Some Economic Considerations for Blueberry Production in the Southeast

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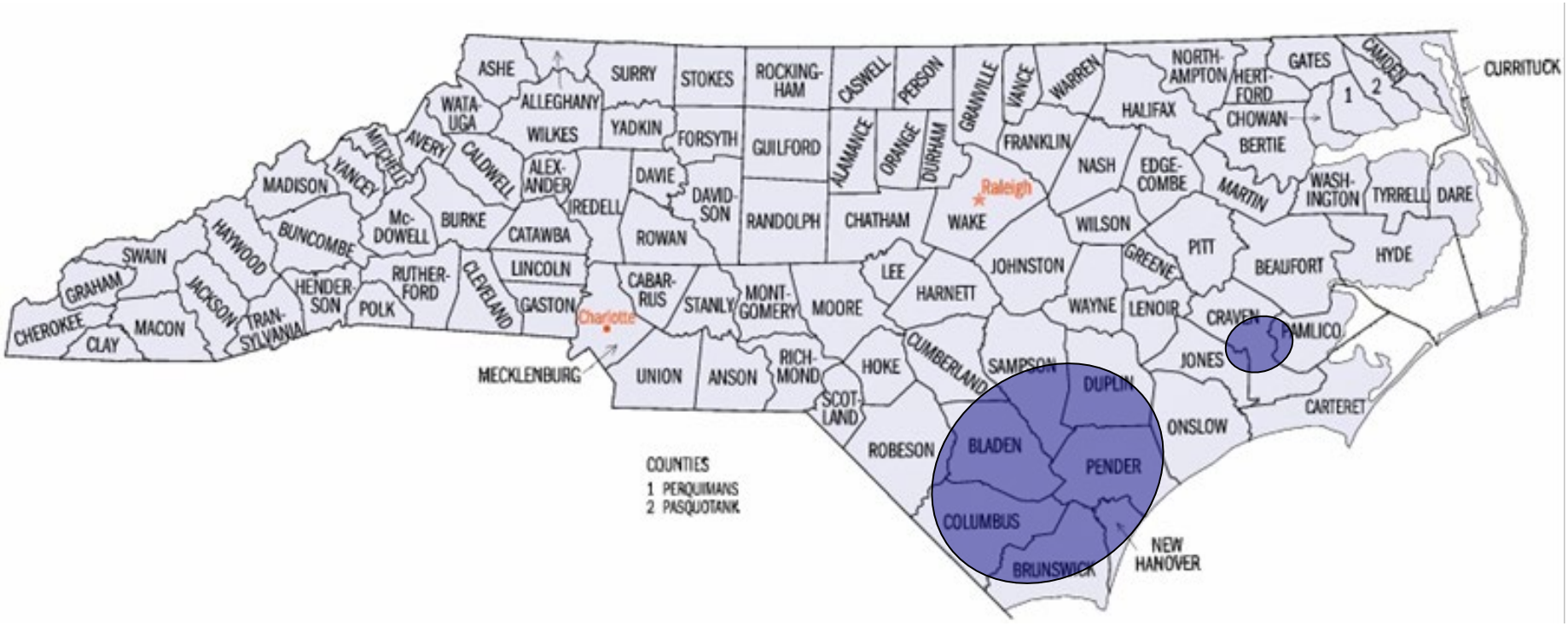
Commercial blueberry acreage in North Carolina by County, 2015. Total 9,756 acres

County	Acres
Bladen	5,859
Pender	2,092
Sampson	1,012
Duplin	501
Columbus	165
Craven	127

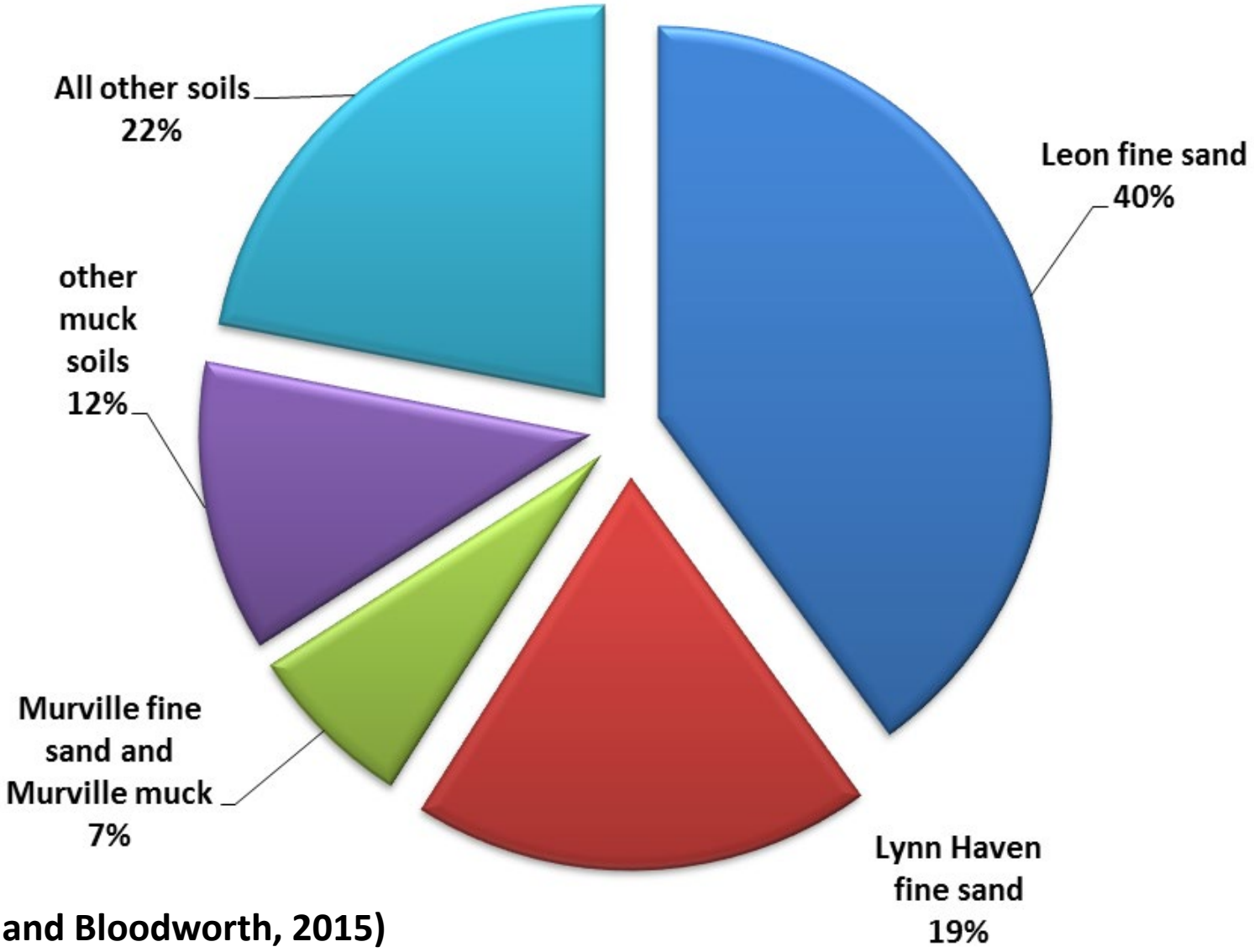
BLUEBERRIES IN NORTH CAROLINA

Home garden and pick-your-own plantings exist throughout the state, but our main commercial crop is harvested in southeastern NC (blue area) with an annual farm gate value of $57M (2018). Limited to unique, low pH sand-based organic soils (Leon, Lynn Haven series), or organic muck soils (i.e., Carolina Bays). Approx 10,000 acres total



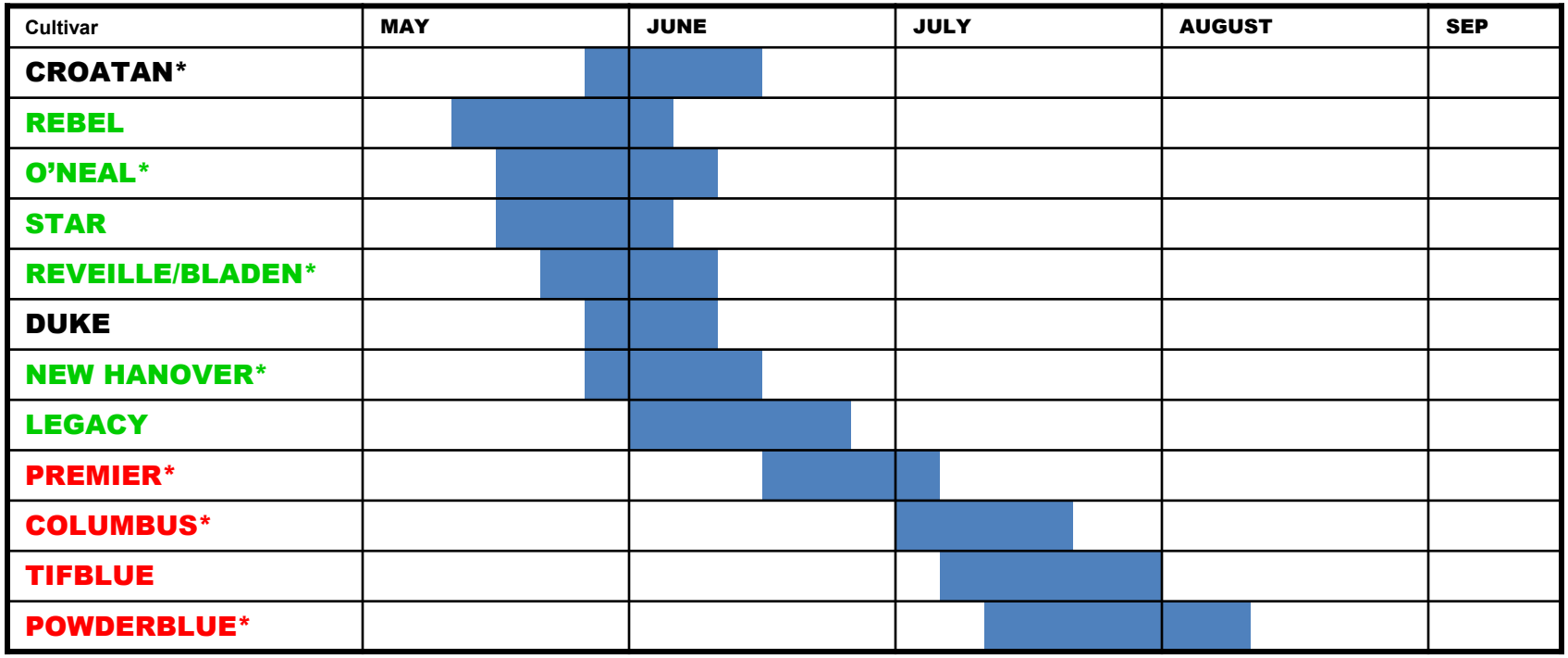
The best native NC blueberry soils are organic sands (>3% organic matter) with a water table within 12-24” of the surface; fields are not mulched but are bedded to improve aeration in the root zone.

Native blueberry soils for commercial production in NC



(Cline and Bloodworth, 2015)

Blueberry harvest timing by cultivar in southeastern NC (*NCSU)



EARLY >>>MIDSEASON >>>LATE

HIGHBUSH SOUTHERN HIGHBUSH RABBITEYE

FRESH price declines over time, so volume is stacked early in the season

Wk	1	2	3	4	5	6	7	8	9	10	11
	May (3 wks)			June				July			
$ per lb	2.46	2.4	2.1	1.89	1.74	1.57	1.45	1.38	1.36	1.45	1.44
% of total crop	10%	30%	17%	16%	10%	7%	3%	3%	2%	1%	<1%

Average NC fresh blueberry returns and volume 2008-2014

Leading states for Cultivated Blueberries, Harvested Acres, 2018 (USDA/NASS) (freeze year in SE)

STATE	ACRES	YIELD/ ACRE	FRESH LBS	PROCESS LBS	% FRESH	$/LB	TOTAL VALUE ($)
Michigan	19,700	3,560	37,000,000	33,000,000	53%	1.00	70,000,000
Florida	5,200	3,950	20,000,000	1,000,000	95%	2.96	60,000,000
California	6,600	9,840	52,000,000	11,000,000	82%	2.20	140,000,000
New Jersey	9,000	4,940	36,000,000	8,000,000	82%	1.42	62,000,000
Georgia	13,300	4,100	32,000,000	21,000,000	60%	1.64	87,000,000
North Carolina	7,500	4,500	25,000,000	8,000,000	76%	1.71	57,000,000
Oregon	13,500	10,200	60,000,000	74,000,000	45%	1.34	181,000,000
Washington	14,400	9,470	42,000,000	94,000,000	31%	1.02	139,000,000
UNITED STATES	89,000	6,300	305,000,000	250,000,000	55%	1.43	797,000,000

2018 Maine wild (lowbush) blueberries, 50 million lbs, $0.46 per lb, farm gate $23,155,000

WHY DO THESE STATES PREDOMINATE IN BLUEBERRY PRODUCTION?

Michigan	Native blueberry soils, multi-generational farms since 1920s, moderation of northern climate due to lake effect (Lake Michigan)
Florida	First to market in US. Recent (1980s) industry based on UFL low-chill cultivars. Bark beds or amended sites, highest returns per pound
California	Very early to market in US; Dry climate ideal for organic production. Amended sites with very high yields due to management and climate (1990s)
New Jersey	Native blueberry soils, multi-generational farms since 1910s
Georgia	Some Native blueberry soils, dominant rabbiteye blueberry producer, early to market. Acreage increased dramatically in 1990s and 2000s
North Carolina	Native blueberry soils, multi-generational farms since 1930s, early to market
Oregon	1970s? Ideal climate, Willamette Valley record yields on amended sites, machine for fresh and processing
Washington	1970s? Ideal climate, western WA record yields on amended sites, Eastern WA dry climate for organic production

Estimated Costs of Producing, Harvesting, and Marketing Blueberries in the Southeastern United States 2005

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Changes since this budget was written

- Labor costs up 50%
- Equipment costs up 25-50%
- Additional equipment costs (soft sorter)
- Addition of pre-cooling in packing areas
- Increased regulation (GAPs, FSMA, 3rd party audits)
- Improved cultivars, Higher yields
- Increased machine-for-fresh harvesting
- Increased farm size – economy of scale

Procedures

- **Cost estimates were based on a 100 Acre blueberry planting**
- **Production practices were based on management practices recommended by Extension Specialists and Farmers**
- **Equipment costs were based on 2004 purchase prices**
- **Input prices were collected from farmers and dealers who supply NC blueberry growers**

(Safley, Cline & Mainland, 2005)

Yield Assumptions – Good Soil

Years	Irrigation	No irrigation
3	2,000	1,500
4	4,000	3,000
5	5,500	4,000
6	7,000	4,500
7 – 9	8,000	5,000
10 -12	7,000	4,000
13 - 15	6,000	3,500
16- 18	5,000	3,000
19 - 20	4,000	2,500

Yield Assumptions – Marginal Soil

Years	Irrigation	No Irrigation
3	1,500	750
4	3,000	1,000
5	4,000	2,000
6	5,000	2,500
7 – 9	6,000	3,000
10 -12	5,000	2,500
13 - 15	4,000	2,000
16- 18	3,500	1,500
19 - 20	3,000	1,000

Yield Assumptions – Cost to pick & pack

- **Fresh Market – 80%**
  - 60% hand harvested @ $8.29/flat
  - 20% machine harvested @ $5.67/flat
- **Process Market – 18%**
  - 1.8% hand harvested (“fresh rejects”)@ $0.83/lb
  - 16.2% machine harvested @ $0.39/lb
- **Economic loss – 2%**

(Safley, Cline & Mainland, 2005)

Harvest Assumptions

- **Harvest season lasted 11 weeks – Last week in May through first week in August**
- **Fresh blueberries averaged $14.11 per flat**
- **Processed berries were sold for $0.60 per pound**

Note: One flat equals 9 pounds of blueberries

(Safley, Cline & Mainland, 2005)

Equipment Investment – 1st Year

Tractor, 70 – 80 hp (2)	$65,000
Mower, 5ft, HD	1,000
Fertilizer Spreader	1,200
Herb Sprayer, 200 gal	2,000
Shielded Herb Sprayer	4,000
Tapered Disk, 5ft	1,800
V-bladed Sweep Plow	2,000
Drain Runner (spinner)	1,900
Total	$78,900

(Safley, Cline & Mainland, 2005)

Establishment Costs – 1st Year

Land Clearing ($3,000/A)	$300,000
Ditching & Drainage ($120/A)	12,000
Forming Beds ($25/A)	2,500
Plants (1,210/A @ 50¢ /plant)	60,500
Irrigation Pond (4 – 30,000 cu yd)	36,000
Irrigation Well (300 gpm)	15,000
Sprinklers, pipes & valves	120,000
Pumps (4 – 1,400 gpm)	38,000
Total	$584,000

(Safley, Cline & Mainland, 2005)

Equipment Investment – 2nd Year

Airblast Sprayer, 220 gal	$7,600
Farm Trailers (4)	4,000
Total	$11,600

(Safley, Cline & Mainland, 2005)

Equipment Investment – 3rd Year

Truck, 1-Ton	$ 26,000
Mower, Articulated Fail	12,000
Mower, Flail, 40”	5,000
Metal Building (125’x50’)	156,250
Packing Equipment	35,000
Total	$234,250

(Safley, Cline & Mainland, 2005)

Equipment Investment Costs

4th Year	Harvester, Self Propelled	$114,000
5th Year	Farm trailers (4)	$4,000
6th Year	Packing Equipment (line 2)	$35,000
6th Year	Color Sorter	70,000
6th Year	Pneumatic Pruners	12,000

(Safley, Cline & Mainland, 2005)

Estimated Annual Costs, 8th Year

Expense	Good Soil	Good Soil	Mar. Soil
Pruning	$ 297	$ 297	$ 297
Weed Control	144	144	144
Disease & Insect	360	360	360
Irrigation	477	0	477
Land Rental	40	40	40
Harvest	6,053	3,784	4,541
Total	$7,371	$4,625	$5,859

(Safley, Cline & Mainland, 2005)

Estimated Annual Receipts & Costs, 8th Year

	Good Soil	Good Soil	Mar. Soil
Receipts	$10,897	$6,810	$8,173
Pruning	- 297	- 297	- 297
Weed Control	- 144	- 144	- 144
Disease & Insect	- 360	- 360	- 360
Irrigation	- 477	0	- 477
Land Rental	- 40	- 40	- 40
Harvest	- 6,053	- 3,784	- 4,541
Total	$ 3,526	$2,185	$2,314

(Safley, Cline & Mainland, 2005)

Flow of Funds – Good Soil

Years	Irrigation	No irrigation
1	-$804,064	-$567,974
2	-$ 58,264	-$ 31,174
3	-$193,727	-$190,434
4	$ 60,832	$ 24,867
5	$247,561	$180,069
6	$199,036	$ 68,489
7	$379,090	$217,016
8	$379,090	$217,016
9	$379,090	$217,016

Flow of Funds – Marginal Soil

Years	Irrigation	No irrigation
1	-$804,064	-$567,974
2	-$ 58,264	-$ 31,174
3	-$217,524	-$226,939
4	-$ 2,223	-$101,350
5	$152,979	$ 53,743
6	$ 72,926	-$ 57,890
7	$252,981	$ 90,583
8	$252,981	$ 90,583
9	$252,981	$ 56,110

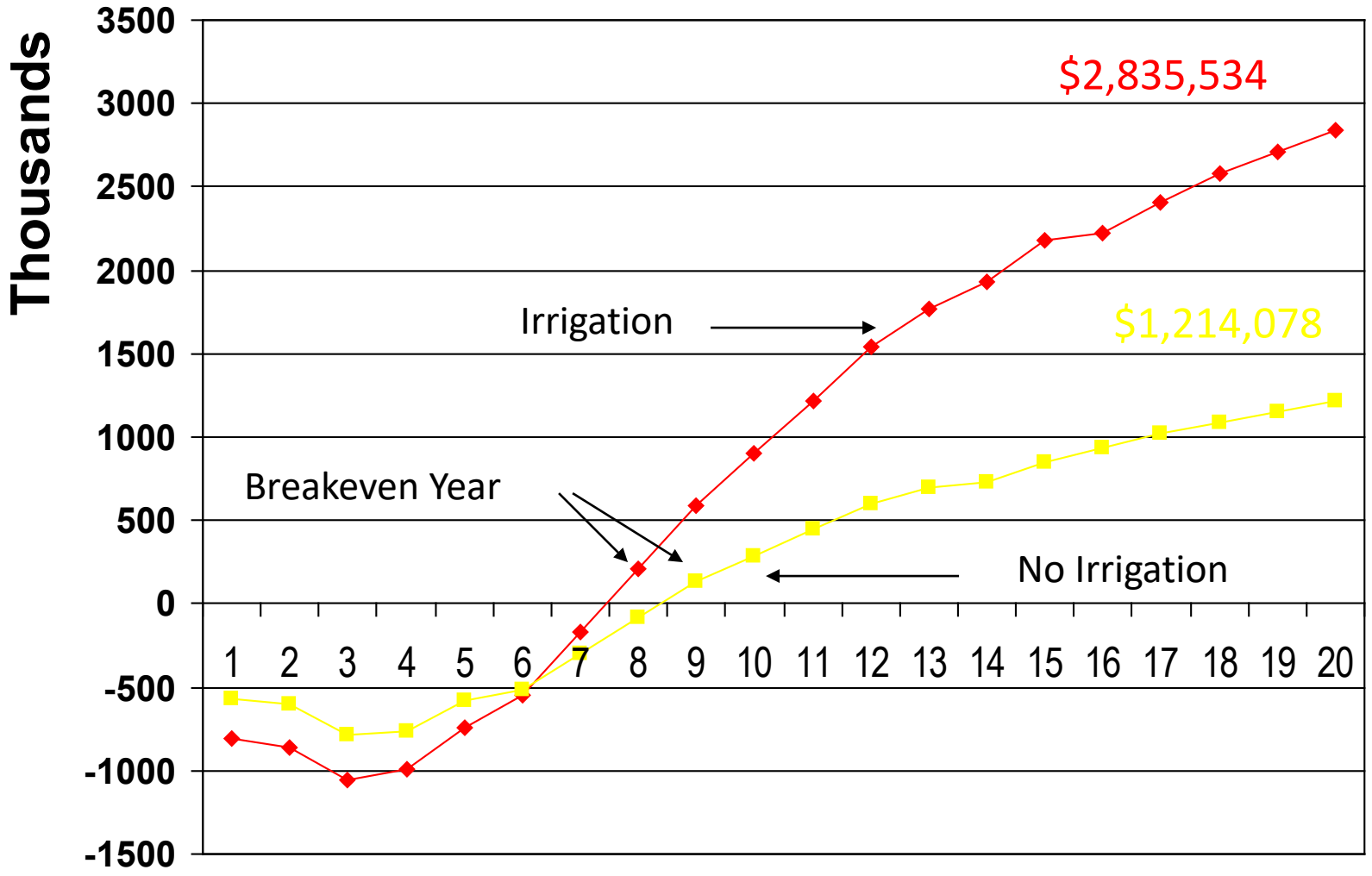
Accumulated Cash Flows – Good Soil

Years	Irrigation	No irrigation
1	-$804,064	-$567,974
2	-$862,328	-$599,148
3	-$1,056,055	-$789,582
4	-$995,224	-$764,715
5	-$747,663	-$584,646
6	-$548,627	-$516,157
7	-$169,537	-$299,141
8	**$209,553	-$82,125
9	$588,664	**$134,892

Breakeven Year

- The year when enough revenue has been generated to cover start-up expenses.
- To secure a loan of shorter duration could leave the farming operation insolvent.

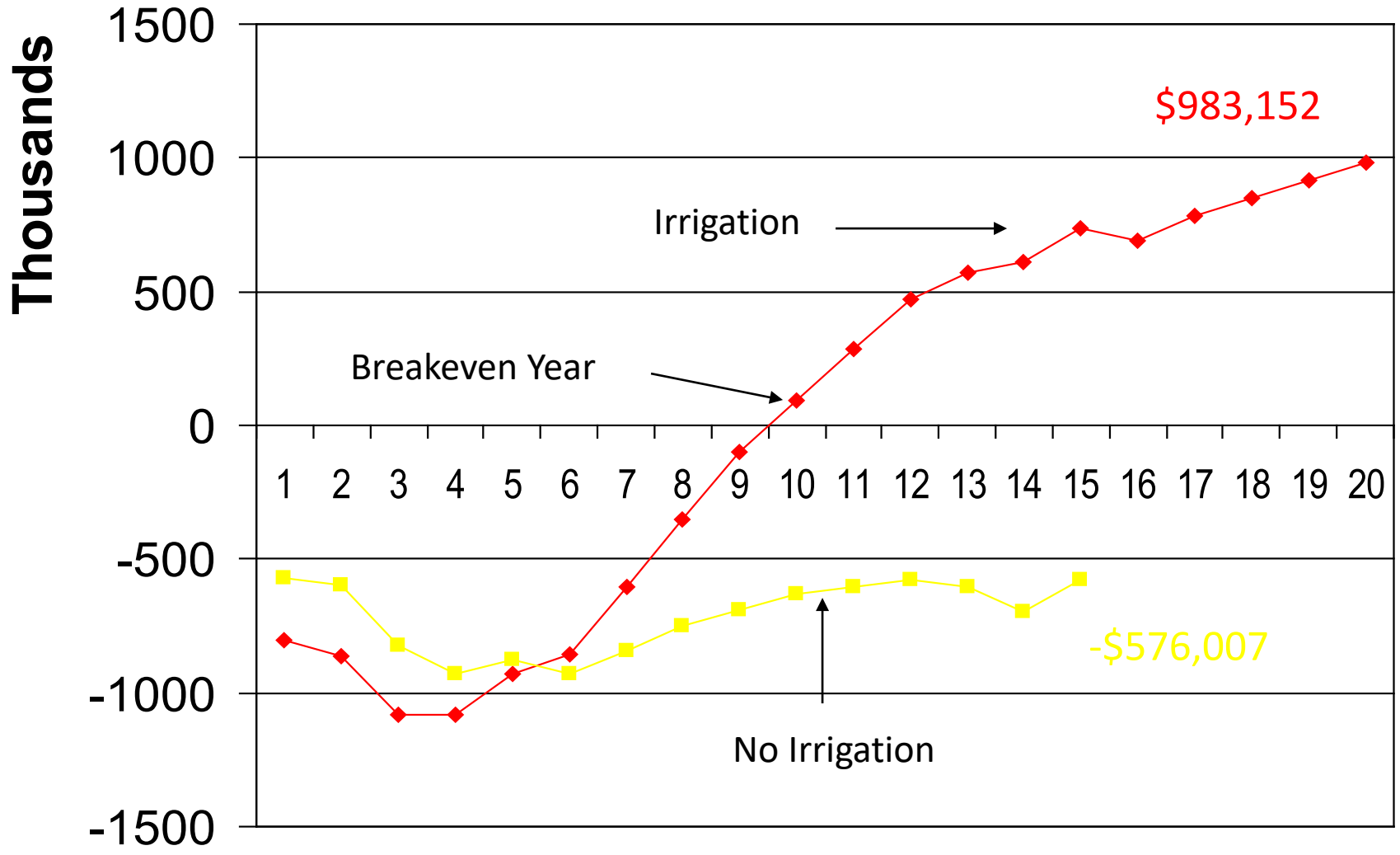
Accumulated Cash Flows – Good Soil



Accumulated Cash Flows – Marginal Soil

Years	Irrigation	No irrigation
1	-$804,064	-$567,974
2	-$862,328	-$599,148
3	-$1,079,852	-$826,087
4	-$1,082,075	-$927,437
5	-$929,096	-$873,694
6	-$856,170	-$931,584
7	-$603,189	-$841,001
8	-$350,208	-$750,418
9	-$97,227	-$691,309
10	**$92,699	-$632,199

Accumulated Cash Flows – Marginal Soil



Conclusions

- A new 100A blueberry planting on good soil can be a profitable venture
- A new 100A blueberry planting on marginal soil w/o irrigation is a losing venture
- A new 100A blueberry planting on marginal soil w/ irrigation can be a risky venture
- Irrigation for frost protection and soil moisture pays handsomely

Budgets for Small Plantings

- There are lots of blueberry budgets (NC, GA, OR, FL, CA, KY) but none fit our needs exactly for small-scale growers in NC.
- Some needs and resources are consistent, others vary widely among locations and farms, such as cost and availability of soil amendments.
- Wholesale prices are too low to support small farms.
- By “cutting out the middleman” direct-marketing can greatly increase returns to the grower – but you also have to be your own marketer.

Wholesale vs Direct Marketed

- US wholesale avg (2018) = $1.43/lb ($7.86/gal)
- Pick-your-own = $2.72 to $3.63/lb ($20/gal)
- Ready-picked = $2.66 to $5.45/lb ($30/gal)

(One gallon assumed to weigh 5.5 lbs)

Some per-acre establishment costs to consider for small plantings on upland sites (2019 NC prices):

Cultivation, bedding	140.00
Sulfur/fertilizer	112.00
Pine bark (100 cu yd)	1640.00
Drip irrigation lines and labor (two lines per row, pressure-compensated with built-in emitters at 18”)	3040.00
Plants (2 yr bare-root, 4x10 ft = 1,089/acre) x $2.50	2722.00
Planting labor 8 hr x $12.23 (H2A)	98.00
TOTAL SO FAR….	$7752.00
Does not include cost of well or filtration system, equipment, fuel, buildings, depreciation or interest, etc.	

Small Plantings -- Budgets (continued)

- Most budgets estimate blueberry establishment costs at between $8,000 and $9,000 per acre.
- Regardless of source (CA, KY, NC) most budgets show net returns of $3,500 to $4,000 per acre.
- Where given, break-even points are 7-8 years out.
- Irrigation greatly affects long-term profitability.