Should I Replant or Protect My Ash?

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Emerald Ash Borer is unlike other pests

- Attacks and kills all North American ash
- Ash trees require constant pesticide protection to survive
- One or two failed applications can allow EAB to kill the tree

Does it make more sense to replace a tree or commit to perpetual protection?

Assumptions

- There are control methods capable of protecting trees
- You know how long will be living in your house
- Trees grow

Approach

- How much do trees grow over time?
- Outside of EAB area, how does the value of an ash of a given caliper compare with that of a replacement tree as it grows over time?
- How does the value of a growing protected ash of a given caliper compare with a replacement tree as it grows over time?
- How does the value of money spent for replacing an ash of different sizes compare with the value of money spent yearly for control.

How much do trees grow over time?

Our guess for annual tree growth rates are as follows for a transplanted 2” DBH tree (DBH =Diameter 5’ above the soil):

DBH 2-4” = ½”

DBH 4-8 = 1”

DBH 8-11= ¾”

DBH 11-13= ½”

DBH >13= ¼”

How much is a tree worth?

Value in $ =

Caliper in inches

X value per sq in of cross section area

X species class ranking (0-1)

X condition class ranking (0-1)

X location class ranking (0-1)

http://www.hort.purdue.edu/hort/ext/Pubs/HO/HO_201.pdf.

Replacement Species

Many other high quality species besides maples can be used to replace ash trees including:

oaks, beech, horsechestnut and linden.

See this link for a complete list:

http://www.in.gov/dnr/forestry/pdfs/ashalternatives.pdf

Value model inputs (based on HO 201)

Value of replacement tree

Cost to professionally replant a 2” caliper maple with staking and mulch = $400

Species 1.0, condition 0.8, site 0.85

Value of protected ash

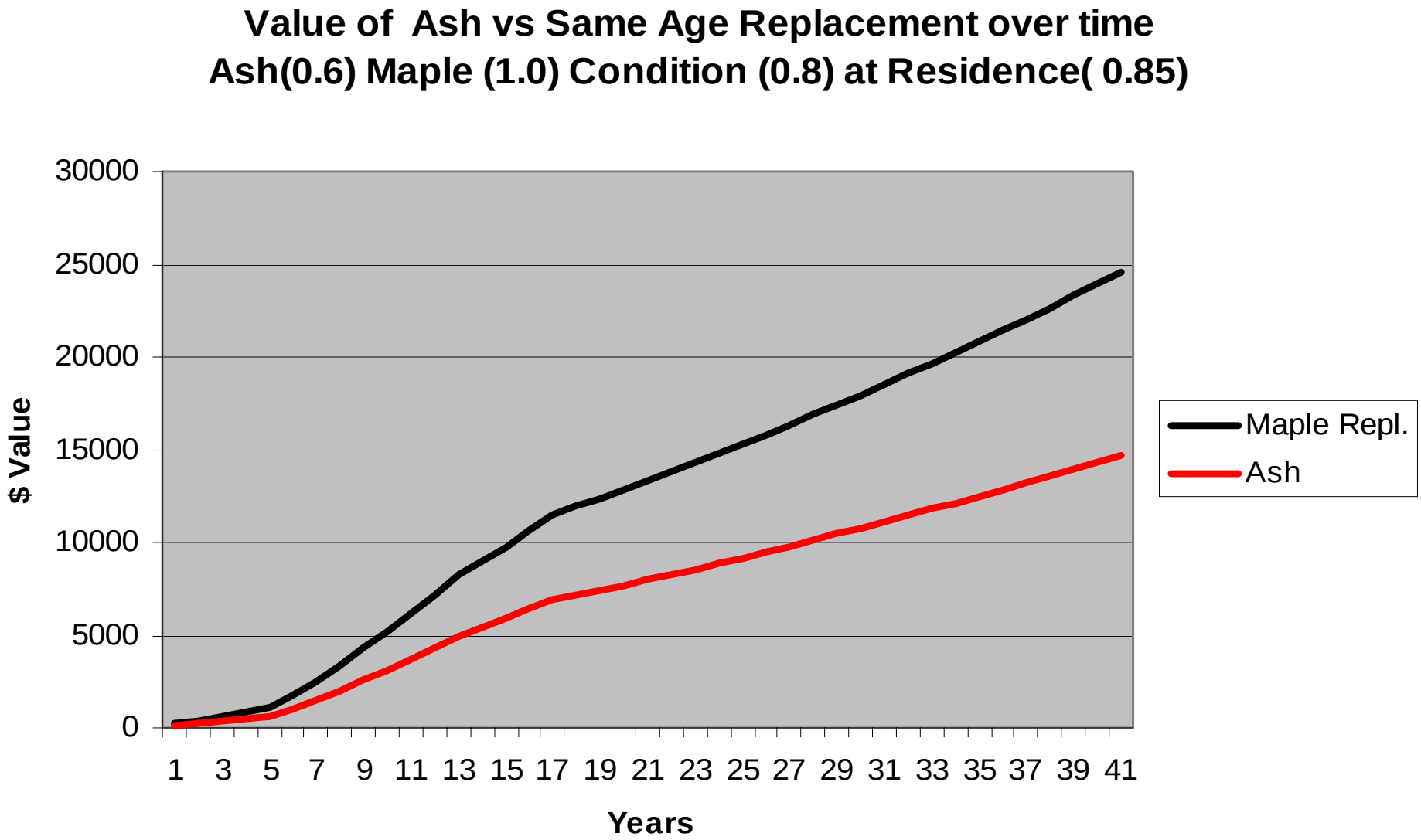
Species 0.6, condition 0.8, site 0.85

Species value is set at the low end of range to reflect problems associated with this species where EAB occurs

Determining Value of a Tree Over Time

- Using formula from Mike Dana's publication HO-201* and our guess for tree growth, we let a 2" caliper maple and a 2" caliper ash "grow" for 40 years.
- A maple tree will be worth more over time even though it grows at the same rate because it is a higher value species than ash.

Value of Ash and Generic Replacement

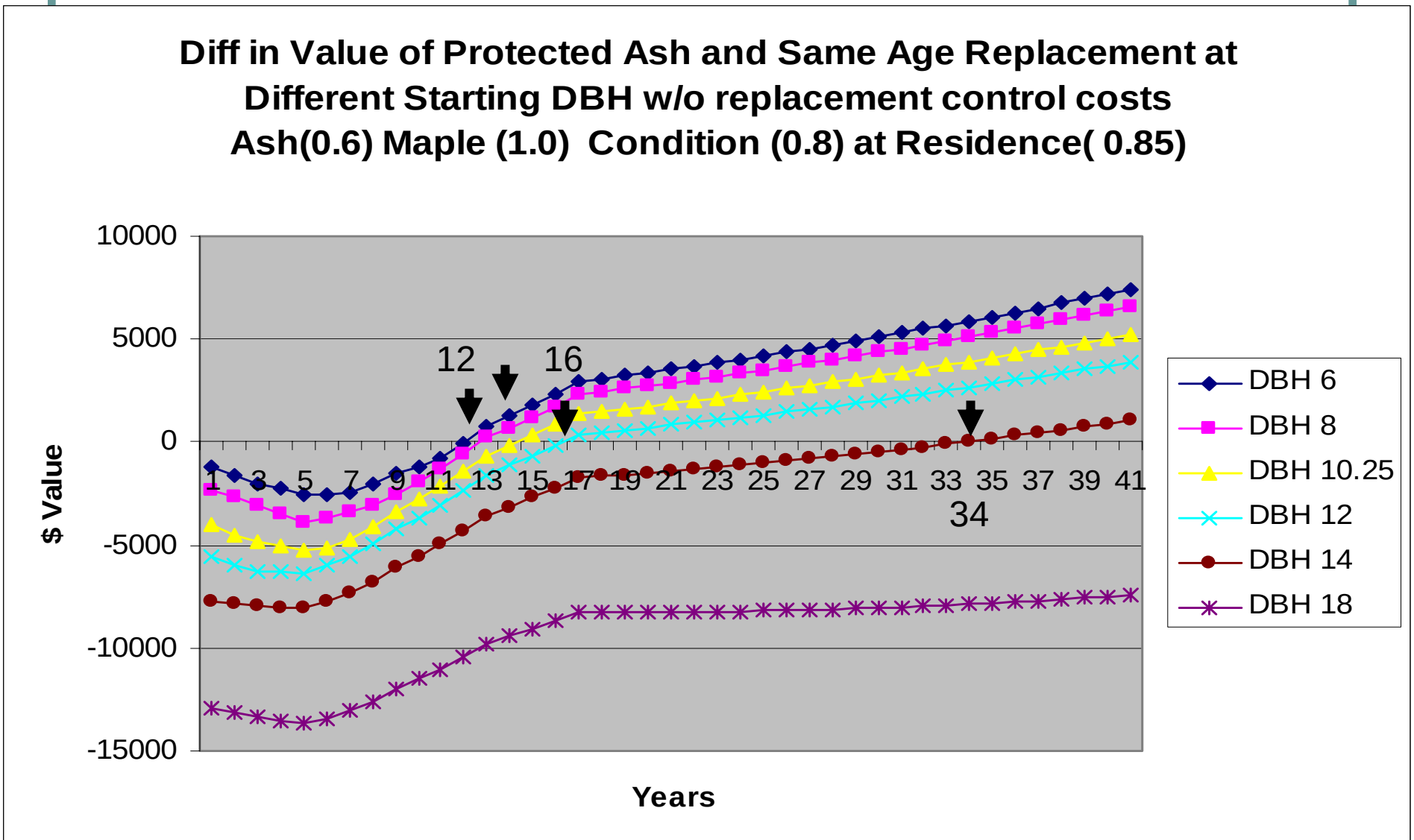


In the absence of EAB control and removal,

How does the value of an ash of a given caliper compare with a replacement tree as it grows over time?

We calculate the difference between the value of a 2” caliper maple and ash of varying caliper over 40 years.

40 yr projected value differences w/o replacement or control costs in absence of EAB



Value Comparison Summary

- Replacement maple trees become as valuable as protected ash trees ≤ 12” caliper < 12 – 16 years, then exceed their value.
- Larger trees take longer to catch up.

Incorporating costs of EAB control and removal,

How does the value of a growing protected ash of a given caliper compare with a replacement tree as it grows over time?

True value of replacing a tree=

Value tree replacement

-value of ash lost

-cost to remove and replant tree

+cost of pesticides not applied to protect tree

Cost to remove a replant a tree (based on phone interviews)

Removal costs include stump removal are $55/hr.

DBH	Removv. Price	Planting Price	Total
8	200	400	600
12	225	400	625
14	275	400	675
18	400	400	800
30	1100	400	1500

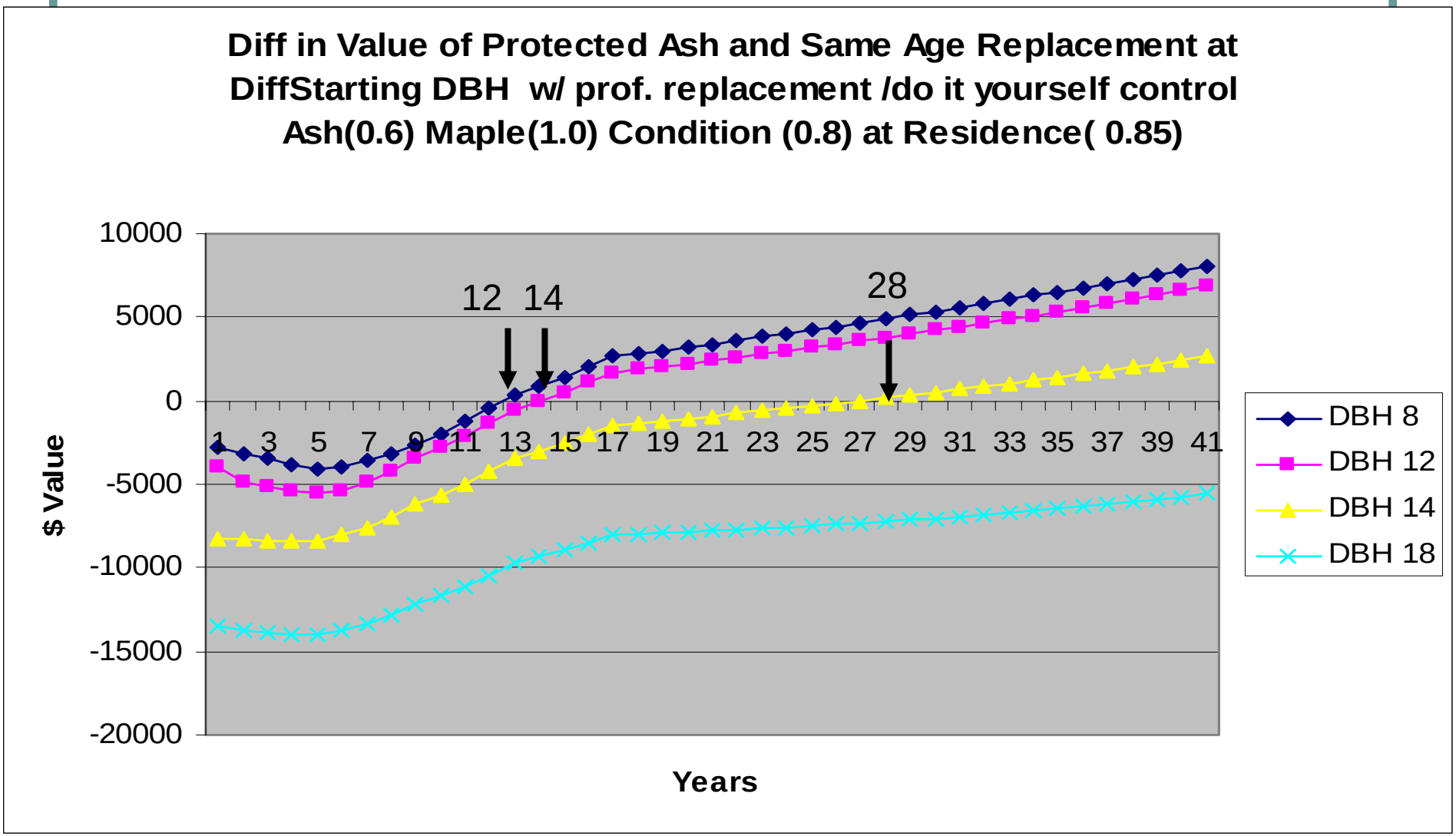
Cost to treat for homeowner to treat a tree with Bayer Imidacloprid

Assumptions:

Cost of of imidacloprid= $22/qt at a rate of one fl. Oz per in circumference. Imidacloprid is applied once per year

Unused imidacloprid will not be saved for next year and whole, not fractions of a bottle can be purchased.

40 yr Projected Value Differences w/ Homeowner applied pesticides



Cost for Arborist Soil Treatment

Assumptions:

Year 1.

Apply bidrin ($7/cap)(1 cap/DBH) $50 min.

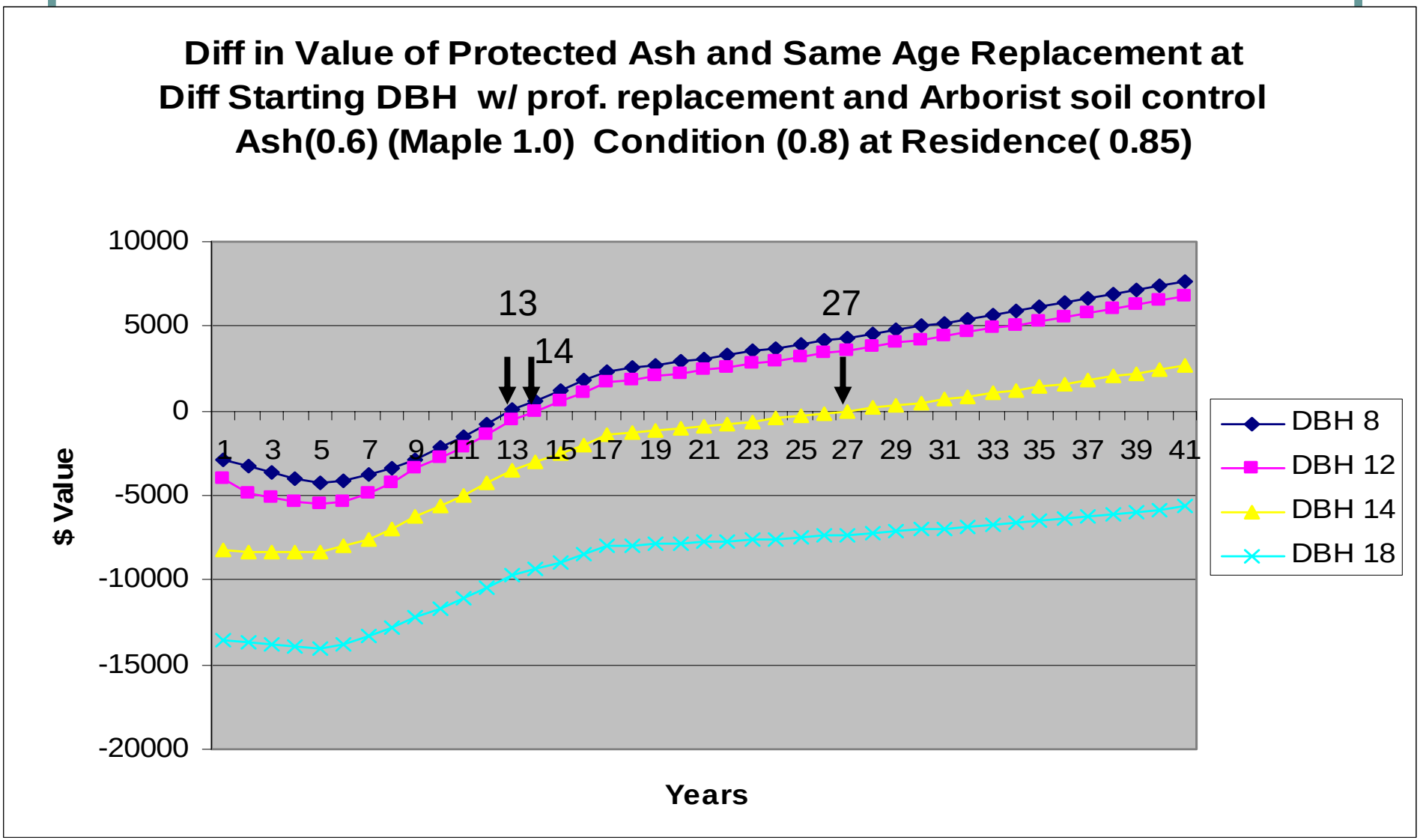
And imidacloprid fertilizer mix to soil at a rate of 2 gal/ DBH @ $1.25/gal, $2.5/ DBH

After Year 1.

Apply imidacloprid fertilizer mix to soil at $1.25/gal and 2 gal/DBH.

Cost = $2.5/DBH.

40 yr Projected Value Differences with soil application by Arborist



Cost for Arborist Injection Treatment

Assumptions:

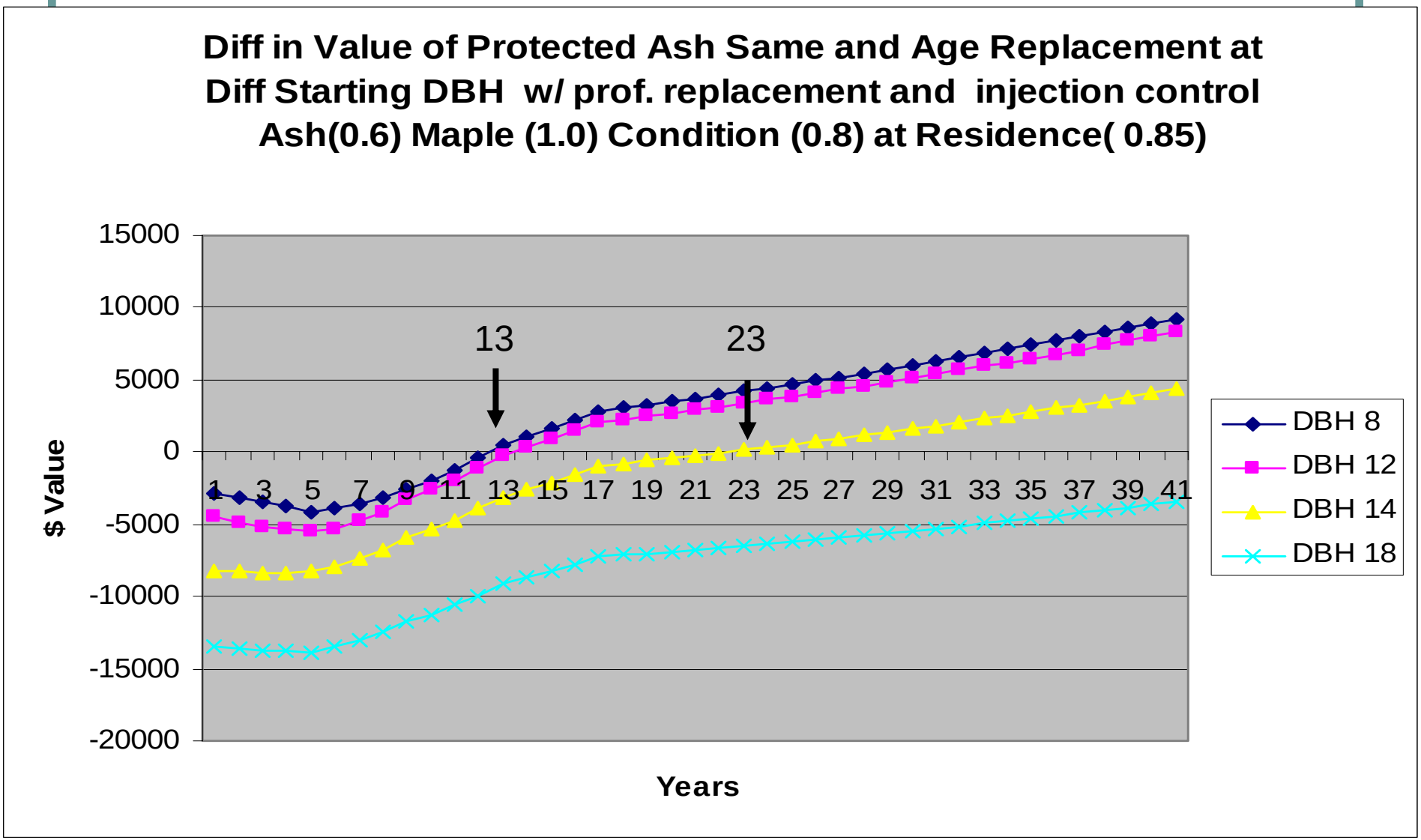
Year 1.

Apply bidrin ($7/cap)(1 cap/DBH) $50 min and imidacloprid soil injected.

After Year 1

Imidacloprid injected once in @2 yr at $10/ in DBH (Arborject)

40 yr Projected Value Differences with Arboject Injection by Arborist



Years until value of replacement exceeds protected ash

Caliper (in)	No treat No EAB	Self soil Treat	Arborist Soil treat	Arborist Inject
8	12	13	13	13
12	16	14	14	13
14	34	28	27	23
18	>40	>40	>40	>40

Value Comparison Conclusions

The break even point for replacing with resistant trees:

≤12”DBH 13-14 yrs

14”DBH 23-28 yrs

18” DBH >40 yrs

If makes economic sense to replace small trees with resistant trees. Larger trees may be worth saving IF control remains effective AND you plan on staying in the house

Problems with Value Method

- Hard to conceptualize value of tree
- Homeowners can only cash in on some of the assessed value at the time of house sale

Out of Pocket Economics

How does the value of money spent for replacing an ash of different sizes compare with the value of money spent yearly for control?

Compare net present value of money spent each year for cost of control vs replacement cost of tree

Assume 5% annual valuation of all costs

Replacement Cost

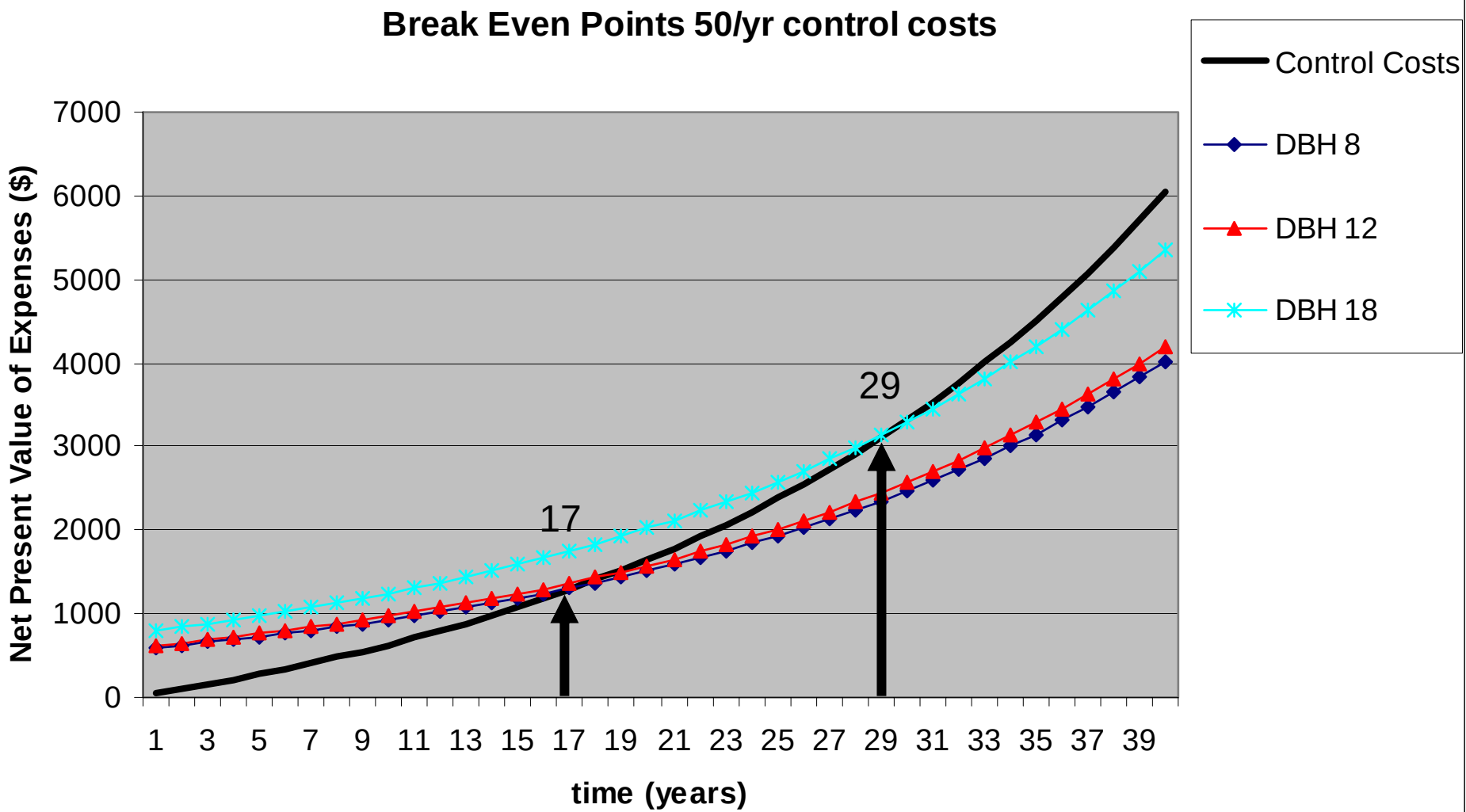
Assume $400 for replant of 2” maple, replacement and removal costs are

DBH	
8	$600
12	$625
18	$800
30	$1500

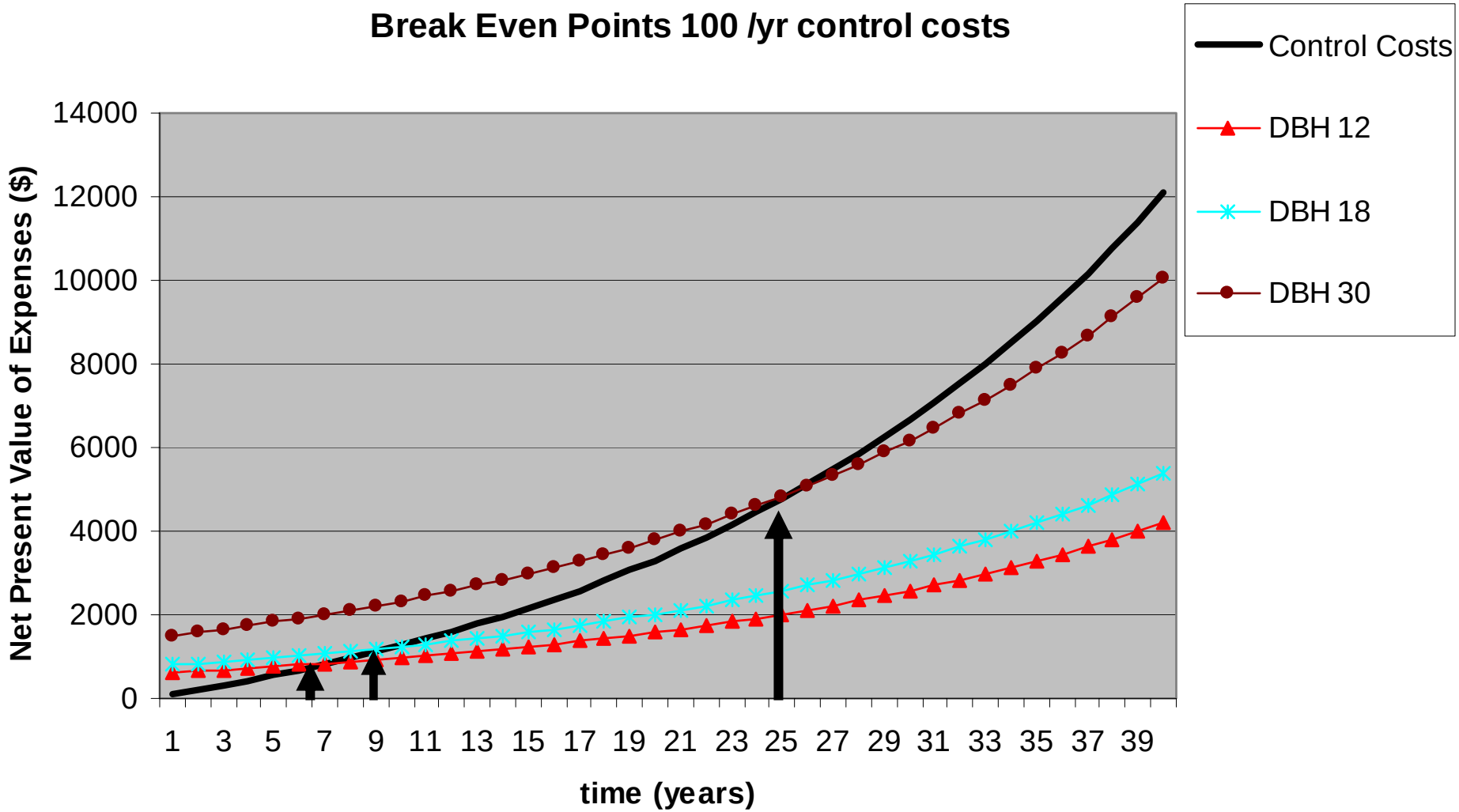
Average Annual Costs over 40 years

Caliper	Homeowner	Arbor Soil	Arbor Inject
12”	$ 48.95	$ 54.85	$ 92
18”	$ 61.05	$ 63.75	$121.75
30”	$ 95	$ 120	$200

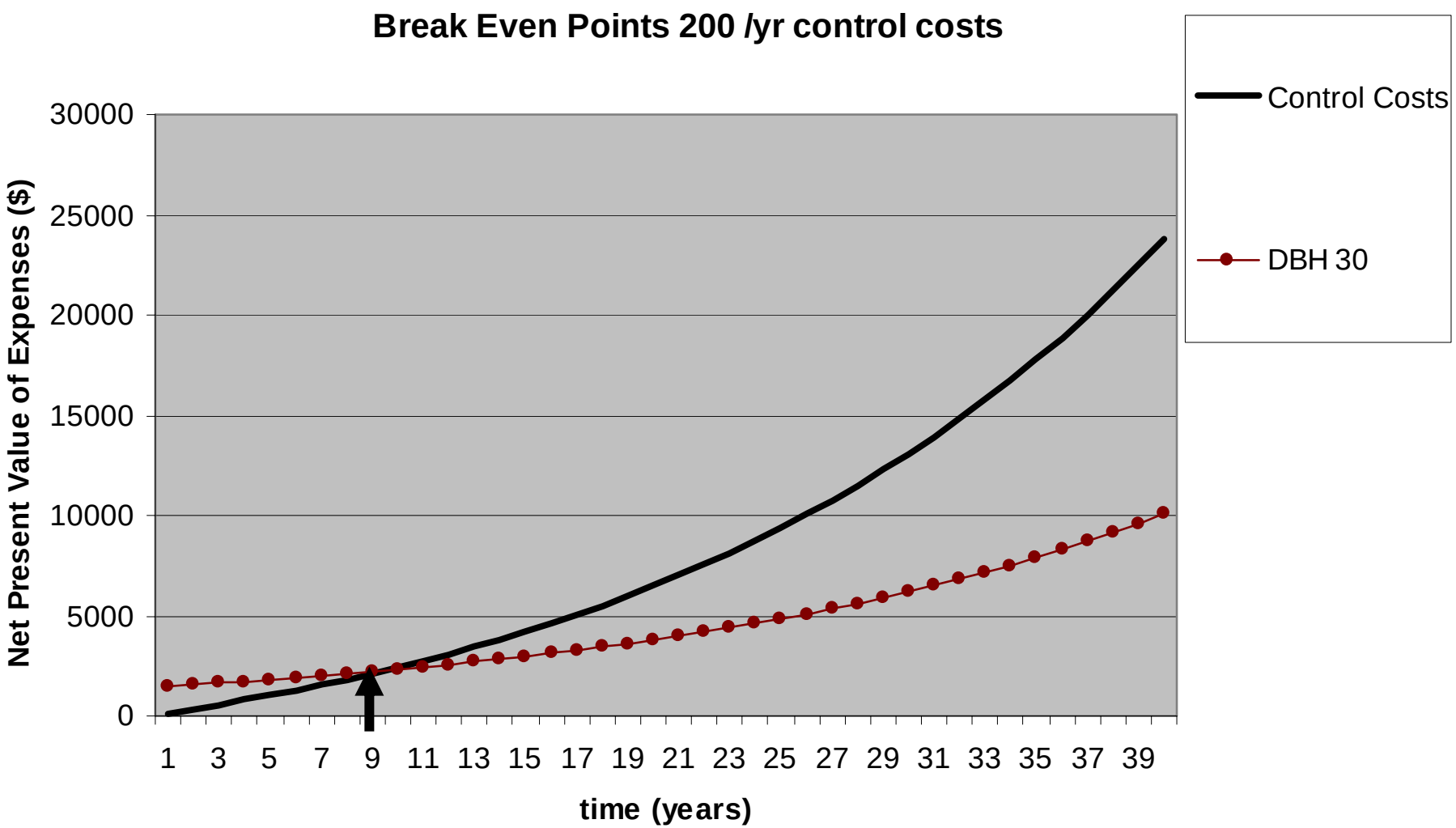
Net Present Value of $50/yr Protection and Replacement Costs



Net Present Value of $100/yr Protection and Replacement Costs



Net Present Value of Protection and Replacment Costs



Years until net present value of replacement exceeds control costs

Caliper (in.)	Ann. Cost $50	Ann. Cost $100	Ann. Cost $ 200
8,12	17 (soil)	6 (inject)	na
18	29 (soil)	9 (inject)	na
30	na	25 (soil)	9 (inject)

Out of Pocket Expense Break Even Summary

- Value of soil applied control costs exceed cost of tree removal and replanting at 17 yrs for < 12” and 25-29 years at 18-30 DBH.
- Increased costs of injection shorten this time to 6 yrs (8-12 DBH), and 9 yrs for 18 DBH and 9 yrs for 30” DBH.
- Bottom line is over time replacement will be less expensive than perpetual control

Overall Conclusions

- Spending money to protect small trees (<12” caliper) makes little economic sense.
- Higher cost of treating larger trees limit the number of years where cumulative control costs are < replacement
- The decision to treat or let the tree be killed depends on the time frame of decision for homeowner. However, in EAB area, ash may be perceived as liability
- For municipalities managing multiple trees for the long term, replanting with resistant species is the only reasonable option