APPENDIX 2
MORE BEES, BUTTERFLIES, AND HUMMINGBIRDS

You can visit bugguide.net to help you with the challenge of identifying bees. Bumble Bees of the Western United States is also a helpful guide, https://www.fs.fed.us/wildflowers/pollinators/documents/BumbleBeeGuideWestern2012.pdf. UW researchers are developing a Wyoming bee identification guide.¹

BEES

Family Andrenidae (mining bees)

**Andrena**

Andrena female with pollen load on a veronica plant.

Photo: Jennifer Thompson

Andrena visiting a fernbush plant.

Photo: J. Thompson

Family Apidae (carpenter, digger, bumble, honey bees, and other)

**Anthophora**

Anthophora move extremely quickly, making them hard to see clearly. They often appear as fuzzy blurs visiting penstemon flowers.

Photo: J. Thompson

¹ Thanks to Christine Bell for her assistance with bees and identification. Butterfly text by Scott Schell. Thanks to UW Biodiversity Institute for the use of butterfly photos from their collection. Additional thanks to Bobbie Holder, Helen Coats, and Jennifer Thompson for use of their photos in this publication.
**Anthophora**

*Anthophora* visiting a daffodil in spring.

Photo: J. Thompson

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**Honey bees**

Honey bees can vary a bit in their coloring. Golden-toned, left; darker, below. Honey bees have hair on their eyes.

Photos: Bobbie Holder, top. J. Thompson, lower

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**Long-horned bee**

Female *Melissodes* with a pollen load.

Photo: B. Holder

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**Long-horned bee**

Male *Melissodes* on sunflower.

Photo: J. Thompson
Mountain bumble bee
*Bombus appositus* visiting a *Penstemon strictus* (Rocky Mountain penstemon) flower. This species has white-colored hair on its face and shoulders.
Photo: J. Thompson

Mountain bumble bee
*Bombus appositus* feeding on a delphinium.
Photo: J. Thompson

Two-form bumble bee
*Bombus bifarius* collecting nectar from a fernbush (*Chamaebatiaria millifolium*) flower.
Photo: J. Thompson

California bumble bee
*Bombus californicus* makes its appearance early. Pictured on golden currant flowers.
Photo: J. Thompson

Central bumble bee
*Bombus centralis* on veronica.
Photo: J. Thompson
Brown-belted bumble bee
*Bombus griseocollis* on purple coneflower (*Echinacea purpurea*).
Photo: B. Holder

Hunt bumble bee
*Bombus huntii* visiting a penstemon flower.
Photo: J. Thompson

Hunt bumble bee
Two *Bombus huntii* visiting bladderpod (*Physaria*) flowers early in the year.
Photo: J. Thompson

Nevada bumble bee
*Bombus nevadensis* visiting a penstemon flower.
Photo: B. Holder

Family Colletidae (plasterer, polyester, and masked)

Masked bee
*Hylaeus* on a veronica plant. You won't see pollen-covered legs on a *Hylaeus* as they carry pollen inside their crop.
Photo: J. Thompson
**Family Halictidae (sweat bees)**
This is one of the most common families of bees found in Wyoming. It contains a very large and diverse number of species.

<table>
<thead>
<tr>
<th>Bee Species</th>
<th>Description</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metallic green bee</strong></td>
<td><em>Agapostemon</em></td>
<td>B. Holder</td>
</tr>
<tr>
<td><strong>Agapostemon femoratus</strong></td>
<td>On rabbitbrush.</td>
<td>B. Holder</td>
</tr>
<tr>
<td><strong>Lasioglossum</strong></td>
<td>Tiny <em>Lasioglossum</em> subgenus <em>Dialictus</em> caught in a spider web.</td>
<td>J. Thompson</td>
</tr>
<tr>
<td><strong>Halictus ligatus</strong></td>
<td>On purple coneflower.</td>
<td>J. Thompson</td>
</tr>
</tbody>
</table>
Family Megachilidae (leafcutter, mason, carder bees, and others)
Female bees in this family can often be identified by the scopa (hairs) they use to collect pollen. These are located under the abdomens; many other bees use hairs on their back legs.

Carder bee
Male Anthidium rests between flights to patrol his territory.
Photo: J. Thompson

Dianthidium
Photo: B. Holder

Mason bee
Hoplitis visiting a veronica flower.
Photo: J. Thompson

Leafcutter bee
Male Megachile. Note the wide portion on the front legs. This helps distinguish males from females.
Photos: J. Thompson
**Leafcutter bee**
Female *Megachile*. Note the hairs (scopa) under the abdomen which are used to carry pollen.
Photos: J. Thompson

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**BUTTERFLIES**

**Family Hesperiidae (Skippers)**
This family gets its common name “skippers” from the members’ darting flight patterns. The small-sized skippers are a very diverse butterfly family. Many species require close examination of facial markings to distinguish. However, all skippers have a thin extension, called an apiculus, on the end of their antennae clubs/knobs, that other butterfly families don’t have. The subfamily called the grass-skippers use grasses for their caterpillar’s host plant so they can be very abundant on Wyoming grasslands.

**Persius duskywing**
*Erynnis persius*
Photo: John Norden

**Western branded skipper**
*Hesperia colorado*
Photo: J. Norden
Family Papilionidae (Parnassians and Swallowtails)
This family contains Wyoming’s largest butterfly species. Most of the swallowtails members have “tails” or projections on the back edge of the hind wings. The five beautiful tiger swallowtail species found in Wyoming can be difficult to tell apart due to color variations and even hybridization, which is known to occur between species. The large size, white wings, lack of “tails” on the hind wings, and the presence of bright spots on the wings distinguish the Parnassians butterflies from their relatives in the family.

Rocky Mountain parnassian
*Parnassius smintheus*
Photos: B. Holder, top and center; J. Norden, bottom
Anise swallowtail
*Papilio zelicaon*
Photos: Helen Coates, top; B. Holder, bottom

Western tiger swallowtail
*(Papilio rutulus)*
Photo: J. Norden.

Western tiger swallowtail chrysalis
*Papilio rutulus*
Chrysalis
Photo: B. Holder

Western tiger swallowtail larva
*Papilio rutulus*
Photo: B. Holder
**Family Pieridae (Whites and Sulphurs)**
Most members of this family are small to medium in size and have wing tops predominantly white or yellow colored. The presence or absence of orange or black markings on the wings can help identify the species observed. Some species can be quite abundant in Wyoming’s farm land including the non-native cabbage white butterfly. It is one of the few species of butterfly whose caterpillars can be a crop and garden pest.
Family Lycaenidae (Gossamer-wing Butterfly)
The common names of the three subfamilies of Lycaenidae are coppers, blues, and hairstreaks and are accurately descriptive. The lycaenids are typically very small but often beautiful butterflies. They usually perch with wings upright. Luckily, the spots and markings on the underwing can be useful to identify them. The hairstreak species frequently have short tails that look like antennae and eyespots on the hind wing that can make some of them appear to have two heads.
**Family Nymphalidae (Brush-footed Butterfly)**

The front pair of legs of members of this family are shortened, hairy, and held tightly to the face unless they are in use to “taste test” flowers. The remaining four legs function typically. Many of Wyoming’s prettiest and most commonly seen butterflies belong to this diverse family.

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**Melissa blue**  
*Plebejus melissa*  
Photos: J. Norden, top; B. Holder, bottom

**Sheridan’s green hairstreak**  
*Calliphrys sheridanii*  
Photo: J. Norden

**Viceroy**  
*Limenitis archippus*  
Photo: H. Coates
Weidemeyer’s admiral
*Limenitis weidemeyerii*
Photos: B. Holder, top; J. Thompson, bottom

Weidemeyer’s admiral larva
*Limenitis weidemeyerii*
Photo: B. Holder

Green Comma
*Polygonia faunus*
Photo: H. Coates

Mourning Cloak
*Nymphalis antiopa*
Photo: J. Thompson
**Milbert’s tortoiseshell**
*Aglais milberti*
Photo: B. Holder

**Common wood-nymph**
*Cercyonis pegala*
Photo: H. Coates

**Painted Lady**
*Vanessa cardui*
Note the front pair of legs (butterflies have 6 legs, 3 pairs) on this butterfly that are “brush-footed.”
Photos: H. Coates

**Painted Lady chrysalis**
*Vanessa cardui*
Photos: B. Holder
Common alpine
Erebia epipsodea
Photo: H. Coates

Common ringlet
Coenonympha tullia
Photo: H. Coates

Mormon fritillary
Speyeria mormonia
Photo: J. Thompson

Red admiral
Vanessa atalanta
Photos: B. Holder
Male hummingbirds are usually easier to identify than females due to the more prominent differences in their plumage color. Pictures of males can be found in the guide, beginning page 30.

*Selasphorus rufus*
Female Rufous hummingbird in flight.
Photo: Pete Arnold
The decision process for creating a pollinator seed mix can be somewhat complex. The following are some factors to consider:

- Most guidelines suggest choosing three species of flowers to bloom in each bloom period for a total of nine species. (Note: the example mix is short one late-blooming species.) There are several USDA-NRCS publications that can help you look at choices. Visit bit.ly/wypollinators for links.

- No more that 30 percent of seed should be grasses (bunch grasses are preferred to rhizomatous since they are less likely to out-compete the flowers)

- Do you want just native plants? How “native”? Native to the U.S.? Native to the region? Native to Wyoming? Native to your county? Visit https://plants.usda.gov/ to see maps (zoom in to see your county) on each plant’s page that shows whether the NRCS considers the plant to be native to the area. (These designations are not always cut-and-dried.)

- Is seed available for this plant from a seed company? (Some sources listed on http://wyomingnativegardens.org/index.php/resources/seed-sources/)

- How much will the seed cost?

This example seed mixture is calculated on a very heavy seeding rate used for broadcast application by hand. It is four times the amount of seed recommended by USDA-NRCS for use with seed drills. Calculations are based on seeding half an acre.

<table>
<thead>
<tr>
<th>Plant common name</th>
<th>Plant scientific name</th>
<th>Seeds/Lb</th>
<th>% mix</th>
<th>Pounds PLS needed</th>
<th>Seeds/ft²</th>
<th>Example cost per pound ($)</th>
<th>Cost of seed ($)</th>
<th>Seedling depth (inches)</th>
<th>Bloom period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian ricegrass</td>
<td>Achnatherum hymenoides</td>
<td>162,000</td>
<td>10%</td>
<td>1.6</td>
<td>11.90</td>
<td>12.00</td>
<td>19.20</td>
<td>½–3</td>
<td></td>
</tr>
<tr>
<td>Bottlebrush squirreltail (grass)</td>
<td>Elymus elymoides</td>
<td>220,000</td>
<td>10%</td>
<td>1.2</td>
<td>12.12</td>
<td>14.00</td>
<td>16.80</td>
<td>¼–½</td>
<td></td>
</tr>
<tr>
<td>Sandberg’s Bluegrass</td>
<td>Poa secunda</td>
<td>1,000,000</td>
<td>10%</td>
<td>0.4</td>
<td>18.37</td>
<td>5.00</td>
<td>2.00</td>
<td>0–¼</td>
<td></td>
</tr>
<tr>
<td>Beeflower, Rocky Mountain</td>
<td>Cleome serrulata</td>
<td>64,000</td>
<td>10%</td>
<td>3.4</td>
<td>9.99</td>
<td>64.00</td>
<td>217.60</td>
<td>0–⅛</td>
<td>early–mid</td>
</tr>
<tr>
<td>Utah Sweetvetch</td>
<td>Hedysarum boreale</td>
<td>46,000</td>
<td>5%</td>
<td>2.4</td>
<td>5.07</td>
<td>150.00</td>
<td>360.00</td>
<td>¼–½</td>
<td>early</td>
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<tr>
<td>Penstemon, Rocky Mountain</td>
<td>Penstemon strictus</td>
<td>286,000</td>
<td>10%</td>
<td>0.8</td>
<td>10.51</td>
<td>70.00</td>
<td>56.00</td>
<td>0–¼</td>
<td>early</td>
</tr>
<tr>
<td>Blanketflower</td>
<td>Gailardia aristata</td>
<td>200,000</td>
<td>10%</td>
<td>1.0</td>
<td>9.18</td>
<td>52.00</td>
<td>52.00</td>
<td>¼–½</td>
<td>early</td>
</tr>
<tr>
<td>Prairie clover, white</td>
<td>Dalea candida</td>
<td>448,000</td>
<td>10%</td>
<td>0.4</td>
<td>8.23</td>
<td>70.00</td>
<td>28.00</td>
<td>¼–½</td>
<td>mid–late</td>
</tr>
<tr>
<td>Sunflower, annual</td>
<td>Helianthus annuus</td>
<td>45,000</td>
<td>10%</td>
<td>4.8</td>
<td>9.92</td>
<td>14.00</td>
<td>67.20</td>
<td>¼–½</td>
<td>mid–late</td>
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<tr>
<td>Coneflower, prairie or Mexican hat</td>
<td>Ratibida columnifera</td>
<td>740,000</td>
<td>15%</td>
<td>0.9</td>
<td>30.58</td>
<td>36.00</td>
<td>32.40</td>
<td>¼–½</td>
<td>mid</td>
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<tr>
<td><strong>Totals</strong></td>
<td></td>
<td>100%</td>
<td>22.9</td>
<td>161.00</td>
<td></td>
<td>$851.20</td>
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</tr>
</tbody>
</table>

1 PLS stands for pure live seed. Read this article to gain a better understanding of what that means. http://www.uwyo.edu/barnbackyard/_files/documents/magazine/2013/fall/092013bbseedlabel.pdf

2 These are just example prices to demonstrate some of the variability (though some of the more expensive ones, $500 per pound, were not included). Seed prices can vary widely year-to-year based on supply and demand.