

A Cost-benefit Analysis of Treating Municipal Ash Trees for Emerald Ash Borer

Alan Siewert, BCMA

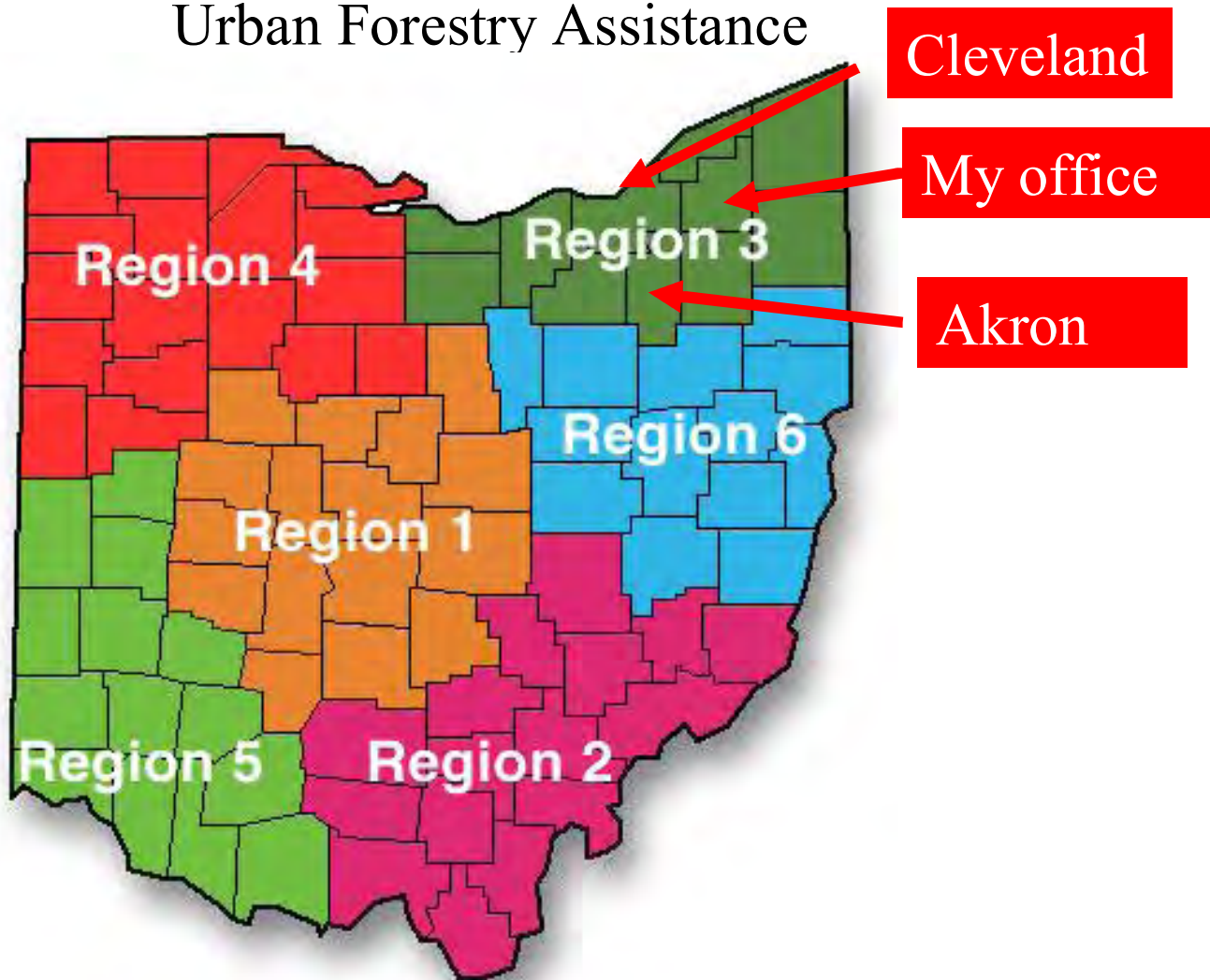
Urban Forester

ODNR Division of Forestry



Division of Forestry

Urban Forestry Assistance







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To:
USA

Factors that Influence the Decision of Long Term Treatment of Municipal Ash Trees for Emerald Ash Borer

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Factor 1: Publicly owned ash trees have different decision making factors than privately owned trees



Four Faces of A Tree Decision

▶ Arboricultural

- Science
- Economics

- ▶ Will a tree grow on a site?
- ▶ Is it the best tree to maximize the goals of the owner.
- ▶ Or will this tree take extra maintenance to keep it functioning.

Four Faces of A Tree Decision

- ▶ Arboricultural
 - Science
 - Economics
- ▶ Personal Taste
- ▶ Beauty is in the eye of the beholder.
- ▶ What one person finds attractive another will find ugly.
- ▶ I hate Crimson King Norway maples.

Four Faces of A Tree Decision

- ▶ Arboricultural
 - Science
 - Economics
- ▶ Personal Taste
- ▶ Emotional
- ▶ Each person has a unique history with a tree or species.
- ▶ It may be good or bad.
- ▶ Neither personal taste nor emotional decision are ever wrong.
- ▶ The first three are used to make a decision on a private tree.

Four Faces of A Tree Decision

- ▶ Arboricultural
 - Science
 - Economics
- ▶ Personal Taste
- ▶ Emotional
- ▶ With a private tree two people with similar taste and common background and one household income make their tree decision based on all three types of decisions.

Four Faces of A Tree Decision

- ▶ Arboricultural
 - Science
 - Economics
- ▶ Personal Taste
- ▶ Emotional
- ▶ Political
- ▶ With public trees there are thousand of owners, with thousands of household income and a diverse range of experiences and taste.
- ▶ Who gets to be right?
- ▶ Political decisions are made when personal taste and emotional decisions are forced on the community.

Four Faces of A Tree Decision

- ▶ Arboricultural
 - Science
 - Economics
- ▶ Personal Taste
- ▶ Emotional
- ▶ Political
- ▶ For sustainable urban forestry only the arboricultural decision can be used.
- ▶ If the other three are allowed to have influence, the urban forest program will quickly fall apart.

Factor 1: Publicly owned ash trees have different decision making factors than privately owned trees.

▶ Privately owned

- Arboricultural
 - ▶ Science
 - ▶ Economics
- Emotional
- Personal Taste
-

▶ Publicly owned

- Arboricultural
 - ▶ Science
 - ▶ Economics
-
-
- Political

Factor 2: Treat or remove is not appropriate for municipalities

▶ Privately owned

- Pre housing bubble burst
 - ▶ Ave. home ownership
 - 7 year
 - ▶ Now
 - ?

▶ Cost benefit of treating

- If you can treat for 24 years for the same cost as removal.
- Then you must sell your home sooner than 24 years.
- If you don't sell, you did not save money.

Factor 2: Treat or remove is not appropriate for municipalities

- ▶ Publicly owned
 - If you can treat for 24 years for the same cost as removal
 - Then you must sell the park or city property sooner than 24 years
 - If you don't sell you did not save money
- ▶ Cities are not selling property
- ▶ All city ash trees will die.
 - ▶ "the only sure thing in life is Death and Taxes"
- ▶ All city trees will die.
- ▶ All trees will die and will have to be removed.
 - ▶ or picked up off of someone or something
- ▶ For Cities it is Treat and remove.

Factor 3: Cost Benefit Analysis for Cities Requires Proper Variables



Theoretical Modeling of Ecological Services

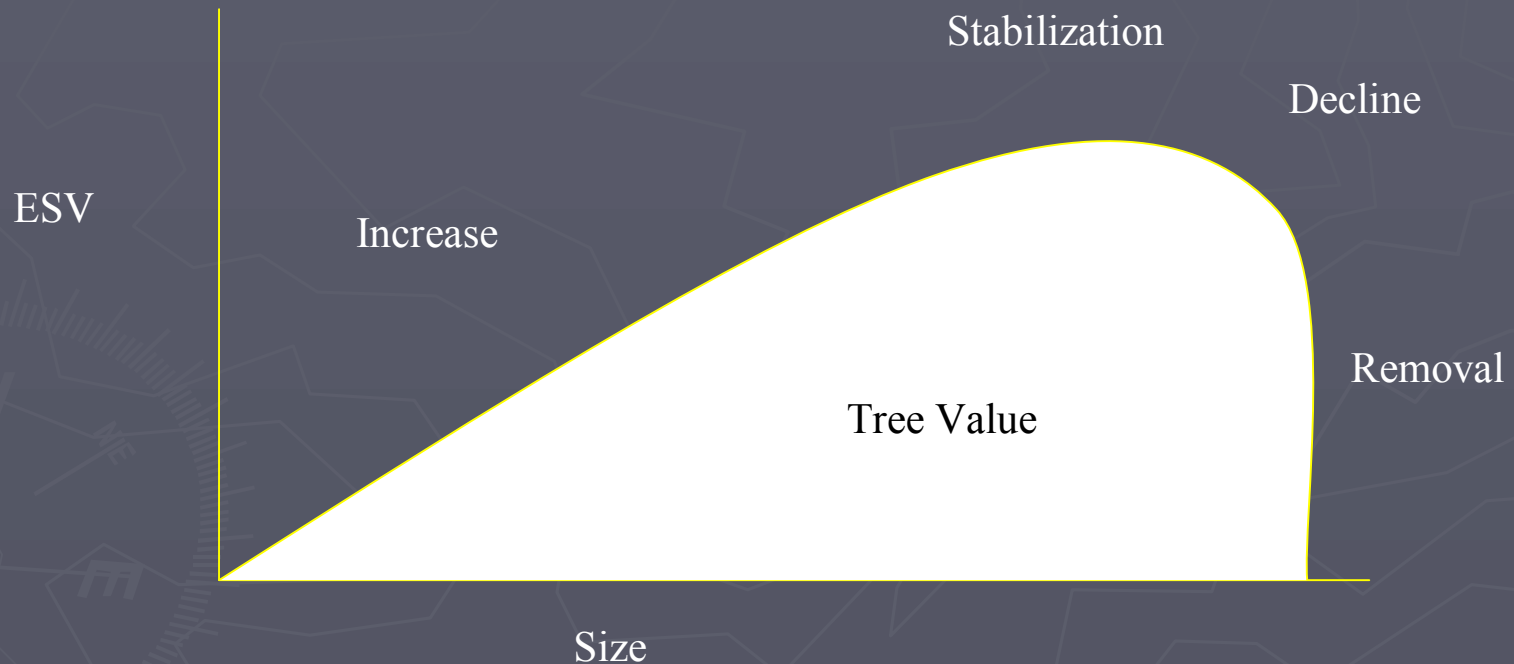


Fig. 1. Simple Conceptual Model of Ecological Services Value

Theoretical Modeling of Ecological Services



Fig. 2. Ecological Services Value of a Site When Tree Immediately Replanted

Theoretical Modeling of Ecological Services

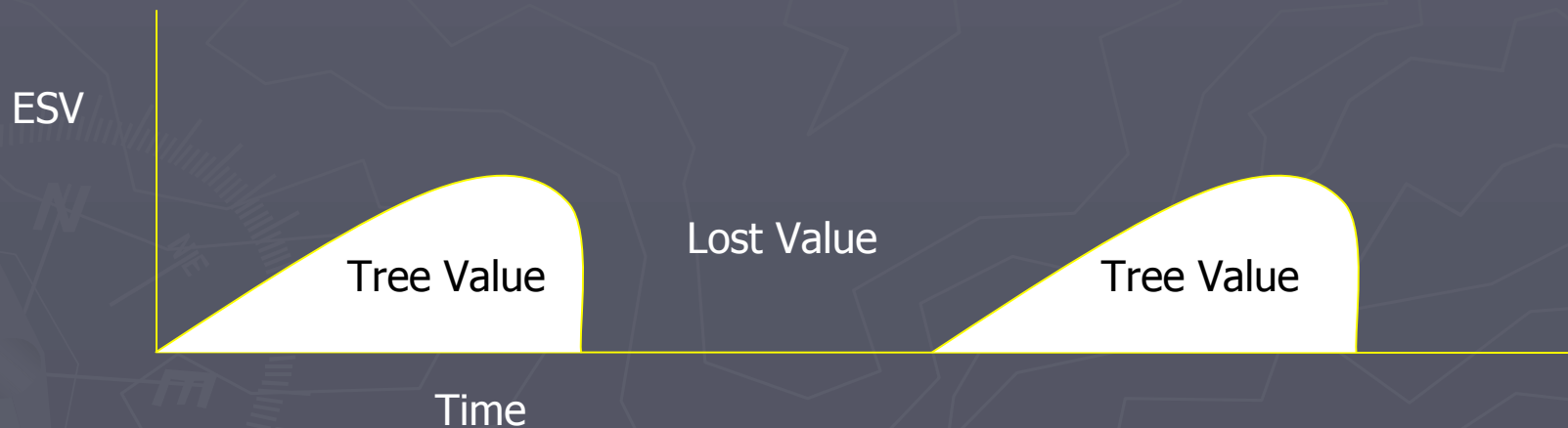


Fig. 3. Ecological Services Value Lost on Site When Tree Replaced After Period of Time

Theoretical Modeling of Ecological Services

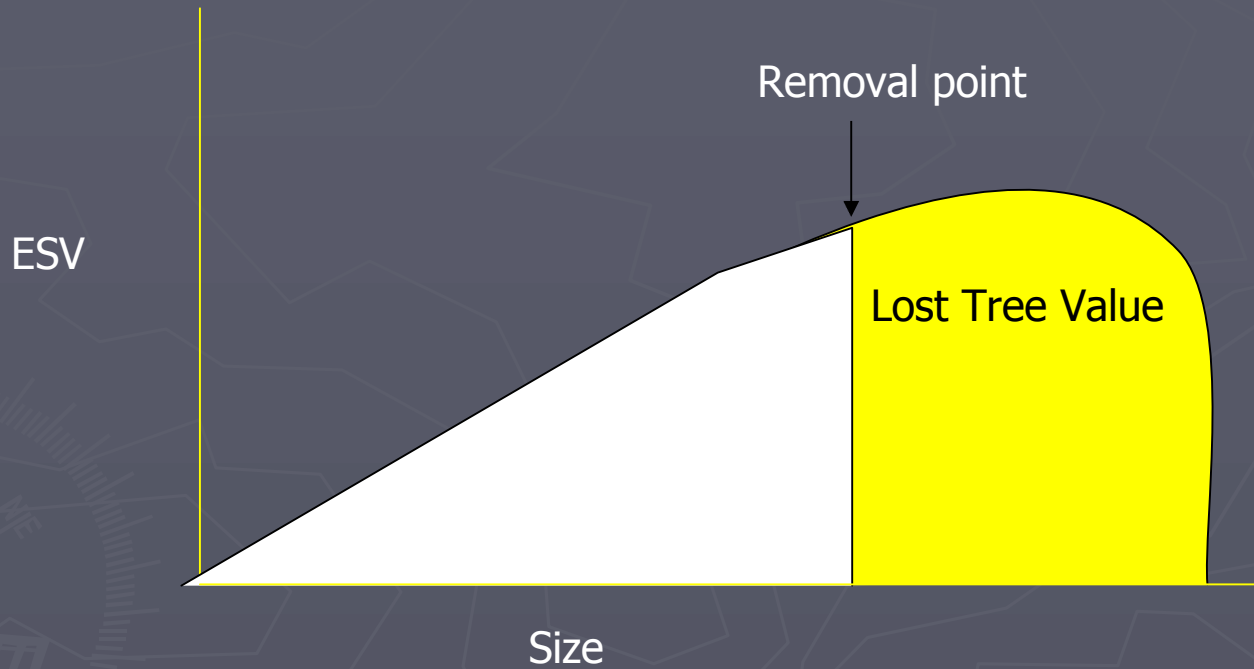


Fig. 4. Loss of Ecological Services Value When a Tree is Removed Prematurely

Theoretical Modeling of Ecological Services

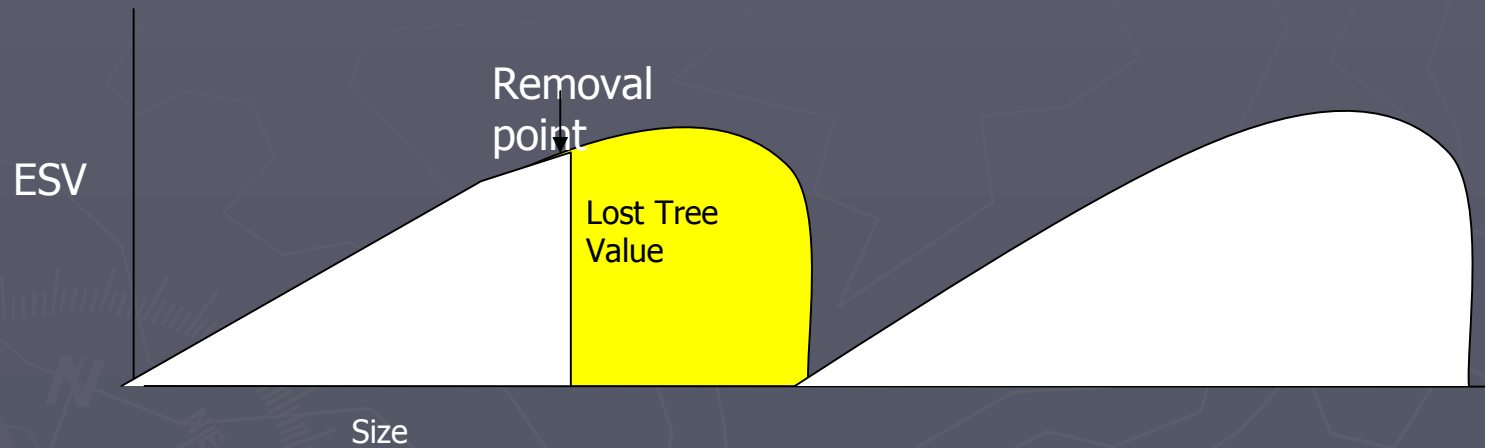


Fig. 5. Loss of Ecological Services Value of Site When a Tree is Removed Prematurely and Replaced in Normal Replant Time

Theoretical Modeling of Ecological Services

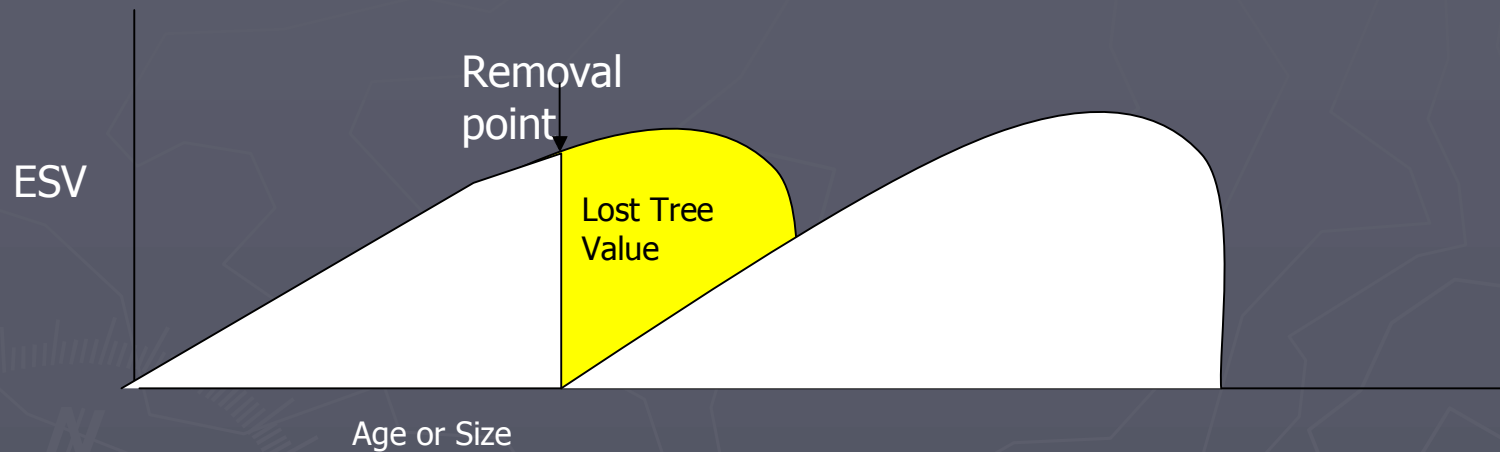


Fig. 6. Loss of Ecological Services Value of Site When a Tree is Removed and Immediately Replaced

Theoretical Modeling of Ecological Services

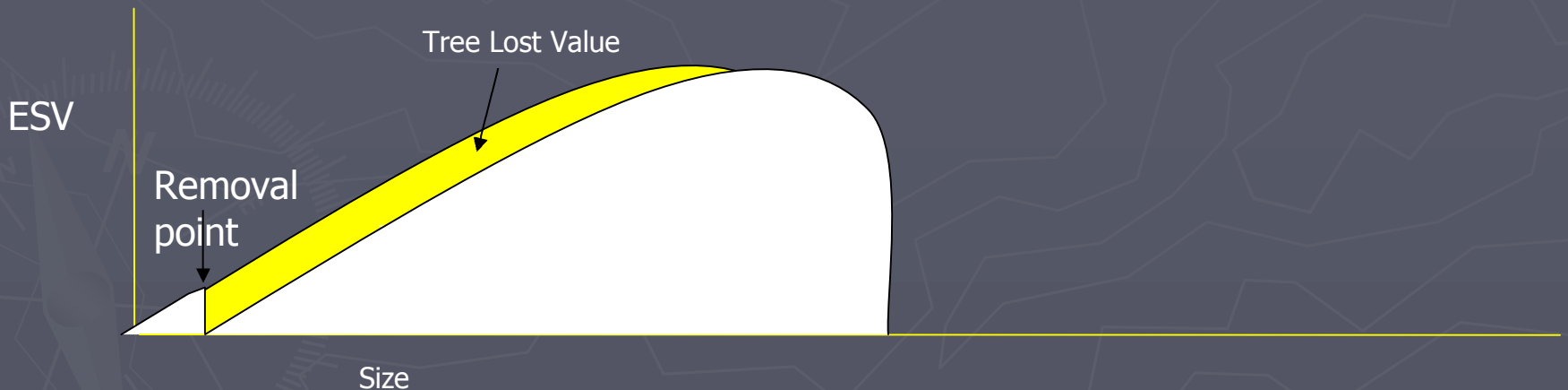


Fig. 7 Loss of Ecological Services Value of Site When a Small Tree is Removed and Replaced

Theoretical Modeling of Ecological Services

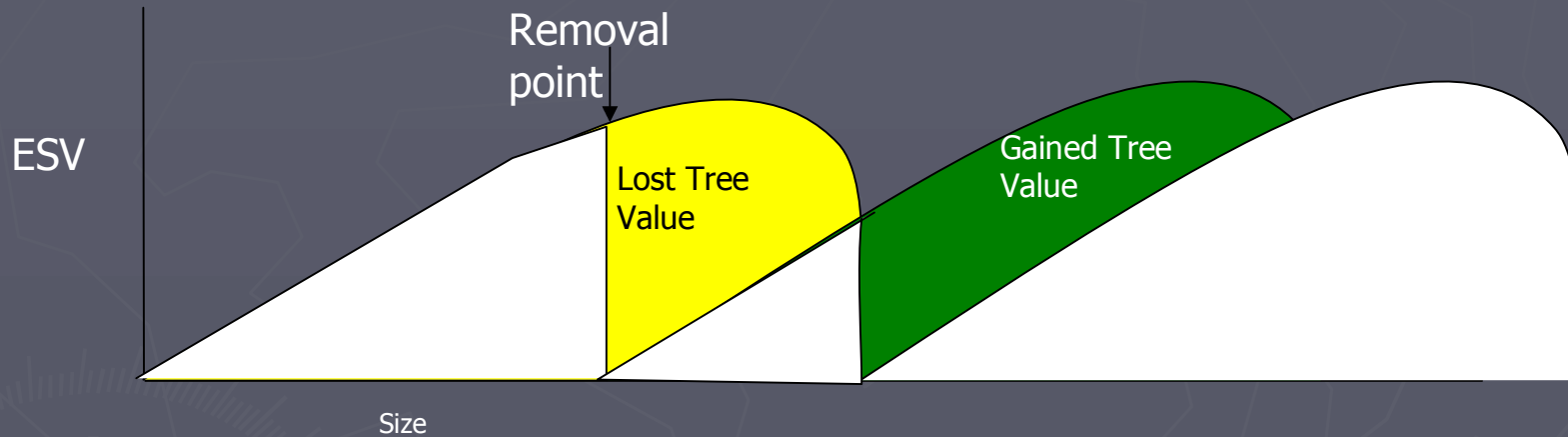


Fig. 8. Loss and Gains of Ecological Services Value when a Tree is Removed Prematurely

Theoretical Modeling of Ecological Services

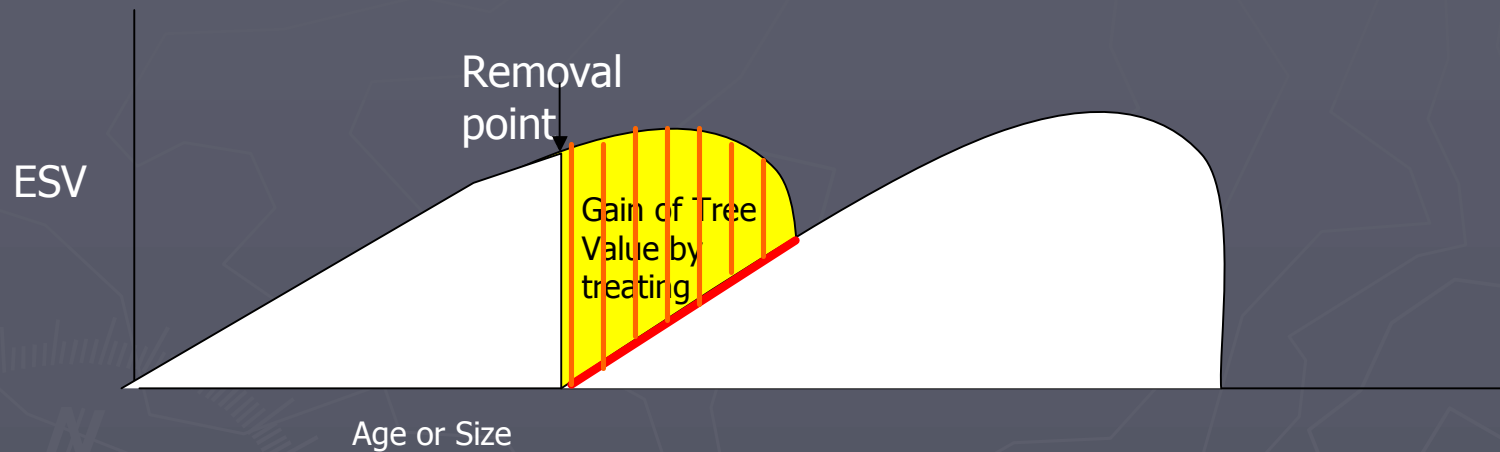


Fig. 6. Loss of Ecological Services Value of Site When a Tree is Removed and Immediately Replaced

Theoretical Modeling of Ecological Services

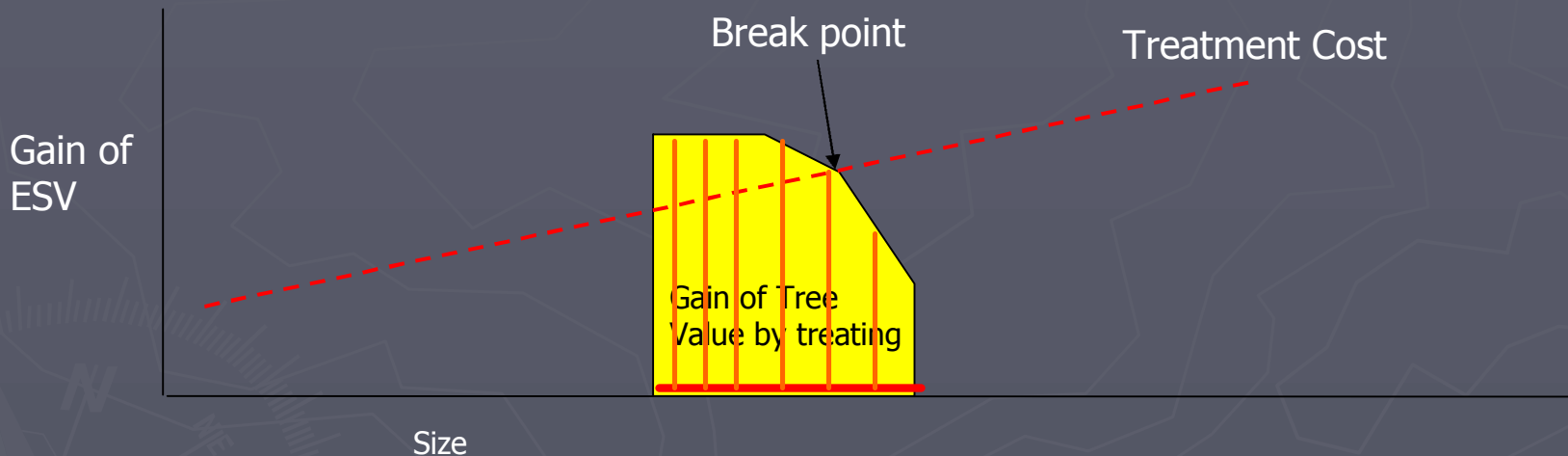


Fig. 9. Marginal Loss of Ecological Services Value and Cost of Treatment

Theoretical Modeling of Ecological Services

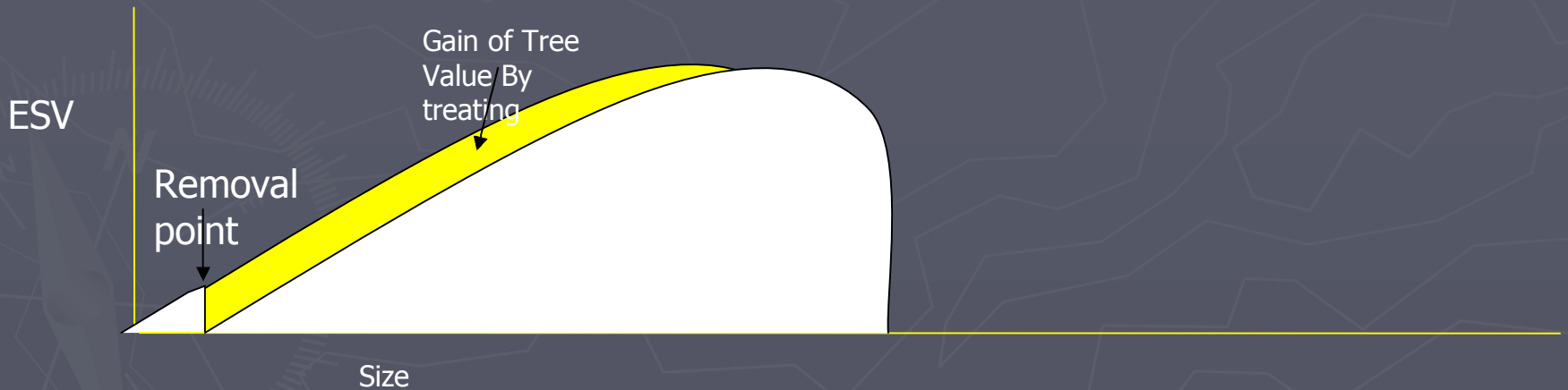


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Theoretical Modeling of Ecological Services

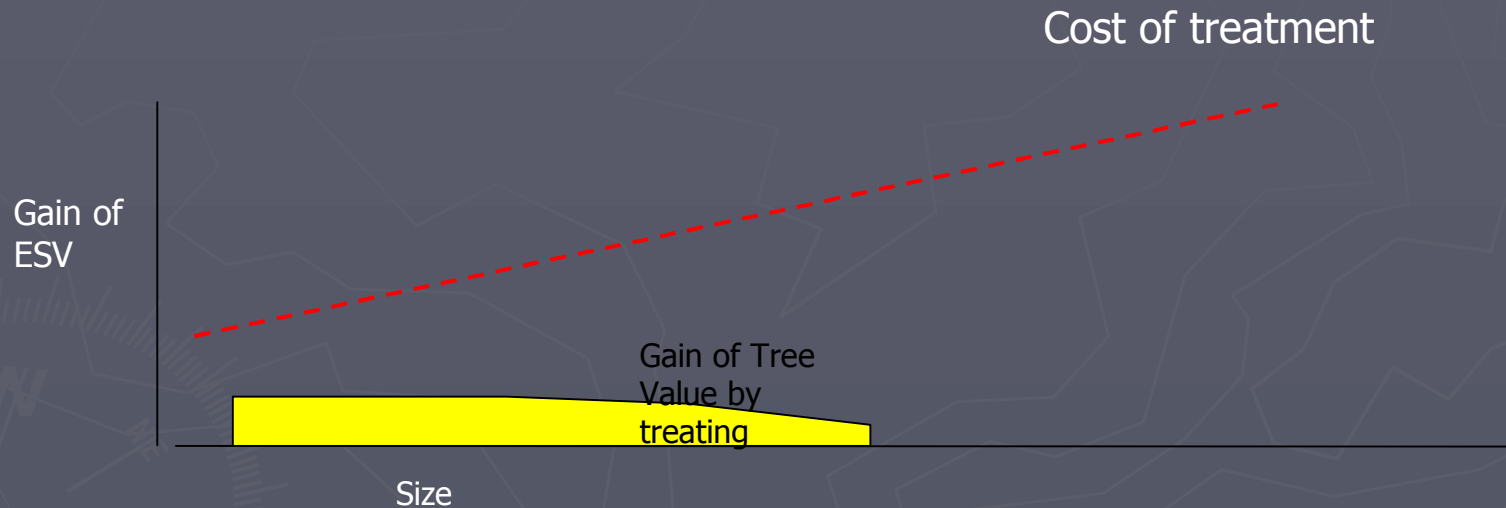


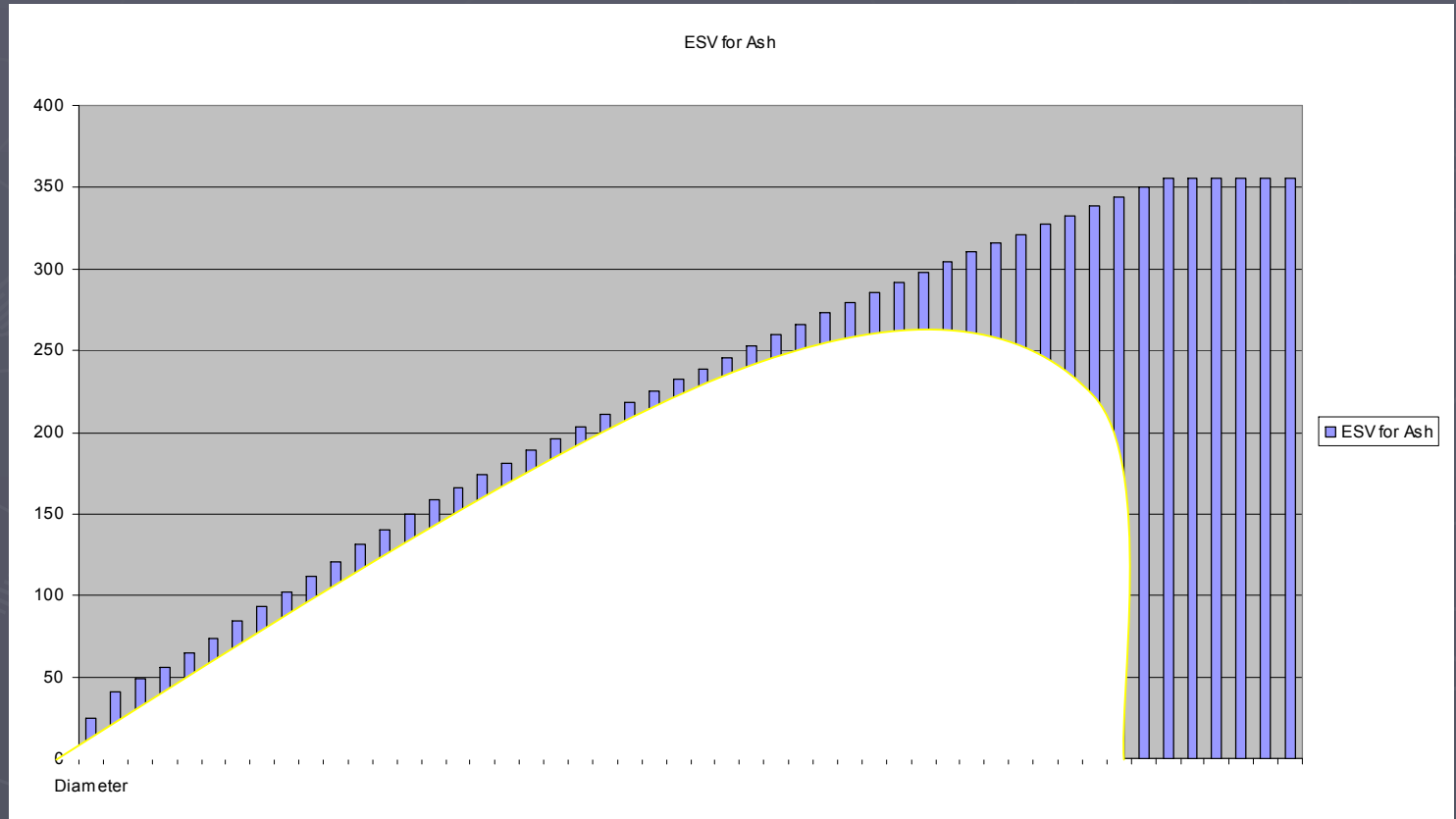
Fig. 10. Marginal Loss of Ecological Services Value and Cost of Treatment of Small Trees

Theoretical to Applied

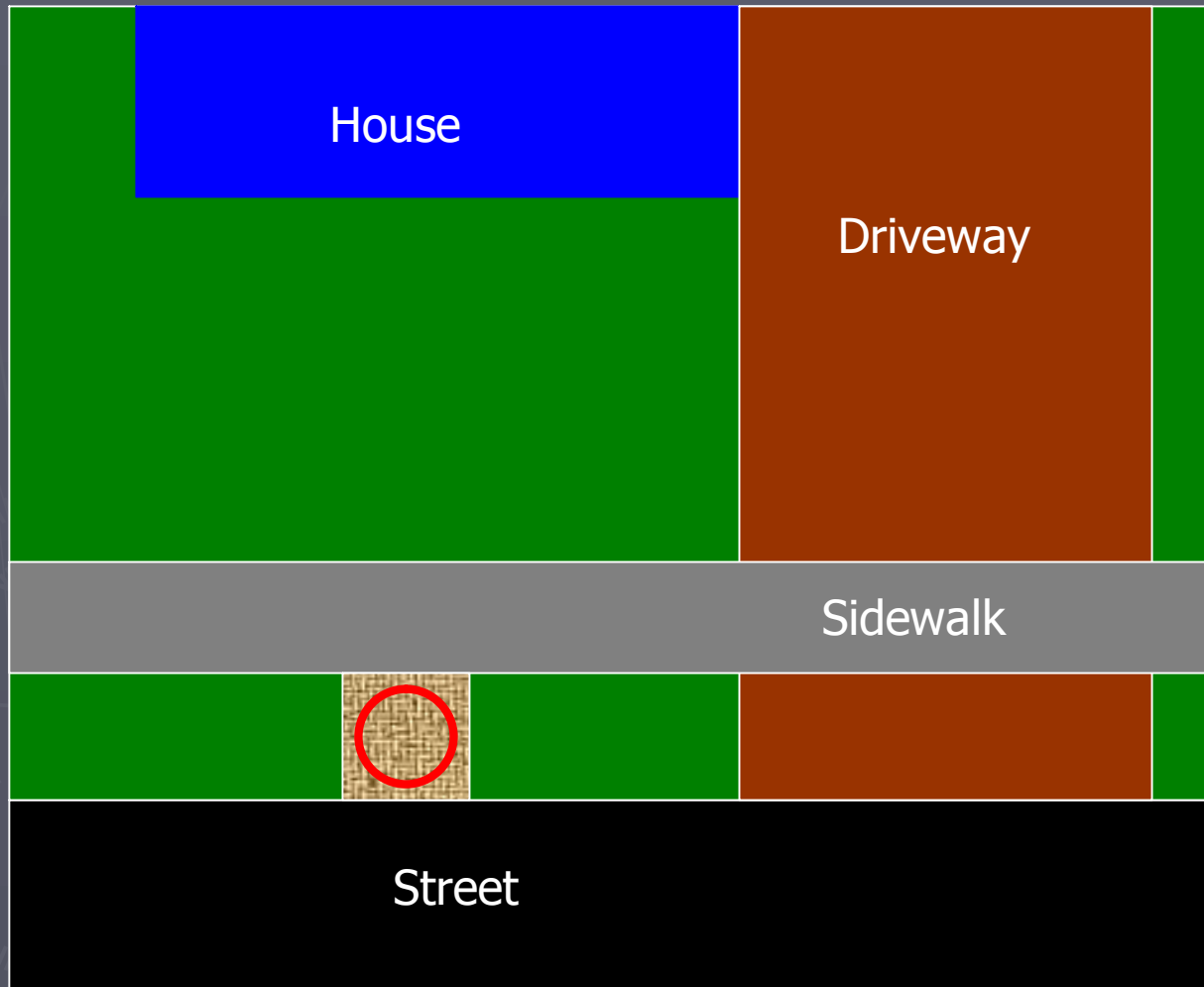
- ▶ How to we get form theoretical to a usable applied model
 1. Ecological services provided by an ash tree
 2. Ecological services provided by the tree we replace the ash with
 3. Cost of treatment

Theoretical to Applied

- ▶ Using I-Tree
 - Ash

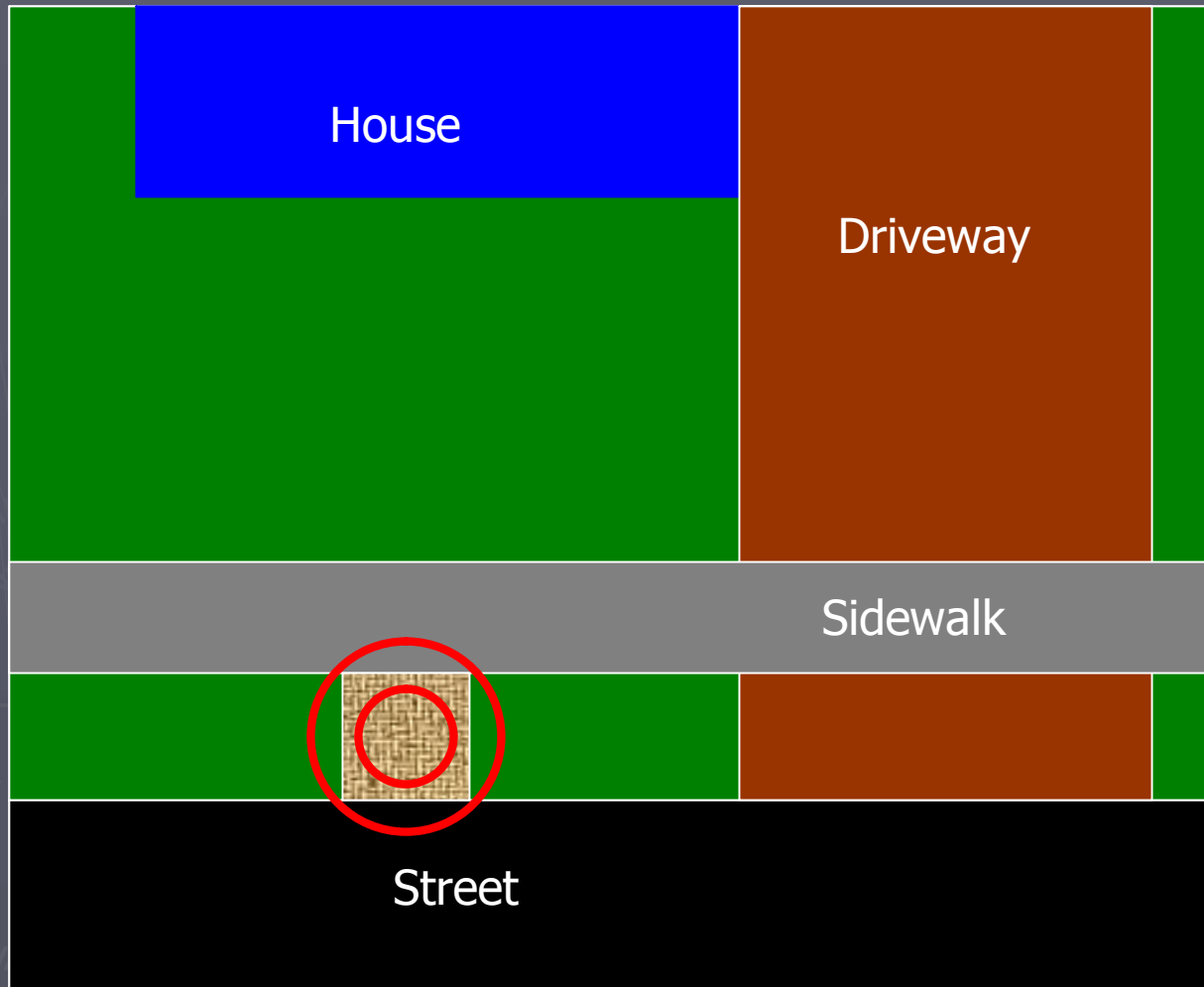


Functional Root Loss



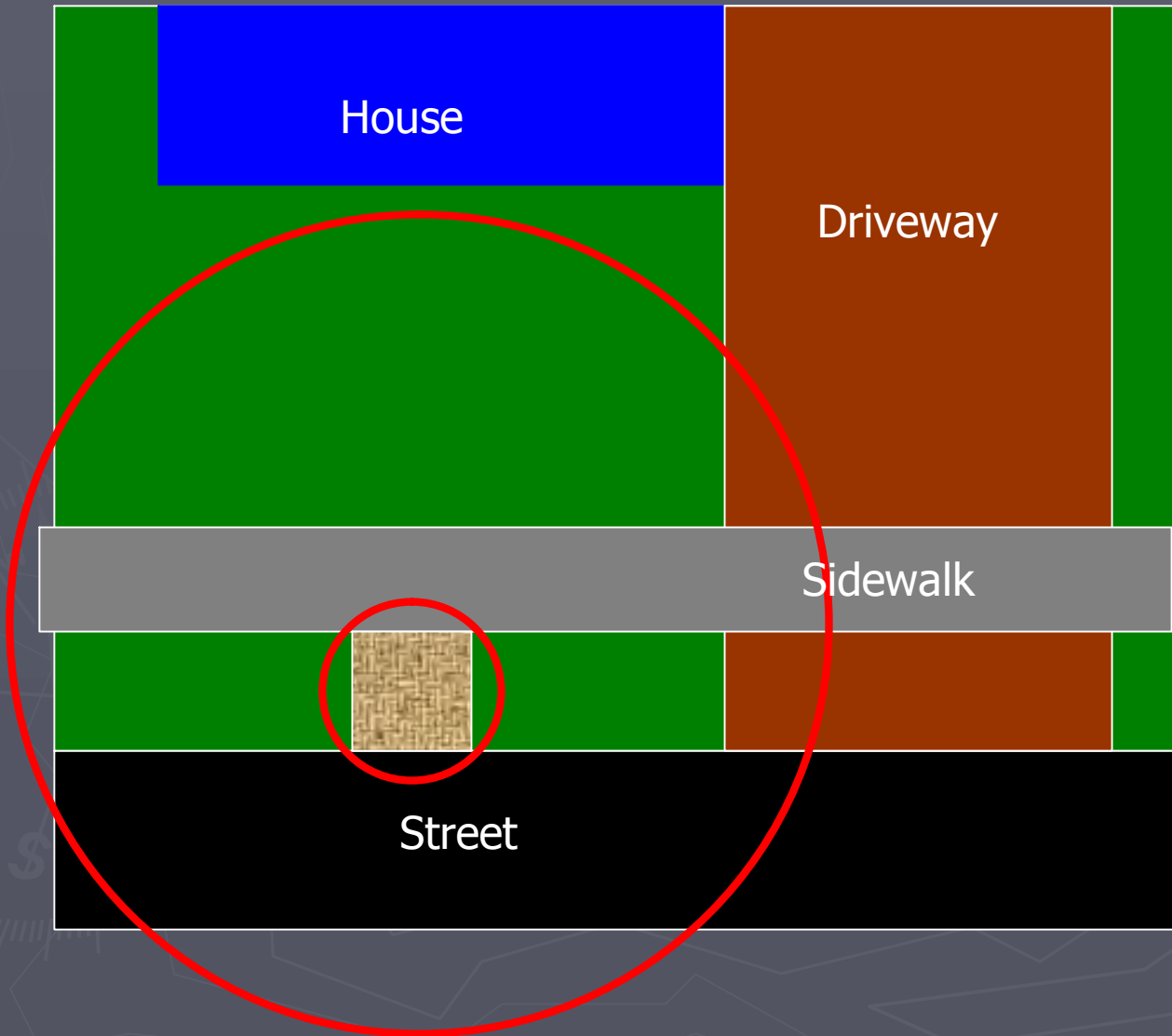
- ▶ 2''- 4'
- 100%

Functional Root Loss



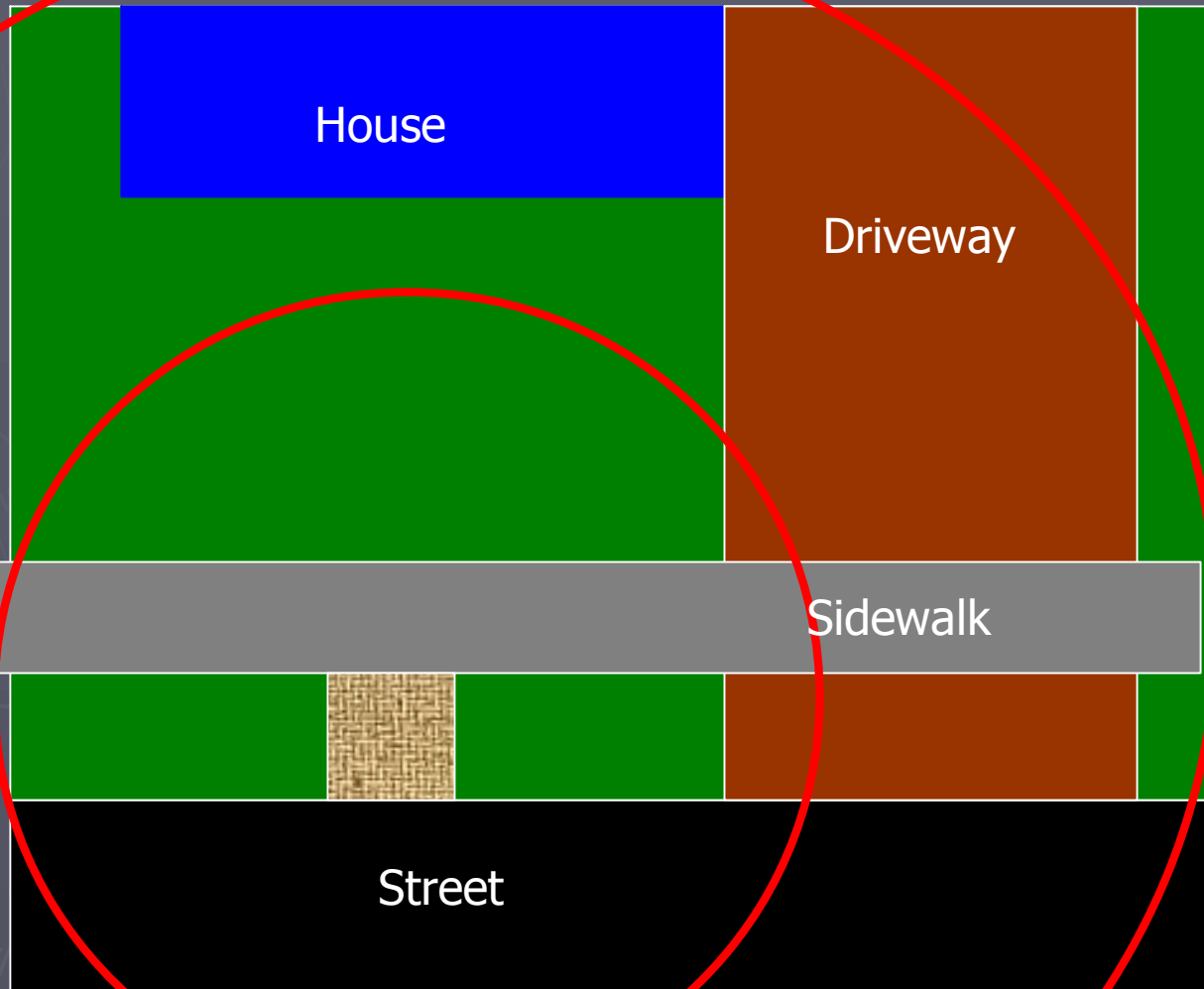
- ▶ 2'' - 4'
 - 100%
- ▶ 4'' - 8'
 - 90%

Functional Root Loss



- ▶ 2'' - 4'
 - 100%
- ▶ 4'' - 8'
 - 90%
- ▶ 20'' - 40'
 - 65%

Functional Root Loss



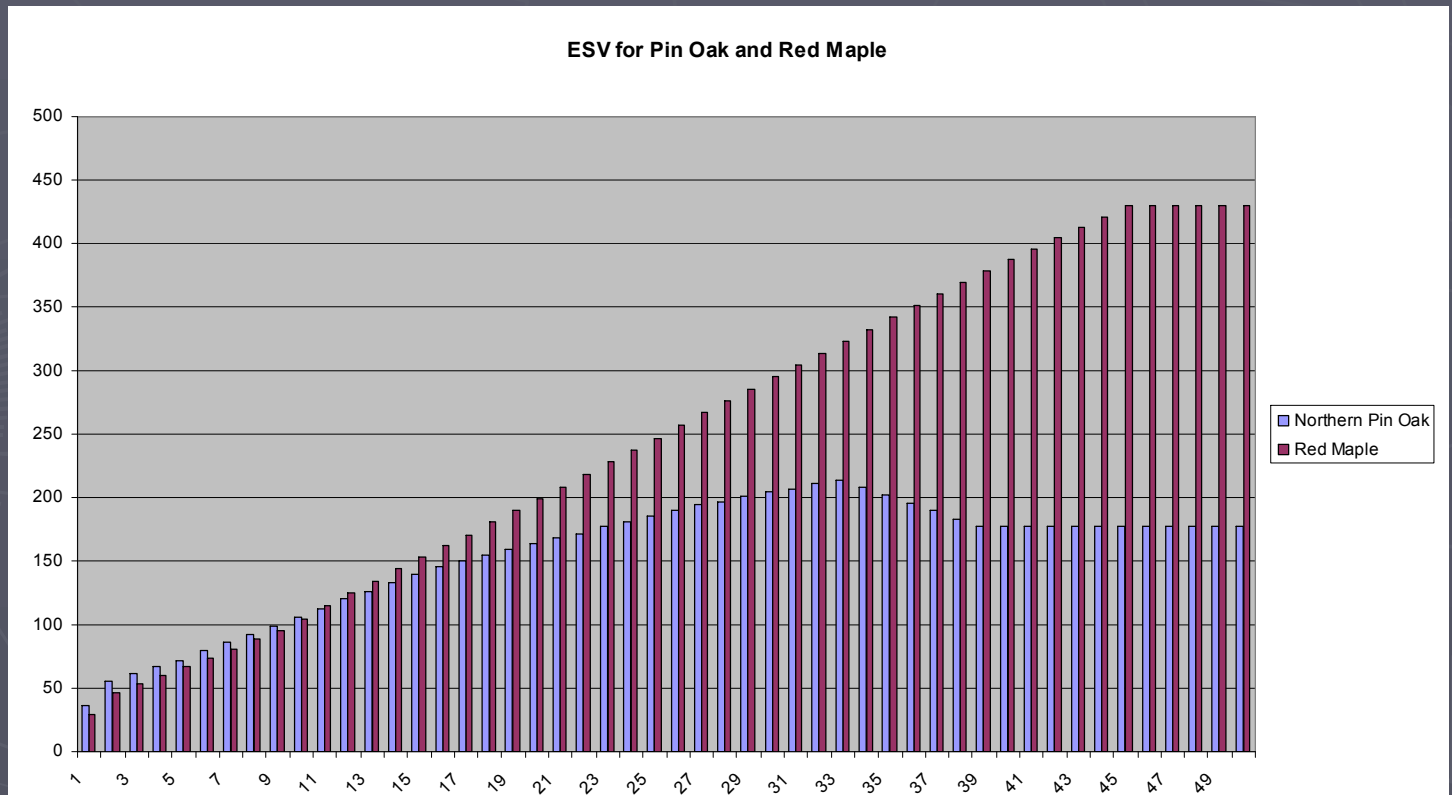
- ▶ 2'' - 4'
 - 100%
- ▶ 4'' - 8'
 - 90%
- ▶ 20'' - 20'
 - 65%
- ▶ 36'' - 72'
 - 45%

Functional Root Loss

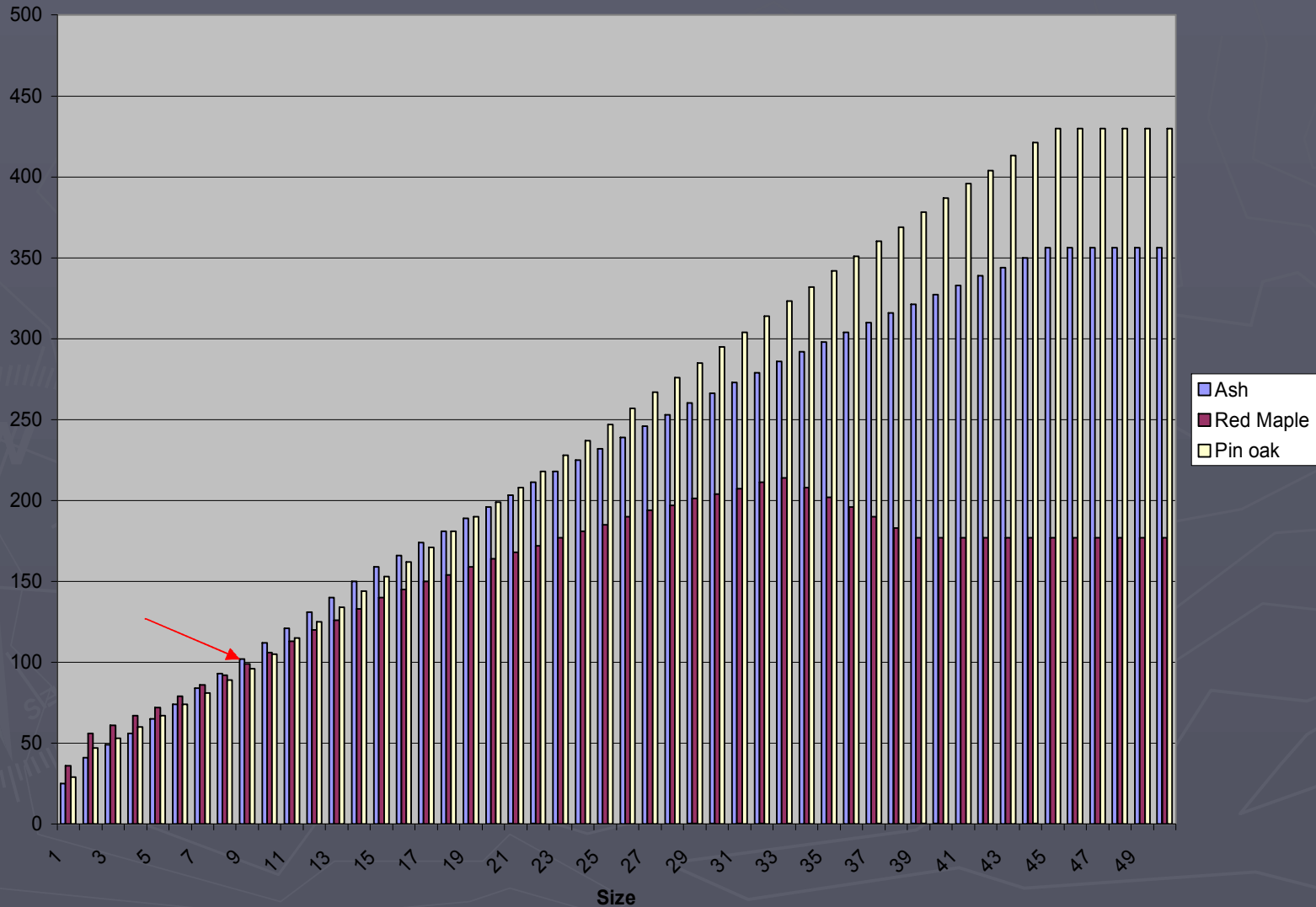


Theoretical to Applied

- ▶ Using I-Tree
 - Northern Pin Oak
 - Red Maple



Applied Modeling of Ecological Services



Theoretical Modeling of Ecological Services

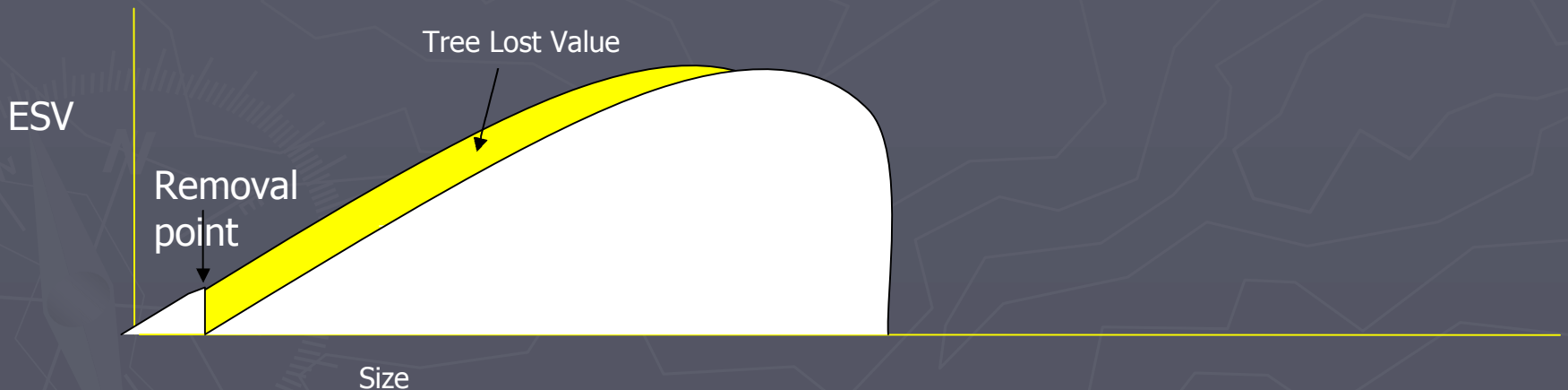


Fig. 7 Loss of Ecological Services Value of Site When a Small Tree is Removed and Replaced

Theoretical Modeling of Ecological Services

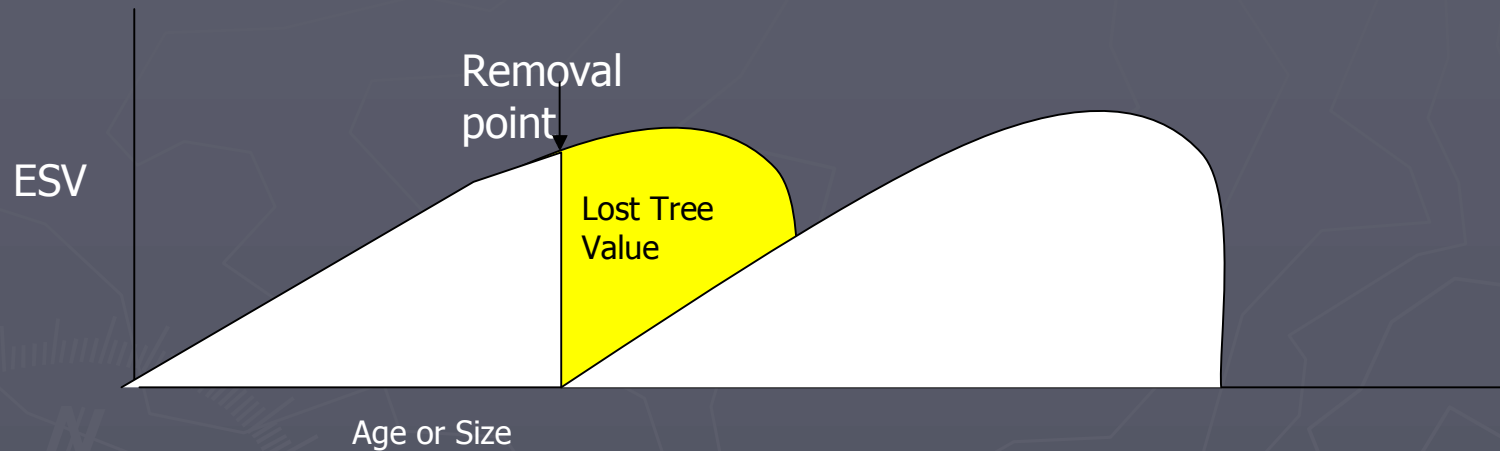


Fig. 6. Loss of Ecological Services Value of Site When a Tree is Removed and Immediately Replaced

Theoretical Modeling of Ecological Services

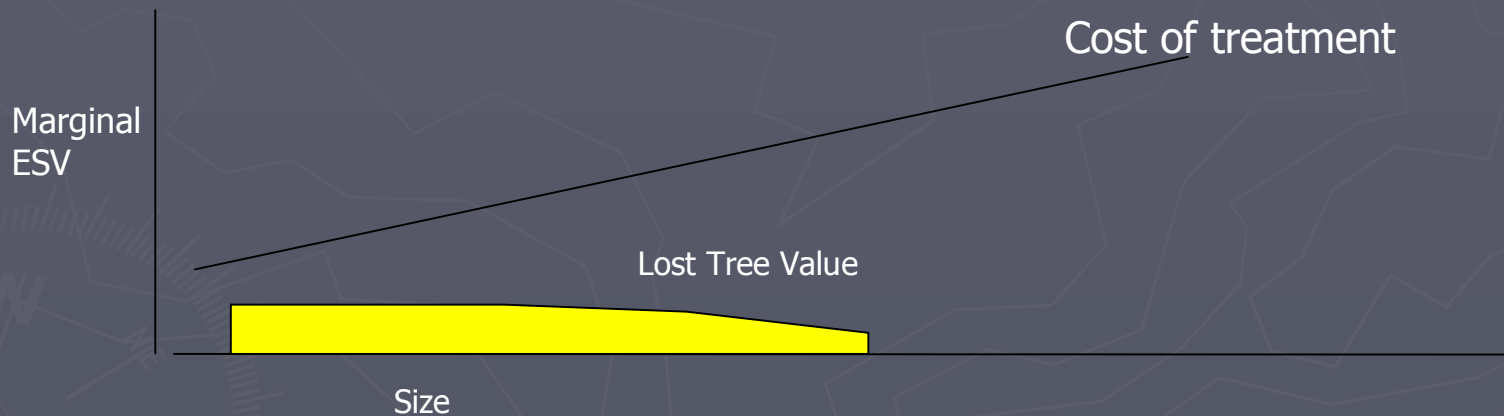


Fig. 10. Marginal Loss of Ecological Services Value and Cost of Treatment of Small Trees

Theoretical Modeling of Ecological Services

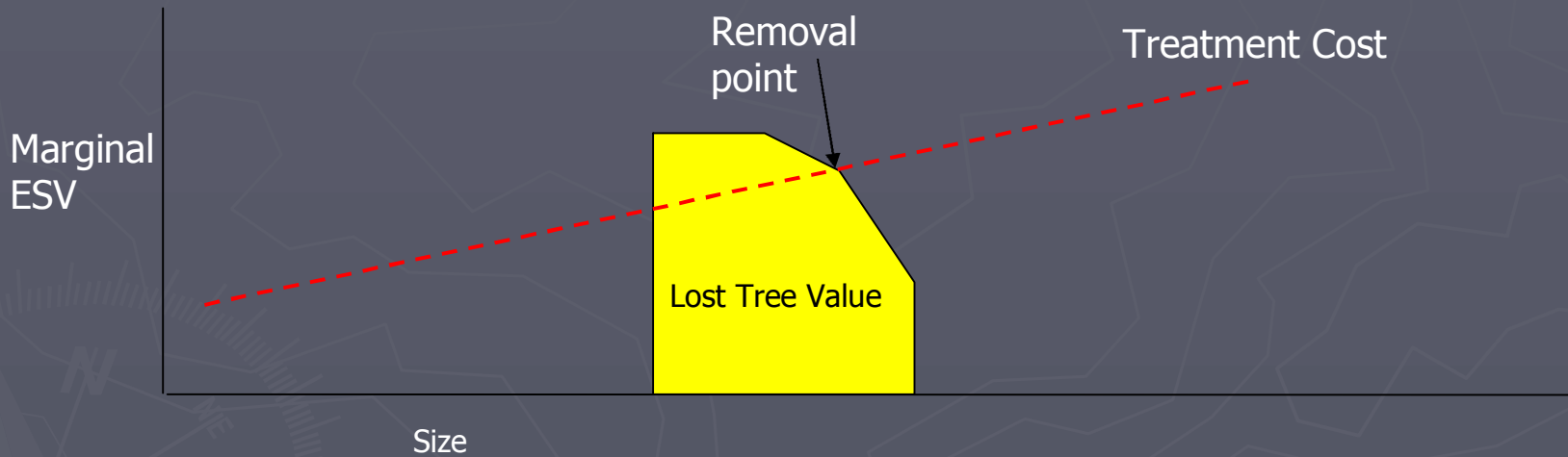
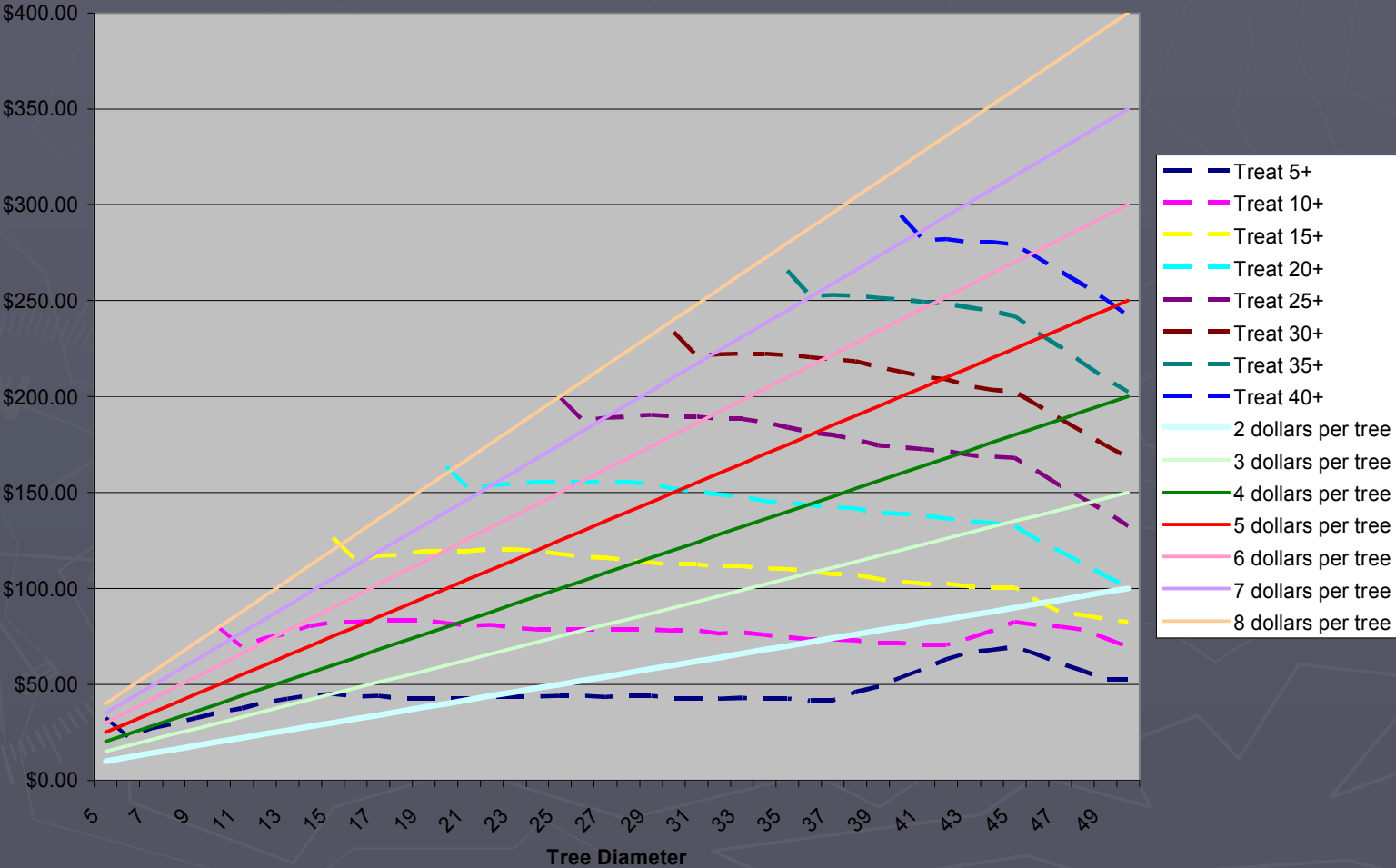


Fig. 9. Marginal Loss of Ecological Services Value and Cost of Treatment

Applied Modeling of Ecological Services

Cost Benefit



Theoretical Modeling of Ecological Services

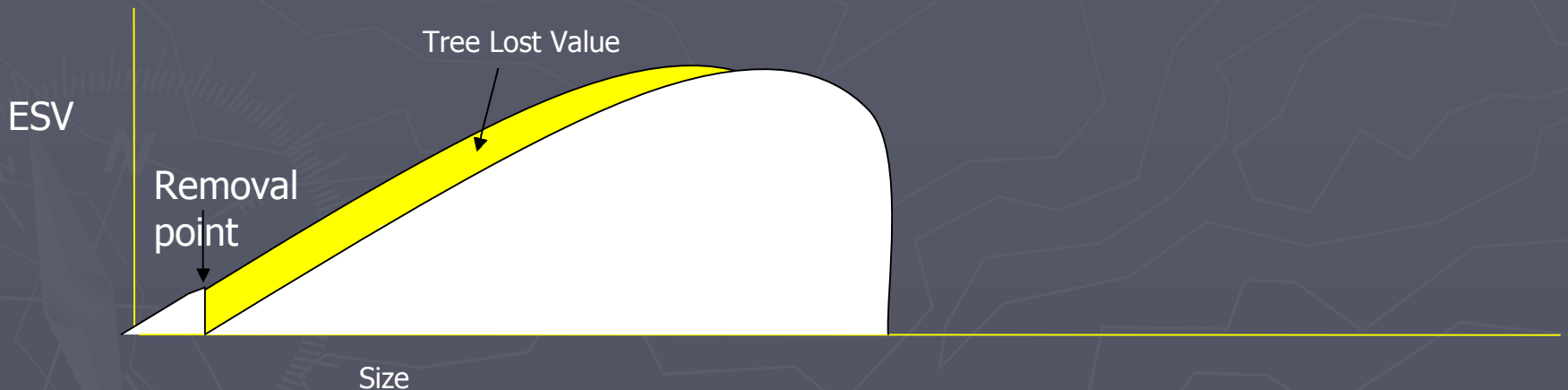


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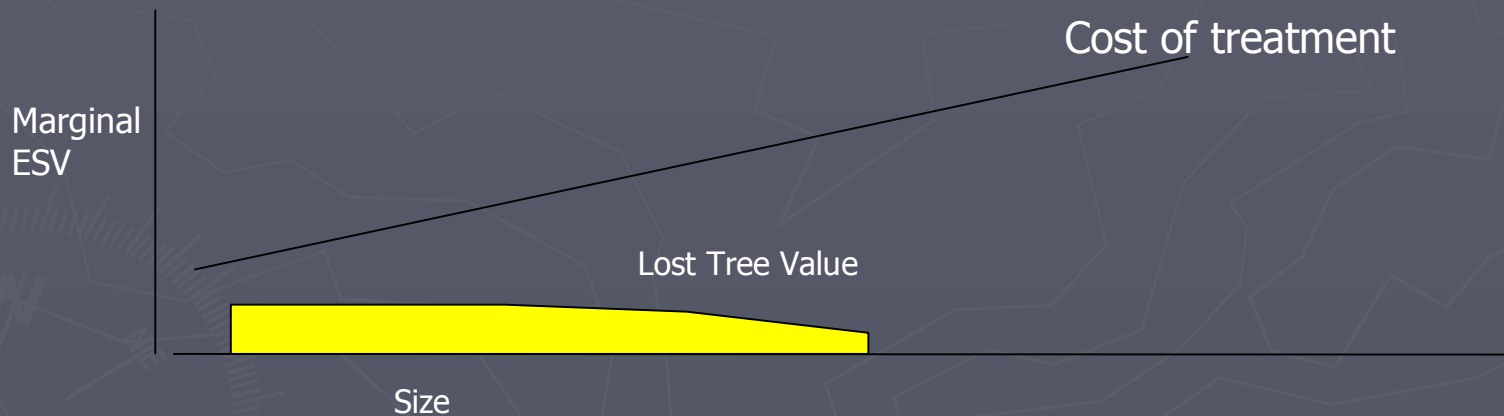
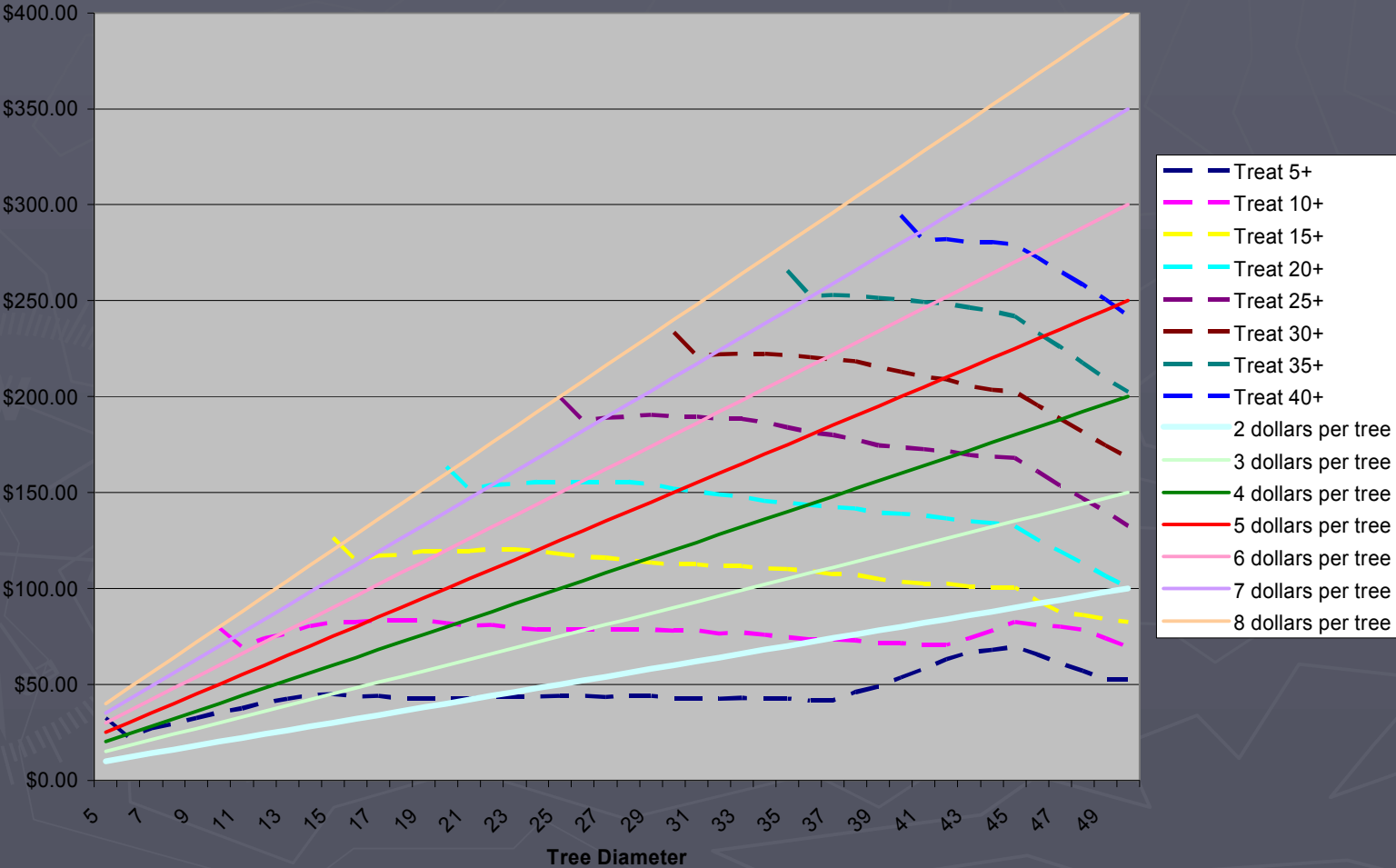


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Applied Modeling of Ecological Services

Cost Benefit



Theoretical Modeling of Ecological Services

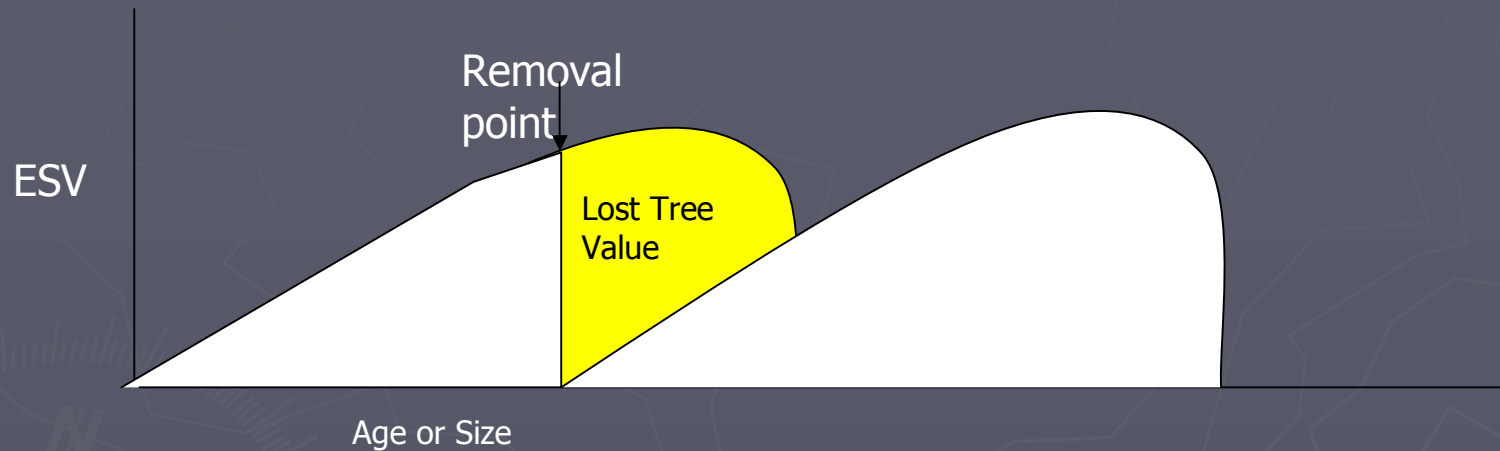


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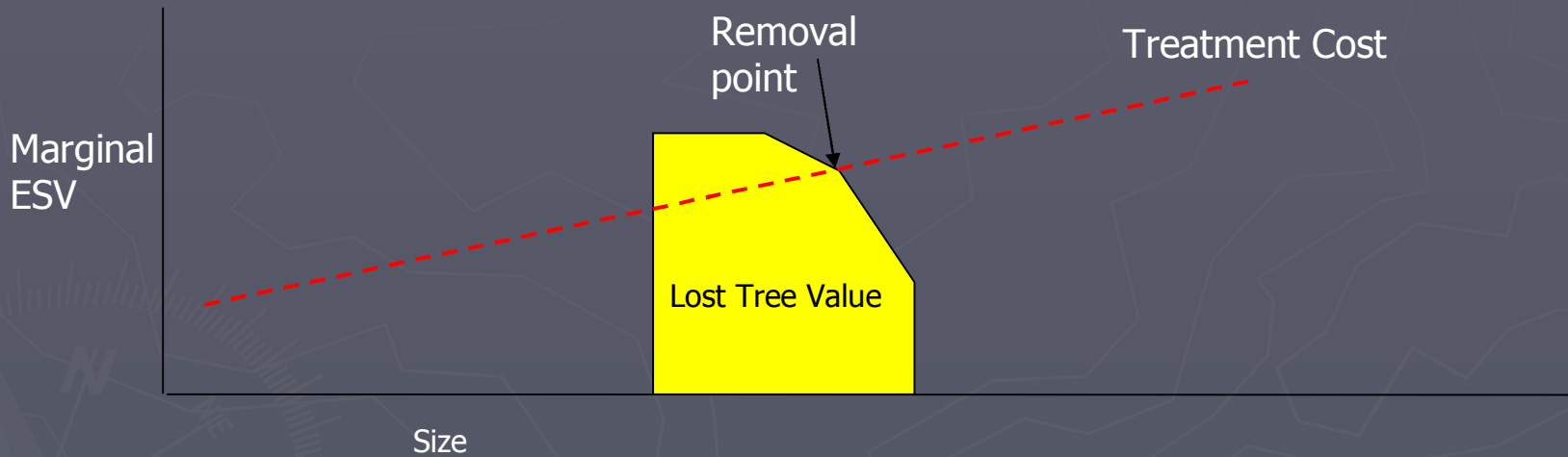
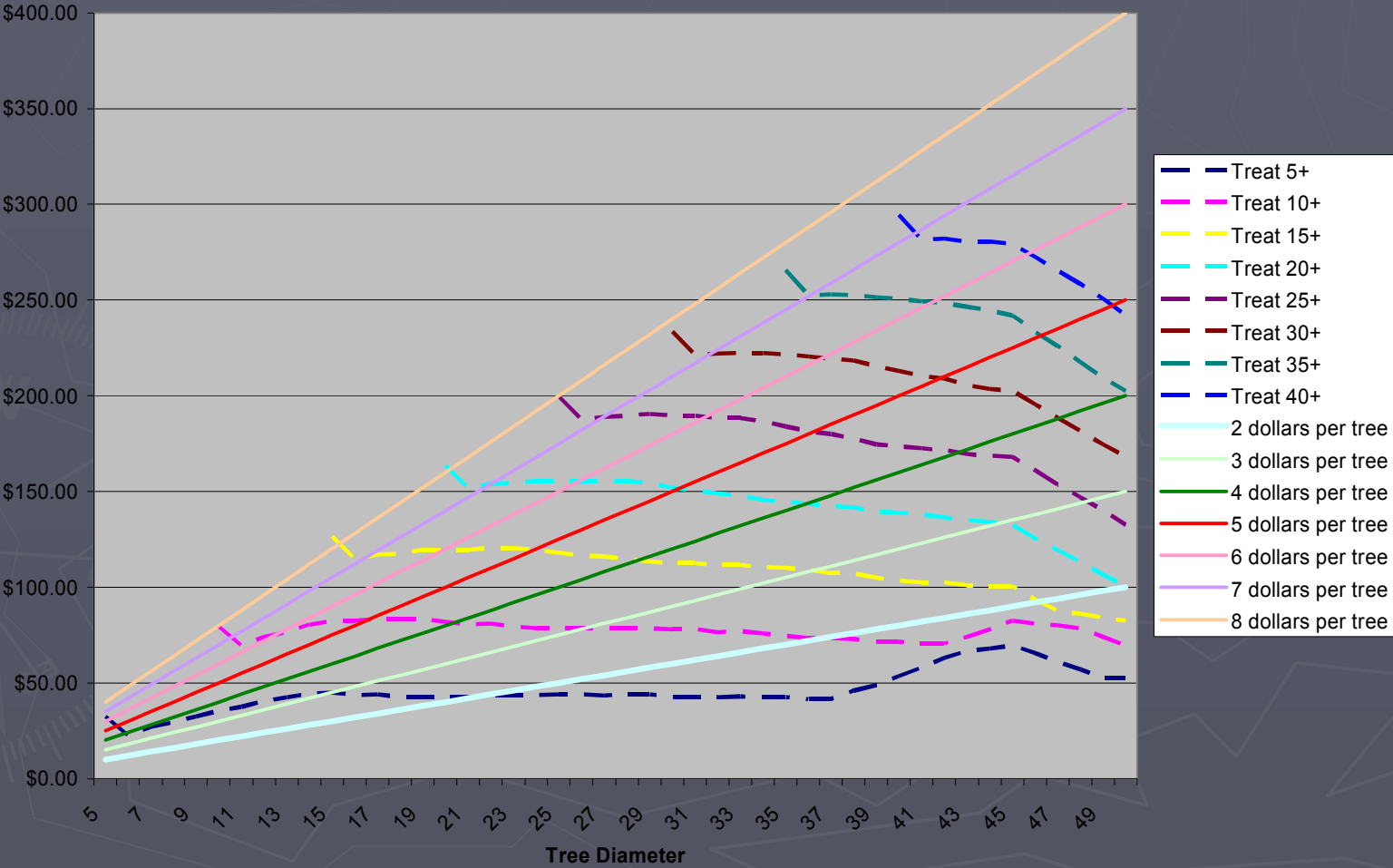


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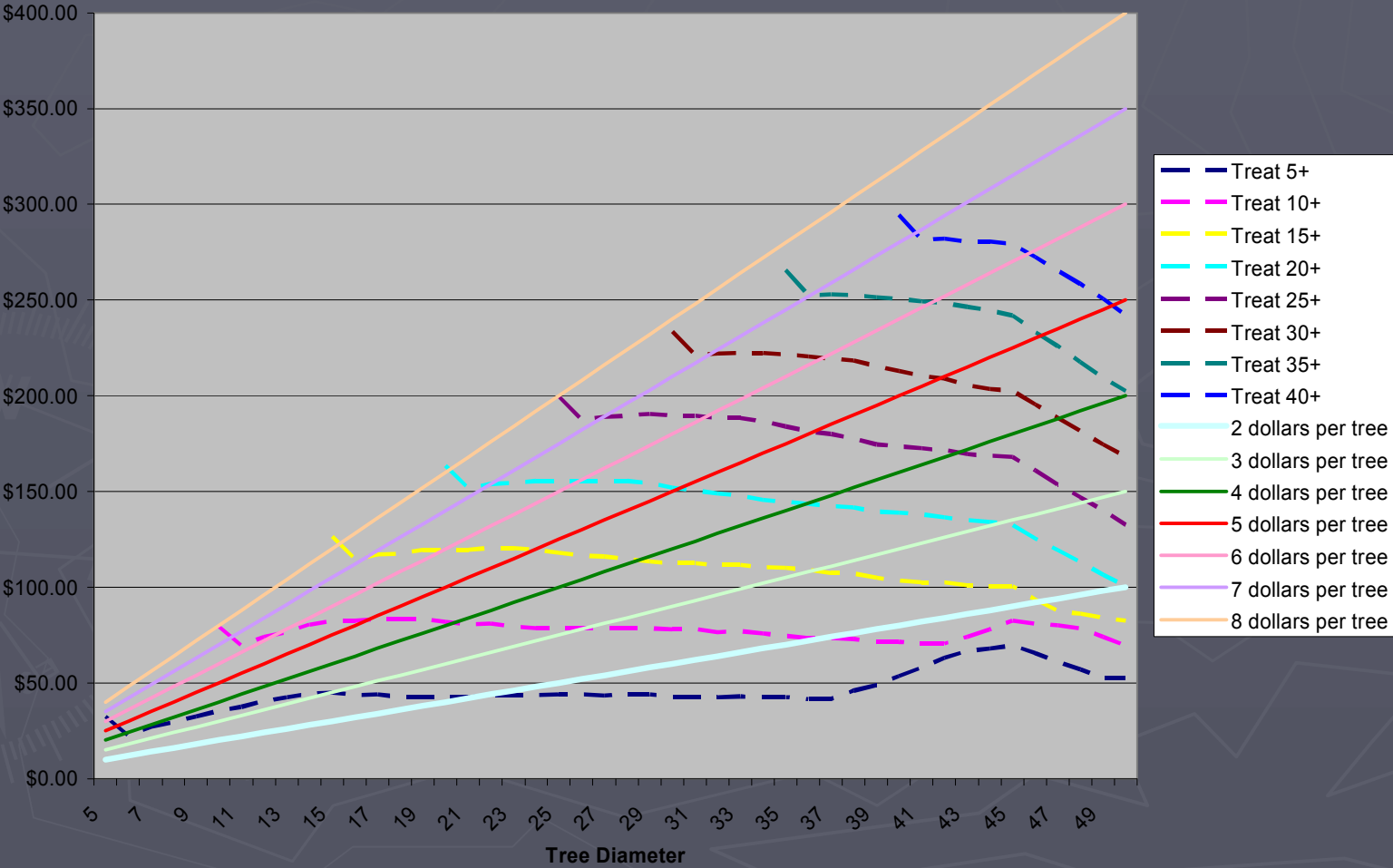
Applied Modeling of Ecological Services

Cost Benefit



Applied Modeling of Ecological Services

Cost Benefit



Factor 4: Funds To Treat Must Be Found and Their Value put into Context

- ▶ The cost of treatment must be accurately calculated.
- ▶ In-house crews may not be cheaper.
- ▶ Funds can not come by deferring other services.
- ▶ Cities do not have extra people sitting around looking for something to do.
- ▶ If you assign a new task to the city staff a current task will not get done.
- ▶ How long will the mayor accept the loss of the current task?

Factor 4: Funds To Treat Must Be Found and Their Value put into Context

- ▶ The cost of treatment must be understood.
- ▶ Current estimates for treatment are about \$5.00 per diameter inch to insure survival during high infestation.
- ▶ In 2011 Tree City USA communities spent:
 - \$10.15 per person on trees
 - \$30.45-\$40.60 per tree
 - Average street tree in Ohio 9.993 inch DBH
- ▶ \$3.05-\$4.06 per inch per year

Factor 4: Funds To Treat Must Be Found and Their Value put into Context

- ▶ All trees \$3.00-\$4.00 dia. inch per year
- ▶ Ash tree \$8.00-\$9.00 dia. inch per year

- ▶ More than double the cost of keeping ash trees.

Factor 5: Funds To Treat Must Be Sustainable for 20 years

- ▶ If you begin to treat then stop you still are faced with all of the removal cost you had when you started treating.

King
Sisyphus



Zeus punished Sisyphus by consigning to an eternity of useless efforts and unending frustration.

Thus it came to pass that pointless and/or interminable activities are sometimes described as *Sisyphean*

Factor 5: Funds To Treat Must Be Sustainable for 20 years

- ▶ If you begin to treat then stop you still are faced with all of the removal cost you had when you started treating.
- ▶ Over 20 years there is the potential of 6 Mayoral administrations and 11 city councils.
- ▶ All must agree that spending the extra money is worth it.
 - Mayors get elected by being different than the previous guy!



Two Questions for Municipalities

- ▶ Do you know how many ash trees you are responsible for?
 - Do you know where they are?
 - ▶ Exactly?
 - Do you know how big they are?
- ▶ If they all died in one or two years could you remove them without economic disaster?

Two Questions for Municipalities

- ▶ Do you know how many ash trees you are responsible for?
 - Do you know where they are?
 - ▶ Exactly?
 - Do you know how big they are?
- ▶ If they all died in one or two years could you remove them without economic disaster?
- ▶ If you can not answer “yes” to both you are gambling more than you can afford to loose.
- ▶ Yes we can treat to preserve.
- ▶ Will your community fund it?

Two Questions for Municipalities

- ▶ Do you know how many ash trees you are responsible for?
 - Do you know where they are?
 - ▶ Exactly?
 - Do you know how big they are?
- ▶ If they all died in one or two years could you remove them without economic disaster?
- ▶ Until natural mortality reduces the ash population to a point you can say "Yes" to #2 you are overextended.

Using Treatment to Slow Removals

► Advantages

- Extend removal cost over more years
 - Less cost per year

► Disadvantage

- First treating then removing is seen as failure by residents
- Added total costs

Using Treatment to Slow Removals

▶ One possible model

- 1 Divide total population of ash into 10 groups based on size
 - ▶ Each group has the same cost of removal and replacement.
 - ▶ Group 1 will have all the small ash and will have more individuals than group 10.

- Remove and replace one group a year starting with the smallest and treat the oldest groups that will not be removed for 3-4 years.

Thank you

Questions?

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