All-natural cannabis pipes made from Arundo Donax to promote removal and spread awareness of the invasive

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Environmental Problem

Arundo Donax, or giant reed, is an invasive plant species that thrives around waterways. Arundo stems grow up to four inches per day and reach a height of 30 feet in riverine habitats. The plant occupies hundreds of thousands of acres across the country, and approximately 10,000 acres throughout California. In the Santa Clara River Watershed (SCRW), near UCSB, millions of public dollars are spent on managing the species, but spatial analyses reveal the infestation is spreading despite these control efforts.

Once established, Arundo outcompetes native vegetation, deteriorates habitat quality, and exacerbates fires and floods

Water Consumption

Arundo has the ability to grow in various types of soil, including in saline conditions. Since this species is drought tolerant and adapts to many weather and soil structures, one of the ways it outcompetes local vegetation is by consuming all the available water.

Fire Risk

The presence of Arundo increases the frequency and intensity of fires due to its dense fuel load. Arundo's characteristic vertical growth paired with its well-ventilated structure sustains fires and acts as a conveyor across the landscape.

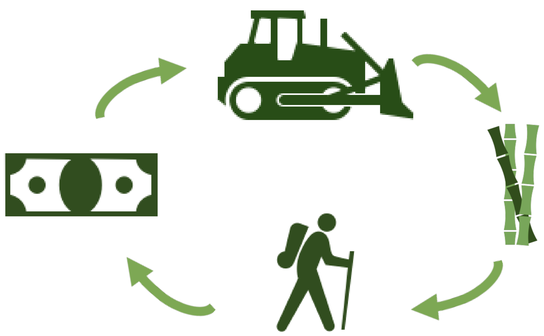
Flood Damage

While Arundo roots reinforce river banks, the stems that fall into the river redirect the flow of water, resulting in steeper banks and increased channel depth. Stems can also clog waterways, obstructing the natural water flow and increasing the risk of flooding to adjacent lands.

Habitat Restoration

Arundo is an excellent colonizer and decreases the quality of invaded habitats. Local plant species lose land space and are shaded by the tall stems. Its dense structure is nearly impossible for wildlife to navigate and the lack of horizontal structure makes it unsuitable for birds.

Environmental Solution



Bad Grass aims to launch an Arundo-based product that would introduce consumer dollars to removal efforts. We will partner with organizations that remove Arundo to get the biomass and pick out the stems we can use to manufacture our product. Consumers will purchase these products and Bad Grass will reinvest a portion of the profits back into Arundo removal.

Product Research Process

Bad Grass investigated different industries to assess the feasibility of introducing an impactful product that could sustain a small-scale business operation. Through our early interviews and the available literature, we filtered out industries where an Arundo product would be unlikely to succeed. In researching, we found there are many studies and experiments testing the potential of using Arundo biomass, but there is far less information available about starting a business. The below diagram highlights our key findings and the logic underlying our pivots, leading us to the conclusion that cannabis pipes are the most promising business opportunity.

Paper
- Low margins calls for a large supply input
- Complex manufacturing process requires expensive infrastructure
- A small number of companies control the market

Energy
- There are no biomass power plants in the SCRW
- Extensive permitting process to burn new plant materials
- Biomass power plants often only paying for transport

Animal Feed
- Large shipments for animals to maintain a consistent diet
- Farm cows follow strict diets for optimal production
- Farmers prefer to simplify animal feed sourcing

Households Products
- Some products require an intensive manufacturing process (i.e. plates)
- Arundo stems are not uniform, it is difficult to make some products (i.e. fences)
- Margins are very thin for some products (i.e. straws)

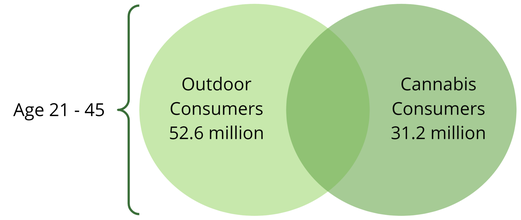
Cannabis Pipes
- Quick and replicable manufacturing process
- Short transportation distance from work-site to workshop
- Appropriately scaled supply requirement for a startup
- High margins per stem and still cost-competitive

Value Proposition

Narrative | **Sustainable** | **Convenient**

Bad Grass makes all-natural, durable, compact, compostable pipes. Perfect for outdoor adventures! They won't break in your backpack and if they get dirty, smelly, or clogged, just compost them. Pipes that make you feel good while doing good!

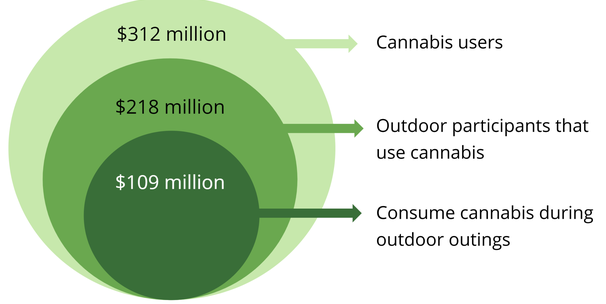
Customer Segment



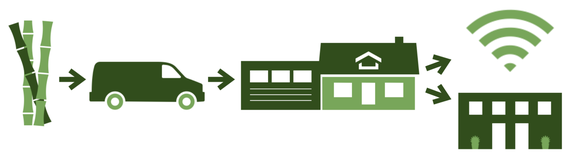
"I like joints but they are wasteful. I prefer pipes but worry about them breaking when I'm adventuring outdoors."
-Jason G. (age 29)

Market Size

We plan on selling a bundle of 5 pipes for $10. If every one of those 31 million cannabis consumers bought our product then there is a total market of around 312 million dollars. From our interviews we found that about 70% of cannabis consumers were also outdoor enthusiasts. Of those, about 50% told us they consumed cannabis while in the outdoors.



Cost Competitive



Bad Grass has a 45% profit margin. On a per acre basis, or 21,000 pipes, our estimated costs are $23,940 and revenue of $42,000, resulting in profits around $18,060 per acre. The key takeaway is the margin between price and costs indicates we can achieve a positive profit margin by introducing Arundo pipes to the cannabis industry.

Acknowledgements
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