

A.M. Shapiro, R. VanBuskirk, G. Kareofelas, and W.D. Patterson. 2003. Phenofaunistics: Seasonality as a Property of Butterfly Faunas. In C.L. Boggs, W.B. Watt and P.R. Ehrlich, eds. *Butterflies: Ecology and Evolution Taking Flight*. University of Chicago Press, Chicago. pp. 111-147.

### 1996 Gates Canyon, California. Presence /absence data from surveys

0 = absence, 1 = presence; total = total number surveys on which species was present.

	5-Jan	25-Jan	9-Feb	13-Feb	7-Mar	15-Mar	26-Mar	10-Apr	22-Apr	6-May	20-May	3-Jun	19-Jun	3-Jul	18-Jul
<i>Thorybes pylades</i>	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0
<i>Epargyreus clarus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Erynnis persius</i>	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0
<i>Erynnis propertius</i>	0	0	0	0	1	1	1	1	1	0	1	1	1	0	0
<i>Erynnis tristis</i>	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1
<i>Erynnis pacuvius</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pholisora catullus</i>	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
<i>Pyrgus communis</i>	0	0	0	0	0	1	1	0	0	0	1	0	1	1	1
<i>Heliopetes ericetorum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Hylephila phyleus</i>	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1
<i>Polites sabuleti</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Lerodea eufala</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Hesperia columbia</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>Atalopedes campestris</i>	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1
<i>Ochlodes sylvanoides</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Ochlodes agricola</i>	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0
<i>Paratrytone melane</i>	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1
<i>Battus philenor</i>	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
<i>Papilio zelicaon</i>	0	0	0	0	1	1	1	0	1	1	0	1	0	0	1
<i>Papilio rutulus</i>	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
<i>Papilio eurymedon</i>	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0
<i>Papilio multicaudatus</i>	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0
<i>Pontia sisymbrii</i>	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
<i>Pontia protodice</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pieris napi</i>	0	0	0	0	1	1	1	1	1	1	0	1	1	0	0
<i>Pieris rapae</i>	1	0	0	0	1	1	1	1	0	1	1	1	1	1	1
<i>Euchloe ausonides</i>	0	0	0	0	1	1	1	0	1	0	1	0	0	0	0

	5-Jan	25-Jan	9-Feb	13-Feb	7-Mar	15-Mar	26-Mar	10-Apr	22-Apr	6-May	20-May	3-Jun	19-Jun	3-Jul	18-Jul
<i>Anthocaris sara</i>	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0
<i>Colias eurytheme</i>	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1
<i>Zerene eurydice</i>	0	0	0	0	0	1	0	1	0	0	1	1	1	0	0
<i>Tharsalea arota</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Lycaena xanthoides</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>Lycaena gorgon</i>	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
<i>Lycaena helloides</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Atlides halesus</i>	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
<i>Satyrium californicum</i>	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0
<i>Satyrium auretteorum</i>	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0
<i>Satyrium tetra</i>	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
<i>Satyrium saepium</i>	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0
<i>Satyrium sylvinus</i>	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0
<i>Callophrys dumetorum</i>	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
<i>Incisalia a. iroides</i>	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
<i>Strymon melinus</i>	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1
<i>Leptotes marina</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Brephidium exile</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Everes comyntas</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Celastrina a. echo</i>	1	0	0	1	1	1	1	1	0	0	1	1	0	0	0
<i>Glaucopsyche lygdamus</i>	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0
<i>Icaricia icarioides</i>	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0
<i>Icaricia acmon</i>	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0
<i>Speyeria coronis</i>	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
<i>Thessalia leanira</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Charidryas palla</i>	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0
<i>Phyciodes mylitta</i>	0	0	0	0	1	1	1	0	1	0	1	1	1	1	1
<i>Euphydryas chalcedona</i>	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0
<i>Polygonia satyrus</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Polygonia zephyrus</i>	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
<i>Nymphalis milberti</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>Nymphalis californica</i>	0	0	1	1	1	1	0	1	0	1	1	0	0	0	0
<i>Nymphalis antiopa</i>	1	0	1	1	1	1	0	1	1	0	1	0	0	0	0
<i>Vanessa virginiensis</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0

	5-Jan	25-Jan	9-Feb	13-Feb	7-Mar	15-Mar	26-Mar	10-Apr	22-Apr	6-May	20-May	3-Jun	19-Jun	3-Jul	18-Jul
<i>Vanessa cardui</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Vanessa annabella</i>	1	0	0	0	1	1	0	0	1	0	1	1	1	0	1
<i>Vanessa atalanta</i>	1	0	0	1	1	0	0	0	1	0	1	1	0	1	1
<i>Junonia coenia</i>	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1
<i>Limenitis lorquini</i>	0	0	0	0	0	0	1	0	1	1	1	1	1	0	0
<i>Adelpha bredowii</i>	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
<i>Coenonympha tullia</i>	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
<i>Danaus plexippus</i>	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1

	2-Aug	15-Aug	28-Aug	12-Sep	24-Sep	9-Oct	16-Oct	1-Nov	13-Nov	26-Nov	15-Dec	Totals
<i>Thorybes pylades</i>	0	0	0	0	0	0	0	0	0	0	0	4
<i>Epargyreus clarus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Erynnis persius</i>	0	0	0	0	0	0	0	0	0	0	0	5
<i>Erynnis propertius</i>	0	0	0	0	0	0	0	0	0	0	0	8
<i>Erynnis tristis</i>	1	1	1	1	0	0	0	0	0	0	0	13
<i>Erynnis pacuvius</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pholisora catullus</i>	1	1	0	0	0	0	0	0	0	0	0	5
<i>Pyrgus communis</i>	1	1	1	0	1	1	0	1	0	0	0	12
<i>Heliopetes ericetorum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Hylephila phyleus</i>	1	1	1	0	1	1	0	1	1	1	0	14
<i>Polites sabuleti</i>	0	0	0	0	1	0	0	0	0	0	0	1
<i>Lerodea eufala</i>	0	1	1	0	0	1	0	1	0	0	0	4
<i>Hesperia columbia</i>	0	0	0	0	1	0	0	0	0	0	0	2
<i>Atalopedes campestris</i>	1	1	1	1	1	1	0	1	0	0	0	12
<i>Ochlodes sylvanoides</i>	1	1	1	1	1	0	0	0	0	0	0	5
<i>Ochlodes agricola</i>	0	0	0	0	0	0	0	0	0	0	0	4
<i>Paratrytone melane</i>	1	1	1	1	1	0	0	0	0	0	0	10
<i>Battus philenor</i>	1	1	1	0	1	1	0	0	0	0	0	17
<i>Papilio zelicaon</i>	1	1	0	1	0	0	0	0	0	0	0	10
<i>Papilio rutulus</i>	1	1	0	0	0	0	0	0	0	0	0	11
<i>Papilio eurymedon</i>	0	0	0	0	0	0	0	0	0	0	0	6
<i>Papilio multicaudatus</i>	0	0	0	0	0	0	0	0	0	0	0	3
<i>Pontia sisymbrii</i>	0	0	0	0	0	0	0	0	0	0	0	2
<i>Pontia protodice</i>	0	0	0	0	0	0	0	0	0	0	0	0

	2-Aug	15-Aug	28-Aug	12-Sep	24-Sep	9-Oct	16-Oct	1-Nov	13-Nov	26-Nov	15-Dec	Totals
<i>Pieris napi</i>	0	0	0	0	0	0	0	0	0	0	0	8
<i>Pieris rapae</i>	1	1	1	1	1	1	1	1	0	0	0	19
<i>Euchloe ausonides</i>	0	0	0	0	0	0	0	0	0	0	0	5
<i>Anthocaris sara</i>	0	0	0	0	0	0	0	0	0	0	0	7
<i>Colias eurytheme</i>	1	1	1	1	1	1	1	1	0	0	0	15
<i>Zerene eurydice</i>	0	0	0	0	0	0	0	0	0	0	0	5
<i>Tharsalea arota</i>	0	0	0	0	0	0	0	0	0	0	0	1
<i>Lycaena xanthoides</i>	0	0	0	0	0	0	0	0	0	0	0	1
<i>Lycaena gorgon</i>	0	0	0	0	0	0	0	0	0	0	0	2
<i>Lycaena helloides</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Atlides halesus</i>	0	0	0	0	0	0	0	0	0	0	0	2
<i>Satyrium californicum</i>	0	0	0	0	0	0	0	0	0	0	0	3
<i>Satyrium auretteum</i>	0	0	0	0	0	0	0	0	0	0	0	3
<i>Satyrium tetra</i>	0	0	0	0	0	0	0	0	0	0	0	2
<i>Satyrium saepium</i>	0	0	0	0	0	0	0	0	0	0	0	3
<i>Satyrium sylvinus</i>	0	0	0	0	0	0	0	0	0	0	0	3
<i>Callophrys dumetorum</i>	0	0	0	0	0	0	0	0	0	0	0	2
<i>Incisalia a. iroides</i>	0	0	0	0	0	0	0	0	0	0	0	7
<i>Strymon melinus</i>	1	1	1	1	1	1	1	0	0	0	0	13
<i>Leptotes marina</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Brephidium exile</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Everes comyntas</i>	1	0	1	0	1	0	0	0	0	0	0	4
<i>Celastrina a. echo</i>	0	0	0	0	0	0	0	0	0	0	0	8
<i>Glaucopsyche lygdamus</i>	0	0	0	0	0	0	0	0	0	0	0	4
<i>Icaricia icarioides</i>	0	0	0	0	0	0	0	0	0	0	0	3
<i>Icaricia acmon</i>	1	1	1	1	1	1	1	1	0	0	0	12
<i>Speyeria coronis</i>	0	0	0	0	1	0	0	0	0	0	0	3
<i>Thessalia leanira</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Charidryas palla</i>	0	0	0	0	0	0	0	0	0	0	0	4
<i>Phyciodes mylitta</i>	1	1	1	0	0	0	1	1	1	0	0	15
<i>Euphydryas chalcedona</i>	0	0	0	0	0	0	0	0	0	0	0	5
<i>Polygonia satyrus</i>	0	0	0	0	0	0	0	0	0	0	0	1
<i>Polygonia zephyrus</i>	0	0	0	0	0	0	0	0	0	0	0	2
<i>Nymphalis milberti</i>	0	0	0	0	0	0	0	0	0	0	0	1

	2-Aug	15-Aug	28-Aug	12-Sep	24-Sep	9-Oct	16-Oct	1-Nov	13-Nov	26-Nov	15-Dec	Totals
<i>Nymphalis californica</i>	0	0	0	0	0	0	0	0	0	0	0	7
<i>Nymphalis antiopa</i>	0	0	0	0	0	0	0	0	0	0	0	8
<i>Vanessa virginiensis</i>	1	0	0	0	0	0	0	1	0	0	0	3
<i>Vanessa cardui</i>	0	1	0	0	0	0	0	0	0	0	0	2
<i>Vanessa annabella</i>	1	0	1	0	1	0	0	1	1	1	1	15
<i>Vanessa atalanta</i>	1	1	1	0	1	1	0	0	0	1	0	14
<i>Junonia coenia</i>	1	1	1	1	1	1	1	0	1	0	0	18
<i>Limenitis lorquini</i>	0	1	0	1	0	1	0	0	0	0	0	9
<i>Adelpha bredowii</i>	0	1	1	1	1	1	1	0	0	0	0	15
<i>Coenonympha tullia</i>	1	0	1	1	0	1	0	0	0	0	0	14
<i>Danaus plexippus</i>	1	1	1	1	1	1	1	0	0	0	0	17