

SURVEY OF THE LEPIDOPTERA OF WRITING-ON-STONE PROVINCIAL PARK



Oligia rampartensis B. & Benj. AB Writing-on-stone P. Park 3-ix-2002 leg. Anweiler
U. A. Strickland Museum #UASM24372 (G. G. Anweiler image)

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SURVEY OF THE LEPIDOPTERA OF WRITING-ON-STONE PROVINCIAL PARK

Doug Macaulay

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Photo: Gary Anweiler of Stonewall Quaker Moth (*Oligia rampartensis*)

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EXECUTIVE SUMMARY

Alberta Lepidoptera Inventories are initiated by both the Alberta Government and members of the Alberta Lepidopterist Guild (ALG) who are working together to document all species found in Alberta's Parks and Protected Areas. Resulting species lists are used by personnel in resource management planning. This report summaries all species that are known from the park. A total of 23 families and 354 species were collected in Writing-On-Stone Provincial Park including 11 that are provincially ranked as S1 and 22 as S2.

1.0 INTRODUCTION

The park has been surveyed several times during the last two decades and during these expeditions many new species for Alberta and Canada were discovered within the park. Most recent visits by myself were on June 29-30, 1996; May 18-19, 2002; June 22-25, 2012; July 19-22, 2012. Other trips made to the park The majority of survey work occurred either in the campground, along the river west of the campground or on the prairie near the lookout (Figure 1).

Butterflies and skippers were not collected as intensely as were the moths and therefore their species numbers are somewhat lower. Further collecting of these dayflies will likely reveal more species. Collecting methods ranged from night sampling using both UV light traps and the traditional MV sheet trap. Day collecting was conducted using hand nets and on a few occasions pheromone traps were deployed as well.

2.0 STUDY AREA

The Writing-on-Stone Provincial Park (see map) is located approximately 100 kilometers to the southeast of Lethbridge in parts of townships 1 and 2, and ranges 12, 13 & 14 and is approximately 6644.79 acres in size.

This park is situated in the Dry Mixedgrass subregion of the Grassland Natural Region that contains badlands, riparian and grassland habitats. All habitat types were surveyed on a number of occasions.



Figure 1. Map of Writing-On-Stone Provincial Park.

3.0 METHODS

Collecting methods ranged from night sampling using both UV light traps and the traditional MV sheet trap. Day collecting was conducted using hand nets and on a few occasions pheromone traps were deployed as well.

Species collected during this study were rated to highlight those that may be vulnerable provincially. I did not use the Alberta Parks Status Ranking (S-Ranking) system as many of the species listed are not ranked in the Alberta Conservation Information Management System (ACIMS) database. I instead used my own system to rate species (Table 1) based on population data gathered from either the University of Alberta's Strickland Virtual Museum, other similar websites or from technical reports and other publications. On occasion when available data was insufficient I used my personal expertise to determine the ranking. For example if a species only had two documented populations in Alberta but I had observed it in many other localities I would give it a higher rating.

However, these ratings can be loosely translated into S-ranks based on the following criteria. For a species rated as "Rare" these would be potential candidates for either an S1, S2 or S3 and for those rated as "Uncommon" as S3 or S3S4 ranks in Alberta. Those rated as "Common" would be potential candidates for an S4 and ratings of "Abundant" would be S5. Lastly, a rating of "SU" would be a species that require more information before a ranking can be completed and a "SNA" is for species that are not native to North America. For more details on my scarcity rating system used in Appendix 1 see below Table 1 that defines how each rating is determined.

Table 1. Scarcity Rating System

Scarcity	Definition
R	Rare species with less than 5 documented populations in Alberta.
U	Uncommon species with less than 20 documented populations in Alberta.
C	Common species with more than 20 documented populations in Alberta.
A	Abundant species with more than 50 documented populations in Alberta.

4.0 RESULTS

A total of 24 families and 356 species were collected in WOS and area. Of these, 22 were butterflies, 305 were macro-moths and 29 were micro-moths (Appendix 1). Of those collected, 35 were ranked as 'rare' and 55 as 'uncommon' (Appendix 1). A total of 4 species discovered in the park are found nowhere else in Alberta.

5.0 DISCUSSION

5.1 Overview

The following is an annotated species list followed by a discussion of significant species' records that are of interest. For each species discussed, comments are included about relative abundance, range extensions, and any other relevant biological or behavioural information.

5.2 Species Accounts

Hepialidae

- 1) *Gazoryctra noviganna*

Elachistidae

- 2) *Ethmia monticola*

Ypsolophidae

- 3) *Ypsolopha canariella*

Sesiidae

- 4) *Sesia tibiale*

Cossidae

- 5) *Prionoxystus robiniae*

Hesperiidae

- 6) *Epargyreus clarus clarus*
- 7) *Erynnis afranius*
- 8) *Ochlodes sylvanoides*
- 9) *Amblyscirtes oslari*

Papilionidae

- 10) *Papilio multicaudatus*

Pieridae

- 11) *Pontia occidentalis*
- 12) *Pieris rapae*
- 13) *Colias a. alexandra*

Lycaenidae

- 14) *Lycaena rubidus sirius*
- 15) *Satyrium titus immaculosus*
- 16) *Lycaeides melissa melissa*
- 17) *Icaricia acmon*

Nymphalidae

- 18) *Euptoieta claudia*
- 19) *Speyeria aphrodite ethne*
- 20) *Speyeria callippe calgariana*
- 21) *Phyciodes tharos orantain*
- 22) *Limenitis arthemis rubrofasciata*
- 23) *Limenitis archippus*
- 24) *Limenitis weidemeyerii oberfoelli*
- 25) *Coenonympha tullia*
- 26) *Neominois ridingsii minimus*
- 27) *Danaus plexippus*

Crambidae

- 28) *Mimoschinia rufofascialis*
- 29) *Evergestis simulatilis*
- 30) *Evergestis vinctalis*
- 31) *Perispasta caeculalis*
- 32) *Sitochroa chortalis*
- 33) *Loxostege sticticalis*
- 34) *Pyrausta unifascialis*
- 35) *Nomophila nearctica*
- 36) *Chrysoteuchia topiarius*
- 37) *Pediasia trisecta*
- 38) *Euchromius californicalis*
- 39) *Toripalpus trabalis*

Pyralidae

- 40) *Pococera baptisiella*
- 41) *Acrobasis tricolorella*
- 42) *Pima fosterella*
- 43) *Interjectio nivella*
- 44) *Ambesa laetella*
- 45) *Sciota fernaldi*
- 46) *Sciota rubescentella*

- 47) *Staudingeria albipenella*
 48) *Peoria approximella*

Thyrididae

- 49) *Thyris maculata* Harris

Pterophoridae

- 50) *Paraplatyptilia maea*
 51) *Paraplatyptilia modestus*

Drepanidae

- 52) *Pseudothyatira cymatophoroides*
 53) *Ceranemota albertae*

Geometridae

- 54) *Speranza sulphurea*
 55) *Speranaza bitactata*
 56) *Digrammia curvata*
 57) *Digrammia denticulata*
 58) *Digrammia californiaria*
 59) *Digrammia neptaria*
 60) *Digrammia subminiata*
 61) *Fernaldella fimetaria*
 62) *Hesperumia sulphuraria*
 63) *Lycia ursaria*
 64) *Hypagyrtis unipunctata*
 65) *Euchlaena johnsonaria*
 66) *Euchlaena madusaria*
 67) *Euchlaena tigrinaria*
 68) *Pero honestaria*
 69) *Pero morrisonaria*
 70) *Ennomos magnaria*
 71) *Selenia alciphearia*
 72) *Probole amicaria*
 73) *Tetracis cachexiata*
 74) *Prochoerodes lineola*
 75) *Scopula junctaria*
 76) *Scopula inductata*
 77) *Scopula sentinaria*
 78) *Leptostales ferruminaria*
 79) *Eulithis propulsata*
 80) *Zenophleps alpinata*
 81) *Orthonama centrostrigaria*
 82) *Horisme intestinata*
 83) *Horisme incana* Swett.

Lasiocampidae

- 84) *Phyllodesma americana*

Saturniidae

- 85) *Antheraea polyphemus*

Sphingidae

- 86) *Ceratomia undulosa*
 87) *Sphinx vashti*
 88) *Smerinthus cerisyi*
 89) *Paonias myops*
 90) *Pachysphinx occidentalis*
 91) *Hyles euphorbiae*
 92) *Hyles gallii*

Notodontidae

- 93) *Gluphisia septentrionis*
 94) *Furcula cinerea*
 95) *Furcula scolopendrina*
 96) *Dasylophia anguina*
 97) *Schizura unicornis*

Erebidae

- 98) *Eilema bicolor*
 99) *Crambidia casta*
 100) *Hypoprepia miniata*
 101) *Estigmene acrea*
 102) *Spilosoma virginica*
 103) *Hyphantria cunea*
 104) *Hypercompe permaculata*
 105) *Grammia nevadensis gibsoni*
 106) *Grammia blakei*
 107) *Grammia williamsii*
 108) *Cycnia oregonensis*
 109) *Dasychira vagans*
 110) *Idia americalis*
 111) *Idia aemula*
 112) *Bleptina caradrinalis*
 113) *Melipotis jucunda*
 114) *Drasteria pallescens*
 115) *Drasteria petricola*
 116) *Drasteria hudsonica heathi*
 117) *Drasteria perplexa*
 118) *Zale minerea*
 119) *Euclidia cuspidata*
 120) *Caenurgina crassiuscula*

- 121) *Caenurgina erechthea*
- 122) *Catocala unijuga*
- 123) *Catocala parta*
- 124) *Catocala luciana*
- 125) *Catocala hermia*
- 126) *Catocala briseis*
- 127) *Catocala semirelicta*
- 128) *Catocala meskei*
- 129) *Catocala junctura*
- 130) *Catocala praeclara*

Euteliidae

- 131) *Marathyssa inficita*

Noctuidae

- 132) *Abrostola urentis*
- 133) *Autographa californica*
- 134) *Autographa mappa*
- 135) *Autographa ampla*
- 136) *Anagrapha falcifera*
- 137) *Syngrapha octoscripta*
- 138) *Pseudeustrotia carneola*
- 139) *Leuconycta lepidula*
- 140) *Ponometia semiflava*
- 141) *Tarachidia tortricina fumata*
- 142) *Ponometia elegantula*
- 143) *Tarache augustipennis*
- 144) *Raphia frater coloradensis*
- 145) *Acronicta dactylina*
- 146) *Acronicta lepusculina*
- 147) *Acronicta mansueta*
- 148) *Acronicta impleta*
- 149) *Acronicta lanceolaria*
- 150) *Apamea cariosa*
- 151) *Apamea lignicolora*
- 152) *Apamea sora*
- 153) *Apamea occidens*
- 154) *Apamea amputatrix*
- 155) *Apamea inordinata*
- 156) *Apamea spaldingi*
- 157) *Apamea commoda*
- 158) *Apamea sordens finitima*
- 159) *Apamea scoparia*
- 160) *Apamea inficita*
- 161) *Apamea burgessi*
- 162) *Apamea longula*

- 163) *Oligia fractilinea*
- 164) *Neoligia subjuncta*
- 165) *Neoligia tonsa*
- 166) *Oligia rampartensis*
- 167) *Oligia mactata*
- 168) *Photodes didonea*
- 169) *Hypocoena rufostrigata*
- 170) *Celaena reniformis*
- 171) *Bellura obliqua*
- 172) *Aseptis characta*
- 173) *Hyppa indistincta*
- 174) *Trachea delicata*
- 175) *Amphipyra glabella*
- 176) *Proxenus miranda*
- 177) *Proxenus mendosa*
- 178) *Platyperigea meralis*
- 179) *Caradrina montana*
- 180) *Spodoptera praefica*
- 181) *Elaphria alapallida*
- 182) *Acopa perpallida*
- 183) *Escaria homogena*
- 184) *Afotella cylindrica*
- 185) *Xylena nupera*
- 186) *Lithophane fagina*
- 187) *Eupsilia tristigmata*
- 188) *Eucirroedia pampina*
- 189) *Sunira bicolorago*
- 190) *Agrochola verberata*
- 191) *Anathix puta*
- 192) *Anathix aggressa*
- 193) *Catabena lineolata*
- 194) *Sympistis stabilis*
- 195) *Sympistis dinalda*
- 196) *Sympistis chionanthi*
- 197) *Sympistis regina*
- 198) *Sympistis occata*
- 199) *Sympistis cibalis*
- 200) *Sympistis pallidior*
- 201) *Sympistis chons*
- 202) *Sympistis chandleri*
- 203) *Sympistis mackiei*
- 204) *Cucullia speyeri*
- 205) *Cucullia intermedia*
- 206) *Cucullia montanae*
- 207) *Cucullia luna*
- 208) *Cucullia antipoda*

209)	<i>Hadenella pergentilis</i>	255)	<i>Orthosia revicta</i>
210)	<i>Anarta trifolii</i>	256)	<i>Orthosia segregata</i>
211)	<i>Anarta mutata</i>	257)	<i>Egira rubrica</i>
212)	<i>Anarta inconcinna</i>	258)	<i>Tholera americana</i>
213)	<i>Anarta farnhami</i>	259)	<i>Nephelodes minians</i>
214)	<i>Anarta crotchi</i>	260)	<i>Anhimella contrahens</i>
215)	<i>Scotogramma submarina</i>	261)	<i>Homorthodes furfurata</i>
216)	<i>Scotogramma fervida</i>	262)	<i>Protorthodes curtica</i>
217)	<i>Anarta decepta</i>	263)	<i>Protorthodes incincta</i>
218)	<i>Sideridis artesta</i>	264)	<i>Protorthodes oviduca</i>
219)	<i>Sideridis rosea</i>	265)	<i>Ulolonche disticha</i>
220)	<i>Mamestra configurata</i>	266)	<i>Orthodes majuscula</i>
221)	<i>Polia imbrifera</i>	267)	<i>Agrotis vetusta</i>
222)	<i>Polia rogenhoferi</i>	268)	<i>Agrotis orthogonia</i>
223)	<i>Polia purpurissata</i>	269)	<i>Agrotis venerabilis</i>
224)	<i>Polia nugatis</i>	270)	<i>Agrotis obliqua</i>
225)	<i>Polia detracta</i>	271)	<i>Agrotis ipsilon</i>
226)	<i>Orthodes goodelli</i>	272)	<i>Feltia jaculifera</i>
227)	<i>Polia obscura</i>	273)	<i>Feltia herilis</i>
228)	<i>Melanchra picta</i>	274)	<i>Euxoa divergens</i>
229)	<i>Lacanobia nevadae</i>	275)	<i>Euxoa messoria</i>
230)	<i>Lacanobia atlantica</i>	276)	<i>Euxoa scandens</i>
231)	<i>Lacanobia subjuncta</i>	277)	<i>Euxoa aurulenta</i>
232)	<i>Spiramater lutra</i>	278)	<i>Euxoa tristicula</i>
233)	<i>Trichordestra lilacina</i>	279)	<i>Euxoa pleuritica</i>
234)	<i>Trichordestra liquida</i>	280)	<i>Euxoa pestula</i>
235)	<i>Hadena circumvadis</i>	281)	<i>Euxoa adumbrata</i>
236)	<i>Hadena variolata</i>	282)	<i>Euxoa auxiliaris</i>
237)	<i>Lacinipolia meditata</i>	283)	<i>Euxoa mimallonis</i>
238)	<i>Lacinipolia lustralis</i>	284)	<i>Euxoa intrita</i>
239)	<i>Lacinipolia longiclava</i>	285)	<i>Euxoa declarata</i>
240)	<i>Lacinipolia vicina</i>	286)	<i>Euxoa spumata</i>
241)	<i>Lacinipolia pensilis</i>	287)	<i>Euxoa pallipennis</i>
242)	<i>Lacinipolia renigera</i>	288)	<i>Euxoa mitis</i>
243)	<i>Lacinipolia stricta</i>	289)	<i>Euxoa aequalis acornis</i>
244)	<i>Lacinipolia lorea</i>	290)	<i>Euxoa comosa</i>
245)	<i>Lacinipolia olivacea</i>	291)	<i>Euxoa infausta</i>
246)	<i>Lacinipolia strigicollis</i>	292)	<i>Euxoa setonia</i>
247)	<i>Dargida procinctus</i>	293)	<i>Euxoa basalis</i>
248)	<i>Faronta diffusa</i>	294)	<i>Euxoa nostra</i>
249)	<i>Mythimna oxygala</i>	295)	<i>Euxoa plagigera</i>
250)	<i>Mythimna unipuncta</i>	296)	<i>Euxoa tessellata</i>
251)	<i>Leucania anteoclara</i>	297)	<i>Euxoa albipennis</i>
252)	<i>Leucania multilinea</i>	298)	<i>Euxoa catenula</i>
253)	<i>Leucania commoides</i>	299)	<i>Euxoa siccata</i>
254)	<i>Leucania insueta</i>	300)	<i>Euxoa medialis</i>

301)	<i>Euxoa obeliscoides</i>	329)	<i>Rhyacia clemens</i>
302)	<i>Euxoa choris</i>	330)	<i>Spaelotis clandestina</i>
303)	<i>Euxoa furtivus</i>	331)	<i>Eurois occulta</i>
304)	<i>Euxoa castanea</i>	332)	<i>Xestia c-nigrum</i>
305)	<i>Euxoa laetificans</i>	333)	<i>Agnorisma bugrai</i>
306)	<i>Euxoa quadridentata</i>	334)	<i>Xestia perquiritata</i>
307)	<i>Euxoa olivalis</i>	335)	<i>Paradiarsia littoralis</i>
308)	<i>Euxoa oblongistigma</i>	336)	<i>Chersotis juncta</i>
309)	<i>Euxoa dargo</i>	337)	<i>Noctua pronuba</i>
310)	<i>Euxoa cicatricosa</i>	338)	<i>Protolampra rufipectus</i>
311)	<i>Euxoa tronellus</i>	339)	<i>Protolampra brunneicollis</i>
312)	<i>Euxoa teleboa</i>	340)	<i>Abagrotis erratica</i>
313)	<i>Euxoa difformis</i>	341)	<i>Abagrotis vittifrons</i>
314)	<i>Euxoa dodi</i>	342)	<i>Abagrotis trigona</i>
315)	<i>Euxoa auripennis</i>	343)	<i>Abagrotis orbis</i>
316)	<i>Euxoa servitus</i>	344)	<i>Abagrotis alternata</i>
317)	<i>Euxoa perolivalis</i>	345)	<i>Abagrotis hermina</i>
318)	<i>Euxoa ridingsiana</i>	346)	<i>Abagrotis variata</i>
319)	<i>Euxoa aberrans</i>	347)	<i>Abagrotis discoidalis</i>
320)	<i>Euxoa manitobana</i>	348)	<i>Abagrotis nanalis</i>
321)	<i>Euxoa flavicollis</i>	349)	<i>Abagrotis duanca</i>
322)	<i>Protogygia enalaga</i>	350)	<i>Abagrotis reedi</i>
323)	<i>Anicla exuberans</i>	351)	<i>Abagrotis cupida</i>
324)	<i>Anicla tepperi</i>	352)	<i>Parabagrotis exsertistigma</i>
325)	<i>Peridroma saucia</i>	353)	<i>Parabagrotis sulinaris</i>
326)	<i>Diarsia freemani</i>	354)	<i>Heliothis phloxiphaga</i>
327)	<i>Actebia balanitis</i>	355)	<i>Schinia meadi</i>
328)	<i>Actebia fennica</i>	356)	<i>Schinia cumatilis</i>

5.3 Species of Significance

Oslar's Roadside Skipper (*Amblyscirtes oslari*) is an extremely rare species that is listed as S1 provincially. It is known from three localities, the first from Lethbridge, the Pinhorn Grazing Reserve and Writing on Stone Provincial Park. The lone specimen was collected in WOS on May 29th, 2000 by Chris Schmidt. This species is recorded to feed on Blue Grama (*Bouteloua gracilis*) or other grasses according to Bird et al., 1995.



Figure 2. *Amblyscirtes oslari* (photo by Nick Grishin, Butterflies of America Foundation).

Two-tailed Swallowtail (*Papilio multicaudata*) is a rare species that is not common in Alberta.



It is known from approximately eight localities in southern Alberta that includes Waterton National Park, Medicine Hat, Lethbridge, Taber and Writing on Stone Provincial Park. In WOS it is quite common in Police coulee region of the park (Bird et al. 1995). It is known to feed on cherries including chokecherry (*Prunus virginiana*) as well as ashes (*Fraxinus* spp.) and Saskatoon (*Amelanchier alnifolia*), all of these plants are found in the park.

Figure 3. *Papilio multicaudatus* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Alexandra's Sulphur (*Colias a. alexandra*) – is a uncommon species that is known from several localities in Alberta. The localities include Coalspur, Jasper, Banff, Olds, Calgary, Dogpound, Flat Creek, Moose Mountain, Empress, Lost River, Red Deer, Plateau Mountain, Cypress Hills PP, Burdett, Patricia, Pakowki Lake dunes, Breed Creek, Regal Creek, Cat Creek, Laggan, Moberly Creek, Prospect Mountain, Ram River Falls, Nordegg, St. Marys Dam, Lloydminster, Standard, Magrath, VanCleve Coulee, Wintering Hills, Dinosaur Provincial Park, Fort Whoop



Up, Lower Milk River, Taber PP and Police Coulee (WOS). The WOS specimen was found in Police Coulee by Norbert Kondla. Hosts include milk-vetch (*Astragalus* spp., *Lathyrus*, *Oxytropis* and *Thermopsis* which are all legumes (Fabaceae) according to Bird et al. (1995) and Layberry et al. (1998) and Guppy & Shepard (2001).

Figure 4. *Colias a. alexandra* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Weidemeyer's Admiral (*Limenitis weidemeyerii oberfoelli*) is a rare species that is listed as S1 provincially. There are approximately seven populations known from the Milk river basin in Alberta (COSEWIC 2012, Macaulay 2012).



From my experience, in WOS this species can be locally common at times. Larvae of this species likely feed on Saskatoon (*Amelanchier alnifolia*) in the park and surrounding areas (Macaulay 2012; Bird et al. 1995).

Figure 5. *Limenitis weidemeyerii* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Ridings' Satyr (*Neominois ridingsii minimus*) - is an uncommon species that is known from a few localities in Alberta. The localities include Fort Macleod, Pincher Creek, Drumheller, Empress, Dorothy, Lethbridge, Calgary, Medicine Hat, Brooks, Finnegan, Plateau Mountain, Rumsey, Van Cleve Coulee, Dinosaur Provincial Park, Midland PP, Elkwater, Rumsey, Pendant



d'Oreille, Rosebud, Standard, Sage Creek, Cutbank Creek, Head-Smashed-In Buffalo Jump PP, Maycroft, Wintering Hills, Taber PP and Police Coulee (WOS). The WOS specimen was found in Police Coulee by Norbert Kondla. Hosts include grasses such as Blue Grama Grass (*Bouteloua gracilis*) according to Bird et al. (1995) and Layberry et al. (1998).

Figure 6. *Neominois ridingsii minimus* (photo by Gary Anweiler, University of Alberta Strickland Museum).



Tan-lined Grass Moth (*Evergestis vinctalis*) is a rare species that is known from only two documented localities in Alberta. This species has been found near Lethbridge as well as in WOS. A second locality was discovered during a collecting trip I made in June 2012, all three specimens were collected at a MV sheet trap.

Figure 7. *Evergestis vinctalis* (photo by Jim Vargo, Moth Photographers Group).

White-washed Webworm Moth (*Pococera baptisiella*) is a rare species that is known from only two other localities in Alberta. It is known from Sandy Point, campground in South



Saskatchewan River valley and at Onefour just north of the Milk River Valley. The lone WOS specimen was collected on June 23, 2012 in a UV light trap. This species has been reared on Wild Indigo Bush (*Amorpha canescens*) that is not recorded from the park.

Figure 8. *Pococera baptisiella* (photo by Jim Vargo, Moth Photographers Group).



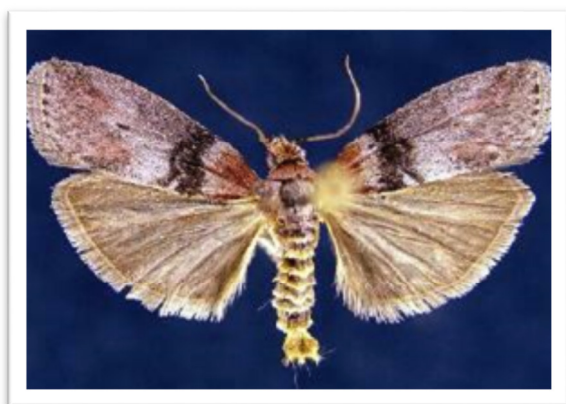
White-edged Snout Moth (*Pima fosterella*) is a rare species that is known from only two other localities in Alberta. The other two localities are from Jasper, 7 km NE of at the Maligne Canyon hostel and at Jenner, 10 km N of, rodeo grounds. The lone WOS specimen was collected on June 23, 2012 in a UV light trap. Despite there being only three localities is likely that species is much more common in the province.

Figure 9. *Pima fosterella* (photo by Jim Vargo, Moth Photographers Group).



Smear White Snout Moth (*Interjectio niviella*) - is an uncommon species that is known from only three other localities in Alberta. The other localities are Trochu, Canada: Alberta, Lowden Springs Conservation Area and Nordegg. The two WOS specimens were collected on June 23, 2012 in a UV light trap. There is nothing known about the life history of this species other than it is most commonly found in the grassland natural regions of Alberta (Pohl et al. 2010).

Figure 10. *Interjectio niviella* (photo by Jim Vargo, Moth Photographers Group).



Leadplant Snout Moth (*Sciota rubescentella*) is a rare moth that is known from only two other localities in Alberta. The other localities are Onefour, Bindloss and the Pinhorn Provincial Grazing Reserve. The lone WOS specimens were hand collected on July 21, 2012 at a MV light sheet trap. According to Harrison (2011) this species is known to feed on Leadplant (*Amorpha canescens*), a plant species currently not confirmed in the park.

Figure 11. *Sciota rubescentella* (photo by Jim Vargo, Moth Photographers Group).

Spotted Thyris Moth (*Thyris maculata*) is a rare species that is known from only three localities in Alberta. The other two localities are Dinosaur Provincial Park and Medicine Hat. Amazingly, several specimens were collected in a Sessidae pheromone trap hanging in willows along the Milk River between June 23 and 25, 2012. The larvae of this species are suspected to feed on Larvae feed on *Clematis* and *Houstonia* species (Covell 2005) with Western Clematis (*Clematis ligusticifolia*) that is found in the WOS (Wildlands Ecological Consulting Ltd. 2004) being the likely host. I suspect this diurnal micromoth is quite common in the park but is often overlooked due to its tiny size of 12 millimeters.



Figure 12. *Thyris maculata* (photo by Ashley Bradford, Moth Photographers Group).

Green Broomweed Looper Moth (*Fernaldella fimetaria*) is a rare species that is known from only three other localities in Alberta. The other localities are Dinosaur Provincial Park, Lost River Valley west of Onefour and Medicine Hat. The lone WOS specimen was collected on June 28, 2000 in a UV light trap by Gary Anweiler and Jim Troubridge. According to Ferguson (2008), the larvae of this species feed on Broomweed (*Gutierrezia sarothrae*) that is found in the badland and shrub land regions of the park (Wildlands Ecological Consulting Ltd. 2004).



Figure 13. *Narraga fimetaria* (photo by Gary Anweiler, University of Alberta Strickland Museum).



Figure 14. *Orthonama centrostrigaria* (photo by Jim Troubridge, Canadian National Collection).

Bent-line Carpet Moth (*Orthonama centrostrigaria*) is a rare species that is only known from this park. The lone specimen was collected by at an MV sheet trap on June 24, 2012. Larvae are known to feed on *Polygonum* species (knotweed, smartweed). In WOS, the likely host is Water Smartweed (*Polygonum amphibium*) that is found in the park (Wildlands Ecological Consulting Ltd. 2004).



Figure 15. *Catocala junctura* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Joined Underwing Moth (*Catocala junctura*) is a rare species that is only known from one other location in Alberta. This species is found in the riparian woodlands of Taber Municipal Park and WOS. The species was found twice, the first specimen was found in a bait trap on September 10th, 1999 and the other in a UV light trap on September 1st, 2002. The species is known to feed on willows (*Salix*) and poplars (*Populus*) as stated in Covell 2005 and Wagner (2011).

Lanceolate Dagger Moth (*Acronicta lanceolaria*) is a rare species that was previously known from only three other localities in Alberta. It is known from Edgerton dunes, Jenner Bridge, and the Oldman River badlands south of Vauxhall. The fifth population in WOS was discovered on



Figure 16. *Acronicta lanceolaria* (photo by Gary Anweiler, University of Alberta Strickland Museum).

June 24, 2012. It is a generalist though it is most likely feeding on either Large-tooth aspen (*Populus grandidenata*), willow (*Salix*) or cherry (*Prunus*) (Rockburne and Lafontaine 1996) in the park.

Friable Quaker Moth (*Apamea cariosa*) is another rare species that is known from only three



localities in Alberta. It is known from Lethbridge, Burstall, ~20 km W at S., Sask. Riv. and WOS. The lone specimen was collected by Gary Anweiler with a UV trap on June 28, 2000. It is a true prairie generalist that prefers grasses but it may also feed on dead leaf litter as stated in Mikkola et al. (2009).

Figure 17. *Apamea cariosa* (photo by Jim Troubridge, Canadian National Collection).

Spalding's Quaker Moth (*Apamea spaldingi*) is another rare species that is known from three



localities in Alberta. It is known from Olds, Jenner, and WOS. The lone specimen was collected by Gary Anweiler with a UV trap on June 15, 2000. This specimen was collected in the riparian zone of the park.

Figure 18. *Apamea spaldingi* (photo by Gary Anweiler, University of Alberta Strickland Museum).



Burgess' Quaker Moth (*Apamea burgessi leucoptera*) is another rare species that is known in Canada from three Alberta localities. The specimens are known from Writing-On-Stone Provincial Park, Lethbridge, and Taber Municipal Park. The immature stages of this species are unknown.

Figure 19. *Apamea burgessi* (photo by Jim Troubridge, Canadian National Collection).



Tonsa Brocade (*Neoligia tonsa*) is rare species that is known from three localities in Alberta. The specimens are known from Hailstone Butte and the foothills near Calgary (head of Pine Creek) and Writing-On-Stone Provincial Park. The lone specimen was collected by Gary Anweiler with a UV trap on September 2, 2009 in the riparian zone of the park.

Figure 20. *Neoligia tonsa* (photo by Jim Troubridge, Canadian National Collection).

Stonewall Quaker Moth (*Oligia rampartensis*) is rare species that is known from two localities in Alberta. The localities documented are from Banff and Writing-On-Stone Provincial Park. The lone WOS specimen was collected by Gary Anweiler with a UV trap on September 1-4, 2002. The host of this species is rushes (*Juncus* sp.) that are found in wet areas of the park in the riparian zone.



Figure 21. *Oligia rampartensis* (photo by Gary Anweiler, University of Alberta Strickland Museum).



Alyssa Minor Moth (*Photedes didonea*) is a rare species that is only known in Canada from Alberta. The two localities for this moth are Lethbridge and Writing-On-Stone Provincial Park. The biology of this species is unknown but it is suspected to be a borer of the stems of coarse marsh grasses (Poaceae).

Figure 22. *Photedes didonea* (photo by Jim Vargo, Moth Photographers Group).

Western Yellow-striped Armyworm (*Spodoptera praefica*) is a rare species that is only known from two localities in the dry grasslands region of southern Alberta. This species is found in both Medicine Hat and Writing-On-Stone Provincial Park. In WOS several specimens were found in late summer, from September 1

-9 by Gary Anweiler and were collected in UV light traps. This species is considered a generalist and in some regions, especially the United States it can be a pest of alfalfa forage crops.

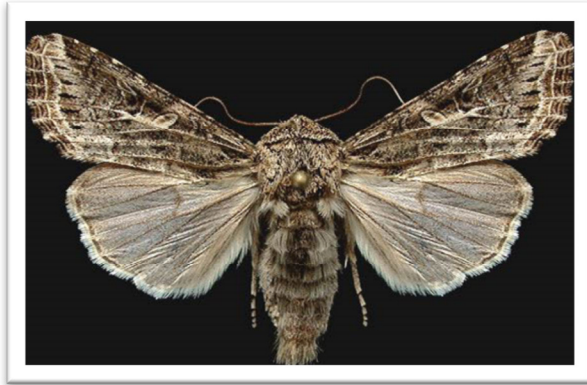
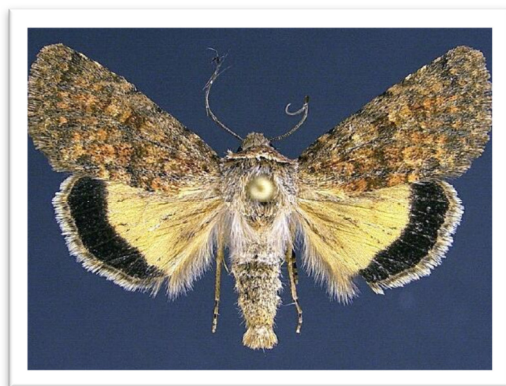


Figure 23. *Spodoptera praefica* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Fine-lined Sallow Moth (*Catabena lineolata*) is a rare moth known from four localities in Alberta. It is found north of Bow Island on South Saskatchewan River Taber Municipal Park, Sandy Point Campground on the South Saskatchewan River and Writing-On-Stone Provincial Park. The lone WOS specimen was collected on June 28, 2000 by Jim Troubridge in a UV trap in the riparian region of the park. The host of this species is goldenrod (*Solidago* sp.) and Hoary Vervain (*Verbena stricta*).



Figure 24. *Catabena lineolata* (photo by Jim Vargo, Moth Photographers Group).



Queen Sallow Moth (*Sympistis regina*) is a rare moth known from four localities in Alberta. It is found in the South Saskatchewan River Valley at the Old Bindloss Ferry Crossing, the Pinhorn Grazing Reserve, Dinosaur PP, Red Deer River Valley near Empress and Writing-On-Stone Provincial Park. The lone WOS specimen was collected on September 2, 2009 by Gary Anweiler in a UV trap in the riparian region of the park. Its biology is unknown though it is suspected to feed on (*Penstemon* spp.) in the Scrophulariaceae family

Figure 25. *Sympistis regina* (photo by Jim Vargo, Moth Photographers Group).

Harrow Sallow Moth (*Sympistis occata*) is a rare moth known from three localities in Alberta.



It is found in Medicine Hat, Lost River Valley near Onefour and Writing-On-Stone Provincial. The lone WOS specimen was collected on September 2, 2009 by Gary Anweiler in a UV trap in the riparian region of the park. Its biology is unknown.

Figure 26. *Sympistis occata* (photo by Jim Vargo, Moth Photographers Group).

Brown Arches Moth (*Lacinipolia stricta*) is rarely found in Alberta. There are three localities



for this species known, Olds, Taber Municipal Park and Writing-On-Stone Provincial Park. The two specimens in WOS were found on September 9, 1999 and September s, 2009 and collected in UV traps. Both were found in the riparian region of the park where it likely feeds on herbaceous plants. In some areas of North America this species can be a minor pest in agricultural crops such as lettuce, strawberry, and peppermint.

Figure 27. *Lacinipolia stricta* (photo by Jim Vargo, Moth photographers Group).

Collared Arches Moth (*Lacinipolia strigicollis*) is a rare moth known from two localities in Alberta. It is found in Medicine Hat and Writing-On-Stone Provincial Park. The lone WOS



specimen was collected on July 14, 1995 by Jim Troubridge. It is a cutworm who feeds on herbaceous low growing plants in the Asteraceae and Fabaceae families.

Figure 28. *Lacinipolia strigicollis* (photo by Jim Vargo, Moth Photographers Group).



Figure 29. *Ulolonche disticha* (photo by Jim Vargo, Moth Photographers Group).

Ulolonche disticha is a rare moth only known in Canada from Writing-On-Stone Provincial Park. The specimens were all found on June 28, 2000 in a UV trap by Gary Anweiler and Jim Troubridge, and a lone specimen on June 23, 2012. Its biology is unknown.

Rustic Quaker Moth (*Orthodes majuscula*) is a rare moth known from four localities in Alberta. It is found in Taber Municipal Park, Sandy Point Campground on the South Saskatchewan River at Highway 41, Lost River Valley near Onefour and Writing-On-Stone Provincial Park. Several WOS specimens were collected in late June. The larvae are generalists and have been recorded feeding on dandelion, plantain, grasses, and willow.

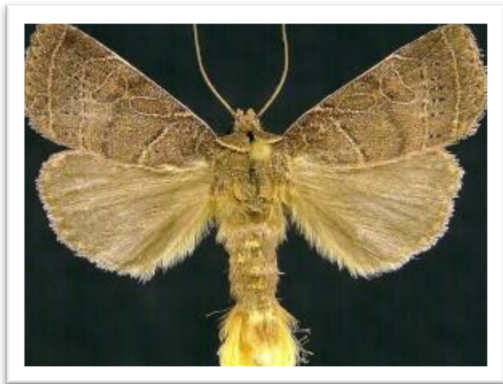


Figure 30. *Orthodes majuscula* (photo by Jim Vargo, Moth Photographers Group).



Figure 31. *Euxoa nostra* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Our Cutworm Moth (*Euxoa nostra*) is a rare species that is only known from Writing-On-Stone Provincial Park. The lone specimen was collected by Gary Anweiler and Jim Troubridge in a UV light trap on June 28, 2000. It was found in the sandy prairie sandstone badlands region of the park though nothing is known of its life history.

Scarred Cutworm Moth (*Euxoa cicatricosa*) is a rare moth known from three localities in Alberta. It is found in Medicine Hat, Old Bindloss Ferry Crossing, and Writing-On-Stone Provincial Park. In WOS several specimens were found in late summer from September 1st to 9th by Gary Anweiler. Nothing is known of this species biology other than it appears to flourish in dry southern Alberta river valleys.



Figure 32. *Euxoa cicatricosa* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Badland Cutworm Moth (*Euxoa dodi*) is a rare moth known from three localities in Alberta. It is found in Dinosaur Provincial Park, Lethbridge and Writing-On-Stone Provincial Park. The lone WOS specimen was collected on August 14th, 2001 by Gary Anweiler and Jim Troubridge in a UV light trap. Nothing is known of this species biology other than it prefers the dry grasslands of the badlands.



Figure 33. *Euxoa dodi* (photo by Jim Troubridge, Canadian National Collection).

Wandering Cutworm Moth (*Euxoa aberrans*) is a rare moth known from two localities in Alberta. It is found in the Lost River Valley near Onefour and Writing-On-Stone Provincial Park. This species was recorded twice in WOS, both by Jim Troubridge. The first record was on July 14, 1995 and the second on June 28th, 2000 Nothing is known about the biology of this species.



Figure 34. *Euxoa aberrans* (photo by Jim Troubridge, Canadian National Collection).

Roving Dart Moth (*Abagrotis erratica*) is a rare moth known only from Writing-On-Stone Provincial Park. The three records from WOS were discovered by Gary Anweiler on a trip during August 12 to the 13th. One was captured at bait while the others in a UV light trap. Larvae have been recorded to feed on hardwoods such as willows (Lafontaine 1998).



Figure 35. *Abagrotis erratica* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Pale-edged Dart Moth (*Abagrotis vittifrons*) is a rare moth known from three localities in Alberta. It is found in Sandy Point Campground on the South Saskatchewan River at Highway 41, Lost River Valley near Onefour and Writing-On-Stone Provincial Park. The lone WOS specimen was collected on September 10th, 1999 by Gary Anweiler and Jim Troubridge in a bait trap. This species is suspected to feed on big sagebrush (*Artemisia tridentata*). Although big sagebrush is not found in the park, silver sagebrush (*Artemisia cana*), a potential host plant, is found on many steeper banks in the park according to Wildlands Ecological Consulting Ltd. 2004 report.



Figure 36. *Abagrotis vittifrons* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Variegated Dart Moth (*Abagrotis variata*) is a rare moth known from three localities in Alberta. It is found in Olds, Dinosaur Provincial Park and Writing-On-Stone Provincial Park. The lone WOS specimens were collected in late June and early August in both bait and UV light traps by Gary Anweiler and Jim Troubridge. It is a hardwood generalist that has been recorded feeding on willows, cherries, and serviceberry.



Figure 37. *Abagrotis variata* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Greasewood Dart Moth (*Abagrotis discoidalis*) is a rare moth known from three localities in Alberta. It is found in Dinosaur Provincial Park, Pakowki Lake dunes and Writing-On-Stone



Figure 38. *Abagrotis discoidalis* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Provincial Park. The lone WOS specimens were collected in late June in UV light traps by Gary Anweiler and Jim Troubridge. The larval host is greasewood (*Sarcobatus vermiculatus*) (Lafontaine 1998) that is found in the park (Wildlands Ecological Consulting Ltd. 2004).

Sagebrush Dart Moth (*Abagrotis duanca*) is a rare moth known from three localities in Alberta. It is found in Hailstone Butte, Pakowki Lake dunes and Writing-On-Stone Provincial Park. The two WOS specimens were collected on June 28th, 200 in UV light traps by Gary Anweiler and



Figure 39. *Abagrotis duanca* (photo by Gary Anweiler, University of Alberta Strickland Museum).

Jim Troubridge. The larval host is sagebrush (*Artemisia tridentata*) (Lafontaine 1998). Although big sagebrush is not found in the park, silver sagebrush (*Artemisia cana*), a potential host plant, is found on many of the slopes in the park according to Wildlands Ecological Consulting Ltd. 2004 report.

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7.0 APPENDICES

Appendix 1. Writing on Stone Provincial Park Species List

(Last updated January 10th, 2016)

#	Scarcity	S-Ranking	MONA#	Family	Species
1	R	S4	29.00	Hepialidae	<i>Gazoryctra noviganna</i>
2	C	S4	987.00	Elachistidae	<i>Ethmia monticola</i>
3	C	S4	2371.00	Ypsolophidae	<i>Ypsolopha canariella</i>
4	C	S4	2543.00	Sesiidae	<i>Sesia tibiale</i>
5	C	S4	2693.00	Cossidae	<i>Prionoxystus robiniae</i>
6	C	S4	3870.00	Hesperiidae	<i>Epargyreus clarus</i>
7	C	S4	3960.00	Hesperiidae	<i>Erynnis afranius</i>
8	C	S2	4054.00	Hesperiidae	<i>Ochlodes sylvanoides</i>
9	R	S1	4094.00	Hesperiidae	<i>Amblyscirtes oslari</i>
10	R	S3	4171.00	Papilionidae	<i>Papilio multicaudatus</i>
11	A	S5	4194.00	Pieridae	<i>Pontia o. occidentalis</i>
12	A	SNA	4197.00	Pieridae	<i>Pieris rapae</i>
13	U	S3	4257.00	Lycaenidae	<i>Lycaena rubidus sirius</i>
14	C	S4	4280.10	Lycaenidae	<i>Satyrium titus immaculosus</i>
15	A	S5	4375.00	Lycaenidae	<i>Lycaeides melissa</i>
16	U	S3	4380.00	Lycaenidae	<i>Aricia lupini</i>
17	C	SNA	4447.00	Nymphalidae	<i>Euptoieta claudia</i>
18	C	S4	4451.00	Nymphalidae	<i>Speyeria aphrodite ethne</i>
19	A	S5	4457.00	Nymphalidae	<i>Speyeria callippe calgariana</i>
20	C	S4	4481.00	Nymphalidae	<i>Phyciodes tharos orantain</i>
21	C	S4	4522.00	Nymphalidae	<i>Limenitis arthemis rubrofasciata</i>
22	C	S4	4523.00	Nymphalidae	<i>Limenitis archippus</i>
23	R	S1	4524.00	Nymphalidae	<i>Limenitis weidemeyerii oberfoelli</i>
24	A	S5	4582.00	Nymphalidae	<i>Coenonympha tullia</i>
25	U	S3?	4614.00	Nymphalidae	<i>Danaus plexippus</i>
26	C	S4	4826.00	Crambidae	<i>Mimoschinia rufofascialis</i>
27	C	S4	4904.00	Crambidae	<i>Evergestis simulatilis</i>
28	R	S1	4906.00	Crambidae	<i>Evergestis vinctalis</i>
29	C	S4	4951.00	Crambidae	<i>Perispasta caeculalis</i>
30	C	S4	4987.00	Crambidae	<i>Sitochroa chortalis</i>
31	A	S5	5004.00	Crambidae	<i>Loxostege sticticalis</i>
32	C	S4	5068.00	Crambidae	<i>Pyrausta unifascialis</i>
33	C	S4	5156.00	Crambidae	<i>Nomophila nearctica</i>
34	A	S5	5391.00	Crambidae	<i>Chrysoteuchia topiarius</i>
35	A	S5	5413.00	Crambidae	<i>Pediasia trisecta</i>
36	C	S4	5455.00	Crambidae	<i>Euchromius californicalis</i>

37	U	S3	5585.00	Crambidae	<i>Toripalpus trabalis</i>
38	C	S1	5619.00	Pyralidae	<i>Pococera baptisiella</i>
39	C	S4	5655.00	Pyralidae	<i>Acrobasis tricolorella</i>
#	Scarcity	S-Ranking	MONA#	Family	Species
40	R	S3	5748.00	Pyralidae	<i>Pima fosterella</i>
41	R	S2	5758.00	Pyralidae	<i>Interjectio niviella</i>
42	C	S4	5759.00	Pyralidae	<i>Ambesa laetella</i>
43	R	S1	5791.00	Pyralidae	<i>Sciota rubescentella</i>
44	U	S3	5792.00	Pyralidae	<i>Sciota fernaldi</i>
45	U	S3	5917.00	Pyralidae	<i>Staudingeria albipenella</i>
46	U	S3	6053.00	Pyralidae	<i>Peoria approximella</i>
47	R	S2	6076.00	Thyrididae	<i>Thyris maculata</i>
48	U	S3	6137.00	Pterophoridae	<i>Paraplatyptilia maea</i>
49	U	S3	6140.00	Pterophoridae	<i>Paraplatyptilia modestus</i>
50	C	S4	6237.00	Drepanidae	<i>Pseudothyatira cymatophoroides</i>
51	C	S4	6248.00	Drepanidae	<i>Ceranemota albertae</i>
52	C	S4	6283.00	Geometridae	<i>Speranza sulphurea</i>
53	C	S4	6304.00	Geometridae	<i>Speranza bitactata</i>
54	U	S3	6370.00	Geometridae	<i>Digrammia curvata</i>
55	C	S4	6373.00	Geometridae	<i>Digrammia denticulata</i>
56	C	S4	6380.00	Geometridae	<i>Digrammia californiaria</i>
57	C	S4	6396.00	Geometridae	<i>Digrammia neptaria</i>
58	C	S4	6399.00	Geometridae	<i>Digrammia subminiata</i>
59	R	SNR	6420.00	Geometridae	<i>Fernaldella fimetaria</i>
60	C	S4	6431.00	Geometridae	<i>Hesperumia sulphuraria</i>
61	C	S4	6651.00	Geometridae	<i>Lycia ursaria</i>
62	C	S4	6654.00	Geometridae	<i>Hypagyrtis unipunctata</i>
63	C	S4	6729.00	Geometridae	<i>Euchlaena johnsonaria</i>
64	C	S4	6731.00	Geometridae	<i>Euchlaena madusaria</i>
65	C	S4	6737.00	Geometridae	<i>Euchlaena tigrinaria</i>
66	C	S4	6753.00	Geometridae	<i>Pero honestaria</i>
67	C	S4	6755.00	Geometridae	<i>Pero morrisonaria</i>
68	C	S4	6797.00	Geometridae	<i>Ennomos magnaria</i>
69	C	S4	6817.00	Geometridae	<i>Selenia alciphearia</i>
70	C	S4	6838.00	Geometridae	<i>Probole amicaria</i>
71	C	S4	6964.00	Geometridae	<i>Tetracis cachexiata</i>
72	C	S4	6982.00	Geometridae	<i>Prochoerodes lineola</i>
73	A	S5	7164.00	Geometridae	<i>Scopula junctaria</i>
74	A	S5	7169.00	Geometridae	<i>Scopula inductata</i>
75	C	S4	7172.00	Geometridae	<i>Scopula sentinaria</i>
76	U	S3	7180.00	Geometridae	<i>Leptostales ferruminaria</i>
77	C	S4	7199.00	Geometridae	<i>Eulithis propulsata</i>

78	A	S5	7408.00	Geometridae	<i>Zenopheps alpinata</i>
79	R	S1	7416.00	Geometridae	<i>Orthonama centrostrigaria</i>
80	A	S5	7445.00	Geometridae	<i>Horisme intestinata</i>
81	C	S4	7446.00	Geometridae	<i>Horisme incana</i>
82	A	S5	7687.00	Lasiocampidae	<i>Phyllodesma americana</i>
83	C	S4	7757.00	Saturniidae	<i>Antheraea polyphemus</i>
#	Scarcity	S-Ranking	MONA#	Family	Species
84	C	S4	7787.00	Sphingidae	<i>Ceratomia undulosa</i>
85	A	S5	7803.00	Sphingidae	<i>Sphinx vashti</i>
86	A	S5	7822.00	Sphingidae	<i>Smerinthus cerisyi</i>
87	A	S5	7825.00	Sphingidae	<i>Paonias myops</i>
88	C	S4	7829.00	Sphingidae	<i>Pachysphinx occidentalis</i>
89	U	SNA	7892.00	Sphingidae	<i>Hyles euphorbiae</i>
90	C	S4	7893.00	Sphingidae	<i>Hyles gallii</i>
91	A	S5	7931.00	Notodontidae	<i>Gluphisia septentrionis</i>
92	C	S4	7937.00	Notodontidae	<i>Furcula cinerea</i>
93	A	S5	7940.00	Notodontidae	<i>Furcula scolopendrina</i>
94	U	S3	7957.00	Notodontidae	<i>Dasylophia anguina</i>
95	A	S5	8007.00	Notodontidae	<i>Schizura unicornis</i>
96	C	S4	8043.00	Erebidae	<i>Eilema bicolor</i>
97	A	S5	8051.00	Erebidae	<i>Crambidia casta</i>
98	C	S4	8089.00	Erebidae	<i>Hypoprepia miniata</i>
99	C	S4	8131.00	Erebidae	<i>Estigmene acrea</i>
100	C	S4	8137.00	Erebidae	<i>Spilosoma virginica</i>
101	C	S4	8140.00	Erebidae	<i>Hyphantria cunea</i>
102	C	S4	8144.00	Erebidae	<i>Hypercompe permaculata</i>
103	C	S4	8179.00	Erebidae	<i>Grammia nevadensis gibsoni</i>
104	C	S4	8185.00	Erebidae	<i>Grammia blakei</i>
105	A	S5	8186.00	Erebidae	<i>Grammia williamsii</i>
106	C	S4	8231.00	Erebidae	<i>Cycnia oregonensis</i>
107	C	S4	8294.00	Erebidae	<i>Dasychira vagans</i>
108	C	S4	8322.00	Erebidae	<i>Idia americalis</i>
109	C	S4	8323.00	Erebidae	<i>Idia aemula</i>
110	C	S4	8370.00	Erebidae	<i>Bleptina caradrinalis</i>
111	C	S4	8607.00	Erebidae	<i>Melipotis jucunda</i>
112	U	S3	8628.00	Erebidae	<i>Drasteria pallescens</i>
113	C	S4	8631.00	Erebidae	<i>Drasteria petricola athabascaae</i>
114	C	S4	8632.00	Erebidae	<i>Drasteria hudsonica heathi</i>
115	C	S4	8635.00	Erebidae	<i>Drasteria perplexa</i>
116	C	S4	8697.00	Erebidae	<i>Zale minerea</i>
117	A	S5	8731.00	Erebidae	<i>Euclidia cuspeida</i>
118	A	S5	8738.00	Erebidae	<i>Caenurgina crassiuscula</i>

119	C	S4	8739.00	Erebidae	<i>Caenurgina erechtea</i>
120	A	S5	8805.00	Erebidae	<i>Catocala unijuga</i>
121	C	S4	8806.00	Erebidae	<i>Catocala parta</i>
122	U	S3	8808.00	Erebidae	<i>Catocala luciana</i>
123	C	S4	8812.00	Erebidae	<i>Catocala hermia</i>
124	A	S5	8817.00	Erebidae	<i>Catocala briseis</i>
125	A	S5	8821.00	Erebidae	<i>Catocala semirelict</i>
126	U	S3S4	8822.00	Erebidae	<i>Catocala meskei</i>
127	R	S3	8829.00	Erebidae	<i>Catocala junctura</i>
#	Scarcity	S-Ranking	MONA#	Family	Species
128	U	S3?	8865.00	Erebidae	<i>Catocala praeclara</i>
129	C	S4	8881.00	Noctuidae	<i>Abrostola urentis</i>
130	A	S5	8914.00	Noctuidae	<i>Autographa californica</i>
131	C	S4	8919.00	Noctuidae	<i>Autographa mappa</i>
132	C	S4	8923.00	Noctuidae	<i>Autographa ampla</i>
133	A	S5	8924.00	Noctuidae	<i>Anagrapha falcifera</i>
134	C	S4	8926.00	Noctuidae	<i>Syngrapha octoscripta</i>
135	U	S3	8955.00	Euteliidae	<i>Marathyssa inficita</i>
136	C	S4	9053.00	Noctuidae	<i>Pseudeustrotia carneola</i>
137	U	S3	9066.00	Noctuidae	<i>Leuconycta lepidula</i>
138	C	S4	9085.00	Noctuidae	<i>Ponometia semiflava</i>
139	C	S4	9101.00	Noctuidae	<i>Tarachidia tortricina fumata</i>
140	C	S4	9109.00	Noctuidae	<i>Ponometia elegantula</i>
141	C	S4	9111.00	Noctuidae	<i>Tarache augustipennis</i>
142	C	S4	9193.00	Noctuidae	<i>Raphia frater coloradensis</i>
143	C	S4	9203.00	Noctuidae	<i>Acronicta dactylina</i>
144	C	S4	9205.00	Noctuidae	<i>Acronicta lepusculina</i>
145	U	S3	9218.00	Noctuidae	<i>Acronicta mansueta</i>
146	C	S4	9257.00	Noctuidae	<i>Acronicta impleta</i>
147	R	S2	9274.00	Noctuidae	<i>Acronicta lanceolaria</i>
148	R	S2	9329.00	Noctuidae	<i>Apamea cariosa</i>
149	C	S4	9333.00	Noctuidae	<i>Apamea lignicolora</i>
150	C	S4	9339.10	Noctuidae	<i>Apamea sora</i>
151	U	S3	9346.00	Noctuidae	<i>Apamea occidens</i>
152	A	S5	9348.00	Noctuidae	<i>Apamea amputatrix</i>
153	C	S4	9353.00	Noctuidae	<i>Apamea inordinata</i>
154	R	S2	9356.00	Noctuidae	<i>Apamea spaldingi</i>
155	C	S4	9359.00	Noctuidae	<i>Apamea commoda</i>
156	C	S4	9364.00	Noctuidae	<i>Apamea sordens finitima</i>
157	C	S4	9365.00	Noctuidae	<i>Apamea scoparia</i>
158	C	S4	9369.00	Noctuidae	<i>Apamea inficita</i>
159	R	S2	9378.00	Noctuidae	<i>Apamea burgessi lecoptera</i>

160	C	S4	9383.00	Noctuidae	<i>Apamea longula</i>
161	C	S4	9406.00	Noctuidae	<i>Mesapamea fractilinea</i>
162	C	S4	9412.00	Noctuidae	<i>Neoligia subjuncta</i>
163	R	S2	9413.00	Noctuidae	<i>Neoligia tonsa</i>
164	R	S1	9414.10	Noctuidae	<i>Oligia rampartensis</i>
165	C	S4	9419.00	Noctuidae	<i>Platypolia mactata</i>
166	R	S1	9432.00	Noctuidae	<i>Photedes didonea</i>
167	C	S4	9440.00	Noctuidae	<i>Hypocoena rufostrigata</i>
168	C	S4	9453.00	Noctuidae	<i>Celaena reniformis</i>
169	C	S4	9525.00	Noctuidae	<i>Bellura obliqua</i>
170	C	S4	9543.00	Noctuidae	<i>Aseptis characta</i>
171	C	S4	9581.00	Noctuidae	<i>Hyppa indistincta</i>
#	Scarcity	S-Ranking	MONA#	Family	Species
172	U	S3	9626.00	Noctuidae	<i>Trachea delicata</i>
173	U	S3	9640.00	Noctuidae	<i>Amphipyra glabella</i>
174	C	S4	9647.00	Noctuidae	<i>Proxenus miranda</i>
175	C	S4	9649.00	Noctuidae	<i>Proxenus mendosa</i>
176	U	S3	9654.00	Noctuidae	<i>Platyperigea meralis</i>
177	C	S4	9656.00	Noctuidae	<i>Caradrina montana</i>
178	R	S2	9667.00	Noctuidae	<i>Spodoptera praefica</i>
179	C	S4	9682.20	Noctuidae	<i>Elaphria alapallida</i>
180	U	S3	9826.00	Noctuidae	<i>Acopa perpallida</i>
181	C	S4	9832.00	Noctuidae	<i>Escaria homogena</i>
182	U	S3	9841.00	Noctuidae	<i>Afotella cylindrica</i>
183	C	S4	9873.00	Noctuidae	<i>Xylena nupera</i>
184	C	S4	9917.00	Noctuidae	<i>Lithophane fagina</i>
185	C	S4	9935.00	Noctuidae	<i>Eupsilia tristigmata</i>
186	C	S4	9952.00	Noctuidae	<i>Eucirroedia pampina</i>
187	C	S4	9957.00	Noctuidae	<i>Sunira bicolorago</i>
188	C	S4	9960.00	Noctuidae	<i>Agrochola verberata</i>
189	C	S4	9962.00	Noctuidae	<i>Anathix puta</i>
190	C	S4	9963.00	Noctuidae	<i>Anathix aggressa</i>
191	R	S2	10033.00	Noctuidae	<i>Catabena lineolata</i>
192	C	S4	10062.00	Noctuidae	<i>Sympistis stabilis</i>
193	C	S4	10066.10	Noctuidae	<i>Sympistis dinalda</i>
194	C	S4	10067.00	Noctuidae	<i>Sympistis chionanthi</i>
195	R	S2	10073.00	Noctuidae	<i>Sympistis regina</i>
196	R	S2	10101.00	Noctuidae	<i>Sympistis occata</i>
197	C	S4	10124.00	Noctuidae	<i>Sympistis cibalis</i>
198	C	S4	10130.20	Noctuidae	<i>Sympistis pallidior</i>
199	U	S2	10135.70	Noctuidae	<i>Sympistis chons</i>
200	U	S3	10140.00	Noctuidae	<i>Sympistis chandleri</i>

201	C	S4	10143.00	Noctuidae	<i>Sympistis mackiei</i>
202	C	S4	10190.00	Noctuidae	<i>Cucullia speyeri</i>
203	C	S4	10194.00	Noctuidae	<i>Cucullia intermedia</i>
204	U	S3	10201.00	Noctuidae	<i>Cucullia montanae</i>
205	C	S4	10205.00	Noctuidae	<i>Cucullia luna</i>
206	U	S3	10206.00	Noctuidae	<i>Cucullia antipoda</i>
207	U	S3	10221.00	Noctuidae	<i>Hadenella pergentilis</i>
208	C	S4	10223.00	Noctuidae	<i>Anarta trifolii</i>
209	C	S4	10224.00	Noctuidae	<i>Anarta mutata</i>
210	C	S4	10226.00	Noctuidae	<i>Anarta inconcinna</i>
211	C	S4	10232.00	Noctuidae	<i>Anarta farnhami</i>
212	C	S4	10233.00	Noctuidae	<i>Anarta crotchi</i>
213	C	S4	10238.00	Noctuidae	<i>Scotogramma submarina</i>
214	U	S3	10239.00	Noctuidae	<i>Scotogramma fervida</i>
215	U	S2	10259.00	Noctuidae	<i>Anarta decepta</i>
#	Scarcity	S-Ranking	MONA#	Family	Species
216	C	S4	10263.00	Noctuidae	<i>Sideridis artesta</i>
217	C	S4	10265.00	Noctuidae	<i>Sideridis rosea</i>
218	A	S5	10271.00	Noctuidae	<i>Mamestra configurata</i>
219	C	S4	10276.00	Noctuidae	<i>Polia imbrifera</i>
220	C	S4	10277.00	Noctuidae	<i>Polia rogenhoferi</i>
221	C	S4	10280.00	Noctuidae	<i>Polia purpurissata</i>
222	C	S4	10281.00	Noctuidae	<i>Polia nugatis</i>
223	C	S4	10288.00	Noctuidae	<i>Polia detracta</i>
224	C	S4	10289.00	Noctuidae	<i>Orthodes goodelli</i>
225	C	S4	10290.00	Noctuidae	<i>Polia obscura</i>
226	C	S4	10293.00	Noctuidae	<i>Melanchra picta</i>
227	C	S4	10296.00	Noctuidae	<i>Lacanobia nevadae</i>
228	C	S4	10297.00	Noctuidae	<i>Lacanobia atlantica</i>
229	C	S4	10299.00	Noctuidae	<i>Lacanobia subjuncta</i>
230	C	S4	10301.00	Noctuidae	<i>Spiramater lutra</i>
231	C	S4	10307.00	Noctuidae	<i>Trichordestra lilacina</i>
232	C	S4	10308.00	Noctuidae	<i>Trichordestra liquida</i>
233	C	S4	10322.00	Noctuidae	<i>Hadena circumvadis</i>
234	C	S4	10326.00	Noctuidae	<i>Hadena variolata</i>
235	C	S4	10368.00	Noctuidae	<i>Lacinipolia meditata</i>
236	C	S4	10370.00	Noctuidae	<i>Lacinipolia lustralis</i>
237	C	S4	10374.00	Noctuidae	<i>Lacinipolia longiclava</i>
238	C	S4	10394.00	Noctuidae	<i>Lacinipolia vicina</i>
239	U	S3	10395.00	Noctuidae	<i>Lacinipolia pensilis</i>
240	C	S4	10397.00	Noctuidae	<i>Lacinipolia renigera</i>
241	R	S3?	10398.00	Noctuidae	<i>Lacinipolia stricta</i>

242	C	S4	10405.00	Noctuidae	<i>Lacinipolia lorea</i>
243	C	S4	10406.00	Noctuidae	<i>Lacinipolia olivacea</i>
244	R	S2	10415.00	Noctuidae	<i>Lacinipolia strigicollis</i>
245	C	S4	10428.00	Noctuidae	<i>Dargida procinctus</i>
246	A	S5	10431.00	Noctuidae	<i>Faronta diffusa</i>
247	A	S5	10436.00	Noctuidae	<i>Mythimna oxygala</i>
248	C	S4	10438.00	Noctuidae	<i>Mythimna unipuncta</i>
249	C	S4	10442.00	Noctuidae	<i>Leucania anteoclara</i>
250	C	S4	10446.00	Noctuidae	<i>Leucania multilinea</i>
251	C	S4	10447.00	Noctuidae	<i>Leucania commoides</i>
252	C	S4	10449.00	Noctuidae	<i>Leucania insueta</i>
253	C	S4	10490.00	Noctuidae	<i>Orthosia revicta</i>
254	C	S4	10493.00	Noctuidae	<i>Orthosia segregata</i>
255	C	S4	10514.00	Noctuidae	<i>Egira rubrica</i>
256	C	S4	10523.00	Noctuidae	<i>Tholera americana</i>
257	C	S4	10524.00	Noctuidae	<i>Nephelodes minians</i>
258	C	S4	10530.00	Noctuidae	<i>Anhimella contrahens</i>
259	C	S4	10532.00	Noctuidae	<i>Homorthodes furfurata</i>
#	Scarcity	S-Ranking	MONA#	Family	Species
260	C	S4	10546.00	Noctuidae	<i>Protorthodes curtica</i>
261	C	S4	10552.00	Noctuidae	<i>Protorthodes incincta</i>
262	C	S4	10563.00	Noctuidae	<i>Protorthodes oviduca</i>
263	R	S1	10573.00	Noctuidae	<i>Ulolonche disticha</i>
264	R	S3	10585.00	Noctuidae	<i>Orthodes majuscula</i>
265	C	S4	10641.00	Noctuidae	<i>Agrotis vetusta</i>
266	C	S4	10645.00	Noctuidae	<i>Agrotis orthogonia</i>
267	C	S4	10651.00	Noctuidae	<i>Agrotis venerabilis</i>
268	C	S4	10660.00	Noctuidae	<i>Agrotis obliqua</i>
269	C	S4	10663.00	Noctuidae	<i>Agrotis ipsilon</i>
270	A	S5	10670.00	Noctuidae	<i>Feltia jaculifera</i>
271	C	S4	10676.00	Noctuidae	<i>Feltia herilis</i>
272	C	S4	10702.00	Noctuidae	<i>Euxoa divergens</i>
273	C	S4	10705.00	Noctuidae	<i>Euxoa messoria</i>
274	C	S4	10715.00	Noctuidae	<i>Euxoa scandens</i>
275	C	S4	10716.00	Noctuidae	<i>Euxoa aurulenta</i>
276	A	S5	10723.00	Noctuidae	<i>Euxoa tristicula</i>
277	C	S4	10727.00	Noctuidae	<i>Euxoa pleuritica</i>
278	C	S4	10728.00	Noctuidae	<i>Euxoa pestula</i>
279	C	S4	10730.00	Noctuidae	<i>Euxoa adumbrata</i>
280	A	S5	10731.00	Noctuidae	<i>Euxoa auxiliaris</i>
281	C	S4	10738.00	Noctuidae	<i>Euxoa mimallonis</i>
282	C	S4	10749.00	Noctuidae	<i>Euxoa intrita</i>

283	C	S4	10755.00	Noctuidae	<i>Euxoa declarata</i>
284	U	S3	10763.00	Noctuidae	<i>Euxoa spumata</i>
285	C	S4	10765.00	Noctuidae	<i>Euxoa pallipennis</i>
286	U	S3	10774.00	Noctuidae	<i>Euxoa mitis</i>
287	C	S4	10776.00	Noctuidae	<i>Euxoa aequalis acornis</i>
288	C	S4	10780.00	Noctuidae	<i>Euxoa comosa</i>
289	U	S3	10785.00	Noctuidae	<i>Euxoa infausta</i>
290	C	S4	10794.00	Noctuidae	<i>Euxoa setonia</i>
291	C	S4	10798.00	Noctuidae	<i>Euxoa basalis</i>
292	R	S1	10800.00	Noctuidae	<i>Euxoa nostra</i>
293	C	S4	10804.00	Noctuidae	<i>Euxoa plagigera</i>
294	C	S4	10805.00	Noctuidae	<i>Euxoa tessellata</i>
295	C	S4	10807.00	Noctuidae	<i>Euxoa albipennis</i>
296	U	S3	10809.00	Noctuidae	<i>Euxoa catenula</i>
297	U	S3	10811.00	Noctuidae	<i>Euxoa siccata</i>
298	U	S3	10813.00	Noctuidae	<i>Euxoa medialis</i>
299	C	S4	10817.00	Noctuidae	<i>Euxoa obeliscoides</i>
300	U	S3	10819.00	Noctuidae	<i>Euxoa choris</i>
301	C	S4	10825.10	Noctuidae	<i>Euxoa castanea</i>
302	U	S3?	10826.10	Noctuidae	<i>Euxoa furtivus</i>
303	U	S3	10829.00	Noctuidae	<i>Euxoa laetificans</i>
#	Scarcity	S-Ranking	MONA#	Family	Species
304	C	S4	10830.00	Noctuidae	<i>Euxoa quadridentata</i>
305	C	S4	10833.00	Noctuidae	<i>Euxoa olivalis</i>
306	C	S4	10834.00	Noctuidae	<i>Euxoa oblongistigma</i>
307	U	S3	10836.00	Noctuidae	<i>Euxoa dargo</i>
308	R	S2	10839.00	Noctuidae	<i>Euxoa cicatricosa</i>
309	U	S3	10842.00	Noctuidae	<i>Euxoa tronellus</i>
310	U	S3	10843.00	Noctuidae	<i>Euxoa teleboa</i>
311	U	S3	10845.00	Noctuidae	<i>Euxoa difformis</i>
312	R	S2	10849.00	Noctuidae	<i>Euxoa dodii</i>
313	C	S4	10852.00	Noctuidae	<i>Euxoa auripennis</i>
314	C	S4	10854.00	Noctuidae	<i>Euxoa servitus</i>
315	C	S4	10860.00	Noctuidae	<i>Euxoa perolivalis</i>
316	C	S4	10861.00	Noctuidae	<i>Euxoa ridingsiana</i>
317	R	S2	10862.00	Noctuidae	<i>Euxoa aberrans</i>
318	C	S4	10863.00	Noctuidae	<i>Euxoa manitobana</i>
319	C	S4	10864.00	Noctuidae	<i>Euxoa flavicollis</i>
320	C	S4	10893.00	Noctuidae	<i>Protogygia enalaga</i>
321	U	S3	10905.00	Noctuidae	<i>Anicla exuberans</i>
322	C	S4	10910.00	Noctuidae	<i>Anicla tepperi</i>
323	C	S4	10915.00	Noctuidae	<i>Peridroma saucia</i>

324	C	S4	10922.00	Noctuidae	<i>Diarsia freemani</i>
325	A	S5	10923.00	Noctuidae	<i>Actebia balanitis</i>
326	C	S4	10924.00	Noctuidae	<i>Actebia fennica</i>
327	C	S4	10925.10	Noctuidae	<i>Rhyacia clemens</i>
328	C	S4	10926.00	Noctuidae	<i>Spaelotis clandestina</i>
329	C	S4	10929.00	Noctuidae	<i>Eurois occulta</i>
330	C	S4	10942.00	Noctuidae	<i>Xestia c-nigrum</i>
331	C	S4	10954.00	Noctuidae	<i>Agnorisma bugrai</i>
332	C	S4	10962.00	Noctuidae	<i>Xestia perquiritata</i>
333	C	S4	10992.00	Noctuidae	<i>Paradiarsia littoralis</i>
334	C	S4	11003.00	Noctuidae	<i>Chersotis juncta</i>
335	C	S4	11003.10	Noctuidae	<i>Noctua pronuba</i>
336	C	S4	11004.00	Noctuidae	<i>Protolampra rufipectus</i>
337	C	S4	11006.00	Noctuidae	<i>Protolampra brunneicollis</i>
338	R	S1	11013.00	Noctuidae	<i>Abagrotis erratica</i>
339	R	S2	11016.00	Noctuidae	<i>Abagrotis vittifrons</i>
340	U	S3	11018.00	Noctuidae	<i>Abagrotis trigona</i>
341	C	S4	11027.00	Noctuidae	<i>Abagrotis orbis</i>
342	U	S3	11029.00	Noctuidae	<i>Abagrotis alternata</i>
343	C	S4	11030.10	Noctuidae	<i>Abagrotis hermina</i>
344	R	S2	11032.00	Noctuidae	<i>Abagrotis variata</i>
345	R	S2	11035.00	Noctuidae	<i>Abagrotis discoidalis</i>
346	U	S3S4	11038.00	Noctuidae	<i>Abagrotis nanalis</i>
347	R	S2	11039.00	Noctuidae	<i>Abagrotis duanca</i>
#	Scarcity	S-Ranking	MONA#	Family	Species
348	U	S3	11040.00	Noctuidae	<i>Abagrotis reedi</i>
349	U	S3S4	11043.00	Noctuidae	<i>Abagrotis cupida</i>
350	C	S4	11047.00	Noctuidae	<i>Parabagrotis exsertistigma</i>
351	C	S4	11048.10	Noctuidae	<i>Parabagrotis sulinaris</i>
352	C	S4	11072.00	Noctuidae	<i>Heliiothis phloxiphaga</i>
353	C	S4	11175.00	Noctuidae	<i>Schinia meadi</i>
354	C	S4	11192.00	Noctuidae	<i>Schinia cumatilis</i>