

Bees of the St Vrain Greenway: Pre- and Post- flooding Status Report

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Abstract

There is overwhelming evidence that Earth's climate is rapidly changing due to human activities, which has led to a rise in global temperatures, changes to the water cycle, the cryosphere, the oceans, and atmospheric circulation. These changes in the climate have initiated an unpredictable increase in the frequency of extreme weather events, such as flooding. The ecological impacts of extreme weather events are often difficult to study due to their rarity and unpredictability. In 2012, the University of Colorado Museum of Natural History (UCMNH) Entomology Section established 11 plots along an 8-mile stretch of the St. Vrain Greenway in Longmont, CO and collected wild bees from these plots over the field season (March – October). In 2013, the site was heavily impacted by a catastrophic flood. Bees were resampled in 2014 to assess the immediate flood impacts on the wild bee community. This report on the finding of those results indicates that at least 206 bee species (morphospecies) have been identified to date. Both bee richness and abundance were negatively impacted by the 2013 flood.

The Entomology Section is requesting to sample the same 11 plots again in 2020, to provide a unique dataset of the pre-, post-, and recovery stages of the wild bee community along the St. Vrain Greenway in relation to the catastrophic flood in 2013. Due to the rarity and unpredictability of catastrophic weather, little is known about its impact on wild bee communities. With this unique dataset, we are able to assess the impacts of catastrophic flooding on wild bee and plant communities and, in turn, provide recommendations for their restoration. Ultimately, these findings could help in mitigating the impacts of predicted increases in catastrophic weather associated with future climate change.

Introduction

Human-induced environmental change is a dominant factor affecting biological communities, altering not only global temperatures, but also hydrological cycles, weather patterns, and the frequency and intensity of extreme weather events (IPCC 2018). For instance, much of the southwestern United States is anticipated to experience longer and more intense droughts (Seager et al. 2007), while globally, the potential for severe flooding has increased, likely due to heavy rain events (Milly et al. 2002). Moreover, interactions between intense weather events could occur (Staudt et al. 2013), such as severe flooding in fire scars as a result of prolonged drought. Risks to human health and well-being posed by the consequences of changing climate can come from direct harm (McMichael et al. 2006) but also indirectly through changes in ecosystem structure (Grimm et al. 2013) and the services they provide (Nelson et al. 2013). Pollination is an extremely important ecosystem service and is critical for human well being given our reliance on pollinators for food and agriculture. How changes in severe weather events will affect pollinator communities and the plants which rely on them are only beginning to be studied. To do requires both historical context (i.e., data on the endemic bee fauna, the ecologies of species within it, and their distributions) and comparative studies. The former is rare, and the latter is difficult to execute as we cannot manipulate extreme weather events on large scales. However, extreme weather events themselves can be used as ‘natural experiments’ to study the effects of catastrophic event pre and post disturbance.

Riverine and floodplain habitats are important for many bees. For example, many crucial floral resources, such as willows, are only found along rivers, especially in arid regions. Moreover, rivers and streams also provide nesting habitat for soil-nesting species, such as vertical banks and open sandbars. However, surprisingly little is known about bees’ responses to flooding. Many have apparent adaptations to flooding, such as resins or secretions to waterproof cells that are provisioned below the water table (Roubik and Michener 1980; Cane 1997). However, such adaptations may be insufficient during extreme weather events and catastrophic effects of flooding (even on flood adapted species) have been reported (Fellendorf et al. 2004). Given the importance of bees’ as pollinators (Gallai et al. 2008), further study of their response to flooding could help inform conservation and restoration efforts, which is crucial in light of changes in climactic events and the resulting consequences on local communities (Stein et al. 2013).

In this report, we use a catastrophic flooding event in 2013 along the Front Range of Colorado, USA, to 1) assess the impacts of this type of extreme weather event on pollinator communities; 2) identify groups of pollinators that are particularly vulnerable to catastrophic flooding; and 3) explore how this extreme flooding event could change plant-pollinator interactions. The results presented here are preliminary but represent ongoing research that we hope to continue into 2020. First, we provide background on both the diversity and natural history of bees in our focal set of sites, as well as the catastrophic flooding event that impacted them. Second, we compare bee abundance and diversity pre- and post-flood. We then use ecological traits to explore guild and taxonomic group response to flooding. Finally, we explore future research goals to help understand how such extreme weather events impact plant-pollinator interactions. Ultimately, these findings will help managers and conservationists determine how best to mitigate the potential impacts of such massive flooding events on pollinator communities.

Background

History of Boulder County bee research

Pollinator research in Colorado and specifically Boulder County is tied to a long history of bee researchers working at the University of Colorado Museum of Natural History (UCMNH). It started in 1904 when T.D.A. and W.P. Cockerell moved to the city of Boulder and began collecting bees, depositing many voucher specimens in the Entomology Section of the UCMNH. In 1907, T.D.A. Cockerell wrote his first comprehensive introduction to the bees of Boulder County (Cockerell 1907). While T.D.A. Cockerell was a professor at University of Colorado he focused much of his research on bees. He mentored many University of Colorado students and one young high school student (the extremely well-known, Charles Michener) who traveled from California to spend a summer working with Cockerell. T.D.A Cockerell described over 6,000 bee species and published over 3900 papers during his career (Weber 1965). One of those students, Charles Hicks, specifically worked on Boulder County bees (Hicks 1926). Another student at University of Colorado in the early 1930s was Url Lanham. Lanham grew up in Longmont collecting insects, particularly bees, that are deposited in the Entomology Section of the UCMNH.

Following the Cockerells' departure from University of Colorado, Hugo Rodeck, the director of the UCMNH continued the study of bees in the area. Url Lanham returned to UCMNH in the late 1960s as curator of Entomology and focused his research on bees, primarily in Colorado. In 1989, Deane Bowers was appointed Curator of the Entomology Section. Virginia Scott was hired in 1994 as the Entomology Collections Manager and focused her research on Colorado bees. In 2007, The National Academies published a volume on the Status of Pollinators in North America that lists Boulder, Colorado as an area ripe for resurvey (NRC 2007), due to the comprehensive collection of specimens from the previous 100 years. Kearns and Oliveras undertook some bee studies in Boulder County in the 2000s, (Kearns and Oliveras 2009a, 2009b). In 2011, Scott published an updated treatise on the bees of Colorado (Scott et al. 2011), followed by a paper focusing on Boulder County bees (Goldstein and Scott 2015). Adrian Carper joined the Entomology Section's bee team as a Post-Doc in 2013, focusing on bee communities in the Eastern Plains and Front Range portions of Colorado.

Bee biology and natural history

To put the local bee community into context it is important to understand something about bee diversity, not only their taxonomy, but also their many and varied life history traits. Different bee species vary widely in behaviors and life history patterns, and thus, react to the environment or, important here, changes in their environment, very differently. Taxonomically, bees are extremely diverse. Worldwide there are over 20,000 bees and North America is home to some 4,000 bee species (Ascher 2020). The 946 bee species known to occur in Colorado (Scott et al 2011) fall into six families, which includes 562 species known to occur in Boulder County (Goldstein and Scott 2015). To explore community dynamics, bee species are often grouped into

guilds based on shared biological dynamics (see Table 1). For example, only a minority of bee species (9.4%) are social, including bumble bees and honeybees. Most bee species, however, (77.4%) are solitary, with each female constructing her own nest, provisioning it with pollen she collects from flowers, and laying eggs in that nest. The remaining bee species (13.2%) are parasites of other bee species, laying their eggs in the nests of other bees (Danforth et al. 2019). Bees also vary in their floral preferences; some bees, particularly social bees, are generalist foragers, collecting pollen and nectar from plants in many different families. Other species are specialists, foraging from members of only one plant family, and in some cases, only one species. Plants that have many specialist bee species associated with them include willows, cacti, squashes, and sunflowers, although these same plants attract a number of generalist pollinators, as well. Nesting habitat is an important trait of bee species' biology that is often overlooked. While honeybees usually live in man-made hive boxes and bumble bees often live in old mouse burrows or tree cavities, about two-thirds of our nesting bee species nest in the ground, either digging their own tunnels or re-using tunnels in the ground. About one-third of our nesting bees create nests in pithy twigs (sumac, rose, brambles) or wood. Most twig/wood nesting species use preexisting tunnels such as those made by beetle larvae, however, some species dig their own tunnels in twigs or wood.

Table 1. Bee families known to occur in Boulder County, Colorado, along with the number of species and life history traits. (Goldstein and Scott 2015).

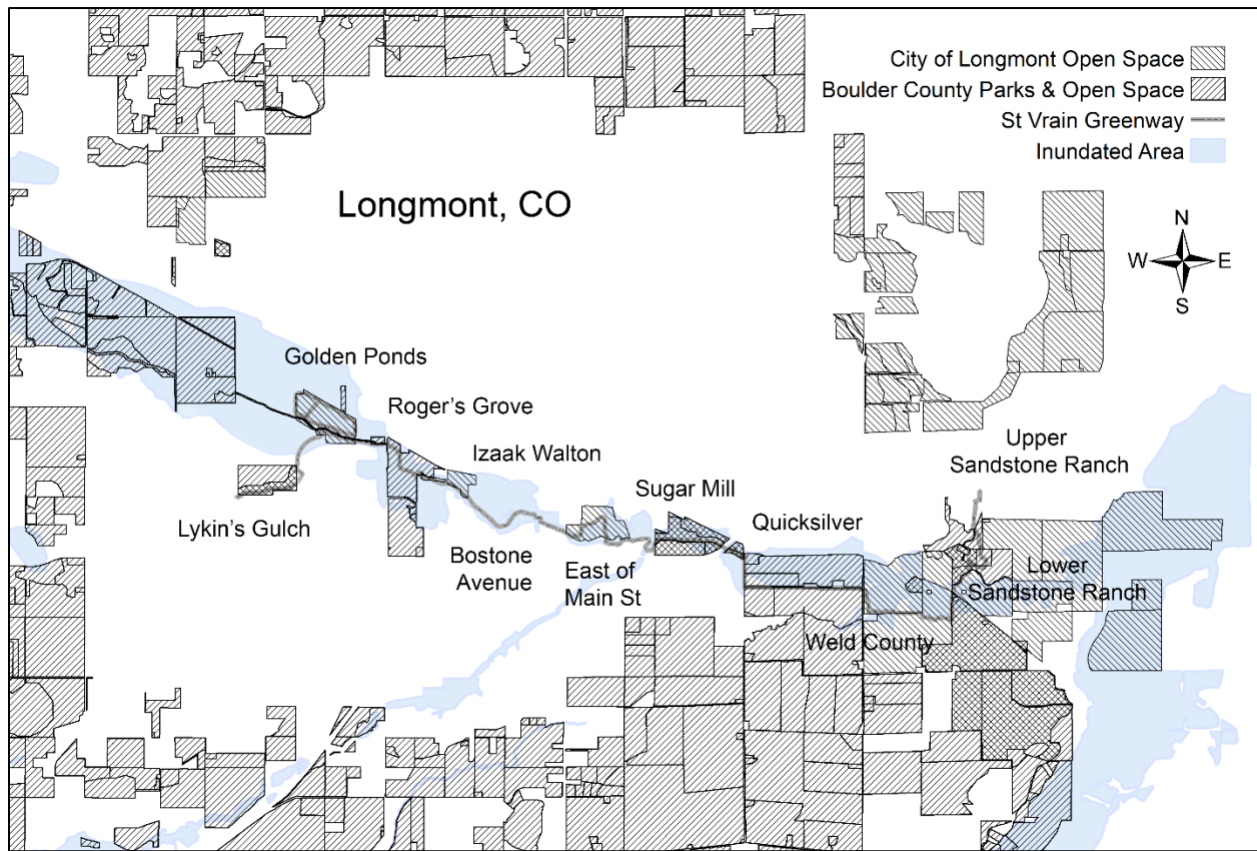
Bee Family	Common name	Species in Boulder County	Sociality	Pollen specificity	Nesting location
Andrenidae	Mining and Fairy bees	129 species	Solitary	Generalists Specialists	Ground
Apidae	Carpenter, Digger, Bumble, and Honeybees	149 species	Social Solitary Parasitic	Generalists Specialists	Ground Twig/wood Cavities
Colletidae	Plasterer and Masked bees	34 species	Solitary	Generalists Specialists	Ground Twigs/wood
Halictidae	Sweat bees	84 species	Social Solitary Parasitic	Generalists Specialists	Ground (Wood)
Megachilidae	Leaf-cutting and Mason bees	165 species	Solitary Parasitic	Generalists Specialists	Ground Twigs/wood
Melittidae	Oil bees	1 species	Solitary	Specialists	Ground

Methods

The St. Vrain Greenway Bee Surveys

After publication of *The Bees of Colorado* (Scott et al. 2011), Scott took on a more local bee survey project. The St. Vrain Greenway became the focus of that study. Due to the nature of the property, a continuous 8-mile, east-west corridor, near water, with various surrounding habitats (suburbia, mall, agriculture, sandy short grass prairie), it offered an interesting study area with a diverse bee fauna. The 2012 survey consisted of sampling bees by hand-netting at roughly 10-day intervals at 11 established plots from late March through early October. Log sheets were kept where the following data were recorded: date (and duration of collecting), time, weather, collectors, and plants on which specimens were sampled. Specimens were returned to the lab, processed (pinned and labeled) as time permitted, and identified. It should be noted that although 2012 was an extremely dry and hot summer, the water of the St. Vrain Creek created a reservoir for flowering plants and foraging.

Figure 1. Delineation of 11 sampling sites in 2012 and 2014.



Catastrophic flooding along St. Vrain Creek - a 'Natural Experiment'

Between Sept 10th and 15th 2013, there was a catastrophic 500 Year Flood in Colorado's Front Range (Kindelspire and Rochat 2013), where there were five consecutive days of record-breaking precipitation (Gochis et al. 2013), expanding the stream to over a mile in some places. A new channel was carved out in some areas. Huge amounts of debris, mostly trees, but also coolers, staircases, household items, holiday decorations, and even a roll-away dumpster were deposited along the Greenway. Part of Golden Ponds and Issak Walton Pond were breached (see Figure 2). While the 2012 St. Vrain Greenway bee survey was meant to be a one-year survey investigating bee diversity, the unfortunate events of the 2013 flood provided a unique research opportunity to assess the impacts of catastrophic flooding on native bee communities. To our knowledge, there have not been any studies conducted looking at bee community-level responses prior to and after a catastrophic flooding event. After a thorough literature review, we found only two species-level publications assessing the impacts of extreme weather on bees and how they survive inundation by water (Fellendorf et al. 2004, Cane 1997). Additionally, there are a few bee species specially adapted to living under seasonally flooded grounds (Visscher et al. 1994; Roubik and Michener 1980).

Figure 2. The same view of the St. Vrain Greenway at Issak Walton Ponds in 2012 (pre-flooding) and 2014 (post-flooding). Red dot is meant to help orient the viewer.



In 2014, we re-surveyed the 11 plots established in 2012. Due to the destruction, and in some cases obliteration of vegetation in certain areas, we added some additional trapping methods (blue vanes, pan traps, and bee nesting blocks (Figure 3), beyond Scott's hand netting. We also received a Team UROP (Undergraduate Research Opportunities Program) grant through University of Colorado for the summer of 2014 to hire student assistants to collect and process specimens (pinning and labelling). Since 2014, all specimens were identified to generic level and select specimens were loaned out to taxonomists for expert species level identifications.

Figure 3. From left to right: bee bowls, vane trap and bee block.



In the summer of 2019, Jacob Unger, an undergraduate student, wrote an individual UROP grant and received funding to work on this project. He helped with identifications and updated all the specimen records with their current identifications in our database. This enabled us to move ahead with this project and afforded him real-lab experience. At the beginning of fall semester 2019, Jess Mullins, a new graduate student in CU's Museum and Field Studies program, adopted this project as the subject of her master's thesis. She was one of the undergraduate students who helps with the 2014 survey. Her dedicated efforts have reinvigorated this project.

Figure 4. A drawer and close-up of green sweat bee specimens, *Agapostemon* sp. (family Halictidae).



Preliminary Results

Preliminary Analyses

To compare bee communities pre- and post-flood we focused on netting conducted by only one observer, Scott. While not standardized methodologically per se, she is a specialist bee taxonomist, an experienced netter, and spent comparable effort in both years collecting at the sites. To explore entire bee community response to flooding, we compared total netted bee species richness between 2012 and 2014 using a Welch's 2-sample t-test. If flooding had negative impacts on the entire community, we expected that total bee richness would decline from 2012 to 2014. To explore whether particular groups of bees responded differently to flooding, we used a linear mixed effect model with bee abundance as the response variable and year (pre- or post-flood), the family of bee (Apidae, Colletidae, etc.), and their interaction as fixed effects. We included site as a random effect to account for multiple measures of bee families on each site and avoid pseudo-replication. We also log-transformed bee abundances to meet the assumptions of normality. If particular families of bees were more susceptible to flooding, we would expect to find a significant interaction between year and bee family, wherein some families are more negatively impacted than others.

Bee community summary

All bee specimens have now been identified to at least generic level (although some species level identifications are still to come.) A total of 18,044 specimens were collected. Of those, 1155 non-target insects (beetles, wasps, flies...) were also collected and are pinned, labeled, databased, and housed at UCMNH. A total of 16,889 bees were collected during 2012 and 2014. The remainder of this report will focus on them. These are also pinned, labeled, databased, and housed at UCMNH. Summed across both years, there were at least 206 morphospecies that represent all bee families found in Boulder County (Table 2).

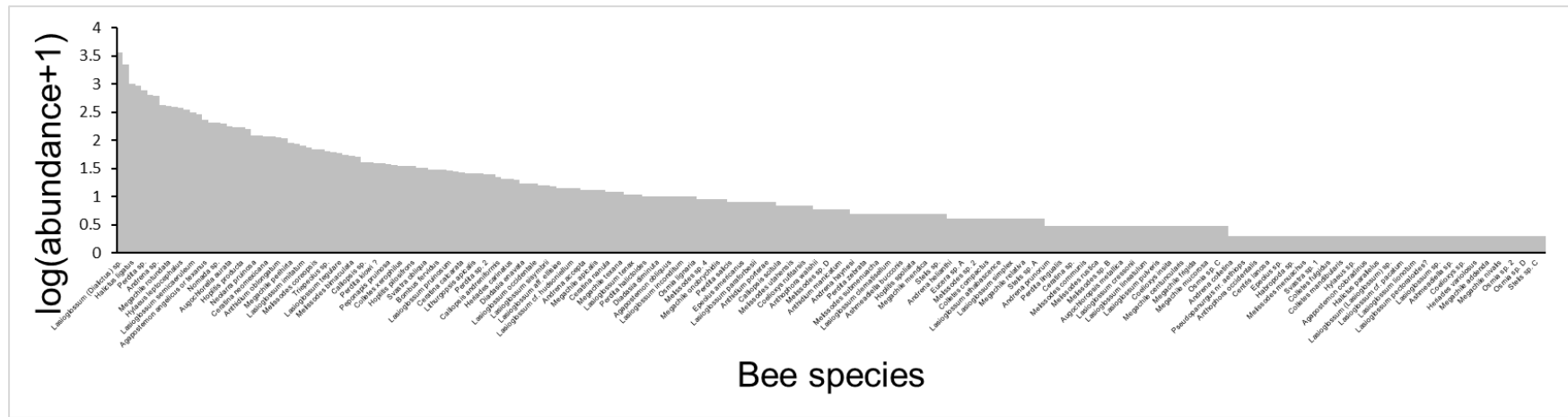
Table 2. The number of specimens and morphospecies collected by bee family for both years and all collecting methods combined.

Bee Family	Number of specimens	Minimum number of morphospecies
Andrenidae	1753	18
Apidae	3065	58
Colletidae	1525	15
Halictidae	9119	52
Megachilidae	1425	62
Melittidae	2	1
Total	16889	206

Most of the bees collected in this survey were native species with a few exceptions. There were seven introduced bee species (not native to North America), all of which were known to Colorado prior to this collecting, including: *Apis mellifera* Apidae (the western honeybee); *Hylaeus leptcephalus* and *Hylaeus punctatus* Colletidae; and *Anthidium manicatum* (european wool carder bee), *Anthidium oblongatum*, *Megachile apicalis*, and *Megachile rotundata* (the alfalfa leafcutting bee) Megachilidae. Additionally, we found two accidental species (native to North America, but not to Colorado): *Bombus vosnesenskii* and *Centris lanosa* (Apidae). Two species were new state records for Colorado, representing extensions to the known ranges of these bees: *Lasioglossum simplex* (Halictidae) and *Megachile addenda* (Megachilidae).

While diversity was high, overall, the bee community was dominated by small social sweat bees, family Halictidae. Two groups, *Lasioglossum* sp. and *Halictus tripartitus* made up 22% and 13%, respectively, of all captured specimens. Furthermore, 52 species were represented by a single collected specimen, suggesting they may be locally rare (Figure 5). Three detailed lists are included at the end of this report as Appendices. Appendix 1 is a list of the bee genera collected, including the number of specimens collected (abundance), the number of species or morphospecies identified, whether these are native or include introduced species, degree of sociality, pollen (= floral visitation) specificity, nest site location and notes. Appendix 2 is a list of each bee species or morphospecies identified, noting the plants from which each species was collected. Appendix 3 is a list of each of the plants we netted from, noting all visiting bee species.

Figure 5. Rank abundance of all bee morphospecies collected.



Comparing Trap Methods

The majority of the collecting was done with hand nets. In 2014 we added two trapping methods, bee bowls and vane traps because we were concerned about reduced bee captures by netting because of a perceived potential for a reduction in flowering plants due to the flood impacts. Of the 700 specimens collected from bee bowls, only three species (4 specimens total) were collected exclusively in bee bowls, including: *Eucera* sp C (1 specimen) Apidae, and *Lasioglossum desertum* (1 specimen) and *L. heterorhinum* (2 specimens) Halictidae. Of the 2010 specimens collected in vane traps, only eight species (10 specimens total) were collected exclusively in vane traps, including: *Epeolus* sp. (1 specimen), *Eucera* sp B. (2 specimen), *Habropoda* sp. (1 specimen), and *Svastra* sp. 1 (1 specimen) Apidae; *Agapostemon coloradinus* (1 specimen) Halictidae; and *Anthidium emarginatum* (1 specimen), *Megachile melanophaea* (2 specimen), and *Osmia* sp. 2 (1 specimen) Megachilidae. Of the 14,179 specimens that were netted, there were 158 species were collected exclusively by netting. Since the majority of the collecting effort focused on netting rather than traps, this is not unexpected. Although traps caught a few interesting records, the time spent processing trap specimens produced very few unique records.

In addition to netting and traps, we placed one bee block at each of the 11 sites. Each block provides 40 potential nesting tunnels for bees and wasps. The number of nests per block ranged from 0 to 31, with a total of 188 nests made. Of these, 50 were constructed by wasps and 138 were constructed by bees. Analyses of the data from these bee blocks are in progress.

Table 3. Total number of bees collected by site, year, and trapping method for 2012 and 2014.

Site	2012 VLS netting	2014 VLS netting	2014 Net/Spring (Va & ALC)	2014 Net/Summer (Students)	2014 Bee Bowls	2014 Vane Traps	Grand Total
Lykins Gulch	571	163	40	94	23	116	1007
Golden Ponds	955	449	133	142	39	184	1902
Rogers Grove	625	354	42	121	37	113	1292
Izaak Walton	252	501	34	108	21	60	976
Boston Ave	365	84	67	86	16	17	635
East of Main	678	934	34	95	30	76	1847
Sugarmill	722	366	118	171	86	203	1666
Quicksilver	3	0	23	113	126	131	396
Weld County	507	800	71	202	104	128	1812
Lower Sandstone	413	176	58	80	139	529	1395
Sandstone Ranch	1557	1227	255	390	79	453	3961
Grand Total	6648	5054	875	1602	700	2010	16889

Table 4. Number of nests constructed in bee blocks by solitary wood-nesting bees and wasps at the various sites.

Taxon	Lykins Gulch	Golden Ponds	Rogers Grove	Issak Walton Pond	Boston Ave	East of Main	Sugar mill	Weld County	Lower Sandstone	Sandstone Ranch	Grand Total
BEE	29	23	5	0	0	28	8	5	21	19	138
<i>Osmia</i>	10	1	0	0	0	0	0	0	0	0	11
<i>Anthidium</i>	0	0	0	0	0	0	0	0	1	0	1
<i>Megachile</i> (<i>Chelostomoides</i>)	0	1	0	0	0	0	0	0	0	0	1
<i>Megachile</i> (<i>Litomegachile</i> + <i>Megachile</i>)	0	0	0	0	0	0	0	0	0	4	4
<i>Megachile</i> (<i>Eutricharia</i>)	19	21	5	0	0	28	8	5	20	15	121
WASP	1	0	1	0	0	1	12	20	10	5	50
(<i>Eumeninae</i> + <i>Tyrpoxylon</i>)	1	0	0	0	0	0	0	0	0	0	1
<i>Solierella</i>	0	0	1	0	0	0	8	0	1	5	15
<i>Passaloecus</i>	0	0	0	0	0	1	0	0	0	0	1
<i>Isodontia</i>	0	0	0	0	0	0	4	20	9	0	33
Grand Total	30	23	6	0	0	29	20	25	31	24	188

Comparing pre- and post-flood communities

We found nine potential high elevation bee species that showed up, **only** in post flood samples, in 2014. Further investigation is needed to determine the likelihood that flood waters contributed to the appearance of these bees in 2014. These species included: *Lasioglossum athabascence*, *L. desertum*, and *L. heterorhinum* (Halictidae); and *Dianthidium ulkei*, *Heriades cressoni*, *Hoplitis fulgida*, *Megachile melanophea*, *M. mellitarsus*, *M. lapponica* (Megachilidae). Whether these captures were the result of movement downstream by flooding is speculative, though historic records place them at much higher elevations than Longmont, Colorado.

In terms of flooding's impacts on the entire bee community, we found an overall negative effect on bee richness, with the number of netted bee species declining nearly 33% between pre- and post-flood years ($t_{17.5} = 2.54$, $p = 0.021$, Figure 6), suggesting that the bee community likely was heavily impacted by flooding in 2013.

Figure 6. Pre- and post- flooding hand-net collections by VLS, excluding the Quicksilver site due to very low numbers. Site is the replicate. (t-test).

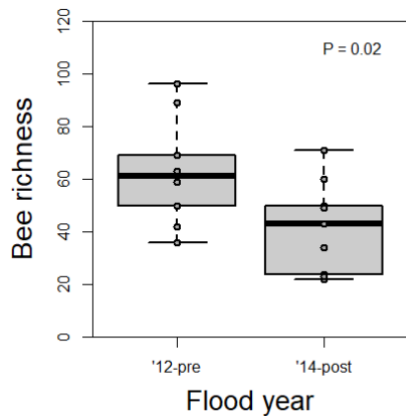
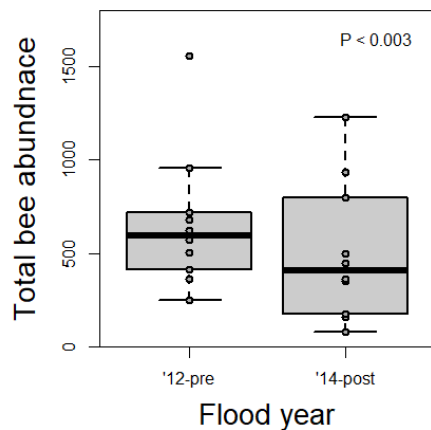
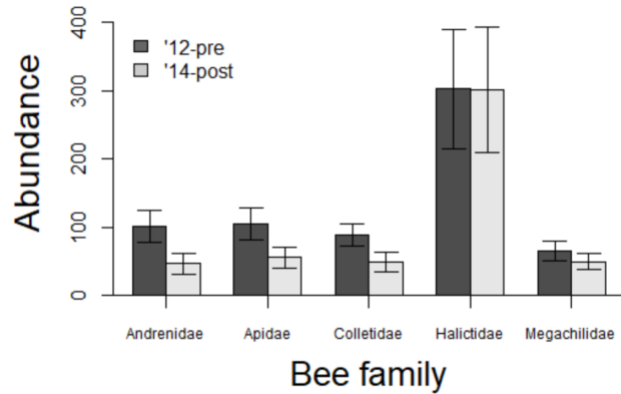


Figure 7. Pre- and post- flooding hand-net collections by Scott, excluding the Quicksilver site due to very low numbers. Site is the replicate, for all bee abundances. There were significant effects of year and family, but no interaction (in LME).



We also found a significant effect of year on bee abundances ($F_{1,145} = 9.22$, $p = 0.028$) wherein bee abundance declined 24% on average from 2012 to 2014 (Figure 7). However, while there was a significant effect of bee family in the model ($F_{4,145} = 22.16$, $p < 0.001$), there was no significant interaction between year and bee family ($F_{4,145} = 1.96$, $p < 0.104$), even though declines across families ranged from practically no reduction in the abundances of halictids (0.3% decline) to a nearly 54% decline the the abundance of andrenids (Figure 8). While likely driven by relative abundances, more detailed exploration of community scale response will likely help in determining guild-specific response to flooding within the community.

Figure 8. Pre- and post- flooding hand-net collections by Scott, excluding the Quicksilver site due to very low numbers. Site is the replicate, by Family. Significant effect of year and family, but no interaction (in ANOVA).



Discussion

Bee Community response to catastrophic flooding

Overall, while we found that the wild bee community along the St. Vrain Greenway was initially both abundant and diverse, the catastrophic flooding of 2013 had strong negative consequences for the wild bee community. Our surveys pre- and post-flood suggest that catastrophic flooding reduced wild bee abundance and diversity across the entire community. These impacts could be driven in large part by the direct impacts of flooding on bees through mortality, but also potentially indirectly through changes in plant communities on which bees rely for foraging and nesting resources. While still preliminary, these results provide evidence of how bee communities respond to catastrophic flooding and offer insight into how land managers may potentially mitigate the impacts of such severe weather in the future, see below.

Although the initial 2012 survey was not planned as a way to explore the consequences of extreme flooding on native bee communities, it none-the-less provided a serendipitous baseline that allowed us to investigate such questions. Moreover, it was valuable in itself, providing new data on species occurrences and distributions. We have added a number of new bee species to the known diversity of Colorado's bees, and have also provided specimens from this research to taxonomists across the continent in order to allow them to formally describe formerly unknown species. Moreover, as global climate change is expected to result in more extreme weather, predicting the impacts of those events becomes even more important to restoration efforts. Buffering riparian communities with additional conservation plantings: i.e., targeted plantings, protected nesting habitats, etc. will help us anticipate when or where catastrophic flooding is likely to occur. Conversely, predicting particularly vulnerable areas could suggest investing in alternative habitats for conservation, to effectively capitalize on the resilience of difficult and expensive habitat improvements. As analyses continue, we should be

able to make stronger recommendations on how bee communities change in response to flooding and where and how those changes occur.

Future Research

Given that taxonomic determinations are still ongoing, for many of our more difficult groups (*Andrena*, *Perdita*, *Lasioglossum*, *Melissodes*), additional avenues of research are still possible with our current dataset, and we are planning to explore several potential lines of inquiry based on bee community response to flooding. At the very basic level, not all sites were equally impacted by the catastrophic flooding of 2013. We plan to explore the relationship between landscape scale susceptibility to flooding and measurable impact on bee abundance and diversity. Data on inundated area is already available, and we will use this as well as other hydrologic measures to assess how the degree to which streams were impacted alters the surrounding habitat and bee communities. For instance, in sites where entire stream banks were eroded, destroying bee nesting habitat as well as floral resources, we expect that the negative impacts were much stronger. Conversely, in sites less impacted, like the upper regions of Sandstone Ranch, both plant and bee communities were spared the direct impacts of flooding, and likely suffered fewer overall impacts in the long run.

Furthermore, not all bees should respond to flooding similarly. Guild-specific responses within bee communities have been documented in response to many anthropogenic pressures, and catastrophic flooding is likely the result of multiple anthropogenic stressors (i.e. altered hydrology, urbanization, non-native plants, and climate change). How these factors impact 1) wood vs ground nesting bees, 2) specialist vs generalists, or 3) social vs solitary vs parasitic species are questions we intend to address as species-level determination make ascribing ecological differences possible. Our current Museum and Field Studies student, Jessica Mullins, is currently compiling species-level ecological traits towards this goal and is hoping to continue work on this project for her master's thesis.

It is important to note that all specimens from this project are being vouchered in UCMNH and provide the basis, not just for this research project, but for many future projects on bees in Boulder County, Colorado, North America, and the world.

Conclusions

Even though bees are essential in providing pollination services for our crops and native ecosystems, there is limited documentation available about the effects of extreme weather events, such as large flooding events, on native bee communities, or how we can improve prime bee habitat to speed the recovery from catastrophic flooding. Because extreme flooding events are predicted to become more common under future climate scenarios, data on bee community responses to such events are necessary to help protect both pollinator and plant communities. Given that previous research assessing the effects of flooding on native bees has focused on a single species (Visser et al., 1994; Cane, 1997; Fellendorf et al., 1994), this project provides much-needed community-level data. Additionally, the data from this monitoring will offer

guidance in the development of effective restoration management plans for pollinator conservation and sustainability on public lands like the St. Vrain Greenway. Research suggests bee communities quickly rebound after restoration (Exeler et al. 2009). There are, however, limited long-term datasets available for bees (Winfree, 2010), and this multi-year dataset will set a precedent for future monitoring of these plots to account for natural variation in communities (Swanson et al., 1994) and provide data applicable for bee communities outside of Colorado.

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Appendix 1. Generic level summary for St. Vrain Greenway bees collected during 2012 and 2014 including life history traits.

Taxon	Common name	Minimum Number (morpho) species	Abundance	Native Introduced Accidental	Sociality	Pollen specificity	Nesting location (host nests)	Nesting notes (host bee taxon)
Andrenidae	Mining and fairy bees	18	1753	Native	Solitary	Generalist Specialist	Ground	no cocoons
<i>Andrena</i> spp.	Mining bees	7	815	Native	Solitary	Generalist Specialist	Ground	
<i>Calliopsis</i> spp.	Mining bees	3	70	Native	Solitary	Specialist	Ground	
<i>Perdita</i> spp.	Fairy Bees	7	860	Native	Solitary	Generalist Specialist	Ground	
<i>Pseudopanurgus</i> sp.	Mining bees	1	8	Native	Solitary	Specialist	Ground	
Apidae	Honey Bumble Cuckoo Long-horned Digger bee	58	3065	Native Accidental	Solitary Social Parasitic	Generalist Specialist	Ground Wood	
<i>Ceratina</i> spp.	Small carpenter bees	3	156	Native	Social	Generalist	Twig	dig tunnels
<i>Epeolus</i> spp.	Cuckoo bee	3	16	Native	Parasitic	n/a	(Ground)	(<i>Colletes</i>)
<i>Holcopasites</i> spp.	Cuckoo bee	1	9	Native	Parasitic	n/a	(Ground)	(<i>Calliopsis</i>)
<i>Neolarra</i> sp.	Cuckoo bee	1	121	Native	Parasitic	n/a	(Ground)	(<i>Perdita</i>)
<i>Nomada</i> spp.	Cuckoo bee	8	206	Native	Parasitic	n/a	(Ground)	(<i>Andrena</i> +)
<i>Triepeolus</i> spp.	Cuckoo bee	3	63	Native	Parasitic	n/a	(Ground)	(<i>Melissodes</i> +)
<i>Anthophora</i> spp.	Digger bee	5	72	Native	Solitary	Generalist	Ground Wood	
<i>Apis mellifera</i>	Honey bee	1	652	Introduced	Social	Generalist	Hives	
<i>Bombus</i> spp.	Bumble bee	8	523	Native Accidental	Social Parasitic	Generalist	Ground	

Taxon	Common name	Minimum Number (morpho) species	Abundance	Native Introduced Accidental	Sociality	Pollen specificity	Nesting location (host nests)	Nesting notes (host bee taxon)
<i>Centris</i> sp.	Oil-Digger bee	1	1	Accidental	Solitary	Generalist	Ground	collect oils
<i>Diadasia</i> spp.	Digger bee	3	64	Native	Solitary	Specialist	Ground	
<i>Eucera</i> spp.	Long-horned bee	3	6	Native	Solitary	Generalist Specialist	Ground	
<i>Habropoda</i> sp.	Digger bee	1	1	Native	Solitary	Generalist	Ground	
<i>Melecta</i> sp.	Cuckoo bee	1	5	Native	Parasitic	n/a	(Ground)	(<i>Anthophora</i>)
<i>Melissodes</i> spp.	Long-horned bee	13	1101	Native	Solitary	Generalist Specialist	Ground	
<i>Peponapis pruinosa</i>	Squash bee	1	37	Native	Solitary	Specialist	Ground	
<i>Svastra</i> spp.	Long-horned bee	2	32	Native	Solitary	Specialist	Ground	
Colletidae	Plasterer Masked bee	15	1525	Native Introduced	Solitary	Generalist Specialist	Ground Twig/wood	lines nests with secretions no cocoons
<i>Colletes</i> spp.	Plasterer bee	9	173	Native	Solitary	Generalist Specialist	Ground	Line nests no cocoons
<i>Hylaeus</i> spp.	Masked bee	6	1352	Native Introduced	Solitary	Generalist Specialist	Twig/Wood	Line nests no cocoons
Halictidae	Sweat bee	52	9119	Native	Solitary Social Parasitic	Generalist Specialist	Ground Wood	
<i>Agapostemon</i> spp.	Green sweat bee	5	443	Native	Solitary	Generalist	Ground	
<i>Augochlorella aurata</i>	Green sweat bee	1	175	Native	Social	Generalist	Wood	
<i>Augochloropsis</i> sp.	Green sweat bee	1	2	Native	Solitary	Generalist	Ground	
<i>Halictus</i> spp.	Sweat bee	5	3590	Native	Social	Generalist	Ground	

Taxon	Common name	Minimum Number (morpho) species	Abundance	Native Introduced Accidental	Sociality	Pollen specificity	Nesting location (host nests)	Nesting notes (host bee taxon)
<i>Lasioglossum</i> spp.	Sweat bees	33	4481	Native	Social Solitary Parasitic	Generalist Specialist	Ground Wood	
<i>Sphecodes</i> spp.	Parasitic sweat bee	5	415	Native	Parasitic	n/a	(Ground)	(<i>Halictus</i>) (<i>Lasioglossum</i>)
<i>Dieunomia</i> sp.	Sweat bee	1	4	Native	Solitary	Specialist	Ground	
<i>Dufourea</i> sp.	Sweat bee	1	9	Native	Solitary	Specialist	Ground	
Megachilidae	Leafcutting-mason bees	62	1425	Native Introduced	Solitary Parasitic	Generalist Specialist	Twig/Wood Ground Free	add materials to nest
<i>Anthidiellum notatum</i>	Resin bee	1	9	Native	Solitary	Generalist	Free Standing	Resin
<i>Anthidium</i> spp.	Wool carder bee	4	123	Native Introduced	Solitary	Generalist	Twigs/Wood Ground	Fuzz (debris?)
<i>Ashmeadiella</i> spp.	Mason bee	2	43	Native	Solitary	Generalist	Twigs/Wood	Resin
<i>Coelioxys</i> spp.	Parasitic leafcutting bee	6	25	Native	Parasitic	n/a	(Twigs/Wood Ground)	(<i>Megachile</i>)
<i>Dianthidium</i> spp.	Resin bee	3	62	Native	Solitary	Specialist	Twigs/Wood Ground Free	Resin Debris
<i>Heriades</i> spp.	Mason bee	3	31	Native	Solitary	Generalist	Twigs/Wood	Resin
<i>Hoplitis</i> spp.	Mason bee	4	210	Native	Solitary	Generalist	Twigs/Wood	Leaves pebbles
<i>Lithurgopsis apicalis</i>	Cactus woodborer bee	1	25	Native	Solitary	Specialist	Twigs/Wood	near on ground
<i>Megachile</i> spp.	Leafcutting bee	26	821	Native Introduced	Solitary	Generalist Specialist	Twigs/Wood Ground	leaves +
<i>Osmia</i> spp.	Mason bee	8	60	Native	Solitary	Generalist Specialist	Twigs/Wood Ground	mud/leaves
<i>Stelis</i> spp.	Cuckoo bee	3	15	Native	Parasitic	n/a	(Twigs/Wood)	(<i>Osmia</i> + <i>Hoplitis</i>)

Taxon	Common name	Minimum Number (morpho) species	Abundance	Native Introduced Accidental	Sociality	Pollen specificity	Nesting location (host nests)	Nesting notes (host bee taxon)
<i>Trachusa</i> sp.	Resin bee	1	1	Native	Solitary	Specialist	Ground	
Melittidae	Evening bee	1	2	Native	Solitary	Specialist	Ground	
<i>Hesperapis</i> sp.	Evening bee	1	2	Native	Solitary	Specialist	Ground	
Grand Total		206	16889					

Appendix 2. For each bee species (or genus), a list of the plants from which they were collected.

ANDRENIDAE

ANDRENINAE

Andrena accepta - *Helianthus annuus*

Andrena candida - *Convolvulus arvensis*, *Crataegus* sp., *Malus* sp., *Potentilla fruticosa*, *Prunus americana*, *Prunus virginiana*, *Pyrus* sp., *Salix exigua*, *Salix* sp., *Veronica* cf. *catenata*

Andrena colletina - *Chrysothamnus nauseosus*

Andrena haynesi - *Chrysothamnus nauseosus*, *Helianthus annuus*, *Verbesina encelioides*

Andrena helianthi - *Helianthus annuus*

Andrena prunorum - *Prunus virginiana*

Andrena sp. - *Amorpha fruticosa*, *Barbarea* sp., *Crataegus* sp., *Descurainia sophia*, *Erigeron divergens*, *Gutierrezia sarothrae*, *Helianthus nuttallii*, *Lepidium* sp., *Lonicera morrowii*, *Malus* sp., *Melilotus officinalis*, *Potentilla fruticosa*, *Prunus americana*, *Prunus virginiana*, *Pyrus* sp., *Rhus glabra*, *Rhus trilobata*, *Salix alba*, *Salix exigua*, *Salix* sp., *Veronica* cf. *catenata*

PANURGINAE

Calliopsis andreniformis - *Dalea candida*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Ratibida columnifera*

Calliopsis chlorops - *Aster* sp., *Chrysothamnus nauseosus*, *Grindelia squarrosa*

Calliopsis scitula - *Descurainia* sp., *Erigeron divergens*, *Lepidium* sp., *Veronica* sp.

Calliopsis sp. - *Aster* sp., *Convolvulus arvensis*, *Erigeron divergens*, *Grindelia squarrosa*, *Lepidium* sp., *Malva neglecta*, *Melilotus officinalis*, *Melilotus* sp., *Verbena hastata*, *Veronica* cf. *catenata*

Perdita bishoppi - *Erigeron divergens*

Perdita halictoides - *Cleome serrulata*, *Physalis virginiana*

Perdita ignota - *Grindelia squarrosa*, *Heterotheca villosa*

Perdita kiowi - *Mentzelia nuda*

Perdita lingualis - *Helianthus annuus*

Perdita salicis - *Salix exigua*, *Salix* sp.

Perdita zebrata - *Physalis virginiana*

Perdita sp. 1 - *Cleome serrulata*, *Erigeron divergens*

Perdita sp. 2 - *Grindelia squarrosa*, *Machaeranthera tanacetifolia*

Perdita sp. - *Cleome serrulata*, *Erigeron divergens*, *Grindelia squarrosa*, *Gutierrezia sarothrae*, *Helianthus annuus*, *Heterotheca villosa*, *Lepidium* sp., *Physalis virginiana*, *Salix exigua*, *Salix* sp.

Pseudopanurgus nr. *aethiops* - *Verbesina encelioides*

Pseudopanurgus sp. - *Helianthus annuus*, *Ratibida columnifera*, *Sphaeralcea coccinea*

APIDAE

APINAE

Anthophorini

Anthophora affabilis - *Argemone polyanthemus*, *Delphinium caroliniana virescens*, *Sophora nuttalliana*

Anthophora bomboidea - *Opuntia polyacantha*

Anthophora montana - *Mentzelia nuda*, *Perovskia atriplicifolia*, *Solanum rostratum*, *Zinnia* sp.

Anthophora occidentalis - *Carduus nutans*

Anthophora walshii - *Dipsacus sylvestris*, *Perovskia atriplicifolia*

Apini

Apis mellifera - *Asclepias incarnata*, *Asparagus officinalis*, *Aster* sp., *Carduus nutans*, *Chrysothamnus nauseosus*, *Cirsium arevne*, *Cleome serrulata*, *Conyza canadensis*, *Dipsacus sylvestris*, *Eriogonum effusum*, *Erodium cicutarium*, *Fallopia aubertii*, *Grindelia squarrosa*, *Helianthus annuus*, *Malus* sp., *Marrubium vulgare*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Mentzelia nuda*, *Monarda pectinata*, *Rhus glabra*, *Salix exigua*, *Salix* sp.

Bombini

Bombus appositus - *Dipsacus sylvestris*

Bombus fervidus - *Carduus nutans*, *Coronilla varia*, *Cosmos bipinnatus*, *Cosmos sulphureus*, *Dipsacus sylvestris*, *Helianthus annuus*, *Mentzelia nuda*, *Perovskia atriplicifolia*, *Thermopsis* sp., *Zinnia* sp.

Bombus fraternus - *Asclepias incarnata*, *Chrysothamnus nauseosus*, *Helianthus annuus*, *Perovskia atriplicifolia*

Bombus griseocollis - *Asclepias incarnata*, *Asclepias speciosa*, *Astragalus* sp., *Caragana* sp., *Carduus nutans*, *Chrysothamnus nauseosus*, *Cirsium arevne*, *Cleome serrulata*, *Coronilla varia*, *Cosmos bipinnatus*, *Cosmos sulphureus*, *Dalea candida*, *Dipsacus sylvestris*, *Helianthus annuus*, *Marrubium vulgare*, *Melilotus* sp., *Mentzelia nuda*, *Monarda pectinata*, *Oenothera strigosa*, *Perovskia atriplicifolia*, *Solanum rostratum*, *Tagetes* sp., *Verbesina encelioides*

Bombus huntii - *Apocynum* sp., *Carduus nutans*, *Caryopteris* sp., *Centaurea diffusa*, *Chrysothamnus nauseosus*, *Cirsium arevne*, *Cleome serrulata*, *Coronilla varia*, *Cosmos bipinnatus*, *Cosmos sulphureus*, *Dipsacus sylvestris*, *Fallopia aubertii*, *Grindelia squarrosa*, *Helianthus annuus*, *Malus* sp., *Malva neglecta*, *Marrubium vulgare*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Mentzelia nuda*, *Monarda pectinata*, *Nepeta cataria*, *Perovskia atriplicifolia*, *Persicaria* sp., *Potentilla fruticosa*, *Prunus americana*, *Rosa* (yellow multiflora), *Solidago* nr *canadensis*, *Solidago* cf *gigantea*, *Tagetes* sp., *Trifolium pratense*, *Trifolium repens*, *Verbena hastata*, *Verbesina encelioides*, *Zinnia* sp.

Bombus nevadensis - *Asclepias incarnata*, *Dipsacus sylvestris*, *Melilotus* sp., *Thermopsis* sp., *Trifolium pratense*

Bombus pensylvanicus - *Asclepias incarnata*, *Carduus nutans*, *Chrysothamnus nauseosus*, *Cirsium vulgare*, *Cleome serrulata*, *Coronilla varia*, *Cosmos bipinnatus*, *Cosmos sulphureus*, *Gaillardia aristata*, *Helianthus annuus*, *Mentzelia nuda*, *Monarda pectinata*, *Monarda* sp., *Opuntia polyacantha*, *Opuntia* sp., *Perovskia atriplicifolia*, *Potentilla fruticosa*, *Solanum rostratum*, *Tagetes* sp., *Verbesina encelioides*, *Zinnia* sp.

Bombus vosnesenskii - *Coronilla varia*, *Cosmos sulphureus*

Centridini

Centris lanosa - *Dipsacus sylvestris*

Emphorini

Diadasia australis* or *rinconis - *Carduus nutans*, *Opuntia polyacantha*, *Opuntia* sp.

Diadasia diminuta - *Lepidium* sp., *Machaeranthera tanacetifolia*, *Malva neglecta*, *Sphaeralcea coccinea*

Diadasia enavata - *Carduus nutans*, *Gaillardia aristata*, *Helianthus annuus*, *Verbesina encelioides*

Eucerini

Melissodes agilis - *Aster* sp., *Carduus nutans*, *Chrysothamnus nauseosus*, *Cirsium vulgare*, *Cosmos bipinnatus*, *Dipsacus sylvestris*, *Gaillardia aristata*, *Grindelia squarrosa*, *Helianthus annuus*, *Perovskia atriplicifolia*, *Persicaria* sp., *Polygonum* sp., *Ratibida columnifera*, *Verbena hastata*, *Verbesina encelioides*

Melissodes bimaculata - *Convolvulus arvensis*, *Cosmos sulphureus*, *Dipsacus sylvestris*, *Malva neglecta*, *Perovskia atriplicifolia*

Melissodes communis - *Carduus nutans*, *Perovskia atriplicifolia*

Melissodes comptoides - *Chrysothamnus nauseosus*, *Cirsium arevnse*, *Perovskia atriplicifolia*

Melissodes coreopsis - *Aster* sp., *Carduus nutans*, *Cosmos bipinnatus*, *Gaillardia aristata*, *Grindelia squarrosa*, *Helianthus annuus*, *Ratibida columnifera*, *Verbena hastata*, *Verbesina encelioides*

Melissodes druriella - *Grindelia squarrosa*

Melissodes glenwoodensis - *Chrysothamnus nauseosus*

Melissodes menuachus - *Trifolium repens*

Melissodes montana - *Chrysothamnus nauseosus*, *Grindelia squarrosa*

Melissodes rustica - *Aster* sp., *Grindelia squarrosa*

Melissodes submenuacha - *Chrysothamnus nauseosus*, *Euthamia occidentalis*

Melissodes utahensis - *Grindelia squarrosa*

Melissodes verbesinarum - *Grindelia squarrosa*

***Melissodes* sp.** - *Argemone polyanthemus*, *Aster* sp., *Carduus nutans*, *Centaurea diffusa*, *Chrysothamnus nauseosus*, *Cirsium arevnse*, *Cosmos bipinnatus*, *Cosmos sulphureus*, *Dipsacus sylvestris*, *Euthamia occidentalis*, *Gaillardia aristata*, *Grindelia squarrosa*, *Helianthus annuus*, *Heterotheca villosa*, *Machaeranthera pinnatifida*, *Machaeranthera tanacetifolia*, *Malva neglecta*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Opuntia polyacantha*, *Opuntia* sp., *Perovskia atriplicifolia*, *Ratibida columnifera*, *Solidago* sp., *Sphaeralcea coccinea*, *Verbena hastate*, *Verbesina encelioides*

Peponapis pruinosa - *Dipsacus sylvestris*

Svastra obliqua - *Carduus nutans*, *Cleome serrulata*, *Cosmos bipinnatus*, *Dipsacus sylvestris*, *Grindelia squarrosa*, *Helianthus annuus*, *Ratibida columnifera*, *Zinnia* sp.

Melectini

Melecta pacifica - *Monarda pectinata*

NOMADINAE

Ammobatoidini

Holcopasites calliopsidis - *Erigeron divergens*, *Grindelia squarrosa*, *Lepidium* sp., *Veronica* cf. *catenata*, *Veronica* sp.

Epeolini

Epeolus americanus - *Erigeron divergens*, *Machaeranthera tanacetifolia*, *Salix* sp.

Epeolus bifasciatus - *Verbena hastata*

Epeolus minimus - *Grindelia squarrosa*, *Melilotus officinalis*, *Salix* sp.

Triepeolus sp. - *Aster* sp., *Cirsium arevnse*, *Dipsacus sylvestris*, *Gaillardia aristata*, *Grindelia squarrosa*, *Helianthus annuus*, *Machaeranthera pinnatifida*, *Machaeranthera tanacetifolia*, *Melilotus* sp., *Monarda pectinata*, *Verbena hastata*, *Verbesina encelioides*

Neolarrini

Neolarra pruinosa - *Cirsium arevnse*, *Erigeron divergens*, *Lepidium* sp., *Salix* sp.

Nomadini

Nomada sp. - *Apocynum cannabinum*, *Apocynum sibiricum*, *Apocynum* sp., *Cirsium arevnse*, *Crataegus* sp., *Erigeron divergens*, *Fallopia aubertii*, *Helianthus annuus*, *Heterotheca villosa*, *Lepidium* sp., *Lotus tenuis*, *Machaeranthera tanacetifolia*, *Melilotus alba*, *Melilotus* sp., *Monarda pectinata*, *Potentilla fruticosa*, *Prunus virginiana*, *Rhus trilobata*, *Salix exigua*, *Salix* sp., *Taraxacum* sp., *Verbesina encelioides*, *Veronica* cf. *catenata*, *Veronica* sp.

XYLOCOPINAE

Ceratinini

Ceratina calcarata - *Aster* sp., *Barbarea* sp., *Cirsium arevnse*, *Descurainia sophia*, *Grindelia squarrosa*, *Linaria dalmatica*, *Machaeranthera* sp., *Malva neglecta*, *Melilotus alba*, *Monarda pectinata*, *Prunus americana*, *Rhus glabra*, *Salix exigua*, *Salix* sp., *Solidago* cf. *canadensis*, *Taraxacum* sp., *Verbena hastata*

Ceratina nanula - *Convolvulus arvensis*, *Erigeron divergens*, *Heterotheca villosa*, *Verbena bracteata*

Ceratina neomexicana - *Argemone polyanthemus*, *Aster* sp., *Carduus nutans*, *Chrysothamnus nauseosus*, *Cirsium arevnse*, *Cleome serrulata*, *Convolvulus arvensis*, *Crataegus* sp., *Descurainia sophia*, *Descurainia* sp., *Erigeron divergens*, *Erigeron* sp., *Grindelia squarrosa*, *Helianthus annuus*, *Heterotheca villosa*, *Lonicera morrowii*, *Lonicera tatarica*, *Machaeranthera* sp., *Malva neglecta*, *Melilotus officinalis*, *Monarda pectinata*, *Nepeta cataria*, *Oenothera strigosa*, *Opuntia polyacantha*, *Prunus virginiana*, *Pyrus* sp., *Rhus glabra*, *Salix* sp., *Sphaeralcea coccinea*, *Tamarix pentandra*, *Taraxacum* sp., *Thermopsis* sp., *Verbena bracteata*, *Verbena hastata*, *Weigela* sp.

Ceratina sp. - *Aster* sp.

COLLETIDAE

COLLETINAE

Colletes ciliates - *Persicaria* sp.

Colletes compactus - *Chrysothamnus nauseosus*

Colletes fulgidus - *Fallopia aubertii*

Colletes gypsicolens - *Chrysothamnus nauseosus*

Colletes hyalinus - *Euthamia occidentalis*, *Salix* sp.

Colletes lutzi - *Melilotus officinalis*, *Melilotus* sp.

Colletes mandibularis - *Ratibida columnifera*

Colletes phaceliae - *Apocynum* sp., *Centaurea repens*, *Eriogonum effusum*, *Fallopia aubertii*, *Grindelia squarrosa*, *Gutierrezia sarothrae*, *Lepidium* sp., *Melilotus officinalis*, *Melilotus* sp., *Potentilla fruticosa*, *Salix exigua*, *Salix* sp., *Salsola iberica*, *Solidago mollis*, *Verbesina encelioides*, *Veronica* cf. *catenata*
Colletes xerophilus - *Cirsium arevnse*, *Salix exigua*, *Salix* sp.
Colletes sp. - *Melilotus* sp.

HYLAEINAE

Hylaeus affinis - *Apocynum* sp., *Aster* sp., *Cirsium arevnse*, *Malva neglecta*, *Melilotus alba*, *Melilotus* sp., *Mentha arvensis*, *Nasturtium officinale*, *Polygonum* sp., *Rhus glabra*, *Solidago* nr *canadensis*, *Verbena hastata*, *Veronica* sp.
Hylaeus leptcephalus - *Apocynum cannabinum*, *Apocynum sibiricum*, *Apocynum* sp., *Chrysanthemum leucanthemum*, *Chrysothamnus nauseosus*, *Cirsium arevnse*, *Conyza canadensis*, *Crataegus* sp., *Descurainia* sp., *Erigeron divergens*, *Erigeron* sp., *Euthamia occidentalis*, *Gaillardia aristata*, *Grindelia squarrosa*, *Lepidium* sp., *Malva neglecta*, *Medicago lupulina*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Persicaria* sp., *Plantago lanceolata*, *Polygonum* sp., *Ratibida columnifera*, *Rosa* (pink), *Salix exigua*, *Salix* sp., *Tamarix pentandra*, *Veronica* sp.
Hylaeus mesillae - *Achillea lanulosa*, *Alyssum* sp., *Amorpha fruticosa*, *Apocynum cannabinum*, *Apocynum sibiricum*, *Apocynum* sp., *Asclepias incarnata*, *Asclepias speciosa*, *Aster* sp., *Barbarea* sp., *Carduus nutans*, *Centaurea repens*, *Chrysothamnus nauseosus*, *Cirsium arevnse*, *Cleome serrulata*, *Convolvulus arvensis*, *Conyza canadensis*, *Cornus stolonifera*, *Crataegus* sp., *Dalea candida*, *Dalea purpurea*, *Descurainia* sp., *Echinocystis lobata*, *Erigeron divergens*, *Erigeron* sp., *Eriogonum effusum*, *Euthamia occidentalis*, *Fallopia aubertii*, *Gaillardia aristata*, *Gleditsia triacanthos*, *Grindelia squarrosa*, *Helianthus annuus*, *Lepidium* sp., *Lotus tenuis*, *Melilotus alba*, *Melilotus* sp., *Mentha arvensis*, *Nasturtium officinale*, *Nepeta cataria*, *Persicaria* sp., *Polygonum* sp., *Potentilla fruticosa*, *Ratibida columnifera*, *Rhus glabra*, *Rhus trilobata*, *Rosa* (pink), *Salix exigua*, *Salix* sp., *Solidago* nr *canadensis*, *Solidago gigantea*, *Solidago* sp., *Tamarix pentandra*, *Verbena hastata*, *Veronica* cf. *catenata*, *Veronica* sp.
Hylaeus modestus - *Rhus glabra*, *Symphoricarpos* sp.
Hylaeus punctatus - *Fallopia aubertii*
Hylaeus verticalis - *Salix* sp.
Hylaeus sp. - *Achillea lanulosa*, *Convolvulus arvensis*, *Dalea purpurea*, *Lepidium* sp., *Melilotus alba*, *Melilotus* sp., *Parthenocissus inserta*, *Potentilla* cf. *recta*, *Potentilla fruticosa*, *Rhus glabra*, *Solidago* nr *canadensis*, *Solidago* sp., *Tamarix pentandra*, *Veronica* sp.

HALICTIDAE

HALICTINAE

Augochlorini

Augochlorella aurata - *Aster* sp., *Barbarea* sp., *Carduus nutans*, *Centaurea diffusa*, *Chenopodium* cf. *album*, *Chrysothamnus nauseosus*, *Cirsium arevnse*, *Convolvulus arvensis*, *Conyza canadensis*, *Cosmos bipinnatus*, *Descurainia sophia*, *Epilobium* sp., *Euthamia occidentalis*, *Fallopia aubertii*, *Gaillardia aristata*, *Glandularia bipinnatifida*, *Grindelia squarrosa*, *Helenium autumnale*, *Helianthus annuus*, *Heterotheca villosa*, *Lotus tenuis*, *Machaeranthera pinnatifida*, *Machaeranthera tanacetifolia*, *Malva*

neglecta, *Medicago sativa*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Opuntia* sp., *Perovskia atriplicifolia*, *Persicaria* sp., *Physalis* cf *virginiana*, *Polygonum* sp., *Potentilla fruticosa*, *Prunus virginiana*, *Ratibida columnifera*, *Salix* sp., *Solidago mollis*, *Solidago* sp., *Tagetes* sp., *Taraxacum* sp., *Trifolium fragiferum*, *Verbena hastata*, *Verbesina encelioides*, *Weigela* sp.

Augochloropsis metallica - *Apocynum* sp., *Potentilla fruticosa*

Halictini

Agapostemon angelicus - *Aster* sp., *Carduus nutans*, *Centaurea diffusa*, *Chrysothamnus nauseosus*, *Cosmos bipinnatus*, *Eriogonum effusum*, *Euthamia occidentalis*, *Grindelia squarrosa*, *Gutierrezia sarothrae*, *Helianthus annuus*, *Machaeranthera pinnatifida*, *Machaeranthera tanacetifolia*, *Machaeranthera* sp., *Malva neglecta*, *Melilotus alba*, *Melilotus* sp., *Monarda pectinata*, *Nepeta cataria*, *Perovskia atriplicifolia*, *Verbesina encelioides*

Agapostemon angelicus* or *texanus - *Aster* sp., *Carduus nutans*, *Centaurea diffusa*, *Cirsium arevne*, *Convolvulus arvensis*, *Dalea purpurea*, *Descurainia* sp., *Dipsacus sylvestris*, *Euthamia occidentalis*, *Fallopia aubertii*, *Grindelia squarrosa*, *Lepidium* sp., *Lotus tenuis*, *Machaeranthera pinnatifida*, *Melilotus alba*, *Mentzelia nuda*, *Opuntia polyacantha*, *Opuntia* sp., *Perovskia atriplicifolia*, *Rosa* (pink), *Salix* sp., *Verbena hastata*, *Verbesina encelioides*, *Veronica* sp., *Weigela* sp.

Agapostemon obliquus - *Aster* sp., *Chrysothamnus nauseosus*, *Melilotus alba*, *Nasturtium officinale*, *Verbesina encelioides*

Agapostemon texanus - *Chrysothamnus nauseosus*, *Grindelia squarrosa*, *Machaeranthera pinnatifida*, *Perovskia atriplicifolia*, *Verbesina encelioides*

Agapostemon virescens - *Aster* sp., *Grindelia squarrosa*, *Helianthus annuus*

Halictus confusus - *Aster* sp., *Barbarea* sp., *Carduus nutans*, *Chrysothamnus nauseosus*, *Cirsium arevne*, *Cleome serrulata*, *Convolvulus arvensis*, *Coronilla varia*, *Crataegus* sp., *Descurainia sophia*, *Descurainia* sp., *Echinocereus viridiflorus*, *Erigeron divergens*, *Eriogonum effusum*, *Fallopia aubertii*, *Grindelia squarrosa*, *Helianthus annuus*, *Heterotheca villosa*, *Lepidium* sp., *Lotus tenuis*, *Malva neglecta*, *Medicago sativa*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Monarda pectinata*, *Persicaria* sp., *Physalis virginiana*, *Prunus americana*, *Prunus virginiana*, *Rhus glabra*, *Salix* sp., *Solidago* sp., *Taraxacum* sp., *Tribulus terrestris*, *Trifolium fragiferum*, *Trifolium pretense*, *Verbena hastata*, *Verbesina encelioides*

Halictus ligatus - *Achillea lanulosa*, *Apocynum sibiricum*, *Aster* sp., *Barbarea* sp., *Carduus nutans*, *Centaurea diffusa*, *Centaurea repens*, *Chrysanthemum leucanthemum*, *Chrysothamnus nauseosus*, *Cirsium arevne*, *Convolvulus arvensis*, *Conyza canadensis*, *Coreopsis tinctoria*, *Cosmos bipinnatus*, *Cosmos sulphureus*, *Descurainia sophia*, *Descurainia* sp., *Dipsacus sylvestris*, *Dyssodia papposa*, *Erigeron divergens*, *Euphorbia dentata*, *Euthamia occidentalis*, *Fallopia aubertii*, *Gaillardia aristata*, *Grindelia squarrosa*, *Gutierrezia sarothrae*, *Helianthus annuus*, *Helianthus nuttallii*, *Heterotheca villosa*, *Kochia iranica*, *Machaeranthera pinnatifida*, *Machaeranthera tanacetifolia*, *Malva neglecta*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Opuntia polyacantha*, *Opuntia* sp., *Portulaca oleracea*, *Potentilla fruticosa*, *Prunus virginiana*, *Ratibida columnifera*, *Rhus glabra*, *Rosa* (pink), *Salix* sp., *Senecio spartioides*, *Solidago* nr *canadensis*, *Solidago gigantea*, *Solidago mollis*, *Solidago* sp., *Sonchus* sp., *Sphaeralcea*

- coccinea*, *Taraxacum* sp., *Tragopogon* sp., *Trifolium fragiferum*, *Verbena hastata*, *Verbesina encelioides*
- Halictus parallelus*** - *Fallopia aubertii*
- Halictus rubicundus*** - *Argemone polyanthemus*, *Aster* sp., *Barbarea* sp., *Chrysothamnus nauseosus*, *Cirsium arevnsse*, *Convolvulus arvensis*, *Lepidium* sp., *Malus* sp., *Malva neglecta*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Potentilla fruticosa*, *Prunus virginiana*, *Rhus glabra*, *Salix exigua*, *Salix* sp.
- Halictus tripartitus*** - *Apocynum cannabinum*, *Apocynum sibiricum*, *Apocynum* sp., *Argemone polyanthemus*, *Asclepias incarnata*, *Asclepias speciosa*, *Aster* sp., *Barbarea* sp., *Carduus nutans*, *Centaurea diffusa*, *Centaurea repens*, *Chrysanthemum leucanthemum*, *Chrysothamnus nauseosus*, *Cirsium arevnsse*, *Cleome serrulata*, *Convolvulus arvensis*, *Cosmos bipinnatus*, *Crataegus* sp., *Dalea candida*, *Dalea purpurea*, *Descurainia sophia*, *Descurainia* sp., *Dipsacus sylvestris*, *Erigeron divergens*, *Eriogonum effusum*, *Euthamia occidentalis*, *Fallopia aubertii*, *Gaillardia aristata*, *Grindelia squarrosa*, *Gutierrezia sarothrae*, *Helenium autumnale*, *Helianthus annuus*, *Heterotheca villosa*, *Lepidium* sp., *Lotus tenuis*, *Machaeranthera tanacetifolia*, *Malva neglecta*, *Marrubium vulgare*, *Medicago lupulina*, *Medicago sativa*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Mentzelia nuda*, *Monarda pectinata*, *Onopordum acanthium*, *Opuntia polyacantha*, *Opuntia* sp., *Perovskia atriplicifolia*, *Persicaria* sp., *Plantago lanceolata*, *Portulaca oleracea*, *Potentilla* cf. *recta*, *Potentilla fruticosa*, *Prunus americana*, *Prunus virginiana*, *Pyrus* sp., *Ratibida columnifera*, *Rhus glabra*, *Sagittaria* cf. *cuneata*, *Salix exigua*, *Salix* sp., *Salsola iberica*, *Solanum rostratum*, *Solanum triflorum*, *Solidago* sp., *Sophora nuttalliana*, *Sphaeralcea coccinea*, *Tamarix pentandra*, *Taraxacum* sp., *Verbena bracteata*, *Verbesina encelioides*, *Veronica* cf. *catenata*, *Veronica* sp.
- Lasioglossum* cf. *absimile*** - *Barbarea* sp., *Persicaria* sp., *Portulaca oleracea*, *Prunus virginiana*, *Salix* sp.
- Lasioglossum athabascence*** - *Erodium cicutarium*, *Weigela* sp.
- Lasioglossum cinctipes*** - *Helianthus annuus*, *Malus* sp., *Prunus americana*, *Prunus virginiana*, *Salix alba*, *Salix exigua*, *Salix* sp.
- Lasioglossum clematisellum*** - *Fallopia aubertii*, *Lepidium* sp., *Solanum triflorum*
- Lasioglossum cressonii*** - *Salix* sp.
- Lasioglossum* aff. *ellisiae*** - *Carduus nutans*, *Chenopodium incarum*, *Erigeron divergens*, *Melilotus officinalis*, *Monarda pectinata*, *Solanum triflorum*
- Lasioglossum* cf. *ellisiae*** - *Centaurea diffusa*, *Chamaesyce* sp., *Grindelia squarrosa*, *Lepidium* sp., *Malva neglecta*, *Mentzelia nuda*, *Persicaria* sp., *Physalis* cf. *hederaefolia*, *Physalis* cf. *virginiana*, *Salix* sp.
- Lasioglossum ephialthum*** - *Barbarea* sp., *Nasturtium officinale*, *Salix* sp.
- Lasioglossum foxii*** - *Barbarea* sp., *Cirsium arevnsse*, *Descurainia sophia*, *Nasturtium officinale*, *Prunus virginiana*, *Rhus trilobata*, *Salix* sp., *Solidago* cf. *canadensis*
- Lasioglossum* cf. *hudsoniellum*** - *Carduus nutans*, *Chenopodium incarum*, *Cleome serrulata*, *Lepidium* sp., *Mentzelia nuda*, *Monarda pectinata*
- Lasioglossum imitatum*** - *Apocynum cannabinum*, *Apocynum sibiricum*, *Barbarea* sp., *Centaurea cyanus*, *Cirsium arevnsse*, *Clematis ligusticifolia*, *Convolvulus arvensis*, *Conyza canadensis*, *Cornus stolonifera*, *Crataegus* sp., *Descurainia sophia*, *Erodium cicutarium*, *Fallopia aubertii*, *Glycyrrhiza lepidota*, *Grindelia squarrosa*, *Lepidium* sp.,

Malus sp., *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Nasturtium officinale*,
Persicaria sp., *Prunus americana*, *Prunus virginiana*, *Rhus glabra*, *Salix exigua*, *Salix*
sp., *Solidago* nr *canadensis*, *Solidago* cf *gigantea*, *Tamarix pentandra*
Lasioglossum inconditum - *Machaeranthera tanacetifolia*, *Melilotus officinalis*,
Nasturtium officinale, *Verbesina encelioides*
Lasioglossum lineatulum - *Prunus americana*, *Prunus virginiana*
Lasioglossum cf. lineatulum - *Veronica* cf. *catenata*
Lasioglossum lionotum - *Fallopia aubertii*
Lasioglossum lusorium - *Apocynum* sp., *Carduus nutans*, *Chrysothamnus nauseosus*,
Cirsium arevnsse, *Lepidium* sp., *Melilotus alba*, *Melilotus officinalis*, *Veronica* sp.
Lasioglossum occidentale - *Barbarea* sp., *Convolvulus arvensis*, *Descurainia sophia*,
Lotus tenuis, *Melilotus alba*, *Melilotus* sp., *Mentzelia nuda*, *Prunus virginiana*, *Salix* sp.,
Sphaeralcea coccinea, *Taraxacum* sp.
Lasioglossum pacatum - *Barbarea* sp.
Lasioglossum cf. pacatum - *Erigeron divergens*
Lasioglossum packer - *Chenopodium incarum*, *Salix* sp.
Lasioglossum paraforbesii - *Fallopia aubertii*, *Verbesina encelioides*
Lasioglossum pectoraloides - *Carduus nutans*, *Monarda pectinata*, *Veronica* cf. *catenata*
Lasioglossum aff. perdifficile - *Erodium cicutarium*, *Salix* sp.
Lasioglossum perpunctatum - *Convolvulus arvensis*, *Crataegus* sp., *Lepidium* sp., *Malva*
neglecta, *Salix* sp.
Lasioglossum pruinosum - *Carduus nutans*, *Cleome serrulata*, *Fallopia aubertii*,
Helianthus annuus, *Physalis virginiana*, *Salix* sp., *Verbesina encelioides*
Lasioglossum pulveris - *Prunus virginiana*
Lasioglossum ruidosense - *Salix* sp.
Lasioglossum semicaeruleum - *Argemone polyanthemom*, *Chrysothamnus nauseosus*,
Cirsium arevnsse, *Convolvulus arvensis*, *Crataegus* sp., *Descurainia* sp., *Erigeron*
divergens, *Erodium cicutarium*, *Euthamia occidentalis*, *Fallopia aubertii*, *Gleditsia*
triacanthos, *Grindelia squarrosa*, *Machaeranthera tanacetifolia*, *Malva neglecta*,
Melilotus alba, *Melilotus officinalis*, *Melilotus* sp., *Mentzelia nuda*, *Monarda pectinata*,
Nasturtium officinale, *Opuntia polyacantha*, *Opuntia* sp., *Perovskia atriplicifolia*,
Persicaria sp., *Physalis* cf *virginiana*, *Potentilla fruticosa*, *Prunus americana*, *Prunus*
virginiana, *Ranunculus cymbalaria*, *Rosa* (pink), *Salix exigua*, *Salix* sp., *Solanum*
rostratum, *Sphaeralcea coccinea*, *Tamarix pentandra*, *Taraxacum* sp., *Verbena hastata*,
Verbesina encelioides, *Veronica* cf. *catenata*, *Veronica* sp., *Weigela* sp.
Lasioglossum simplex - *Cleome serrulata*
Lasioglossum sisymbrii - *Argemone polyanthemom*, *Melilotus officinalis*, *Salix* sp.,
Veronica cf. *catenata*
Lasioglossum tegulare - *Convolvulus arvensis*, *Conyza canadensis*, *Descurainia sophia*,
Descurainia sp., *Erigeron divergens*, *Eriogonum effusum*, *Fallopia aubertii*, *Lotus tenuis*,
Melilotus alba, *Mentzelia nuda*, *Monarda pectinata*, *Nasturtium officinale*, *Persicaria* sp.,
Physalis virginiana, *Salix exigua*, *Salix* sp., *Verbesina encelioides*, *Veronica* sp.
Lasioglossum tenax - *Fallopia aubertii*, *Malus* sp., *Nasturtium officinale*, *Salix* sp.
Lasioglossum trigeminum - *Grindelia squarrosa*, *Mentzelia nuda*
Lasioglossum zephyrum - *Fallopia aubertii*, *Melilotus alba*, *Mentzelia nuda*, *Prunus*
americana, *Prunus virginiana*, *Rhus trilobata*, *Salix* sp., *Veronica* cf. *catenata*

Lasioglossum (Dialictus) sp. - *Apocynum cannabinum*, *Apocynum sibiricum*, *Apocynum* sp., *Argemone polyanthemus*, *Asclepias incarnata*, *Asclepias speciosa*, *Asparagus officinalis*, *Aster* sp., *Barbarea* sp., *Carduus nutans*, *Centaurea repens*, *Chamaesyce* sp., *Chenopodium* cf. *album*, *Chenopodium incarum*, *Chrysothamnus nauseosus*, *Cirsium arevnsae*, *Clematis ligusticifolia*, *Cleome serrulata*, *Convolvulus arvensis*, *Conyza canadensis*, *Coreopsis tinctoria*, *Cornus stolonifera*, *Dalea candida*, *Descurainia* sp., *Dipsacus sylvestris*, *Erigeron divergens*, *Erigeron* sp., *Eriogonum effusum*, *Euthamia occidentalis*, *Fallopia aubertii*, *Gaillardia aristata*, *Grindelia squarrosa*, *Gutierrezia sarothrae*, *Helenium autumnale*, *Helianthus annuus*, *Heterotheca villosa*, *Lepidium* sp., *Lotus tenuis*, *Machaeranthera pinnatifida*, *Machaeranthera tanacetifolia*, *Malva neglecta*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Mentzelia nuda*, *Monarda pectinata*, *Nasturtium officinale*, *Onopordum acanthium*, *Perovskia atriplicifolia*, *Persicaria maculata*, *Persicaria* sp., *Physalis* cf. *virginiana*, *Physalis virginiana*, *Plantago lanceolata*, *Polygonum* sp., *Potentilla fruticosa*, *Prunus besseyi*, *Prunus virginiana*, *Psoralea tenuiflora*, *Pyrus* sp., *Ranunculus cymbalaria*, *Ratibida columnifera*, *Rhus glabra*, *Rhus trilobata*, *Rosa* (pink), *Salix alba*, *Salix exigua*, *Salix* sp., *Salsola iberica*, *Solanum rostratum*, *Solanum triflorum*, *Solidago* cf. *canadensis*, *Solidago* cf. *gigantea*, *Solidago mollis*, *Sonchus* sp., *Tamarix pentandra*, *Taraxacum* sp., *Tribulus terrestris*, *Trifolium repens*, *Verbena bracteata*, *Verbena hastata*, *Verbesina encelioides*, *Veronica* cf. *catenata*, *Veronica* sp., *Zigadenus venenosus*

Lasioglossum (Hemihalictus) sp. - *Verbesina encelioides*

Lasioglossum (Lasioglossum) sp. - *Salix* sp.

Lasioglossum sp. - *Verbesina encelioides*

Sphecodes sp. - *Amorpha fruticosa*, *Apocynum cannabinum*, *Apocynum sibiricum*, *Apocynum* sp., *Asclepias incarnata*, *Chrysothamnus nauseosus*, *Cirsium arevnsae*, *Cleome serrulata*, *Crataegus* sp., *Erigeron divergens*, *Erigeron* sp., *Eriogonum effusum*, *Fallopia aubertii*, *Helianthus annuus*, *Lepidium* sp., *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Nasturtium officinale*, *Persicaria* sp., *Prunus virginiana*, *Rhus glabra*, *Rhus trilobata*, *Salix exigua*, *Salix* sp., *Tamarix pentandra*, *Taraxacum* sp., *Verbena bracteata*, *Verbesina encelioides*, *Veronica* cf. *catenata*, *Veronica* sp.

NOMIINAE

Dieunomia triangulifera - *Helianthus annuus*

ROPHITINAE

Dufourea marginata - *Helianthus annuus*

MEGACHILIDAE

MEGACHILINAE

Anthidiini

Anthidiellum notatum - *Lotus tenuis*

Anthidium manicatum - *Coronilla varia*, *Verbena hastata*

Anthidium oblongatum - *Heterotheca villosa*, *Linum lewisii*, *Lotus tenuis*, *Medicago sativa*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Monarda pectinata*, *Onopordum acanthium*, *Salix* sp.

Anthidium porterae - *Chrysothamnus nauseosus*, *Dalea candida*, *Machaeranthera pinnatifida*, *Monarda pectinata*

Dianthidium curvatum - *Gaillardia aristata*

Dianthidium pudicum - *Aster* sp., *Centaurea diffusa*, *Cirsium arevnse*, *Convolvulus arvensis*, *Erigeron divergens*, *Grindelia squarrosa*, *Heterotheca villosa*, *Lotus tenuis*, *Machaeranthera tanacetifolia*, *Veronica* cf. *catenata*

Dianthidium ulkei - *Grindelia squarrosa*

***Stelis* sp.** - *Apocynum* sp., *Erigeron divergens*, *Rhus glabra*

Lithurgini

Lithurgopsis apicalis - *Convolvulus arvensis*, *Opuntia polyacantha*, *Opuntia* sp.

Megachilini

Coelioxys apacheorum - *Grindelia squarrosa*

Coelioxys edita - *Grindelia squarrosa*, *Verbesina encelioides*

Coelioxys insita - *Grindelia squarrosa*, *Machaeranthera tanacetifolia*

Coelioxys octodentata - *Grindelia squarrosa*

Coelioxys rufitarsis - *Aster* sp., *Cosmos sulphureus*, *Grindelia squarrosa*

Coelioxys sayi - *Aster* sp., *Melilotus alba*, *Melilotus* sp., *Rhus glabra*, *Verbena hastata*, *Verbesina encelioides*

***Coelioxys* sp.** - *Grindelia squarrosa*

Megachile apicalis - *Carduus nutans*, *Chrysothamnus nauseosus*, *Heterotheca villosa*, *Lotus tenuis*

Megachile brevis - *Argemone polyanthemus*, *Asclepias incarnata*, *Aster* sp., *Carduus nutans*, *Chrysothamnus nauseosus*, *Dalea purpurea*, *Erigeron divergens*, *Gaillardia aristata*, *Grindelia squarrosa*, *Helianthus annuus*, *Lotus tenuis*, *Machaeranthera pinnatifida*, *Malva neglecta*, *Marrubium vulgare*, *Medicago sativa*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Mentzelia nuda*, *Potentilla fruticosa*, *Psoralea tenuiflora*, *Ratibida columnifera*, *Rhus glabra*, *Sonchus* sp.

Megachile centuncularis - *Grindelia squarrosa*, *Verbesina encelioides*

Megachile fidelis - *Centaurea diffusa*, *Grindelia squarrosa*, *Heterotheca villosa*

Megachile fortis - *Helianthus annuus*

Megachile frigida - *Coronilla varia*, *Medicago sativa*

Megachile inimica - *Aster* sp., *Cosmos bipinnatus*, *Cosmos sulphureus*, *Grindelia squarrosa*, *Helianthus annuus*, *Perovskia atriplicifolia*

Megachile latimanus - *Cirsium arevnse*, *Cosmos bipinnatus*, *Gaillardia aristata*, *Grindelia squarrosa*, *Helianthus annuus*

Megachile lippiae - *Apocynum sibiricum*, *Apocynum* sp., *Asclepias incarnata*, *Asclepias speciosa*, *Gaillardia aristata*, *Glycyrrhiza lepidota*, *Lotus tenuis*, *Melilotus alba*, *Mentzelia nuda*, *Persicaria* sp., *Rhus glabra*

Megachile manifesta - *Erigeron divergens*

Megachile mellitarsus - *Grindelia squarrosa*

Megachile mendica - *Apocynum cannabinum*, *Asclepias incarnata*, *Grindelia squarrosa*, *Rhus glabra*

Megachile montivaga - *Argemone polyanthemus*, *Aster* sp., *Carduus nutans*, *Cosmos bipinnatus*, *Descurainia* sp., *Erigeron divergens*, *Gaillardia aristata*, *Grindelia squarrosa*, *Helianthus annuus*, *Machaeranthera tanacetifolia*, *Mentzelia nuda*, *Opuntia* sp., *Perovskia atriplicifolia*, *Sphaeralcea coccinea*, *Tagetes* sp.

Megachile mucorosa - *Machaeranthera tanacetifolia*, *Ratibida columnifera*

- Megachile onobrychidis*** - *Grindelia squarrosa*, *Lotus tenuis*, *Malva neglecta*, *Mentzelia nuda*
- Megachile parallela*** - *Aster* sp., *Carduus nutans*, *Cosmos bipinnatus*, *Cosmos sulphureus*, *Grindelia squarrosa*, *Helianthus annuus*, *Monarda pectinata*, *Ratibida columnifera*, *Verbesina encelioides*
- Megachile perihirta*** - *Apocynum sibiricum*, *Apocynum* sp., *Asclepias incarnata*, *Asclepias speciosa*, *Aster* sp., *Carduus nutans*, *Centaurea diffusa*, *Chrysothamnus nauseosus*, *Cirsium arevnsae*, *Cirsium vulgare*, *Coronilla varia*, *Cosmos bipinnatus*, *Cosmos sulphureus*, *Dipsacus sylvestris*, *Gaillardia aristata*, *Glycyrrhiza lepidota*, *Grindelia squarrosa*, *Helianthus annuus*, *Heterotheca villosa*, *Lotus tenuis*, *Medicago sativa*, *Nepeta cataria*, *Sonchus* sp., *Verbesina encelioides*
- Megachile pugnata*** - *Apocynum* sp., *Cirsium arevnsae*, *Gaillardia aristata*
- Megachile relativa*** - *Chrysothamnus nauseosus*, *Cosmos bipinnatus*, *Medicago sativa*
- Megachile rotundata*** - *Achillea lanulosa*, *Apocynum cannabinum*, *Apocynum sibiricum*, *Apocynum* sp., *Asclepias incarnata*, *Centaurea diffusa*, *Centaurea repens*, *Cirsium arevnsae*, *Cleome serrulata*, *Convolvulus arvensis*, *Crataegus* sp., *Descurainia sophia*, *Descurainia* sp., *Erigeron divergens*, *Erigeron* sp., *Fallopia aubertii*, *Gaillardia aristata*, *Lepidium* sp., *Lotus tenuis*, *Marrubium vulgare*, *Medicago lupulina*, *Medicago sativa*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Monarda pectinata*, *Opuntia* sp., *Potentilla fruticosa*, *Ratibida columnifera*, *Rhus glabra*, *Salix exigua*, *Tamarix pentandra*, *Trifolium fragiferum*, *Trifolium repens*, *Verbena bracteata*, *Verbena hastata*, *Veronica* cf. *catenata*, *Weigela* sp.
- Megachile snowi*** - *Cirsium arevnsae*, *Malva neglecta*
- Megachile subexilis*** - *Coronilla varia*, *Glycyrrhiza lepidota*, *Lotus tenuis*, *Melilotus* sp., *Rhus glabra*
- Megachile texana*** - *Apocynum* sp., *Carduus nutans*, *Grindelia squarrosa*, *Lotus tenuis*, *Melilotus* sp.

Osminiini

- Ashmeadiella buconis*** - *Grindelia squarrosa*
- Ashmeadiella gillettei*** - *Apocynum cannabinum*, *Apocynum* sp., *Cirsium arevnsae*, *Descurainia* sp., *Erigeron divergens*, *Eriogonum effusum*, *Heterotheca villosa*, *Melilotus alba*, *Melilotus officinalis*, *Melilotus* sp., *Tamarix pentandra*, *Verbena bracteata*
- Ashmeadiella* sp.** - *Melilotus officinalis*
- Heriades carinatus*** - *Apocynum sibiricum*, *Apocynum* sp., *Asclepias incarnata*, *Rhus glabra*, *Salix* sp.
- Heriades cressoni*** - *Chrysothamnus nauseosus*, *Grindelia squarrosa*
- Heriades variolosus*** - *Ratibida columnifera*
- Hoplitis fulgida*** - *Melilotus officinalis*
- Hoplitis pilosifrons*** - *Astragalus drummondii* (?), *Dalea purpurea*, *Glycyrrhiza lepidota*, *Lotus tenuis*, *Machaeranthera tanacetifolia*, *Melilotus officinalis*, *Monarda pectinata*, *Potentilla fruticosa*, *Rosa* (pink), *Thermopsis* sp.
- Hoplitis producta*** - *Apocynum cannabinum*, *Chrysanthemum leucanthemum*, *Cirsium arevnsae*, *Convolvulus arvensis*, *Crataegus* sp., *Descurainia* sp., *Erigeron divergens*, *Heterotheca villosa*, *Lepidium* sp., *Lotus tenuis*, *Malva neglecta*, *Medicago lupulina*, *Medicago sativa*, *Melilotus officinalis*, *Melilotus* sp., *Monarda pectinata*, *Nepeta cataria*, *Potentilla fruticosa*, *Rhus glabra*, *Rosa* (pink), *Salix exigua*, *Salix* sp., *Solanum*

rostratum, *Taraxacum* sp., *Trifolium fragiferum*, *Trifolium repens*, *Verbena bracteata*,
Verbena hastata, *Weigela* sp.

Hoplitis spoliata - *Melilotus officinalis*, *Potentilla fruiticosa*, *Rhus glabra*

***Hoplitis* sp.** - *Glycyrrhiza lepidota*, *Melilotus* sp.

Osmia lignaria - *Salix alba*, *Salix* sp.

***Osmia* sp.** - *Astragalus drummondii* (?), *Convolvulus arvensis*, *Descurainia sophia*,
Glycyrrhiza lepidota, *Lotus tenuis*, *Melilotus officinalis*, *Monarda pectinata*, *Opuntia*
polyacantha, *Potentilla fruiticosa*, *Rosa* (pink), *Trifolium repens*, *Veronica* sp.

MELITTIDAE

DASYPODAINAE

Hesperapini

***Hesperapis* sp.** - *Helianthus annuus*

Appendix 3. For each plant species, a list of the bee collected from that plant.

DICOTS

AMARANTHACEAE

Salsola iberica - COLLETIDAE: *Colletes phaceliae*; HALICTIDAE: *Halictus tripartitus*, *Lasioglossum (Dialictus) sp.*

ANACARDIACEAE

Rhus glabra - ANDRENIDAE: *Andrena sp.*; APIDAE: *Apis mellifera*, *Ceratina calcarata*, *Ceratina neomexicana*; COLLETIDAE: *Hylaeus affinis*, *Hylaeus mesillae*, *Hylaeus modestus*, *Hylaeus sp.*; HALICTIDAE: *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum imitatum*, *Lasioglossum (Dialictus) sp.*, *Sphecodes sp.*; MEGACHILIDAE: *Coelioxys sayi*, *Heriades carinatus*, *Hoplitis producta*, *Hoplitis spoliata*, *Megachile brevis*, *Megachile lippiae*, *Megachile mendica*, *Megachile rotundata*, *Megachile subexilis*, *Stelis sp.*

Rhus trilobata - ANDRENIDAE: *Andrena sp.*; APIDAE: *Nomada sp.*; COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Lasioglossum foxii*, *Lasioglossum zephyrum*, *Lasioglossum (Dialictus) sp.*, *Sphecodes sp.*

APOCYNACEAE

Apocynum cannabinum - APIDAE: *Nomada sp.*; COLLETIDAE: *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Halictus tripartitus*, *Lasioglossum imitatum*, *Lasioglossum (Dialictus) sp.*, *Sphecodes sp.*; MEGACHILIDAE: *Ashmeadiella gillettei*, *Hoplitis producta*, *Megachile mendica*, *Megachile rotundata*

Apocynum sibiricum - APIDAE: *Nomada sp.*; COLLETIDAE: *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum imitatum*, *Lasioglossum (Dialictus) sp.*, *Sphecodes sp.*; MEGACHILIDAE: *Heriades carinatus*, *Megachile lippiae*, *Megachile perihirta*, *Megachile rotundata*

Apocynum sp. - APIDAE: *Bombus huntii*, *Nomada sp.*; COLLETIDAE: *Colletes phaceliae*, *Hylaeus affinis*, *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Augochloropsis metallica*, *Halictus tripartitus*, *Lasioglossum lusorium*, *Lasioglossum (Dialictus) sp.*, *Sphecodes sp.*; MEGACHILIDAE: *Ashmeadiella gillettei*, *Heriades carinatus*, *Megachile lippiae*, *Megachile perihirta*, *Megachile pugnata*, *Megachile rotundata*, *Megachile texana*, *Stelis sp.*

ASCLEPIADACEAE

Asclepias incarnata - APIDAE: *Apis mellifera*, *Bombus fraternus*, *Bombus griseocollis*, *Bombus nevadensis*, *Bombus pensylvanicus*; COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Halictus tripartitus*, *Lasioglossum (Dialictus) sp.*, *Sphecodes sp.*; MEGACHILIDAE: *Heriades carinatus*, *Megachile brevis*, *Megachile lippiae*, *Megachile mendica*, *Megachile perihirta*, *Megachile rotundata*

Asclepias speciosa - APIDAE: *Bombus griseocollis*; COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Halictus tripartitus*, *Lasioglossum (Dialictus) sp.*; MEGACHILIDAE: *Megachile lippiae*, *Megachile perihirta*

ASTERACEAE

Achillea lanulosa - COLLETIDAE: *Hylaeus mesillae*, *Hylaeus sp.*; HALICTIDAE: *Halictus ligatus*; MEGACHILIDAE: *Megachile rotundata*

Aster sp. - ANDRENIDAE: *Calliopsis sp.*; APIDAE: *Ceratina calcarata*, *Ceratina neomexicana*, *Melissodes coreopsis*, *Melissodes rustica*, *Melissodes sp.*; COLLETIDAE:

Hylaeus affinis, *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Agapostemon obliquus*, *Agapostemon virescens*, *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum (Dialictus) sp.*;

MEGACHILIDAE: *Coelioxys rufitarsis*, *Megachile brevis*, *Megachile perihirta*

Aster sp. (large, pale, fragrant) - APIDAE: *Apis mellifera*; HALICTIDAE: *Halictus ligatus*

Aster sp. (purple) - ANDRENIDAE: *Calliopsis chlorops*; APIDAE: *Apis mellifera*, *Ceratina sp.*, *Melissodes agilis*, *Melissodes sp.*, *Triepeolus sp.*; HALICTIDAE: *Augochlorella aurata*, *Halictus ligatus*; MEGACHILIDAE: *Dianthidium pudicum*, *Megachile brevis*, *Megachile inimica*, *Megachile montivaga*, *Megachile parallela*, *Megachile perihirta*

Aster sp. (small, white) - HALICTIDAE: *Augochlorella aurata*, *Halictus ligatus*

Aster sp. (white multiflowered) - APIDAE: *Melissodes sp.*; HALICTIDAE: *Augochlorella aurata*

Aster sp. (white) - COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Agapostemon angelicus* or *texanus*, *Agapostemon virescens*, *Halictus ligatus*, *Lasioglossum (Dialictus) sp.*;

MEGACHILIDAE: *Coelioxys sayi*

Carduus nutans - APIDAE: *Anthophora occidentalis*, *Apis mellifera*, *Bombus fervidus*, *Bombus griseocollis*, *Bombus huntii*, *Bombus pensylvanicus*, *Ceratina neomexicana*, *Diadasia australis* or *rinconis*, *Diadasia enavata*, *Melissodes agilis*, *Melissodes communis*, *Melissodes coreopsis*, *Melissodes sp.*, *Svastra obliqua*; COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Agapostemon angelicus* or *texanus*, *Halictus confusus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum nr. ellisiae*, *Lasioglossum cf. hudsoniellum*, *Lasioglossum lusorium*, *Lasioglossum pectoraloides*, *Lasioglossum pruinatum*, *Lasioglossum (Dialictus) sp.*; MEGACHILIDAE: *Megachile apicalis*, *Megachile brevis*, *Megachile montivaga*, *Megachile parallela*, *Megachile perihirta*, *Megachile texana*

Centaurea cyanus - HALICTIDAE: *Lasioglossum imitatum*

Centaurea diffusa - APIDAE: *Bombus huntii*, *Melissodes sp.*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Agapostemon angelicus* or *texanus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum nr. ellisiae*; MEGACHILIDAE: *Dianthidium pudicum*, *Megachile fidelis*, *Megachile perihirta*, *Megachile rotundata*

Centaurea repens - COLLETIDAE: *Colletes phaceliae*, *Hylaeus mesillae*; HALICTIDAE: *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum (Dialictus) sp.*; MEGACHILIDAE: *Megachile rotundata*

Chrysanthemum leucanthemum - COLLETIDAE: *Hylaeus leptocephalus*; HALICTIDAE: *Halictus ligatus*, *Halictus tripartitus*; MEGACHILIDAE: *Hoplitis producta*

Chrysothamnus nauseosus - ANDRENIDAE: *Andrena colletina*, *Andrena haynesi*, *Calliopsis chlorops*; APIDAE: *Apis mellifera*, *Bombus fraternus*, *Bombus griseocollis*, *Bombus huntii*, *Bombus pensylvanicus*, *Ceratina neomexicana*, *Melissodes agilis*, *Melissodes comptoides*, *Melissodes glenwoodensis*, *Melissodes montana*, *Melissodes submenuacha*, *Melissodes sp.*; COLLETIDAE: *Colletes compactus*, *Colletes gypsicolens*, *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Agapostemon obliquus*, *Agapostemon texanus*, *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum lusorium*, *Lasioglossum semicaeruleum*, *Lasioglossum (Dialictus) sp.*, *Sphecodes sp.*; MEGACHILIDAE: *Anthidium porterae*, *Heriades cressoni*, *Megachile apicalis*, *Megachile brevis*, *Megachile perihirta*, *Megachile relativa*

Cirsium arevnse - APIDAE: *Apis mellifera*, *Bombus griseocollis*, *Bombus huntii*, *Ceratina calcarata*, *Ceratina neomexicana*, *Melissodes comptoides*, *Melissodes* sp., *Neolarra pruinosus*, *Nomada* sp., *Triepeolus* sp.; COLLETIDAE: *Colletes xerophilus*, *Hylaeus affinis*, *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus* or *texanus*, *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum foxii*, *Lasioglossum imitatum*, *Lasioglossum lusorium*, *Lasioglossum semicaeruleum*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Ashmeadiella gillettei*, *Dianthidium pudicum*, *Hoplitis producta*, *Megachile latimanus*, *Megachile perihirta*, *Megachile pugnata*, *Megachile rotundata*, *Megachile snowi*

Cirsium vulgare - APIDAE: *Bombus pensylvanicus*, *Melissodes agilis*; MEGACHILIDAE: *Megachile perihirta*

Conyza canadensis - APIDAE: *Apis mellifera*; COLLETIDAE: *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Halictus ligatus*, *Lasioglossum imitatum*, *Lasioglossum tegulare*, *Lasioglossum (Dialictus)* sp.

Coreopsis tinctoria - HALICTIDAE: *Halictus ligatus*, *Lasioglossum (Dialictus)* sp.

Cosmos bipinnatus - APIDAE: *Bombus fervidus*, *Bombus griseocollis*, *Bombus huntii*, *Bombus pensylvanicus*, *Melissodes agilis*, *Melissodes coreopsis*, *Melissodes* sp., *Svastra obliqua*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Halictus ligatus*, *Halictus tripartitus*; MEGACHILIDAE: *Megachile inimica*, *Megachile latimanus*, *Megachile montivaga*, *Megachile parallela*, *Megachile perihirta*, *Megachile relativa*

Cosmos sulphureus - APIDAE: *Bombus fervidus*, *Bombus griseocollis*, *Bombus huntii*, *Bombus pensylvanicus*, *Bombus vosnesenskii*, *Melissodes bimaculata*, *Melissodes* sp.; HALICTIDAE: *Halictus ligatus*; MEGACHILIDAE: *Coelioxys rufitarsis*, *Megachile inimica*, *Megachile parallela*, *Megachile perihirta*

Dyssodia papposa - HALICTIDAE: *Halictus ligatus*

Erigeron divergens - ANDRENIDAE: *Andrena* sp., *Calliopsis scitula*, *Calliopsis* sp., *Perdita bishoppi*, *Perdita* sp.; APIDAE: *Ceratina nanula*, *Ceratina neomexicana*, *Epeolus americanus*, *Holcopasites calliopsidis*, *Neolarra pruinosus*, *Nomada* sp.; COLLETIDAE: *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Halictus confusus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum nr. ellisiae*, *Lasioglossum pacatum*, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Ashmeadiella gillettei*, *Hoplitis producta*, *Dianthidium pudicum*, *Megachile brevis*, *Megachile manifesta*, *Megachile montivaga*, *Megachile rotundata*, *Stelis* sp.

***Erigeron* sp.** - APIDAE: *Ceratina neomexicana*; COLLETIDAE: *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Megachile rotundata*

Euthamia occidentalis - APIDAE: *Melissodes submenuacha*, *Melissodes* sp.; COLLETIDAE: *Colletes hyalinus*, *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Agapostemon angelicus* or *texanus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum semicaeruleum*, *Lasioglossum (Dialictus)* sp.

Gaillardia aristata - APIDAE: *Bombus pensylvanicus*, *Diadasia enavata*, *Melissodes agilis*, *Melissodes coreopsis*, *Melissodes* sp., *Triepeolus* sp.; COLLETIDAE: *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum (Dialictus)* sp.; MEGACHILIDAE: *Dianthidium*

curvatum, *Megachile brevis*, *Megachile latimanus*, *Megachile lippiae*, *Megachile montivaga*, *Megachile perihirta*, *Megachile pugnata*, *Megachile rotundata*

Grindelia squarrosa - ANDRENIDAE: *Calliopsis chlorops*, *Calliopsis* sp., *Perdita ignota*, *Perdita* sp.; APIDAE: *Apis mellifera*, *Bombus huntii*, *Ceratina calcarata*, *Ceratina neomexicana*, *Epeolus minimus*, *Holcopasites calliopsidis*, *Melissodes agilis*, *Melissodes coreopsis*, *Melissodes druriella*, *Melissodes montana*, *Melissodes rustica*, *Melissodes utahensis*, *Melissodes verbesinarum*, *Melissodes* sp., *Svastra obliqua*, *Triepeolus* sp.; COLLETIDAE: *Colletes phaceliae*, *Hylaeus leptcephalus*, *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Agapostemon texanus*, *Agapostemon virescens*, *Halictus confusus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum* nr. *ellisiae*, *Lasioglossum imitatum*, *Lasioglossum semicaeruleum*, *Lasioglossum trigeminum*, *Lasioglossum (Dialictus)* sp.; MEGACHILIDAE: *Ashmeadiella buconis*, *Coelioxys apacheorum*, *Coelioxys edita*, *Coelioxys insita*, *Coelioxys octodentata*, *Coelioxys rufitarsis*, *Coelioxys* sp., *Dianthidium pudicum*, *Dianthidium ulkei*, *Heriades cressoni*, *Megachile brevis*, *Megachile centuncularis*, *Megachile fidelis*, *Megachile inimica*, *Megachile latimanus*, *Megachile mellitarsus*, *Megachile mendica*, *Megachile montivaga*, *Megachile onobrychidis*, *Megachile parallela*, *Megachile perihirta*, *Megachile texana*

Gutierrezia sarothrae - ANDRENIDAE: *Andrena* sp., *Perdita* sp.; COLLETIDAE: *Colletes phaceliae*; HALICTIDAE: *Agapostemon angelicus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum (Dialictus)* sp.

Helenium autumnale - HALICTIDAE: *Augochlorella aurata*, *Halictus tripartitus*, *Lasioglossum (Dialictus)* sp.

Helianthus annuus - ANDRENIDAE: *Andrena accepta*, *Andrena haynesi*, *Andrena helianthi*, *Perdita lingualis*, *Perdita* sp., *Pseudopanurgus* sp.; APIDAE: *Apis mellifera*, *Bombus fervidus*, *Bombus fraternus*, *Bombus griseocollis*, *Bombus huntii*, *Bombus pensylvanicus*, *Ceratina neomexicana*, *Diadasia enavata*, *Melissodes agilis*, *Melissodes coreopsis*, *Melissodes* sp., *Nomada* sp., *Svastra obliqua*, *Triepeolus* sp.; COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Agapostemon virescens*, *Dieunomia triangulifera*, *Dufourea marginata*, *Halictus confusus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum cinctipes*, *Lasioglossum pruinosum*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Megachile brevis*, *Megachile fortis*, *Megachile inimica*, *Megachile latimanus*, *Megachile montivaga*, *Megachile parallela*, *Megachile perihirta*; MELITTIDAE: *Hesperapis* sp.

Helianthus nuttallii - ANDRENIDAE: *Andrena* sp.; HALICTIDAE: *Halictus ligatus*

Heterotheca villosa - ANDRENIDAE: *Perdita ignota*, *Perdita* sp.; APIDAE: *Ceratina nanula*, *Ceratina neomexicana*, *Melissodes* sp., *Nomada* sp.; HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum (Dialictus)* sp.; MEGACHILIDAE: *Anthidium oblongatum*, *Ashmeadiella gillettei*, *Dianthidium pudicum*, *Hoplitis producta*, *Megachile apicalis*, *Megachile fidelis*, *Megachile perihirta*

Machaeranthera pinnatifida - APIDAE: *Melissodes* sp., *Triepeolus* sp.; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Agapostemon texanus*, *Halictus ligatus*, *Lasioglossum (Dialictus)* sp.; MEGACHILIDAE: *Anthidium porterae*, *Megachile brevis*

***Machaeranthera* sp. (yellow)** - HALICTIDAE: *Agapostemon angelicus*

***Machaeranthera* sp. (purple)** - APIDAE: *Ceratina calcarata*, *Ceratina neomexicana*

Machaeranthera tanacetifolia - ANDRENIDAE: *Perdita* sp.; APIDAE: *Diadasia diminuta*, *Epeolus americanus*, *Melissodes* sp., *Nomada* sp., *Triepeolus* sp.; HALICTIDAE:

Augochlorella aurata, *Agapostemon angelicus*, *Halictus ligatus*, *Halictus tripartitus*,
Lasioglossum inconditum, *Lasioglossum semicaeruleum*, *Lasioglossum (Dialictus) sp.*;
MEGACHILIDAE: *Coelioxys insita*, *Dianthidium pudicum*, *Hoplitis pilosifrons*, *Megachile*
montivaga, *Megachile mucorosa*

Onopordum acanthium - HALICTIDAE: *Halictus tripartitus*, *Lasioglossum (Dialictus) sp.*;
MEGACHILIDAE: *Anthidium oblongatum*

Ratibida columnifera - ANDRENIDAE: *Calliopsis andreniformis*, *Pseudopanurgus sp.*;
APIDAE: *Melissodes agilis*, *Melissodes coreopsis*, *Melissodes sp.*, *Svastra obliqua*;
COLLETIDAE: *Colletes mandibularis*, *Hylaeus leptocephalus*, *Hylaeus mesillae*;
HALICTIDAE: *Augochlorella aurata*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum*
(Dialictus) sp.; MEGACHILIDAE: *Heriades variolosus*, *Megachile brevis*, *Megachile*
mucorosa, *Megachile parallela*, *Megachile rotundata*

Senecio spartioides - HALICTIDAE: *Halictus ligatus*

Solidago canadensis? - APIDAE: *Bombus huntii*, *Ceratina calcarata*; COLLETIDAE:
Hylaeus affinis, *Hylaeus mesillae*, *Hylaeus sp.*; HALICTIDAE: *Halictus ligatus*,
Lasioglossum foxii, *Lasioglossum imitatum*, *Lasioglossum (Dialictus) sp.*

Solidago gigantea? - APIDAE: *Bombus huntii*; COLLETIDAE: *Hylaeus mesillae*;
HALICTIDAE: *Halictus ligatus*, *Lasioglossum imitatum*, *Lasioglossum (Dialictus) sp.*

Solidago mollis - COLLETIDAE: *Colletes phaceliae*; HALICTIDAE: *Augochlorella aurata*,
Halictus ligatus, *Lasioglossum (Dialictus) sp.*

Solidago sp. - APIDAE: *Melissodes sp.*; COLLETIDAE: *Hylaeus mesillae*, *Hylaeus sp.*;
HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Halictus ligatus*, *Halictus*
tripartitus

Sonchus sp. - HALICTIDAE: *Halictus ligatus*, *Lasioglossum (Dialictus) sp.*;
MEGACHILIDAE: *Megachile brevis*, *Megachile perihirta*

Tagetes sp. - APIDAE: *Bombus griseocollis*, *Bombus huntii*, *Bombus pensylvanicus*;
HALICTIDAE: *Augochlorella aurata*; MEGACHILIDAE: *Megachile montivaga*

Taraxacum sp. - APIDAE: *Ceratina calcarata*, *Ceratina neomexicana*, *Nomada sp.*;
HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Halictus ligatus*, *Halictus*
tripartitus, *Lasioglossum occidentale*, *Lasioglossum semicaeruleum*, *Lasioglossum*
(Dialictus) sp., *Sphecodes sp.*; MEGACHILIDAE: *Hoplitis producta*

Tragopogon sp. - HALICTIDAE: *Halictus ligatus*

Verbesina encelioides - ANDRENIDAE: *Andrena haynesi*, *Pseudopanurgus nr. aethiops*;
APIDAE: *Bombus griseocollis*, *Bombus huntii*, *Bombus pensylvanicus*, *Diadasia enavata*,
Melissodes agilis, *Melissodes coreopsis*, *Melissodes sp.*, *Nomada sp.*, *Triepeolus sp.*;
COLLETIDAE: *Colletes phaceliae*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon*
angelicus, *Agapostemon obliquus*, *Agapostemon texanus*, *Halictus confusus*, *Halictus ligatus*,
Halictus tripartitus, *Lasioglossum inconditum*, *Lasioglossum paraforbesii*, *Lasioglossum*
pruinatum, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum (Dialictus)*
sp., *Lasioglossum (Hemihalictus) sp.*, *Lasioglossum sp.*, *Sphecodes sp.*; MEGACHILIDAE:
Coelioxys edita, *Coelioxys sayi*, *Megachile centuncularis*, *Megachile parallela*, *Megachile*
perihirta

Zinnia sp. - APIDAE: *Anthophora montana*, *Bombus fervidus*, *Bombus huntii*, *Bombus*
pensylvanicus, *Svastra obliqua*

BRASSICACEAE

Alyssum sp. - COLLETIDAE: *Hylaeus mesillae*

Barbarea sp. - ANDRENIDAE: *Andrena* sp.; APIDAE: *Ceratina calcarata*; COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum* cf. *absimile*, *Lasioglossum ephialthum*, *Lasioglossum foxii*, *Lasioglossum imitatum*, *Lasioglossum occidentale*, *Lasioglossum pacatum*, *Lasioglossum (Dialictus)* sp.

Descurainia sophia - ANDRENIDAE: *Andrena* sp.; APIDAE: *Ceratina calcarata*, *Ceratina neomexicana*; HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum foxii*, *Lasioglossum imitatum*, *Lasioglossum occidentale*, *Lasioglossum tegulare*; MEGACHILIDAE: *Megachile rotundata*, *Osmia* sp.

Descurainia sp. - ANDRENIDAE: *Calliopsis scitula*; APIDAE: *Ceratina neomexicana*; COLLETIDAE: *Hylaeus leptcephalus*, *Hylaeus mesillae*; HALICTIDAE: *Agapostemon angelicus* or *texanus*, *Halictus confusus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum (Dialictus)* sp.; MEGACHILIDAE: *Ashmeadiella gillettei*, *Hoplitis producta*, *Megachile montivaga*, *Megachile rotundata*

Lepidium sp. - ANDRENIDAE: *Andrena* sp., *Calliopsis scitula*, *Calliopsis* sp., *Perdita* sp.; APIDAE: *Diadasia diminuta*, *Holcopasites calliopsidis*, *Neolarra pruinosa*, *Nomada* sp.; COLLETIDAE: *Colletes phaceliae*, *Hylaeus leptcephalus*, *Hylaeus mesillae*, *Hylaeus* sp.; HALICTIDAE: *Agapostemon angelicus* or *texanus*, *Halictus confusus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum clematisellum*, *Lasioglossum* nr. *ellisiae*, *Lasioglossum* cf. *hudsoniellum*, *Lasioglossum imitatum*, *Lasioglossum lusorium*, *Lasioglossum perpunctatum*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Hoplitis producta*, *Megachile rotundata*

Nasturtium officinale - COLLETIDAE: *Hylaeus affinis*, *Hylaeus mesillae*; HALICTIDAE: *Agapostemon obliquus*, *Lasioglossum ephialthum*, *Lasioglossum foxii*, *Lasioglossum imitatum*, *Lasioglossum inconditum*, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum tenax*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.

CACTACEAE

Echinocereus viridiflorus - HALICTIDAE: *Halictus confusus*

Opuntia polyacantha - APIDAE: *Anthophora bomboides*, *Bombus pensylvanicus*, *Ceratina neomexicana*, *Diadasia australis* or *rinconis*, *Melissodes* sp.; HALICTIDAE: *Agapostemon angelicus* or *texanus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum semicaeruleum*; MEGACHILIDAE: *Lithurgopsis apicalis*, *Osmia* sp.

Opuntia sp. - APIDAE: *Bombus pensylvanicus*, *Diadasia australis* or *rinconis*, *Melissodes* sp.; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus* or *texanus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum semicaeruleum*; MEGACHILIDAE: *Lithurgopsis apicalis*, *Megachile montivaga*, *Megachile rotundata*

CAPRIFOLIACEAE

Lonicera morrowii - ANDRENIDAE: *Andrena* sp.; APIDAE: *Ceratina neomexicana*

Lonicera tatarica - APIDAE: *Ceratina neomexicana*

Symphoricarpos sp. - COLLETIDAE: *Hylaeus modestus*

Weigela sp. - APIDAE: *Ceratina neomexicana*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus* or *texanus*, *Lasioglossum athabascence*, *Lasioglossum semicaeruleum*; MEGACHILIDAE: *Hoplitis producta*, *Megachile rotundata*

CHENOPODIACEAE

Chenopodium album? - HALICTIDAE: *Augochlorella aurata*, *Lasioglossum (Dialictus)* sp.

Chenopodium incarum - HALICTIDAE: *Lasioglossum* nr. *ellisiae*, *Lasioglossum* cf. *hudsoniellum*, *Lasioglossum packeri*, *Lasioglossum* (*Dialictus*) sp.

Kochia iranica - HALICTIDAE: *Halictus ligatus*

CLEOMACEAE

Cleome serrulata - ANDRENIDAE: *Perdita halictoides*, *Perdita* sp.; APIDAE: *Apis mellifera*, *Bombus griseocollis*, *Bombus huntii*, *Bombus pensylvanicus*, *Ceratina neomexicana*, *Svastra obliqua*; COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Halictus confusus*, *Halictus tripartitus*, *Lasioglossum* cf. *hudsoniellum*, *Lasioglossum pruinosum*, *Lasioglossum simplex*, *Lasioglossum* (*Dialictus*) sp., *Sphecodes* sp.; MEGACHILIDAE: *Megachile rotundata*

CONVOLVULACEAE

Convolvulus arvensis - ANDRENIDAE: *Andrena candida*, *Calliopsis* sp.; APIDAE: *Melissodes bimaculata*, *Ceratina nanula*, *Ceratina neomexicana*; COLLETIDAE: *Hylaeus mesillae*, *Hylaeus* sp.; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus* or *texanus*, *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum imitatum*, *Lasioglossum occidentale*, *Lasioglossum perpunctatum*, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum* (*Dialictus*) sp.; MEGACHILIDAE: *Dianthidium pudicum*, *Hoplitis producta*, *Lithurgopsis apicalis*, *Megachile rotundata*, *Osmia* sp.

CORNACEAE

Cornus stolonifera - COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Lasioglossum imitatum*, *Lasioglossum* (*Dialictus*) sp.

CURCUBITACEAE

Echinocystis lobata - COLLETIDAE: *Hylaeus mesillae*

DIPSACACEAE

Dipsacus sylvestris - APIDAE: *Anthophora walshii*, *Apis mellifera*, *Bombus appositus*, *Bombus fervidus*, *Bombus griseocollis*, *Bombus huntii*, *Bombus nevadensis*, *Centris lanosa*, *Melissodes agilis*, *Melissodes bimaculata*, *Melissodes* sp., *Peponapis pruinosa*, *Svastra obliqua*, *Triepeolus* sp.; HALICTIDAE: *Agapostemon angelicus* or *texanus*, *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum* (*Dialictus*) sp.; MEGACHILIDAE: *Megachile perihirta*

EUPHORBIACEAE

***Chamaesyce* sp.** - HALICTIDAE: *Lasioglossum* nr. *ellisiae*, *Lasioglossum* (*Dialictus*) sp.

Euphorbia dentata - HALICTIDAE: *Halictus ligatus*

FABACEAE

Amorpha fruticosa - ANDRENIDAE: *Andrena* sp.; COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Sphecodes* sp.

***Astragalus drummondii*?** - MEGACHILIDAE: *Hoplitis pilosifrons*, *Osmia* sp.

***Astragalus* sp.** (white) - APIDAE: *Bombus griseocollis*

***Caragana* sp.** - APIDAE: *Bombus griseocollis*

Coronilla varia - APIDAE: *Bombus fervidus*, *Bombus griseocollis*, *Bombus huntii*, *Bombus pensylvanicus*, *Bombus vosnesenskii*; HALICTIDAE: *Halictus confusus*; MEGACHILIDAE: *Anthidium manicatum*, *Megachile frigida*, *Megachile perihirta*, *Megachile subexilis*

Dalea candida - ANDRENIDAE: *Calliopsis andreniformis*; APIDAE: *Bombus griseocollis*; COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Halictus tripartitus*, *Lasioglossum* (*Dialictus*) sp.; MEGACHILIDAE: *Anthidium porterae*

Dalea purpurea - COLLETIDAE: *Hylaeus mesillae*, *Hylaeus* sp.; HALICTIDAE: *Agapostemon angelicus* or *texanus*, *Halictus tripartitus*; MEGACHILIDAE: *Hoplitis pilosifrons*, *Megachile brevis*

Gleditsia triacanthos - COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Lasioglossum semicaeruleum*

Glycyrrhiza lepidota - HALICTIDAE: *Lasioglossum imitatum*; MEGACHILIDAE: *Hoplitis pilosifrons*, *Hoplitis* sp., *Megachile lippiae*, *Megachile perihirta*, *Megachile subexilis*, *Osmia* sp.

Lotus tenuis - APIDAE: *Nomada* sp.; COLLETIDAE: *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus* or *texanus*, *Halictus confusus*, *Halictus tripartitus*, *Lasioglossum occidentale*, *Lasioglossum tegulare*, *Lasioglossum (Dialictus)* sp.; MEGACHILIDAE: *Anthidiellum notatum*, *Anthidium oblongatum*, *Dianthidium pudicum*, *Hoplitis pilosifrons*, *Hoplitis producta*, *Megachile apicalis*, *Megachile brevis*, *Megachile lippiae*, *Megachile onobrychidis*, *Megachile perihirta*, *Megachile rotundata*, *Megachile subexilis*, *Megachile texana*, *Osmia* sp.

Medicago lupulina - COLLETIDAE: *Hylaeus leptocephalus*; HALICTIDAE: *Halictus tripartitus*; MEGACHILIDAE: *Hoplitis producta*, *Megachile rotundata*

Medicago sativa - HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Halictus tripartitus*; MEGACHILIDAE: *Anthidium oblongatum*, *Hoplitis producta*, *Megachile brevis*, *Megachile frigida*, *Megachile perihirta*, *Megachile relativa*, *Megachile rotundata*

Melilotus alba - ANDRENIDAE: *Calliopsis andreniformis*; APIDAE: *Apis mellifera*, *Bombus huntii*, *Ceratina calcarata*, *Melissodes* sp., *Nomada* sp.; COLLETIDAE: *Hylaeus affinis*, *Hylaeus leptocephalus*, *Hylaeus mesillae*, *Hylaeus* sp.; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Agapostemon angelicus* or *texanus*, *Agapostemon obliquus*, *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum imitatum*, *Lasioglossum lusorium*, *Lasioglossum occidentale*, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum zephyrum*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Anthidium oblongatum*, *Ashmeadiella gillettei*, *Coelioxys sayi*, *Megachile brevis*, *Megachile lippiae*, *Megachile rotundata*

Melilotus officinalis - ANDRENIDAE: *Andrena* sp., *Calliopsis andreniformis*, *Calliopsis* sp.; APIDAE: *Apis mellifera*, *Bombus huntii*, *Ceratina neomexicana*, *Epeolus minimus*, *Melissodes* sp.; COLLETIDAE: *Colletes lutzi*, *Colletes phaceliae*, *Hylaeus leptocephalus*; HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum nr. ellisiae*, *Lasioglossum imitatum*, *Lasioglossum inconditum*, *Lasioglossum lusorium*, *Lasioglossum semicaeruleum*, *Lasioglossum sisymbrii*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Anthidium oblongatum*, *Ashmeadiella gillettei*, *Ashmeadiella* sp., *Hoplitis fulgida*, *Hoplitis pilosifrons*, *Hoplitis producta*, *Hoplitis spoliata*, *Megachile brevis*, *Megachile rotundata*, *Osmia* sp.

***Melilotus* sp.** - ANDRENIDAE: *Calliopsis andreniformis*, *Calliopsis* sp.; APIDAE: *Apis mellifera*, *Bombus griseocollis*, *Bombus huntii*, *Bombus nevadensis*, *Melissodes* sp., *Nomada* sp., *Triepeolus* sp.; COLLETIDAE: *Colletes lutzi*, *Colletes phaceliae*, *Colletes* sp., *Hylaeus affinis*, *Hylaeus leptocephalus*, *Hylaeus mesillae*, *Hylaeus* sp.; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum imitatum*, *Lasioglossum occidentale*, *Lasioglossum semicaeruleum*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Anthidium*

oblongatum, *Ashmeadiella gillettei*, *Coelioxys sayi*, *Hoplitis producta*, *Hoplitis* sp.,
Megachile brevis, *Megachile rotundata*, *Megachile subexilis*, *Megachile texana*
Psoralea tenuiflora - HALICTIDAE: *Lasioglossum (Dialictus)* sp.; MEGACHILIDAE:
Megachile brevis
Sophora nuttalliana - APIDAE: *Anthophora affabilis*; HALICTIDAE: *Halictus tripartitus*
***Thermopsis* sp.** - APIDAE: *Bombus fervidus*, *Bombus nevadensis*, *Ceratina neomexicana*;
MEGACHILIDAE: *Hoplitis pilosifrons*
Trifolium fragiferum - HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Halictus*
ligatus; MEGACHILIDAE: *Hoplitis producta*, *Megachile rotundata*
Trifolium pratense - APIDAE: *Bombus huntii*, *Bombus nevadensis*; HALICTIDAE: *Halictus*
confusus
Trifolium repens - APIDAE: *Bombus huntii*, *Melissodes menuachus*; HALICTIDAE:
Lasioglossum (Dialictus) sp.; MEGACHILIDAE: *Hoplitis producta*, *Megachile rotundata*,
Osmia sp.

GERANIACEAE

Erodium cicutarium - APIDAE: *Apis mellifera*; HALICTIDAE: *Lasioglossum athabascence*,
Lasioglossum imitatum, *Lasioglossum* aff. *perdifficile*, *Lasioglossum semicaeruleum*

LAMIACEAE

***Caryopteris* sp.** - APIDAE: *Bombus huntii*
Marrubium vulgare - APIDAE: *Apis mellifera*, *Bombus griseocollis*, *Bombus huntii*;
HALICTIDAE: *Halictus tripartitus*; MEGACHILIDAE: *Megachile brevis*, *Megachile*
rotundata
Mentha arvensis - COLLETIDAE: *Hylaeus affinis*, *Hylaeus mesillae*
Monarda pectinata - APIDAE: *Apis mellifera*, *Bombus griseocollis*, *Bombus huntii*, *Bombus*
pensylvanicus, *Ceratina calcarata*, *Ceratina neomexicana*, *Melecta pacifica*, *Nomada* sp.,
Triepeolus sp.; HALICTIDAE: *Agapostemon angelicus*, *Halictus confusus*, *Halictus*
tripartitus, *Lasioglossum* nr. *ellisiae*, *Lasioglossum* cf. *hudsoniellum*, *Lasioglossum*
pectoraloides, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum*
(Dialictus) sp.; MEGACHILIDAE: *Anthidium oblongatum*, *Anthidium porterae*, *Hoplitis*
pilosifrons, *Hoplitis producta*, *Megachile parallela*, *Megachile rotundata*, *Osmia* sp.
***Monarda* sp. (purple)** - APIDAE: *Bombus pensylvanicus*
Nepeta cataria - APIDAE: *Bombus huntii*, *Ceratina neomexicana*; COLLETIDAE: *Hylaeus*
mesillae; HALICTIDAE: *Agapostemon angelicus*; MEGACHILIDAE: *Hoplitis producta*,
Megachile perihirta
Perovskia atriplicifolia - APIDAE: *Anthophora montana*, *Anthophora walshii*, *Bombus*
fervidus, *Bombus fraternus*, *Bombus griseocollis*, *Bombus huntii*, *Bombus pensylvanicus*,
Melissodes agilis, *Melissodes bimaculata*, *Melissodes communis*, *Melissodes comptoides*,
Melissodes sp.; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*,
Agapostemon texanus, *Halictus tripartitus*, *Lasioglossum semicaeruleum*, *Lasioglossum*
(Dialictus) sp.; MEGACHILIDAE: *Megachile inimica*, *Megachile montivaga*

LINACEAE

Linum lewisii - MEGACHILIDAE: *Anthidium oblongatum*

LOASACEAE

Mentzelia nuda - ANDRENIDAE: *Perdita kiowi*; APIDAE: *Anthophora montana*, *Apis*
mellifera, *Bombus fervidus*, *Bombus griseocollis*, *Bombus huntii*, *Bombus pensylvanicus*;
HALICTIDAE: *Agapostemon angelicus* or *texanus*, *Halictus tripartitus*, *Lasioglossum* nr.

ellisiae, *Lasioglossum* cf. *hudsoniellum*, *Lasioglossum occidentale*, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum trigeminum*, *Lasioglossum zephyrum*, *Lasioglossum* (*Dialictus*) sp.; MEGACHILIDAE: *Megachile brevis*, *Megachile lippiae*, *Megachile montivaga*, *Megachile onobrychidis*

MALVACEAE

Malva neglecta - ANDRENIDAE: *Calliopsis* sp.; APIDAE: *Bombus huntii*, *Ceratina calcarata*, *Ceratina neomexicana*, *Diadasia diminuta*, *Melissodes bimaculata*, *Melissodes* sp.; COLLETIDAE: *Hylaeus affinis*, *Hylaeus leptocephalus*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus*, *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum* nr. *ellisiae*, *Lasioglossum perpunctatum*, *Lasioglossum semicaeruleum*, *Lasioglossum* (*Dialictus*) sp.; MEGACHILIDAE: *Hoplitis producta*, *Megachile brevis*, *Megachile onobrychidis*, *Megachile snowi*

Sphaeralcea coccinea - ANDRENIDAE: *Pseudopanurgus* sp.; APIDAE: *Ceratina neomexicana*, *Diadasia diminuta*, *Melissodes* sp.; HALICTIDAE: *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum occidentale*, *Lasioglossum semicaeruleum*; MEGACHILIDAE: *Megachile montivaga*

ONAGRACEAE

***Epilobium* sp.** - HALICTIDAE: *Augochlorella aurata*

Oenothera strigosa - APIDAE: *Bombus griseocollis*, *Ceratina neomexicana*

PAPAVERACEAE

Argemone polyanthemus - APIDAE: *Anthophora affabilis*, *Ceratina neomexicana*, *Melissodes* sp.; HALICTIDAE: *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum semicaeruleum*, *Lasioglossum sisymbrii*, *Lasioglossum* (*Dialictus*) sp.; MEGACHILIDAE: *Megachile brevis*, *Megachile montivaga*

PLANTAGINACEAE

Linaria dalmatica - APIDAE: *Ceratina calcarata*

Plantago lanceolata - COLLETIDAE: *Hylaeus leptocephalus*; HALICTIDAE: *Halictus tripartitus*, *Lasioglossum* (*Dialictus*) sp.

***Veronica catenata*?** - ANDRENIDAE: *Andrena candida*, *Andrena* sp., *Calliopsis* sp.; APIDAE: *Holcopasites calliopsidis*, *Nomada* sp.; COLLETIDAE: *Colletes phacelliae*, *Hylaeus mesillae*; HALICTIDAE: *Halictus tripartitus*, *Lasioglossum lineatulum*, *Lasioglossum pectoraloides*, *Lasioglossum semicaeruleum*, *Lasioglossum sisymbrii*, *Lasioglossum zephyrum*, *Lasioglossum* (*Dialictus*) sp., *Sphecodes* sp.; MEGACHILIDAE: *Dianthidium pudicum*, *Megachile rotundata*

***Veronica* sp.** - ANDRENIDAE: *Calliopsis scitula*; APIDAE: *Holcopasites calliopsidis*, *Nomada* sp.; COLLETIDAE: *Hylaeus affinis*, *Hylaeus leptocephalus*, *Hylaeus mesillae*, *Hylaeus* sp.; HALICTIDAE: *Agapostemon angelicus* or *texanus*, *Halictus tripartitus*, *Lasioglossum lusorium*, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum* (*Dialictus*) sp., *Sphecodes* sp.; MEGACHILIDAE: *Osmia* sp.

POLYGONACEAE

Eriogonum effusum - APIDAE: *Apis mellifera*; COLLETIDAE: *Colletes phacelliae*, *Hylaeus mesillae*; HALICTIDAE: *Agapostemon angelicus*, *Halictus confusus*, *Halictus tripartitus*, *Lasioglossum tegulare*, *Lasioglossum* (*Dialictus*) sp., *Sphecodes* sp.; MEGACHILIDAE: *Ashmeadiella gillettei*

Fallopia aubertii - APIDAE: *Apis mellifera*, *Bombus huntii*, *Nomada* sp.; COLLETIDAE: *Colletes fulgidus*, *Colletes phacelliae*, *Hylaeus mesillae*, *Hylaeus punctatus*; HALICTIDAE:

Augochlorella aurata, *Agapostemon angelicus* or *texanus*, *Halictus confusus*, *Halictus ligatus*, *Halictus parallelus*, *Halictus tripartitus*, *Lasioglossum clematisellum*, *Lasioglossum imitatum*, *Lasioglossum lionotum*, *Lasioglossum paraforbesii*, *Lasioglossum pruinatum*, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum tenax*, *Lasioglossum zephyrum*, *Lasioglossum (Dialictus) sp.*, *Sphecodes sp.*; MEGACHILIDAE: *Megachile rotundata*

Persicaria maculata - HALICTIDAE: *Lasioglossum (Dialictus) sp.*

Persicaria sp. - APIDAE: *Bombus huntii*, *Melissodes agilis*; COLLETIDAE: *Colletes ciliatus*, *Hylaeus leptcephalus*, *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Halictus tripartitus*, *Lasioglossum cf. absimile*, *Lasioglossum nr. ellisiae*, *Lasioglossum imitatum*, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum (Dialictus) sp.*, *Sphecodes sp.*; MEGACHILIDAE: *Megachile lippiae*

Polygonum sp. - APIDAE: *Melissodes agilis*; COLLETIDAE: *Hylaeus affinis*, *Hylaeus leptcephalus*, *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Lasioglossum (Dialictus) sp.*

PORTULACEAE

Portulaca oleracea - HALICTIDAE: *Halictus ligatus*, *Halictus tripartitus*, *Lasioglossum cf. absimile*

RANUNCULACEAE

Clematis ligusticifolia - HALICTIDAE: *Lasioglossum imitatum*, *Lasioglossum (Dialictus) sp.*

Delphinium caroliniana virescens - APIDAE: *Anthophora affabilis*

Ranunculus cymbalaria - HALICTIDAE: *Lasioglossum semicaeruleum*, *Lasioglossum (Dialictus) sp.*

ROSACEAE

Crataegus sp. - ANDRENIDAE: *Andrena candida*, *Andrena sp.*; APIDAE: *Ceratina neomexicana*, *Nomada sp.*; COLLETIDAE: *Hylaeus leptcephalus*, *Hylaeus mesillae*; HALICTIDAE: *Halictus confusus*, *Halictus tripartitus*, *Lasioglossum imitatum*, *Lasioglossum perpunctatum*, *Lasioglossum semicaeruleum*, *Sphecodes sp.*; MEGACHILIDAE: *Hoplitis producta*, *Megachile rotundata*

Malus (pink crabapple) - ANDRENIDAE: *Andrena sp.*; APIDAE: *Apis mellifera*; HALICTIDAE: *Halictus rubicundus*, *Lasioglossum cinctipes*, *Lasioglossum imitatum*

Malus sp. - ANDRENIDAE: *Andrena candida*, *Andrena sp.*; APIDAE: *Bombus huntii*; HALICTIDAE: *Halictus rubicundus*, *Lasioglossum tenax*

Potentilla recta? - COLLETIDAE: *Hylaeus sp.*; HALICTIDAE: *Halictus tripartitus*

Potentilla fruticosa - ANDRENIDAE: *Andrena candida*, *Andrena sp.*; APIDAE: *Bombus huntii*, *Bombus pensylvanicus*, *Nomada sp.*; COLLETIDAE: *Colletes phaceliae*, *Hylaeus mesillae*, *Hylaeus sp.*; HALICTIDAE: *Augochlorella aurata*, *Augochloropsis metallica*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum semicaeruleum*, *Lasioglossum (Dialictus) sp.*; MEGACHILIDAE: *Hoplitis pilosifrons*, *Hoplitis producta*, *Hoplitis spoliata*, *Megachile brevis*, *Megachile rotundata*, *Osmia sp.*

Prunus americana - ANDRENIDAE: *Andrena candida*, *Andrena sp.*; APIDAE: *Bombus huntii*, *Ceratina calcarata*; HALICTIDAE: *Halictus confusus*, *Halictus tripartitus*, *Lasioglossum cinctipes*, *Lasioglossum imitatum*, *Lasioglossum lineatulum*, *Lasioglossum semicaeruleum*, *Lasioglossum zephyrum*

Prunus besseyi - HALICTIDAE: *Lasioglossum (Dialictus) sp.*

Prunus virginiana - ANDRENIDAE: *Andrena candida*, *Andrena prunorum*, *Andrena* sp.; APIDAE: *Ceratina neomexicana*, *Nomada* sp.; HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum* cf. *absimile*, *Lasioglossum cinctipes*, *Lasioglossum foxii*, *Lasioglossum imitatum*, *Lasioglossum lineatulum*, *Lasioglossum occidentale*, *Lasioglossum pulveris*, *Lasioglossum semicaeruleum*, *Lasioglossum zephyrum*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.

Pyrus sp. - ANDRENIDAE: *Andrena candida*, *Andrena* sp.; APIDAE: *Ceratina neomexicana*; HALICTIDAE: *Halictus tripartitus*, *Lasioglossum (Dialictus)* sp.

Rosa sp. (pink) - COLLETIDAE: *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Agapostemon angelicus* or *texanus*, *Halictus ligatus*, *Lasioglossum semicaeruleum*, *Lasioglossum (Dialictus)* sp.; MEGACHILIDAE: *Hoplitis pilosifrons*, *Hoplitis producta*, *Osmia* sp.

Rosa sp. (yellow multiflora) - APIDAE: *Bombus huntii*

SALICACEAE

Salix alba - ANDRENIDAE: *Andrena* sp.; HALICTIDAE: *Lasioglossum cinctipes*, *Lasioglossum (Dialictus)* sp.; MEGACHILIDAE: *Osmia lignaria*

Salix exigua - ANDRENIDAE: *Andrena candida*, *Andrena* sp., *Perdita salicis*, *Perdita* sp.; APIDAE: *Apis mellifera*, *Ceratina calcarata*, *Nomada* sp.; COLLETIDAE: *Colletes phacelliae*, *Colletes xerophilus*, *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum cinctipes*, *Lasioglossum imitatum*, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Hoplitis producta*, *Megachile rotundata*

Salix exigua or **S. interior** - ANDRENIDAE: *Andrena candida*, *Andrena* sp., *Perdita salicis*, *Perdita* sp.; APIDAE: *Apis mellifera*, *Ceratina neomexicana*, *Epeolus americanus*, *Epeolus minimus*, *Neolarra pruinosa*, *Nomada* sp.; COLLETIDAE: *Colletes hyalinus*, *Colletes phacelliae*, *Colletes xerophilus*, *Hylaeus leptocephalus*, *Hylaeus mesillae*, *Hylaeus verticalis*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus* or *texanus*, *Halictus confusus*, *Halictus ligatus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum cressonii*, *Lasioglossum imitatum*, *Lasioglossum occidentale*, *Lasioglossum* aff. *perdifficile*, *Lasioglossum perpunctatum*, *Lasioglossum pruinosum*, *Lasioglossum semicaeruleum*, *Lasioglossum sisymbrii*, *Lasioglossum tegulare*, *Lasioglossum tenax*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Anthidium oblongatum*, *Heriades carinatus*, *Hoplitis producta*

Salix sp. - ANDRENIDAE: *Andrena candida*, *Andrena* sp., *Perdita* sp.; APIDAE: *Apis mellifera*, *Ceratina calcarata*, *Ceratina neomexicana*, *Nomada* sp.; COLLETIDAE: *Colletes xerophilus*, *Hylaeus leptocephalus*, *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Halictus rubicundus*, *Halictus tripartitus*, *Lasioglossum* cf. *absimile*, *Lasioglossum cinctipes*, *Lasioglossum* nr. *ellisiae*, *Lasioglossum ephialthum*, *Lasioglossum foxii*, *Lasioglossum imitatum*, *Lasioglossum packeri*, *Lasioglossum perpunctatum*, *Lasioglossum ruidosense*, *Lasioglossum semicaeruleum*, *Lasioglossum sisymbrii*, *Lasioglossum tegulare*, *Lasioglossum tenax*, *Lasioglossum zephyrum*, *Lasioglossum (Dialictus)* sp., *Lasioglossum (Lasioglossum)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Hoplitis producta*, *Osmia lignaria*

SOLANACEAE

Physalis hederifolia - HALICTIDAE: *Lasioglossum* nr. *ellisiae*

Physalis virginiana - ANDRENIDAE: *Perdita halictoides*, *Perdita zebrata*, *Perdita* sp.; HALICTIDAE: *Augochlorella aurata*, *Halictus confusus*, *Lasioglossum* nr. *ellisiae*, *Lasioglossum pruinatum*, *Lasioglossum semicaeruleum*, *Lasioglossum tegulare*, *Lasioglossum (Dialictus)* sp.

Solanum rostratum - APIDAE: *Anthophora montana*, *Bombus griseocollis*, *Bombus pensylvanicus*; HALICTIDAE: *Halictus tripartitus*, *Lasioglossum semicaeruleum*, *Lasioglossum (Dialictus)* sp.; MEGACHILIDAE: *Hoplitis producta*

Solanum triflorum - HALICTIDAE: *Halictus tripartitus*, *Lasioglossum clematisellum*, *Lasioglossum* nr. *ellisiae*, *Lasioglossum (Dialictus)* sp.

TAMARIACEAE

Tamarix pentandra - APIDAE: *Ceratina neomexicana*; COLLETIDAE: *Hylaeus leptcephalus*, *Hylaeus mesillae*, *Hylaeus* sp.; HALICTIDAE: *Halictus tripartitus*, *Lasioglossum imitatum*, *Lasioglossum semicaeruleum*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Ashmeadiella gillettei*, *Megachile rotundata*

VERBENACEAE

Glandularia bipinnatifida - HALICTIDAE: *Augochlorella aurata*

Verbena bracteata - APIDAE: *Ceratina nanula*, *Ceratina neomexicana*; HALICTIDAE: *Halictus tripartitus*, *Lasioglossum (Dialictus)* sp., *Sphecodes* sp.; MEGACHILIDAE: *Ashmeadiella gillettei*, *Hoplitis producta*, *Megachile rotundata*

Verbena hastata - ANDRENIDAE: *Calliopsis* sp.; APIDAE: *Bombus huntii*, *Ceratina calcarata*, *Ceratina neomexicana*, *Epeolus bifasciatus*, *Melissodes agilis*, *Melissodes coreopsis*, *Melissodes* sp., *Triepeolus* sp.; COLLETIDAE: *Hylaeus affinis*, *Hylaeus mesillae*; HALICTIDAE: *Augochlorella aurata*, *Agapostemon angelicus* or *texanus*, *Halictus confusus*, *Halictus ligatus*, *Lasioglossum semicaeruleum*, *Lasioglossum (Dialictus)* sp.; MEGACHILIDAE: *Anthidium manicatum*, *Coelioxys sayi*, *Hoplitis producta*, *Megachile rotundata*

VITACEAE

Parthenocissus Parthenocissus inserta - COLLETIDAE: *Hylaeus* sp.

ZYGOPHYLLACEAE

Tribulus terrestris - HALICTIDAE: *Halictus confusus*, *Lasioglossum (Dialictus)* sp.

MONOCOTS

ALISMATACEAE

***Sagittaria cuneata*?** - HALICTIDAE: *Halictus tripartitus*

LILIACEAE

Asparagus officinalis - APIDAE: *Apis mellifera*; HALICTIDAE: *Lasioglossum (Dialictus)* sp.

Zigadenus venenosus - HALICTIDAE: *Lasioglossum (Dialictus)* sp.