PARKING LOT PERMACULTURE

PUTTING THE PARK BACK IN PARKING LOTS

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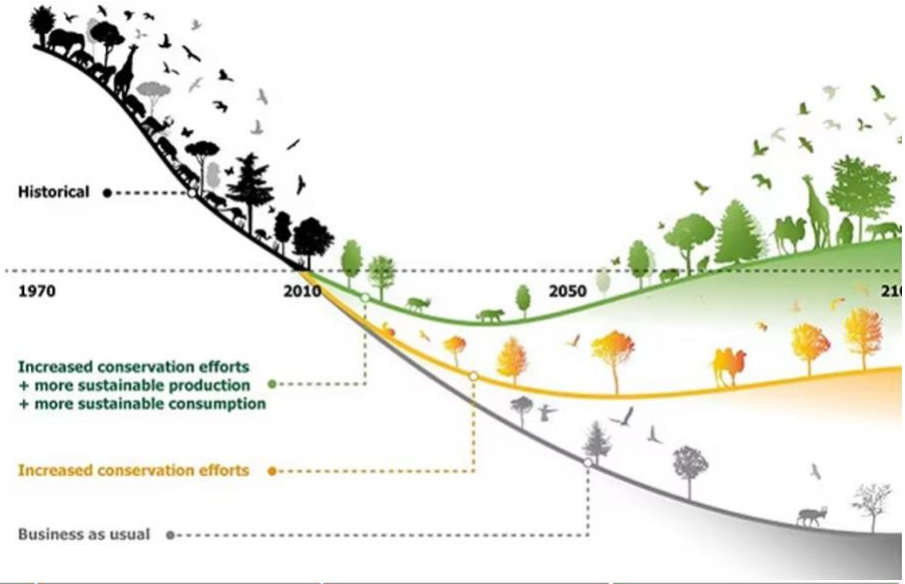
THE CHALLENGE

Urbanization destroys ecologically productive land, devastates local ecosystems, and fails to provide quality food for all city residents. By 2030, urban land cover will be three times larger than it was in 2000, and by 2035, 62.5% of the global population will live in cities We need solutions to prevent **biodiversity loss**, **food insecurity**, and **lack of access to green space** in urban areas.

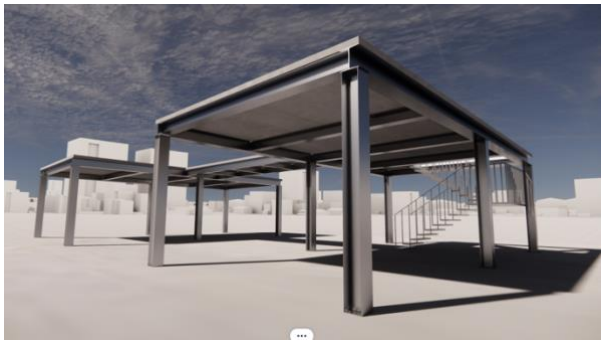
WHY DOES THIS MATTER?

1. Biodiversity is essential for supporting life on Earth by providing us with ecological services and supporting ecosystems.
2. Cities are suffering from urban environmental issues like runoff and the heat island effect.
3. Access to nutritious, quality food is a basic human right.
4. Green space restores mental and physical health and promotes community interaction.



OUR SOLUTION

… is a structure that covers parking lots and can hold native plants and food gardens, in addition to including seating for recreational purposes! Parking Lot Permaculture (PLP) is designed as one module that can be replicated to cover entire lots.



BENEFITS

Increased Biodiversity

Gardens throughout cities contribute to urban habitat, where **small spaces become interconnected** and enlarge the collective habitable landscape. One study found that plantings with **5+ native species had 198 pollinator visits**, while plots with 2 natives had only 4. Another showed that when native vegetation increased from 10% to 30%, the occupancy of **bats, birds, beetles, and bugs** increased from 30% to **120%**. Natural habitat also **replaces pest insects** (which can thrive in fragmented urban landscape) with beneficial insects.

Food Security

Communal gardens can **lessen food insecurity**, since they provide affordable and accessible food, **improve dietary intake,** as fresh produce has high nutritional content, and **strengthen relationships** among families and community members through garden involvement. A study that implemented a personal gardening program reduced the number of respondents facing food insecurity from **31% to 3%**, and another showed that vegetable consumption is three- or four-times greater in children and adults, respectively.

Combats Urban Environmental Issues

Parking lots contribute to the heat island effect and increase city temperatures by up to 22°F, so swapping this for plant material could greatly **reduce urban temperatures** and **lessen the need for cooling systems.** Replacing concrete, an impermeable surface, with green space, which retains water, **alleviates runoff** - a common issue in cities. Plants also **remove air and water pollutants**.

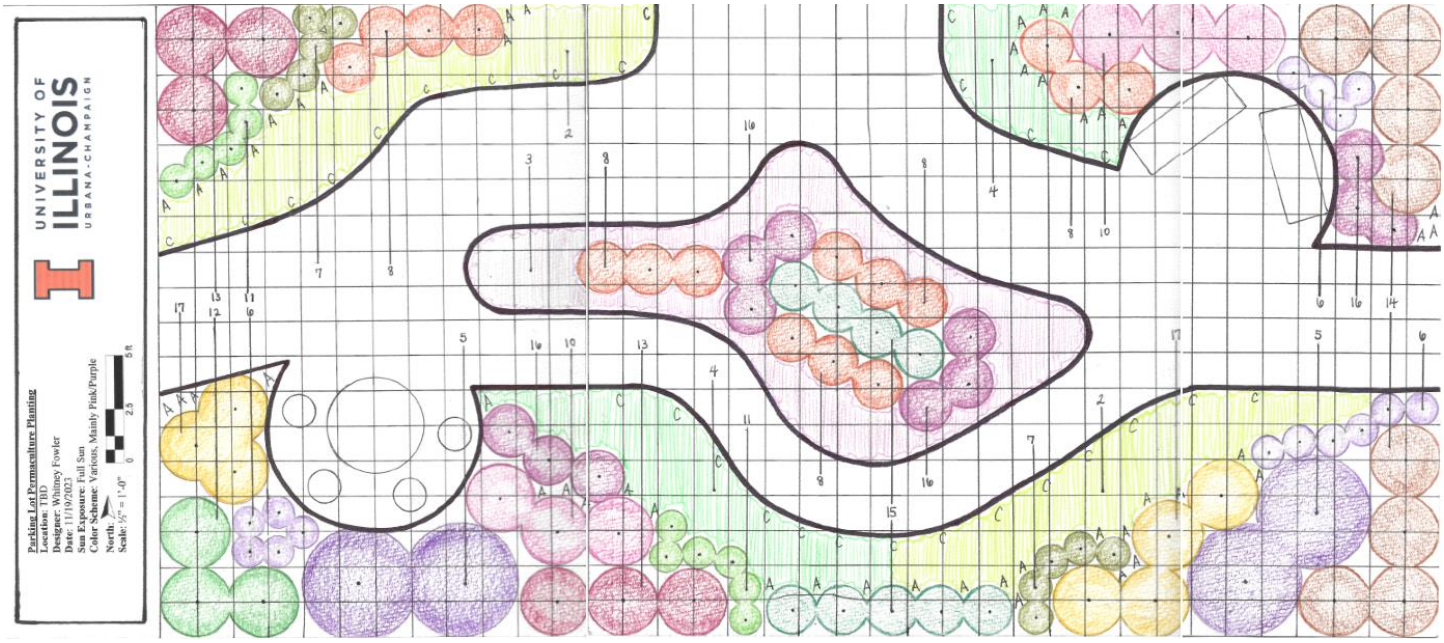
Health and Education

Conclusive research shows nature **reduces stress, anxiety, and depression** and promotes physical activity. In one study, greener neighborhoods had the **lowest risk mental health concerns** and **lessened risk of cardiovascular disease**. Parking Lot Permaculture can be used to **educate the public** about the importance of green space and even used in **school curriculum**.

IMPLEMENTABILITY

- PLP is **highly versatile**; the number of units, variation in layout, and plant selection can be customized based on preferences.
- Sustainable materials must be prioritized in construction, like recycled steel and invasive wood from conservation sites.
- A realistic cost estimate is >$45,000, when considering recycled steel, concrete, plants, soil, and labor.
- For funding, UIUC has groups like **iCAP** (Illinois Climate Action Plan), **iSEE** (Institute for Sustainability, Energy, and Environment), and **SSC** (Student Sustainability Committee), that offer monetary resources.
- Underutilized parking lots are prevalent across America. Universities and other locations would look to implement this green parking structure and improve their **sustainability ratings**, particularly those in highly developed areas.

We have also created a realistic l**andscape design** to show how one half of the structure could be designed with native plant species to best support pollinators and human preferences:



1. Crocus Vernus | **2.** Spotted Geranium | **3.** Creeping Phlox | **4.** Prairie Smoke | **5.** False Indigo | **6.** Bee Balm | **7.** Beardtongue | **8.** Butterfly Weed | **9.** Ornamental Onion | **10.** Purple Coneflower | **11.** Yarrow | **12.** Big Bluestem | **13.** Joe Pye Weed | **14.** Switchgrass | **15.** Little Bluestem | **16.** Blazing Star | **17.** Helen's Flower

CHALLENGES

Maintenance: This structure demands an ongoing commitment to care and involvement. Gardeners, volunteers, community members, and environmental leaders (such as the many environmental clubs at UIUC!) are vital to the maintenance and importance of the structure. Finding lasting leaders and members to involve in this could prove a challenge.

Ensuring sustainable practice: Despite careful consideration of materials used and selection of sustainable facets of the structure, there are still some concerns regarding the carbon footprint of the structure. A proper Life Cycle Analysis should be completed prior to project implementation.

References

Specialist: John Abelson: Engineering University of Illinois - Professor, Dept. MatSE (8/00-present) (abelson@illinois.edu)
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