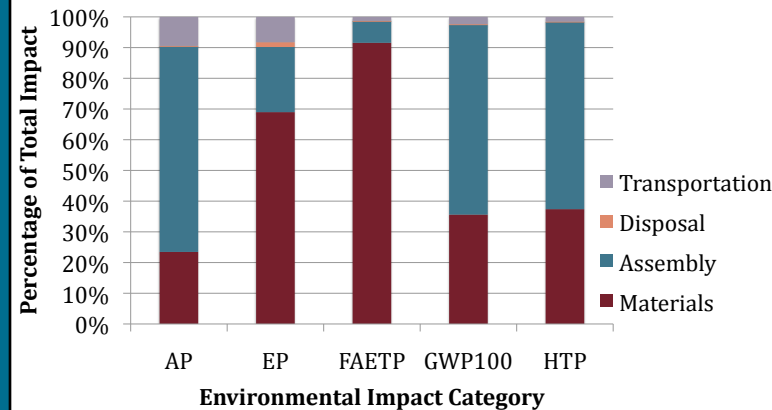
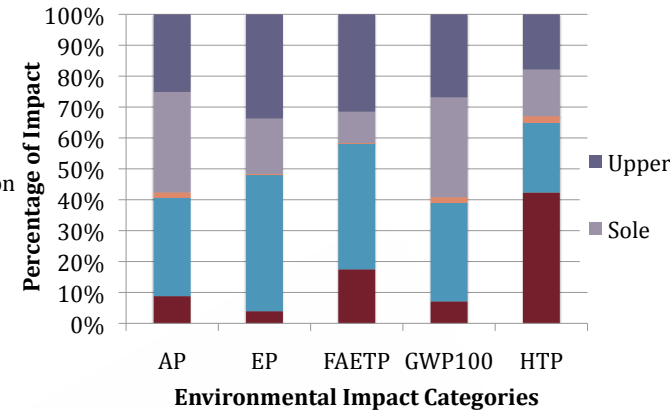


Now, put yourself in a designer's shoes...how would you reduce the impact of footwear?

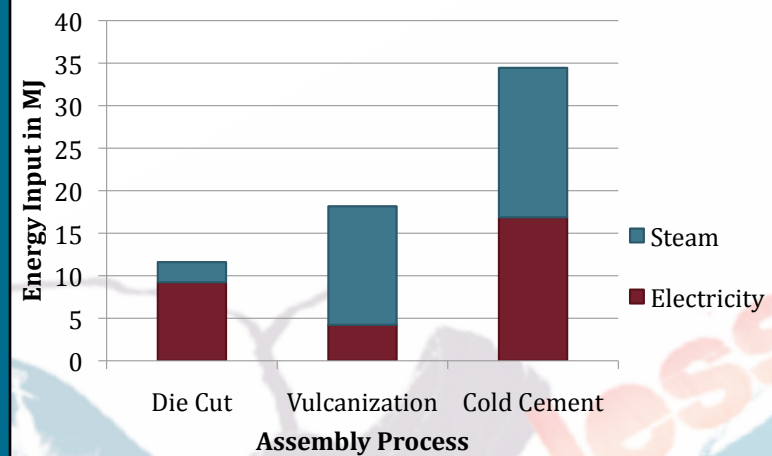
Focus on materials and assembly.



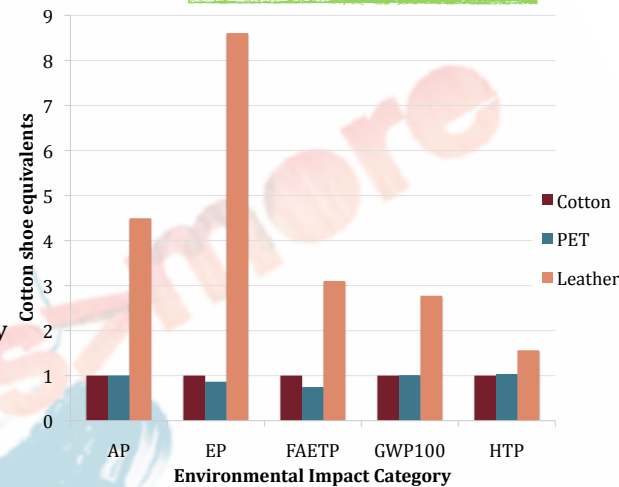
Consider all parts.



Use vulcanization or die-cut.



Replace leather.



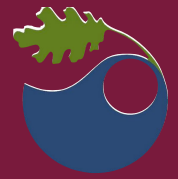
As designers continue to use EcoSTEP over time, they will learn specifically how shoe designs can be altered to potentially reduce Simple Shoes environmental footprint.

Many more conclusions are expected to be found through extended use of the model and will hopefully be incorporated into footwear production by Simple Shoes designers.

The Development of a Standard Tool to Predict the Environmental Impacts of Footwear for Deckers Outdoor Corporations

Bren School of Environmental Science and Management

Ariana Arcenas, Julie Holst, Takuma Ono, Matt Valdin
Faculty Advisor: Sarah Anderson



BIGGER, BETTER AND FASTER HAVE TAKEN THE WHEEL AND SPUN US OUT OF CONTROL. WE'VE BEEN MELTING GLACIERS, BANISHING BEE COLONIES AND DEVOLVING THE HUMAN RACE INTO A RAT RACE.

IT'S TIME TO GET GREEDY FOR THE STUFF THAT REALLY MATTERS.

WE'RE TAKING A STAND AGAINST THE SHENANIGANS OF EXCESS.

**IT'S TIME FOR MORE GIVE THAN TAKE
MORE GOOD THAN BAD
MORE POSITIVE THAN NEGATIVE**



WE PROPOSE A RECALCULATION OF THIS FUZZY MATH. A SIMPLE EQUATION TO HELP PLAY IN AN AGE WHERE LESS>MORE.

Do you know how much carbon dioxide is generated from a pair of shoes? 15 kg.

How many pairs of shoes do you own? If you're like the average Bren student you own 15 pairs.

This equates to 67 million metric tons of CO₂ from American's shoes -- more than the total annual CO₂ emissions of Finland.

By changing materials, designers can significantly reduce the CO₂ emissions of shoes. Here, the emissions of a suede Satire sneaker is equivalent to that of almost four cotton Satire sneakers.



Suede:
15 kg CO₂

Cotton:
4 kg CO₂

Problem: Despite Simple Shoes' environmental efforts, the impacts of alternative designs can be anecdotal and inaccurate. Without rigorous analyses, designers cannot be certain that their product sustainability efforts are successful.

Project Goal

To create a model to predict the environmental impact of any pair of shoes during the design phase.

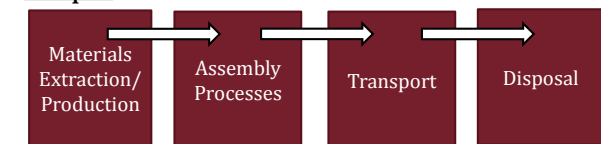
Methods: Life Cycle Assessment

Functional Unit: A pair of shoes to protect a woman's size 7 feet or a man's size 9 feet for 2 years.

Data:

- Data was collected from the client and their supply chain
- Several shoes were disassembled to learn about the shoe parts and generate a list of possible materials.

Scope:



Software Used:

PE America's GaBi4, its extension I-Report, and the Ecoinvent database.

Potential Impacts Assessed:

- Acidification (AP)
- Eutrophication (EP)
- Freshwater Aquatic Ecotoxicity (FAETP)
- Global Warming (GWP)
- Human Toxicity (HTP)

ECOSTEP (Simple Tool for Environmental Prediction)

Visible parts:
Non-visible parts:



Once up to 7 shoe designs are entered into EcoSTEP, the model calculates the environmental impacts of each shoe and its parts. The results are displayed in an easy to read output display so that different designs can be compared.

> Section 1: The Basic Information	Shoe 1
Is it a Men's 9 Shoe or Women's 7?	Women's 7
What kind of shoe would you like to design?	Low-top Sneaker
If applicable, enter upper area in in2	If applicable, enter upper area in in3
Look at entire life cycle or only shoe components?	Look at entire life cycle
How is the shoe assembled?	Vulcanization
> Section 2: Shoe Upper (Vamp, Quarter, Tongue)	
>> Upper Material 1	
What is the primary material used for the upper?	Cotton
What % of the upper does this material cover?	100
What % of the upper does this material cover as an overlay?	10
>> Upper 2	
What 2nd material is used for the upper?	Hemp
What % of the upper does this material cover?	10
What % of the upper does this material cover as an overlay?	0
> Section 3: Accessories	
What material is used for the laces?	Organic Cotton
>> Eyelets	
What material are used for the eyelets and vents?	Copper
How many eyelets and vents are on this shoe?	12
Section 4: Lining	
>> Lining Material 1	
What is the primary material used for the lining/foam?	Cotton
What % of the shoe interior is covered by this lining/foam?	100
What % of the interior does this material cover as overlay?	0
>> Ped-bed Insert	
What material is used for the ped-bed?	Polyurethane
What material is used for the ped-bed wedge?	Polyurethane
> Section 5: Non-visible Reinforcements	
What material is used for the toe box?	Sheet PET
What material is used for the heel counter?	Sheet PET
What material is used for the arch cookie?	Polyurethane
> Section 6: Sole	
>> In/Mid Soles Layers	
What is the 1st material used in the in/mid sole?	Latex Foam
What is the 2nd material used in the in/mid sole?	Sheet PET
What is the 3rd material used in the in/mid sole?	Redboard
What is the 4th material used in the in/mid sole?	Latex Foam
>> Soles with Specific Thickness 1	
What is the 1st material used in the in/mid sole?	- None -
How thick is this material (in mm)?	0
>> Outsole	
What material is used for the outsole?	Reused Car Tire
What is the thickness of the outsole (in mm)?	5
What material is used for the foxing?	Synthetic Rubber