Urban pollinators: bee diversity in Iowa City, IA

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We all depend on managed and wild pollinators for valuable ecosystem services!

For example:

Managed and wild bees support agriculture
- Honey bees (Apis)/bumble bees/solitary bees

Wild native bees pollinate in urban gardens/ yards
- Bumble bees, mining bees, squash bees and leaf cutting bees (The Xerces Society for Invertebrate Conservation, 2014)

http://www.cancertruth.net/2013-july-newsletter/

In urban settings, flower abundance, diversity, and open, vegetated areas are positively associated with bee diversity and abundance (Carper et al., 2014). However, studies sometimes reveal contradictory patterns in specific bee taxa and the factors dictating urban bee diversity are not entirely understood.

Our goal was to provide the City of Iowa City with information about how bee diversity compares across neighborhoods and public sites and how bee diversity is related to floral diversity.

Methods
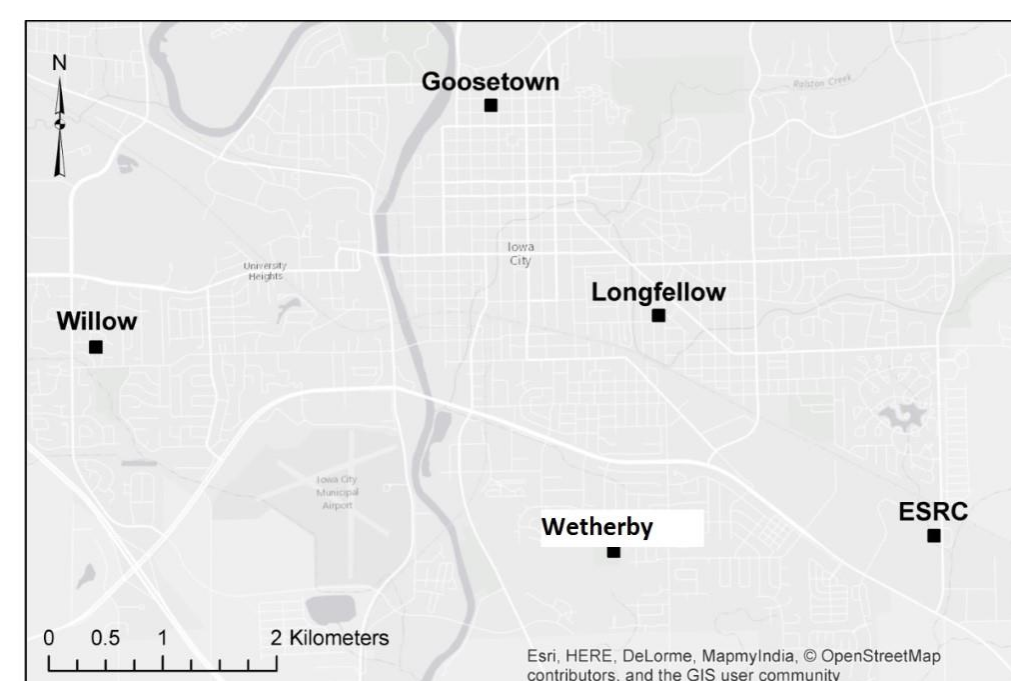
Sampling locations:

- 5 sites with area size of each site being 1 hectare (100 m X 100 m)

- 3 chosen haphazardly in residential areas

- 2 public sites-East Side Recycling Center and Wetherby Park
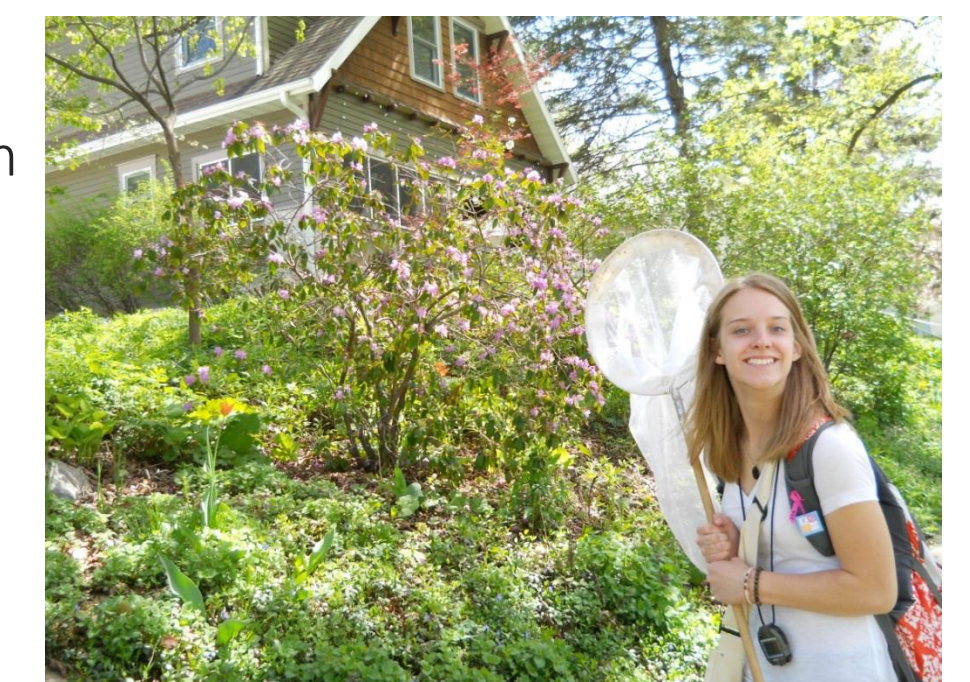

Pan trapping:

- 12 bowls (blue, yellow, white) with soapy water set out 9-10 m apart at each site for at least six hours
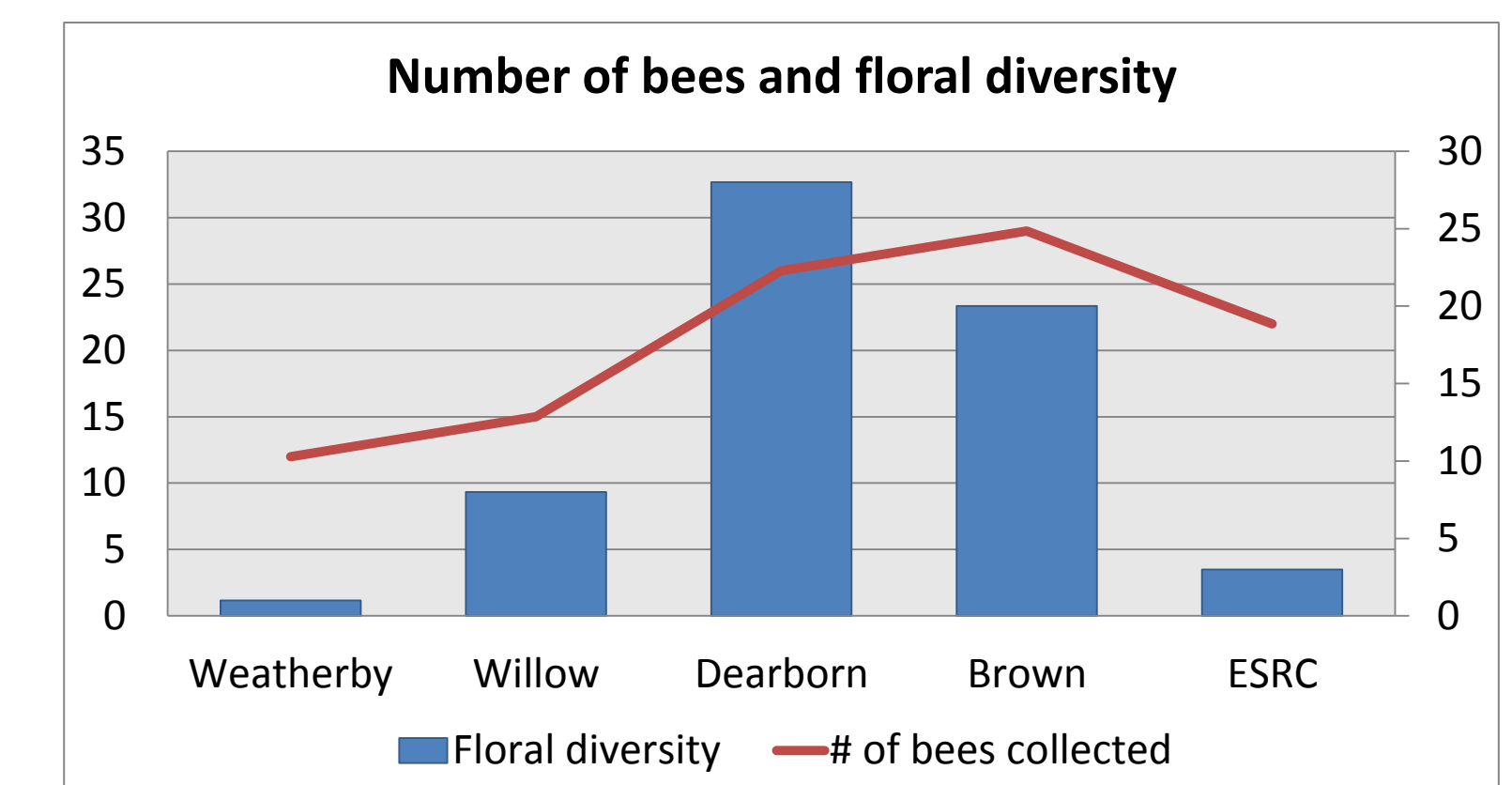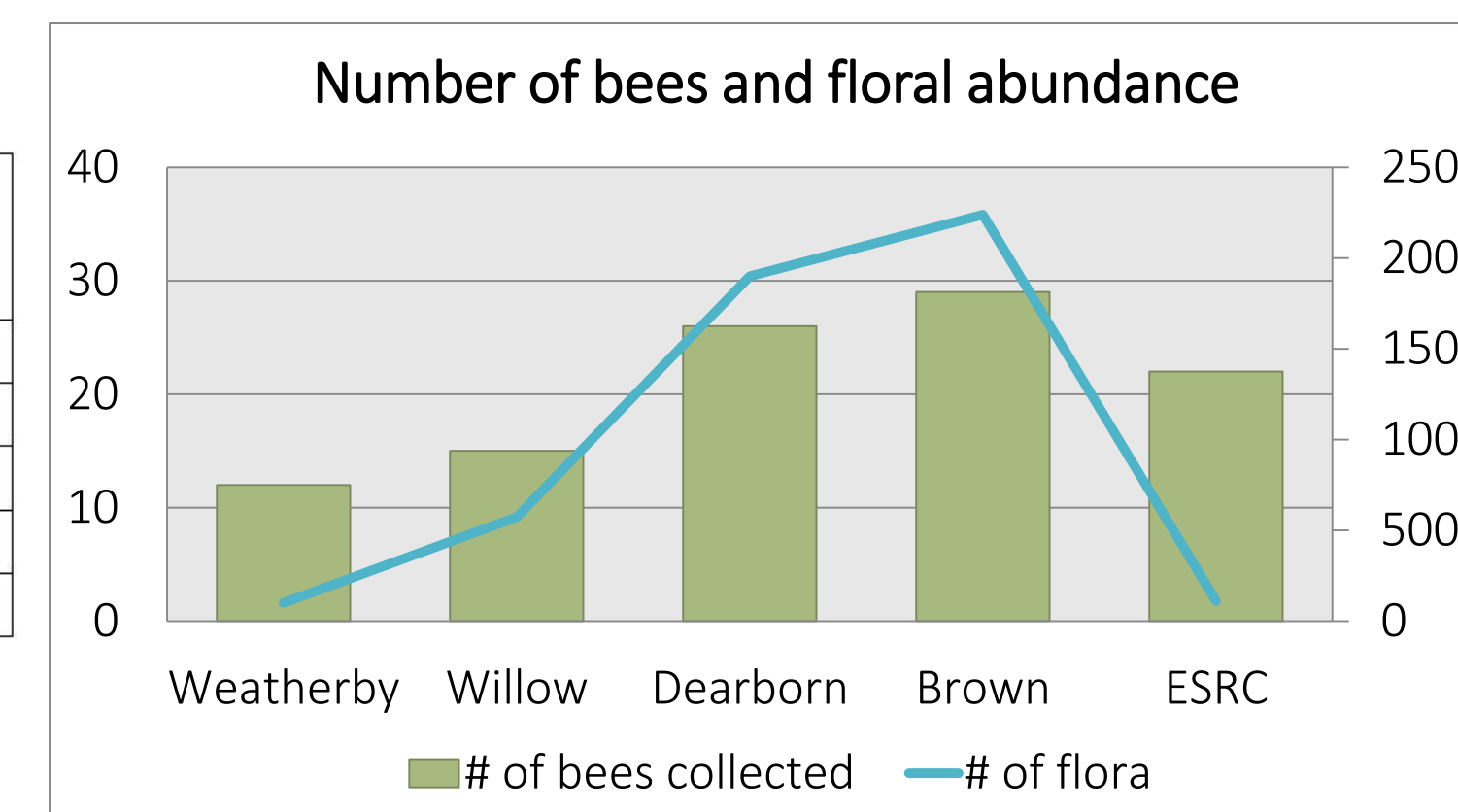
Sweep netting:

- Plot was divided in half and individuals swept for 30 timed-minutes. We then switched halves and swept once more.

Results

Site ID	Number of individuals	Number of genera	Number of males	Number of females	Number of genera with only one gender collected
Brown	26	5	10	16	4
Dearborn	16	6	8	8	4
ESRC	19	7	3	16	7
Wetherby	7	3	1	6	2
Willow	10	6	4	6	4

Bee genera collected:
- 10 *Lasioglossum*-all females
- 3 *Nomada*-all males
- 6 *Colletes*- 2 females, 4 males
- 4 *Halictus*- all females
- 12 *Ceratina*- 5 females, 1 male
- 9 *Apis*- all females
- 33 *Andrena*- 18 females, 15 males
- 1 *Agapostemon*- female
- 4 *Osmia*- 1 female, 3 males
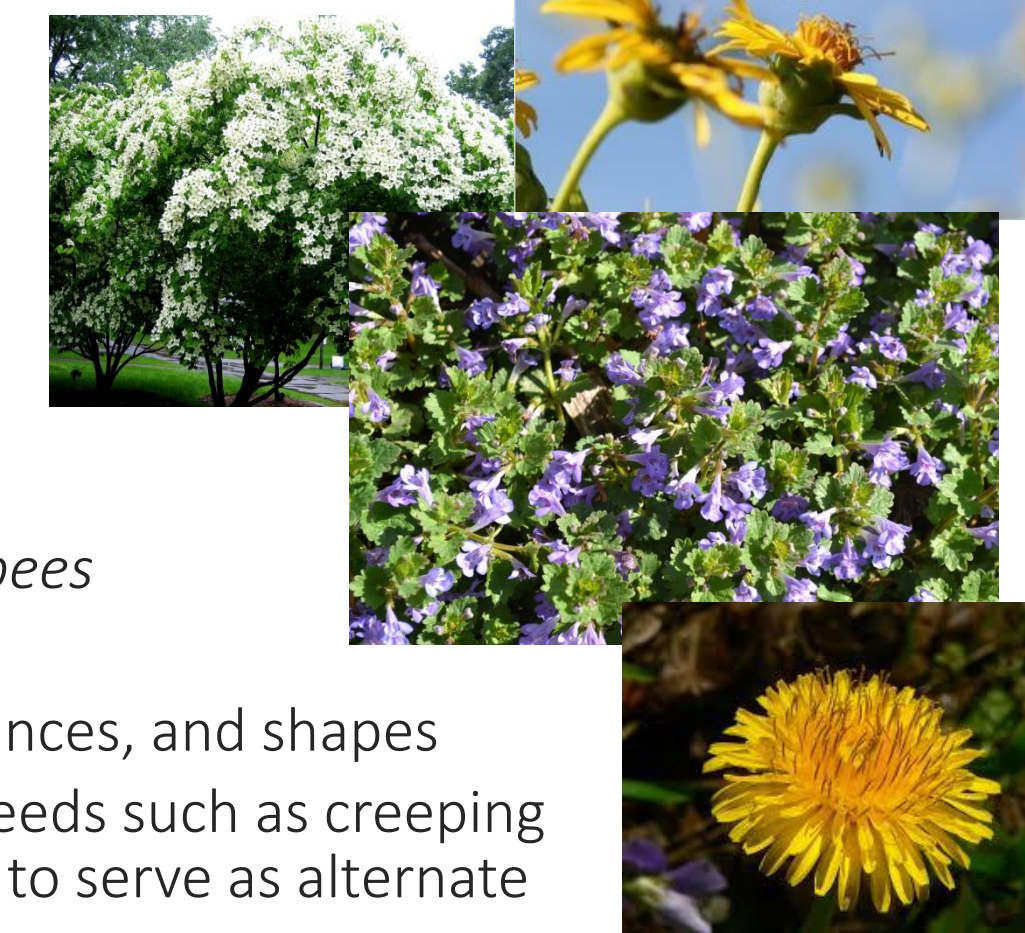- 2 *Bombus*- 2 females
- Total: 52 Females, 26 males

Lasioglossum

Nomada

Agapostemon

We found that bee abundance was correlated with floral abundance (Pearson's r= 0.83) and floral diversity (Pearson's r= 0.77) on sites. ESRC was a notable exception that could be explained by a wealth of good bee habitat and resources in the surrounding area.

Number of bees and floral abundance
# of bees collected   # of flora

Number of bees and floral diversity
Floral diversity   # of bees collected

What can we do for urban bees?


Bees need food:

- More native flowering plants

- Diversifying flowering plants
  - Diversity of plant species
    - A healthy bee diet
    - Attract a great diversity of bees
  - Blooming at different time
  - Different flower colors, fragrances, and shapes
  - Consider leaving flowering weeds such as creeping charlie, violets and dandelions to serve as alternate nectar sources for pollinators

https://beespotter.org/topics/beegarden/#choosing
http://www.extension.iastate.edu/news/2005/mar/pollinators0305.

Pesticides are harmful to bees:
- Reduce pesticide and herbicide usage
- Apply chemicals that are the least disruptive to pollinators
- Apply insecticides when pollinators are least active
  - *very early morning, late evening or after dark*
- Do not apply insecticides to plants that are blooming or when it is windy
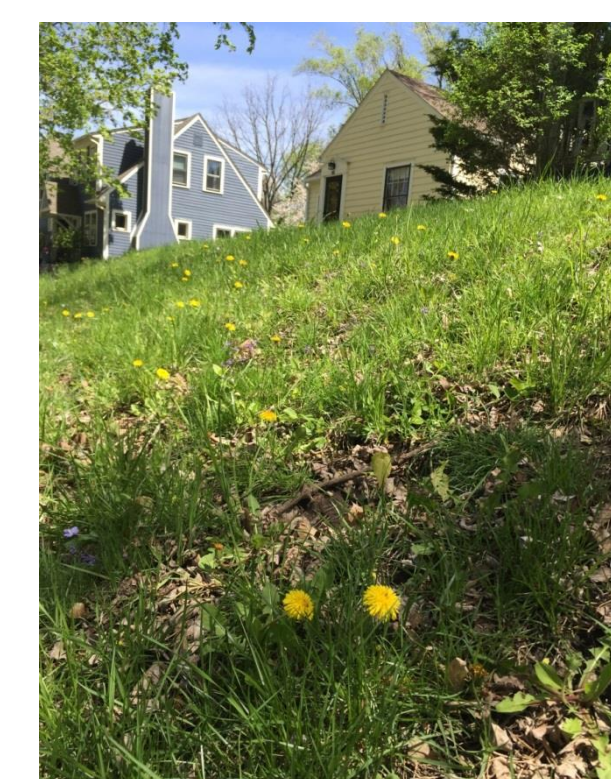
Bees need habitat:

- Exposed & undisturbed soil
  - Dry, sandy soil with vegetation on a hill slop
  - Ground-nesting bees (60%-70% e.g. Genus *Andrena,* Bumble bees) (Joel, 2015)

- Bee house
  - Tunnels for cavity-nesting bees (30-40%) (Joel, 2015)

PESTICIDE FREE ZONE

NO SPRAYING