------------|-----|-----|-------|--------|--------------------------------|--------|--------|--------|--|
| Tree Age (years) | Harvest Yield (lbs/tree) | Tree Density (trees/acre): | | | 145 | | Replacement Rate (trees/year): | | | 3 | |
| | | Grove Year & Number of Trees by Age | | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 1 | 0 | 145 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| 2 | 0 | 0 | 142 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| 3 | 0 | 0 | 0 | 139 | 3 | 3 | 3 | 3 | 3 | 3 | |
| 4 | 55 | 0 | 0 | 0 | 136 | 3 | 3 | 3 | 3 | 3 | |
| 5 | 110 | 0 | 0 | 0 | 0 | 133 | 3 | 3 | 3 | 3 | |
| 6 | 164 | 0 | 0 | 0 | 0 | 0 | 130 | 3 | 3 | 3 | |
| 7 | 219 | 0 | 0 | 0 | 0 | 0 | 0 | 127 | 3 | 3 | |
| 8 | 274 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 124 | 3 | |
| 9 | 365 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | |
| Harvest Yield (lbs/acre): | | 0 | 0 | 0 | 7,480 | 14,795 | 21,815 | 28,800 | 35,620 | 46,631 | |

Harvest Yield by Year (lbs/acre)



Revenue by Year

REVENUE PER ACRE BY GROVE YEAR

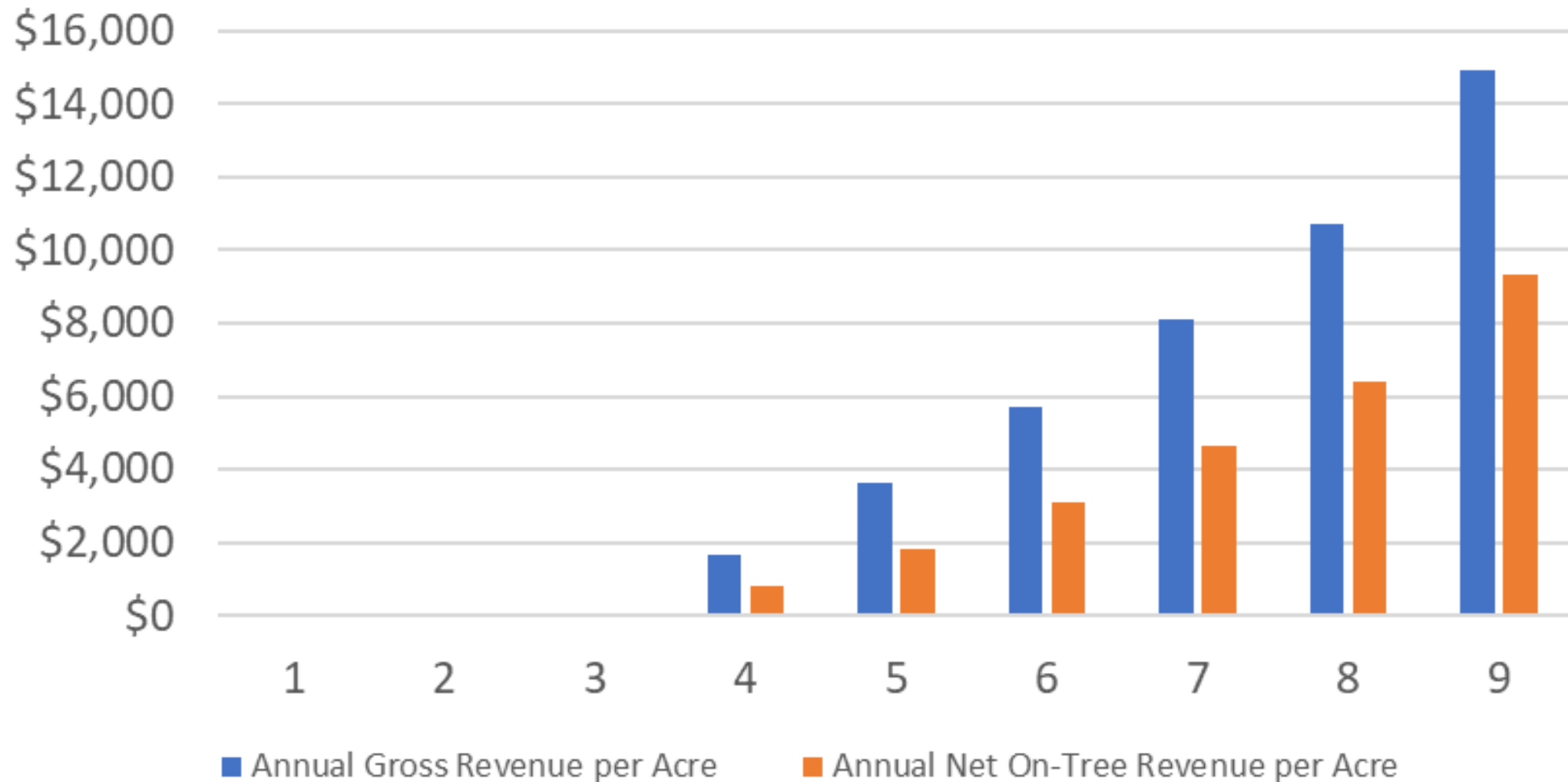
| Product-Market-Terms | Selling Price (\$/lb) | Grove Year & Percent to Each Market | | | | | | | | |
|--|--------------------------|-------------------------------------|------------|------------|----------------|----------------|----------------|----------------|-----------------|-----------------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| #1 Fresh Market, PHD | \$0.45 | 0% | 0% | 0% | 40% | 45% | 50% | 55% | 60% | 65% |
| #2 Fresh Market | \$0.15 | 0% | 0% | 0% | 30% | 28% | 25% | 23% | 20% | 18% |
| Processing Market | \$0.00 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Unmarketable Culls | \$0.00 | 0% | 0% | 0% | 30% | 27% | 25% | 22% | 20% | 17% |
| Annual Sales Revenue (\$/acre): | | \$0 | \$0 | \$0 | \$1,683 | \$3,617 | \$5,726 | \$8,122 | \$10,686 | \$14,899 |

HARVESTING AND MARKETING COSTS PER ACRE BY GROVE YEAR

| Cost Items | Cost (\$/lb) | Grove Year | | | | | | | | |
|---|--------------|------------|------------|------------|--------------|----------------|----------------|----------------|----------------|----------------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Custom pick, roadside & haul | \$0.12 | \$0 | \$0 | \$0 | \$898 | \$1,775 | \$2,618 | \$3,456 | \$4,274 | \$5,596 |
| Annual Harvest & Marketing Cost (\$/acre): | | \$0 | \$0 | \$0 | \$898 | \$1,775 | \$2,618 | \$3,456 | \$4,274 | \$5,596 |

| | | | | | | | | | |
|--|------------|------------|------------|--------------|----------------|----------------|----------------|----------------|----------------|
| ANNUAL NET ON-TREE REVENUE (\$/ACRE): | \$0 | \$0 | \$0 | \$785 | \$1,842 | \$3,109 | \$4,666 | \$6,412 | \$9,303 |
|--|------------|------------|------------|--------------|----------------|----------------|----------------|----------------|----------------|

Annual Revenue (\$/acre)



Annual Budget Summary for Mature Grove

| ANNUAL REVENUE | | | | |
|--|------------|----------------|----------------|------------------|
| Product-Market-Terms | Sales Unit | Price per Unit | Units per Acre | Revenue per Acre |
| #1 fresh market, delivered to packinghouse (PHD) | lb | \$0.45 | 30,310 | \$13,640 |
| #2 fresh market, delivered to packinghouse (PHD) | lb | \$0.15 | 8,394 | \$1,259 |
| Unmarketable culls | lb | \$0.00 | 7,927 | \$0 |
| TOTAL ANNUAL REVENUE | | | \$14,899 | |
| | | | | |
| ANNUAL OPERATING COSTS | | | | |
| | | | Cost per Acre | |
| | | | NonCash | Cash |
| Harvesting & Marketing | | | \$5,596 | |
| Custom Pick, Roadside & Haul | | | | \$5,596 |
| Grove Care | | | \$2,163 | |
| Tree Replacement | | | | \$67 |
| Fertilizer & Soil Amendment | | | | \$421 |
| Weed Management | | | | \$236 |
| Insect/Disease Management | | | | \$340 |
| Scouting | | | | \$234 |
| Pruning | | | | \$250 |
| Irrigation | | | | \$384 |
| Freeze Protection | | | | \$74 |
| Interest on Operating Capital | | | | \$156 |
| TOTAL ANNUAL OPERATING COSTS | | | \$0 | \$7,758 |

Annual Budget Summary for Mature Grove

ANNUAL FIXED OVERHEAD COSTS & ESTABLISHMENT COST RECOVERY

| | Cost per Acre | |
|---|----------------|--------------|
| | Noncash | Cash |
| Grove Establishment Capital Recovery | \$1,292 | \$0 |
| Land Charge, Rental Opportunity Cost | \$164 | \$0 |
| Fixed Production Overhead (Infrastructure, Facilities, Equipment, Durables) | \$1,080 | \$217 |
| General Farm Overhead | \$150 | \$650 |
| TOTAL ANNUAL FIXED OVERHEAD COSTS | \$2,686 | \$867 |

TOTAL COSTS & NET RETURNS PER ACRE

| | | | | |
|-------------------------------|----------|--|---|---------|
| Total Annual Operating Costs: | \$7,758 | | Annual Net Return Over Operating Costs: | \$7,140 |
| Total Annual Cash Costs: | \$8,625 | | Annual Net Return Over Cash Costs: | \$6,274 |
| Total Annual Costs: | \$11,311 | | Annual Net Return Over Total Costs: | \$3,587 |

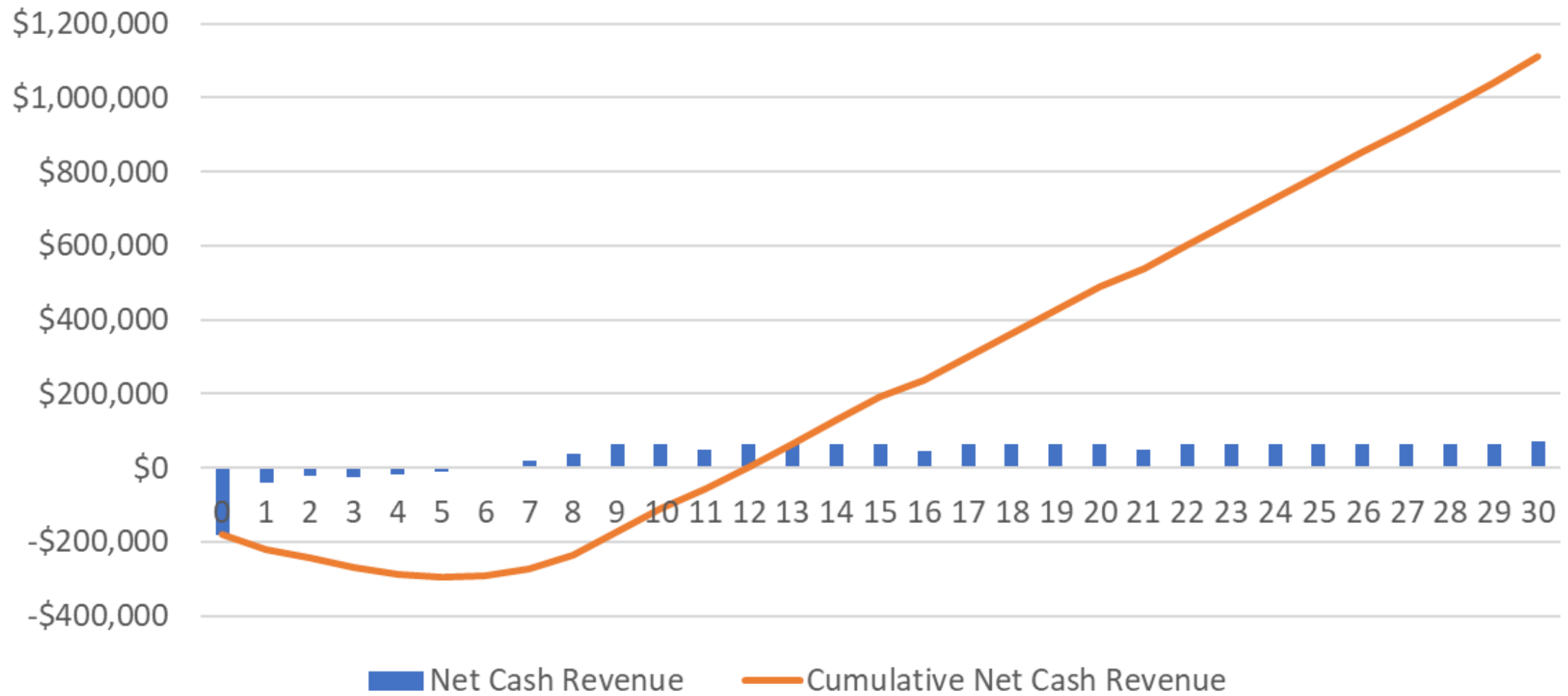
Sensitivity Analysis

SENSITIVITY ANALYSIS

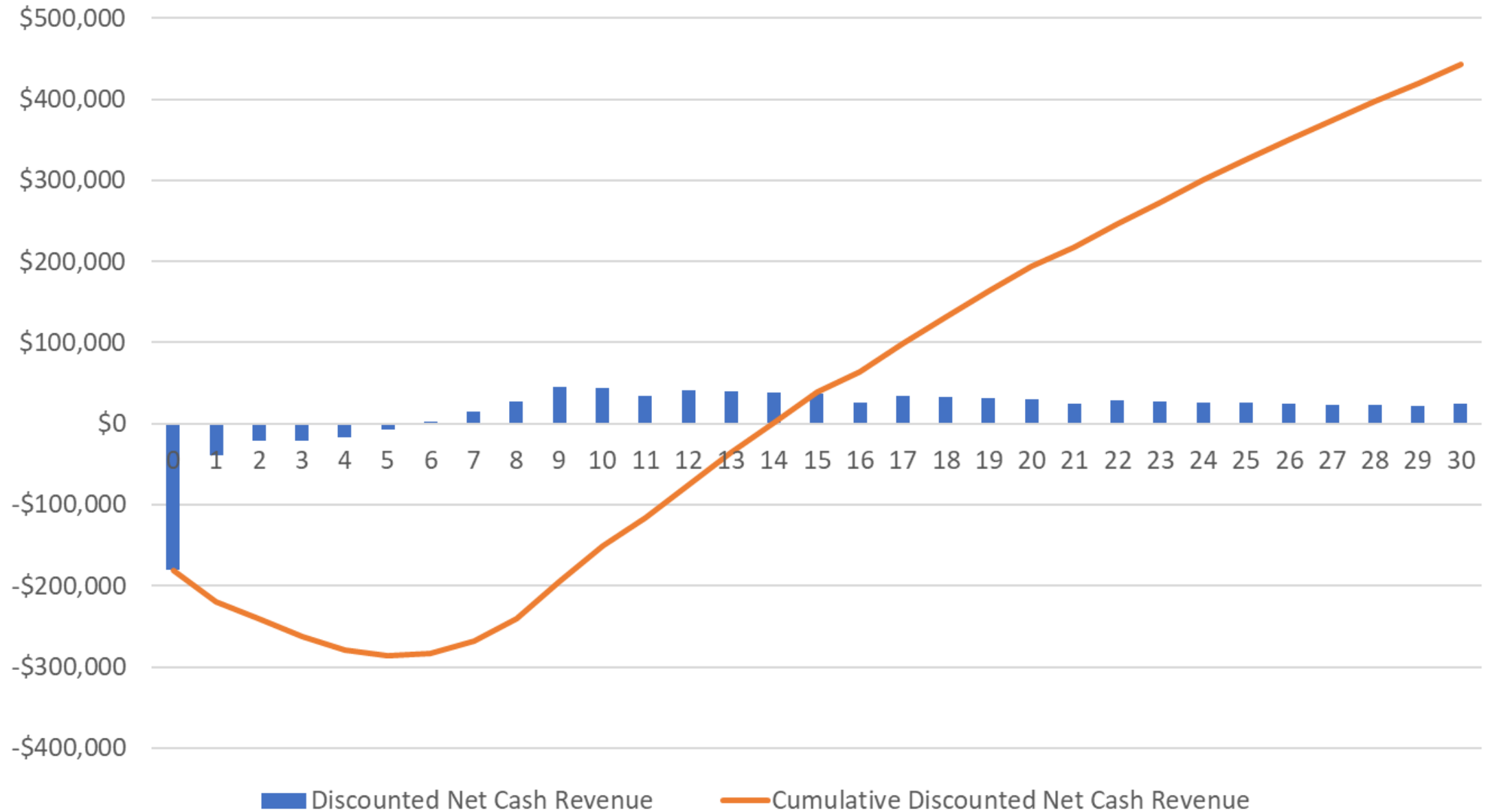
Annual Net Return over Total Costs per Acre for a Mature Grove

| | | Average Selling Price (\$/lb) | | | | |
|----------------------------|--------|-------------------------------|-----------|---------|----------|----------|
| | | \$0.19 | \$0.26 | \$0.32 | \$0.38 | \$0.45 |
| Harvested Yield (lbs/acre) | 27,979 | (\$3,757) | (\$1,798) | (\$120) | \$1,559 | \$3,518 |
| | 37,305 | (\$3,104) | (\$493) | \$1,746 | \$3,984 | \$6,595 |
| | 46,631 | (\$2,451) | \$813 | \$3,611 | \$6,409 | \$9,673 |
| | 55,957 | (\$1,798) | \$2,119 | \$5,476 | \$8,833 | \$12,750 |
| | 65,283 | (\$1,146) | \$3,424 | \$7,341 | \$11,258 | \$15,828 |

Undiscounted Cash Flow



Discounted Cash Flows



Investment Analysis for 10-acre Grove

Payback Period: 12 years

Internal Rate of Return: 10%

Net Present Value:* \$443,600

*Assuming annual real discount rate of 3.65%

Full analysis & report available at <http://edis.ifas.ufl.edu/fe1030>

Discussion

Risk:

- Potential for major losses from disease or freezes
- Labor availability & costs uncertain
- Product quality & packout rates
- Markets & prices

Risk management strategies?

Packing/processing/distribution infrastructure?

Market development?



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