URBAN FARMER

“An edible yard that brings the pollinators home”

Maggie Crowley
December 02, 2016
MSU / Plant Biosciences Building / Room 108
## Performance

<table>
<thead>
<tr>
<th>Feature</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High use of edible plants</td>
<td>69%</td>
</tr>
<tr>
<td>High use of pollinator-friendly plants</td>
<td>63%</td>
</tr>
<tr>
<td>High maintenance</td>
<td>5-7 hours</td>
</tr>
<tr>
<td>Low water use reduction</td>
<td>40%</td>
</tr>
</tbody>
</table>
Schematic Plan
Surface Type Diagram

parcel size: 9852 square feet

56% hardscape

44% vegetated

36.5% roof

29% pervious hardscape

34.5% concrete & asphalt
Vegetation Diagram

- **MT native grass mix**
- **Shrub / perennial**
- **Edible / herb**
- **Turf**
Cues to Care Diagram

- Thin mow-strip
- Mow strip used as informal path
- Workstation

Other cues to care observed:
- fences
- mown turf
- visible, crisp edges defining borders of patches
- colorful flowers
Model - front yard
Model - back yard
Model - side yards
Tea Time is an aesthetically-pleasing, functional raised bed. Entertain your guests with a fresh cup of tea, straight from the garden.

Catnip
(Nepeta cataria)
- attracts bees & butterflies
- drought tolerant
- soothing herbal tea, minty

Chamomile
(Matricaria recutita)
- attracts bees & butterflies
- calming herbal tea, sweet

Pale Purple Coneflower
(Echinacea angustifolia)
- attracts butterflies
- drought tolerant
- immune system - boosting tea, floral taste

($300-$1400)
Strawberry Salad Patch is a great alternative to traditional groundcovers that gets your kids interested in homegrown foods.

**Lettuce** (*Lactuca sativa*)

**Spinach** (*Spinacea oleracea*)

**Strawberry** (*Fragaria spp.*)

($40-$100)
Exploratory Path

Exploratory path... more than just a shortcut to the house.

($100-$300)

1. DIY path
2. Yarrow
   (Achillea millefolium)
3. Idaho Fescue
   (Festuca idahoensis)
4. Blue Grama
   (Bouteloua gracilis)
5. Lewis’s Flax
   (Linum lewisii)
6. Slender Wheatgrass
   (Elymus trachycaulus ssp. trachycaulus)
7. Pale Purple Coneflower
   (Echinacea angustifolia)
8. Bluebunch Wheatgrass
   (Pseudoroegneria spicata ssp. spicata)
9. Basin Wildrye
   (Leymus cinereus)
10. Smooth Aster
    (Aster laevis)
## Comparing Performance - Water

<table>
<thead>
<tr>
<th>Performance</th>
<th>Baseline</th>
<th>Urban Farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>gallons / month used</td>
<td>25,200</td>
<td>10,100</td>
</tr>
<tr>
<td>gallons / month over or under</td>
<td>4,150</td>
<td>10,950</td>
</tr>
<tr>
<td>cost / month for irrigation</td>
<td>$122</td>
<td>$52</td>
</tr>
</tbody>
</table>
## Comparing Performance - Vegetation / Soil

<table>
<thead>
<tr>
<th>Performance</th>
<th>Baseline</th>
<th>Urban Farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>total vegetated coverage = edible</td>
<td>0%</td>
<td>69%</td>
</tr>
<tr>
<td>total vegetated coverage = pollinator-friendly</td>
<td>19%</td>
<td>63%</td>
</tr>
<tr>
<td>property value increase / year</td>
<td>$260</td>
<td>$730</td>
</tr>
<tr>
<td>gallons of stormwater interception / year</td>
<td>600</td>
<td>7,800</td>
</tr>
</tbody>
</table>
## Comparing Performance - Human Health & Well-Being

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Baseline</th>
<th>Urban Farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restorative spaces</td>
<td>covered porches</td>
<td>view from windows covered porches raised beds</td>
</tr>
<tr>
<td>Culturally significant plants</td>
<td>turfgrass</td>
<td>MT native plants Bluebunch Wheatgrass turfgrass</td>
</tr>
<tr>
<td>Learning opportunities</td>
<td>none</td>
<td>Plug-and-plays</td>
</tr>
<tr>
<td>Human comfort zones</td>
<td>covered porches turf area</td>
<td>covered porches work area turf area edible area</td>
</tr>
<tr>
<td>Play spaces</td>
<td>turf area</td>
<td>turf area nature playground</td>
</tr>
</tbody>
</table>
## Comparing Performance - Materials & Energy

<table>
<thead>
<tr>
<th>Performance</th>
<th>Baseline</th>
<th>Urban Farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>pounds of fertilizer applied to turf / year</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>hours / year spent mowing turf</td>
<td>20</td>
<td>4.5</td>
</tr>
<tr>
<td>yearly CO₂ emissions from mowing turf (lbs)</td>
<td>433</td>
<td>27</td>
</tr>
</tbody>
</table>
Making Urban Farmer a reality

Upfront plant costs

Maintenance

Soil

Pollinator homes
Urban Farmer
“An edible yard that brings the pollinators home”

THANK YOU
QUESTIONS? / COMMENTS?
THE MINIMALIST
“Spend less time and money taking care of your landscape and simply enjoy it.”

Haley Craven
December 2, 2016
MSU / Plant Bioscience Building / Room 108

Design Concept:
This design is based upon the rotation of seasons throughout a landscape and having seasonal interest every direction you look.
It uses curvilinear form to create the idea of the cycle through the different seasons.
PERFORMANCE
goals and benefits

- Site management through plant diversity
- Drought tolerant plant species
  - Most found in the City of Bozeman Planting and Outdoor Watering Guide
- Small but high impact on human senses

Sources: City of Bozeman Outdoor Watering Guide
EXISTING

plan view

THE MINIMALIST

• No biodiversity
• Alley loaded
• Small setbacks
PROPOSED

plan view

THE MINIMALIST
• 100% turf reduction
• Human function
• Layers of plantings
THE MINIMALIST

- Curvilinear design
- On ground plane, tree placements, hardscape

PROPOSED schematic design

- 100% turf reduction
- Human function
- Layers of plantings
- Curvilinear design
- On ground plane, tree placements, hardscape
PROPOSED design performance

BEFORE
• 46540 gallons of water used a month
  -Over EPA Water Budget monthly allowance by 38659 gallons
• Existing tree benefits
  -1700 gallons storm water intercepted/year
  -470 lbs of CO2 reduction
  -Increases property value $94.22
• 170 square feet of relaxation space in front yard/side of house

AFTER
• 1892 gallons of water used a month
  -Under EPA Water Budget monthly allowance by 5989 gallons
• New tree benefits
  -1900 more gallons storm water intercepted/year
  -886 more pounds of CO2 sequestration
  -Increases property value $258.31
• Additional 137 square feet of relaxation space in back yard
APPLICATION ideas

THE MINIMALIST

- Plug into own landscape
- Sun levels, locations, area sizes
- Drought tolerant with seasonal interest

1) Sunny Boulevard
2) Turf-Less Frontyard
3) Sheltered Property Line
4) Shaded Backyard
1) **SUNNY boulevard**

**WINTER**

- Low maintenance
- Can still shovel snow
- Still “grassy” boulevard
2) **TURF-LESS**

frontyard

**SPRING**

- Continual flowering
- Creates privacy
- Plant layers
- Conventional plants in different way
3) SHELTERED

property line
SUMMER

THE MINIMALIST

- Collaboration with neighbors
- Shade tolerant
- Low growing
4) SHADY backyard

THE MINIMALIST

- Added privacy
- Trees help with seclusion
- Low maintenance and more usable
- Always shaded
**THE SURVIVOR**

**SUSTAINABILITY | INDEPENDENCE | CONSERVATION**

The survivor is a design concept meant to allow the homeowner the ability to produce their own food and medicinal plants on their property, with minimal water consumption and labor input. Native plants are prioritized over non-natives in the spirit of creating a more region-specific, urban forage experience.

The homeowner should have the ability to produce their own food but not feel constrained by the need to.

Fun, exploratory elements such as a mushroom garden, or forage plants can be implemented as site conditions allow but do not directly contribute to the central themes of independence and sustainability.

---

### PERFORMANCE TARGETS

The design performance targets for this scenario were set with the central themes in mind. Water usage is kept at a minimum while pollinator-friendly and edible plants were maximized to support sustainability and resource independence. Maintenance needs are minimized so that the urban food production efforts don’t take over the homeowner’s life, leaving no room for other activities.

- **high water use reduction (81%)**
- **high edible vegetation (84%)**
- **6+ hours / week maint.**

### SITE OPPORTUNITIES

This site is generally very narrow, being a common space between two other two story houses. However, it does get a large amount of morning and evening sun at its East and West ends, respectively.

Another noteworthy characteristic is the roof runoff, most of which is put out on the two northern downslopes of the structure. The figures below are representative of the volumes expected from a .5” rain event.

- **Nutrient rich runoff (approx. 41.6 gallons of water per growing season)**
- **Squirrel and bird feeding area**

### HYDROZONES

The Plant Pallet and hydrozone layout were informed by the site opportunities, specifically the amount of sun and availability of water. Some zones were created for exploratory purposes or to tie in with the surrounding aesthetic vernacular.

### WATER SMART VEGETABLE BOXES

Raised or in-ground vegetable boxes are a simple and effective way to integrate vegetable production into the urban landscape while still maintaining a clean and put-together aesthetic.

This vegetable box design uses easily accessible materials and a more water-conscious and easily maintained plant pallet to keep costs to the homeowner down while still providing the homeowner with a sense of control. **You will need: 4’ x 11’ of space, 44 9x18 cinder blocks, 2 yd. of topsoil, vegetable seeds or transplants, 10’ of drip irrigation line, and approximately 11.6 gallons of water per growing season.**

For best sunlight penetration make sure the rows go north-south and, if you have a variety of crops, to plant smaller/shorter crops closer to the direction the sun is mostly coming from (in this case, the west).

### URBAN FORAGE BACKYARD

The design of this element strives to provide a place where people can move through on their leisure and perhaps some of the more easily accessible edibles.

Existing plant material was used as much as possible to reduce the extra irrigation required during establishment and the need to weed the area left for the plants to attain maturity.

Adding tree cover, even in shaded areas will help to reduce water needs of the plants below.

### URBAN FORAGE SIDEYARD

These perennial bed strips along the side of the house provide some additional privacy to the homeowner as well as aesthetics cohesion with some of the other typical plantings in the area, albeit applied to a larger area.

Colorful accents to the strips take advantage of the more plentiful sun in addition to providing a pop of brightness.