

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

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



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



Long-horned bee

Female *Melissodes* with a pollen load.

Photo: B. Holder



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.

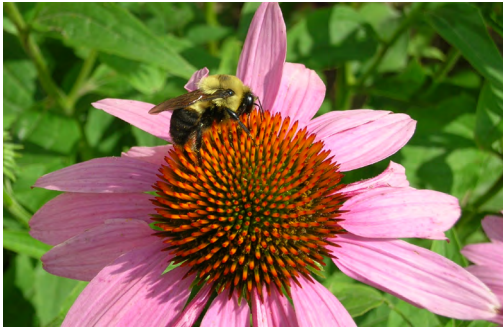
Photo: J. Thompson



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

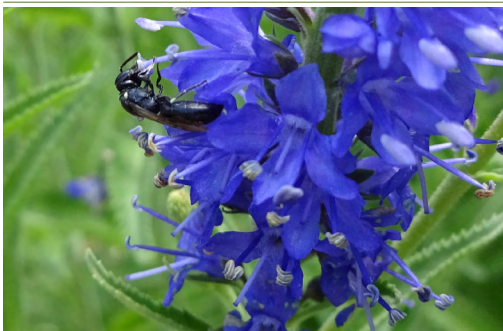


Nevada bumble bee

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.



Metallic green bee

Agapostemon

Photo: B. Holder



Agapostemon femoratus

On rabbitbrush.

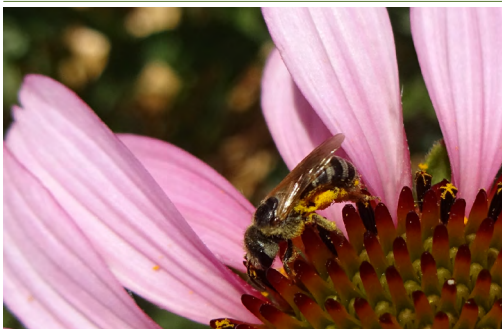
Photo: B. Holder



Lasioglossum

Tiny *Lasioglossum* subgenus *Dialictus* caught in a spider web.

Photo: J. Thompson



Halictus ligatus

On purple coneflower.

Photo: J. Thompson

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



BUTTERFLIES

Family HesperIIDae (Skippers)

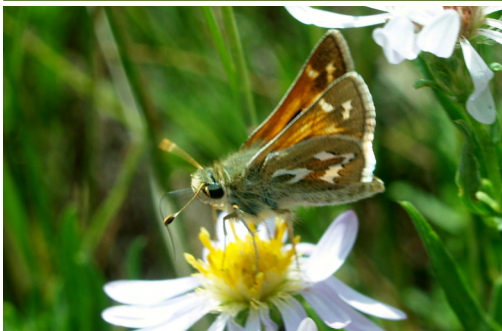
This family gets its common name “skippers” from the members’ darting flight patterns. The small-sized skippers are a very diverse butterfly family. Many species require close examination of facial markings to distinguish. However, all skippers have a thin extension, called an apiculus, on the end of 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



Woodland skipper

Ochlodes sylvanoides

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



Two-tailed swallowtail

Papilio multicaudata

Photos: 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.



Stella orangetip

Anthocharis stella

Photo: J. Norden



Orange sulphur

Colias eurytheme

Photo: H. Coates



Clouded sulphur

Colias philodice

Photo: J. Norden



Western white

Pontia occidentalis

Photo: H. Coates

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.



Ruddy copper

Lycaena rubidus

Photo: J. Norden



Melissa blue

Plebejus melissa

Photos: J. Norden, top; B. Holder, bottom



Sheridan's green hairstreak

Calliphrys sheridanii

Photo: J. Norden

Family Nymphalidae (Brush-footed Butterfly)

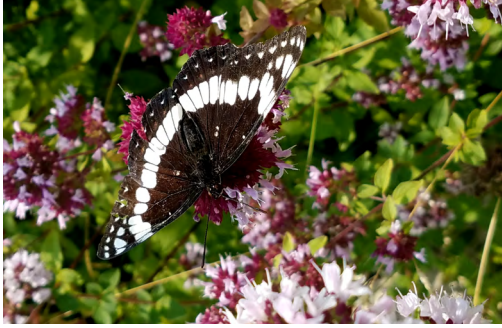
The front pair of legs of members of this family are shortened, hairy, and held tightly to the face unless they are in use to “taste test” flowers. The remaining four legs function typically. Many of Wyoming's prettiest and most commonly seen butterflies belong to this diverse family.



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

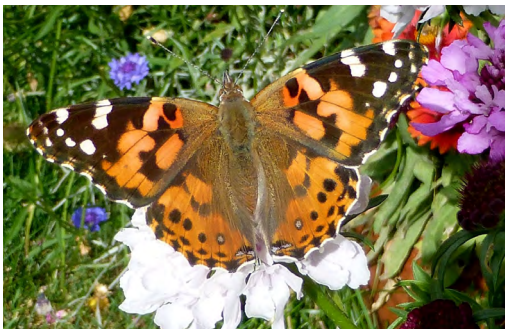
Photo: B. Holder



Common wood-nymph

Cercyonis pegala

Photo: H. Coates

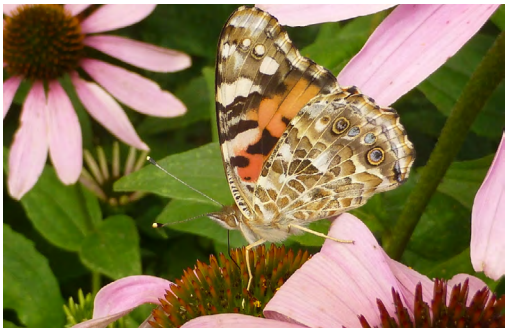


Painted Lady

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

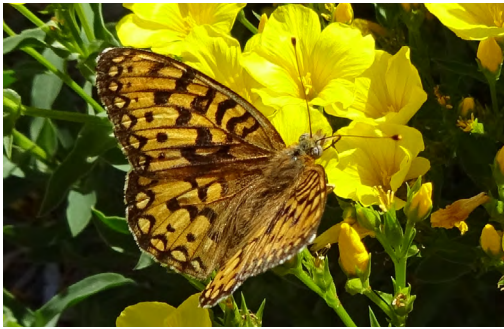
Photo: H. Coates



Common ringlet

Coenonympha tullia

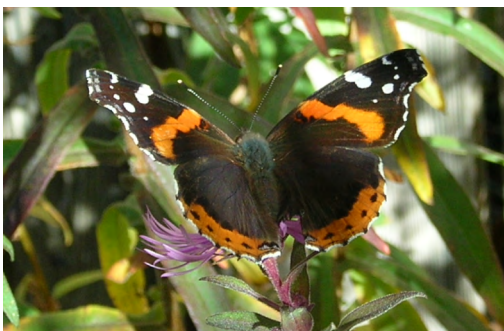
Photo: H. Coates



Mormon fritillary

Speyeria mormonia

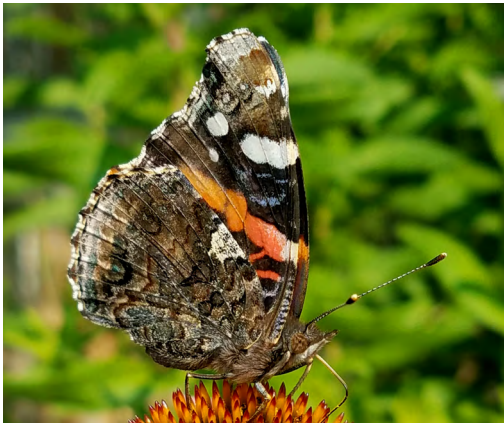
Photo: J. Thompson



Red admiral

Vanessa atalanta

Photos: B. Holder



HUMMINGBIRDS

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

APPENDIX 3

EXAMPLE SEED MIX FOR POLLINATOR PLANTINGS

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 than 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.

Plant common name	Plant scientific name	Seeds/lb	% mix	Pounds PLS needed ¹	Seeds/ft ²	Example cost per pound (\$) ²	Cost of seed (\$)	Seedling depth (inches)	Bloom period
Indian ricegrass	<i>Achnatherum hymenoides</i>	162,000	10%	1.6	11.90	12.00	19.20	1/2–3	
Bottlebrush squirreltail (grass)	<i>Elymus elymoides</i>	220,000	10%	1.2	12.12	14.00	16.80	1/4– 1/2	
Sandberg’s Bluegrass	<i>Poa secunda</i>	1,000,000	10%	0.4	18.37	5.00	2.00	0–1/4	
Beeflower, Rocky Mountain	<i>Cleome serrulata</i>	64,000	10%	3.4	9.99	64.00	217.60	0–1/8	early–mid
Utah Sweetvetch	<i>Hedysarum boreale</i>	46,000	5%	2.4	5.07	150.00	360.00	1/4– 1/2	early
Penstemon, Rocky Mountain	<i>Penstemon strictus</i>	286,000	10%	0.8	10.51	70.00	56.00	0–1/8	early
Blanketflower	<i>Gaillardia aristata</i>	200,000	10%	1.0	9.18	52.00	52.00	1/4– 1/2	early
Prairie clover, white	<i>Dalea candida</i>	448,000	10%	0.4	8.23	70.00	28.00	1/4– 1/2	mid-late
Sunflower, annual	<i>Helianthus annuus</i>	45,000	10%	4.8	9.92	14.00	67.20	1/4– 1/2	mid-late
Coneflower, prairie or Mexican hat	<i>Ratibida columnifera</i>	740,000	15%	0.9	30.58	36.00	32.40	1/4– 1/2	mid
Totals			100%	22.9	161.00		\$851.20		

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.