



Rare Invertebrates of the South Okanagan

*The endangered invertebrates
of the south Okanagan
are at risk because their
ecosystems are at risk.*





The diversity of invertebrates

There are many, many different kinds of terrestrial and freshwater invertebrates in British Columbia. If we went through all the reports and lists that have been published over the years, and peered through the museum drawers filled with specimens, we would be able to list 20 000 to 25 000 species. But when all the surveys are complete and all the specimens described and identified, the total species count will probably be about 40 000 to 50 000 – about 100 times the number of species of birds! Most of these invertebrates are arthropods – insects, spiders and their relatives – but molluscs, rotifers, tardigrades, and various worm phyla also contribute to the total.

This diversity of species translates into a diversity of essential ecosystem jobs that these invertebrates perform. Many insects, including bees, flies, butterflies and beetles, are key players in pollination. As a critical component of the food chain, invertebrates provide food for other animals. Earthworms and other soil-inhabiting creatures help to create productive soil. Many plants are dependent on fungal associations with their roots and invertebrates are important as dispersers of fungal spores. The many predacious and parasitic invertebrates are vital in the control of unwanted plants and other invertebrates that humans consider pests.

Perhaps 15 000 species of invertebrates live in the South Okanagan lowlands.

The diversity of invertebrate communities in the south Okanagan

We also don't know how many invertebrates can be found in the dry, warm lowlands of the south Okanagan and Similkameen valleys, but we can estimate that perhaps 15 000 species live there. Although many of these are common and widespread, some are confined to the dry grasslands of the southern Interior – and there are literally hundreds that are found nowhere else in the province. These are inhabitants of the Great Basin grasslands and wetlands, which extend only a few, narrow fingers north into Canada.

The shrub steppe

The hot, dry grasslands and shrublands that remain in the south Okanagan and Similkameen have an invertebrate fauna quite unlike that of the wetter, forested parts of the province. Sun-loving insects abound. Big, black darkling beetles clamber across the sandy soil; rotund, fuzzy bee flies with patterned wings hover everywhere; colourful and not-so-colourful butterflies visit spring flowers; grasshopper wings crackle in the hot air; bristly robber flies buzz menacingly by; and in the warm evenings, scorpions scramble out from under flat rocks and the songs of crickets fill the dark void.

The group of insects that probably symbolizes the hot shrub steppe the most, however, are the Hymenoptera – the bees, ants and wasps. An astounding number of wasps hunt across the sunny meadows, especially where sandy soil makes digging nesting burrows easy. Many species of several families of 'sand wasps' live here – some red and black with long and slender bodies and thread-like waists; some banded with yellow and black, resembling the (unrelated) yellowjacket wasps

that visit our picnics. Velvet ants are common, too. These are actually wasps with wingless females that look like big, red, furry ants as they scurry around looking for bee nests to lay their eggs in. Spider-hunting wasps are also common and diverse – the most striking of these is an unnervingly large, black species with fire-coloured wings, which hunts the big 'trapdoor' spiders of the grasslands.

Alkaline lakes

In some of the sagebrush basins lie lakes ringed white with drying carbonate and sulphate salts. These alkaline flats are home to another unique community of invertebrates. Tiny ground beetles and brilliantly coloured tiger beetles hunt in and around the mud cracks, and busy little shore bugs and great flocks of tiny shore flies move along the water's edge. Brine shrimp and specially adapted species of dragonflies, damselflies, beetles, and water boatmen bugs paddle and crawl through the clear water.

Wetlands and riparian woodlands

In the valley bottoms, dry grasslands give way abruptly to a narrow band of moist woodlands along the streams, marshes and lakes. These are home to all the diverse invertebrates of lush woods – shade-loving flies, moths, wood-boring beetles, and many others. In the warm, rich wetlands themselves are special communities of dragonflies, diving beetles, backswimmers, snails, mussels and clams.

Why are invertebrates at risk?

Despite our general ignorance of invertebrates, we can say that the endangered invertebrates of the south Okanagan and Similkameen valleys are threatened not by direct exploitation, but by loss or degradation of their habitats. They are at risk because their ecosystems are at risk.

The rich soils of the grasslands are a valuable agricultural resource, and have been ploughed and irrigated to produce tree fruits, grapes, and vegetables. Pesticide use has probably had a great impact on native insects living in and around agri-

Many species are restricted to ecosystems that are themselves endangered.

cultural areas. Heavy grazing has altered the plant composition of grasslands and has undoubtedly changed their invertebrate communities as well. Recreation use, especially off-road vehicle traffic, has also damaged grasslands. In the valley bottoms, streamside woodlands have been cleared and converted to hay meadows.

Humans continue to flock to this region to enjoy its fine climate and, as cities expand, wetlands are drained and filled, and the dry benchlands paved and developed into suburban subdivisions. In the early 1950s, the Okanagan River was channelized and dyked, altering forever the water flow and natural flooding regime that created the marshes and lush riparian woodlands along its course.

Today, only about 10 percent of the south Okanagan grasslands remain in a relatively natural state, and only about 15 percent of the valley's wetlands still exist. Protected areas and other areas managed for wildlife are few and cover less than 3 percent of the southern valleys. Most are concentrated around Vaseux Lake, where BC Environment, BC Parks, the Nature Trust of British Columbia, and the Canadian Wildlife Service all hold lands for the conservation of wetland, grassland, rocky bluff and dry forest ecosystems. The recently created South Okanagan Wildlife Management Area protects riverside

wetlands and dry uplands between Oliver and Osoyoos Lake. Only two tiny ecological reserves exist in the south Okanagan, one of which has burned completely, illustrating the need for a larger, more comprehensive conservation program in the valley.

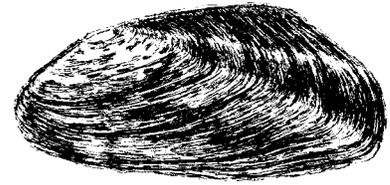
Various government agencies and public organizations have tackled this problem by forming the South Okanagan Conservation Strategy (SOCS). SOCS coordinates activities in research, land acquisition and habitat management.

Rare invertebrates in the south Okanagan and lower Similkameen

As of 1994, 23 invertebrates are known only from this small region in the world and an additional 75 occur nowhere else in Canada. As mentioned earlier, of course, our knowledge of invertebrate ranges and status is poor, and new, intensive surveys are needed to further clarify the status of many of these animals. A provin-

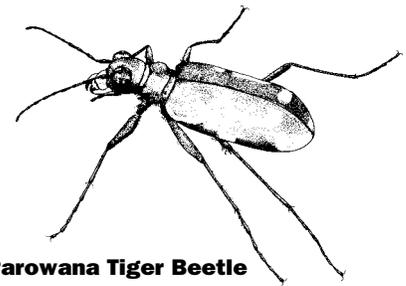
Twenty-three invertebrates are known only from this small region in the world.

cial report has named this area one of the two highest priority areas for such surveys. Despite our scanty knowledge, we can draw up lists of invertebrates that are almost assuredly threatened or endangered in these valleys. These are species that are relatively large and obvious but still rarely seen or collected, and that are restricted to ecosystems that are themselves endangered. From this sort of list, we have chosen ten representatives from different invertebrate groups and from a range of endangered habitats. Their stories follow.



Western Ridge Mussel
Gonidea angulata (Lea)

This freshwater mussel (Order Unionoida) is known in Canada only from the main, valley bottom water bodies from Penticton south. There have been few searches for it, and the only recent records are from the Okanagan River at Okanagan Falls, Vaseux Lake and Osoyoos Lake. The unionid mussels – the family that the western ridge mussel belongs to – are very sensitive to environmental changes and consequently have a high percentage of endangered species within their ranks throughout North America.

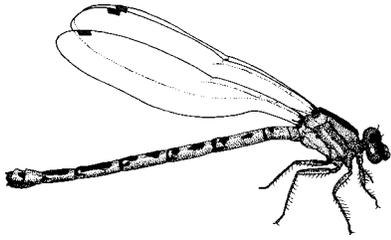


Parowana Tiger Beetle
Cicindela parowana Wick.

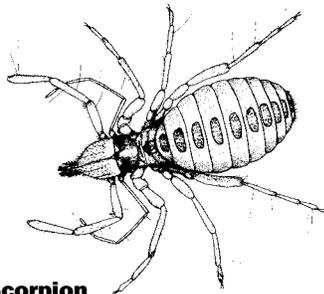
The Parowana Tiger Beetle (Order Coleoptera) dwells on alkaline flats where, as its name suggests, it ambushes and consumes other invertebrates. In Canada it is known only from Okanagan Falls, Oliver, and Penticton. It hasn't been seen recently in any of these areas, and the Penticton site has been destroyed by housing developments.

Vivid Dancer *Argia vivida Hagen*

In southern British Columbia, this lovely damselfly (Order Odonata) lives around spring-fed pools and streams in a very few, scattered localities, mostly associated with hot springs. Most of these habitats are vulnerable to development, and the damselfly populations are



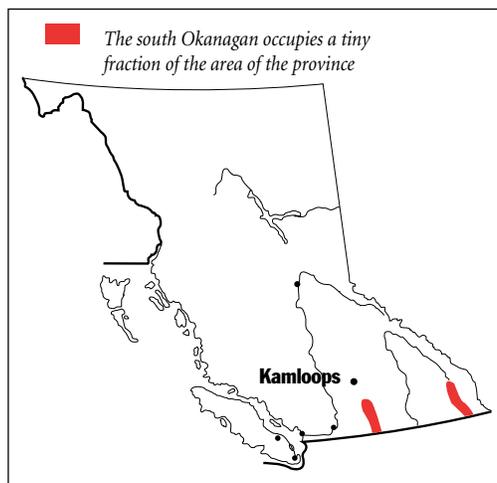
threatened. In the South Okanagan only two sites are known; both are small rangeland streams originating in cold springs, and both are disturbed by cattle or horses. The aquatic larvae cling to the undersides of stones and roots in the small, trickling streams and muddy pools. The adults rest on stones or bare earth nearby, or make low foraging flights after small insect prey. Females lay eggs in aquatic vegetation, often submerging themselves in the process. Meanwhile, the males protect their mates from the attentions of other males by retaining their mating hold on the female's thorax and standing stiffly at attention.



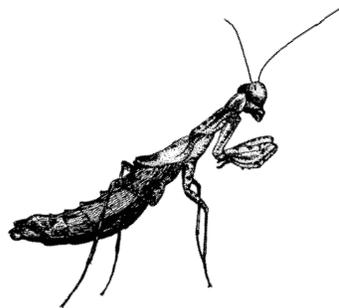
Sun Scorpion

***Eremobates gladiolus* Muma**

Sun scorpions (Order Solpugida), despite their common name, are not scor-



pions and shun the sunlight, preferring to hunt at night. They live in sandy, dry areas, hiding under stones or in shallow burrows during the day. They are arachnids, relatives of spiders and scorpions, but are easily recognized by their large heads and massive jaws (chelicerae), which they use to capture and crush their invertebrate prey. We know hardly anything about the six species that are known from the south Okanagan – in fact, three of these species have been discovered only recently and have not yet received official, scientific names!

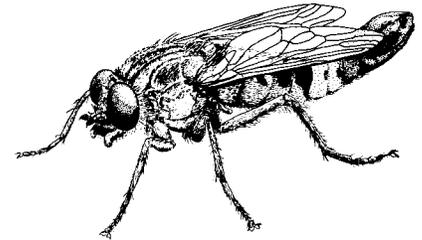


Ground Mantid

***Litaneutria minor* (Scudder)**

Mantids (Order Mantodea) are carnivorous insects distantly related to grasshoppers. They are easily recognized by their long, slender, neck-like thorax and grasping front legs. The Ground Mantid is the only mantid native to Canada. In this country it is known only from the dry grasslands of the extreme South Okanagan near Oliver and Osoyoos. This enigmatic, rare predator lives mostly on the ground and low in shrubs such as sage and antelope brush, where its dusty brown colour makes it hard to find. The males are usually fully winged, but females are flightless – their wings are greatly reduced, less than one-third the length of the abdomen. In the late summer and fall, females lay a small, rectangular egg mass about 7 mm long on the stems of low shrubs. The eggs overwinter and hatch about six or seven months

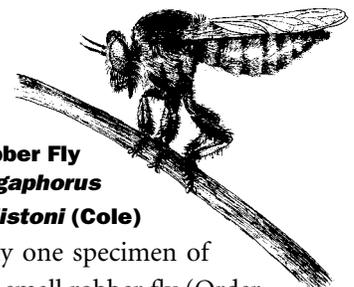
later. Don't confuse this mantid with the much larger Praying Mantid, which was brought to the Okanagan from Ontario to control grasshoppers. This species, originally introduced to eastern North America from Europe, comes in brown and green forms and is fully winged in both sexes.



Apiocerid Fly

***Apiocera barri* Cazier**

This fly is the only member of the Family Apioceridae (Order Diptera) occurring in Canada, where it is restricted to the southern Okanagan Valley. In field guides, members of this family are usually called "flower-loving flies," but research shows that *Apiocera* species, at least, hardly ever live up to this name. They inhabit sandy, arid and semiarid habitats, and most flies observed never visit flowers, but rather are found running on the ground, especially near the sparse vegetation, where they may feed on honeydew beneath aphid-infested plants. They are often seen drinking from damp sand with their sponge-like mouth-parts. The carnivorous larvae live in loose soil and evidently feed on other invertebrates there. Look for these flies on hot days in August.



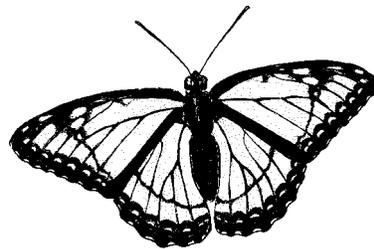
Robber Fly
***Megaphorus willistoni* (Cole)**

Only one specimen of this small robber fly (Order Diptera) has been recorded in Canada, just a few hundred metres from the International Boundary in the southern

Similkameen Valley. These are squat little flies bristling with grey and yellow hairs, which give them an uncanny resemblance to leaf-cutter bees as they buzz from plant to plant, hovering here and there in search of prey. They live in grasslands and seem to prefer areas with many flowers, since this is where their favourite prey, small bees and wasps, abound. Like all robber flies, they capture their prey in their bristly legs and kill it with toxic saliva injected through their short proboscis. The dissolved tissues are then sucked back up through the proboscis. Eggs are laid in a case-like mass on a dead plant stem; the larvae develop in the soil where they apparently prey on other insect larvae.



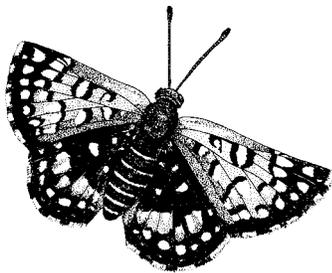
THE WETLANDS AND OTHER ARID GRASSLANDS IN THE SOUTH OKANAGAN VALLEY ARE HOME TO MANY THOUSANDS OF INVERTEBRATE SPECIES. *Robert Cannings photo*



Viceroy

***Limenitis archippus* (Cramer)**

The orange and black Viceroy (Order Lepidoptera) is the famous mimic of the poisonous Monarch butterfly. Although the Monarch still persists in small numbers in the Thompson and Okanagan valleys, the Viceroy has disappeared completely from the province, probably a victim of orchard pesticides. It would have been especially susceptible to these chemicals since some of its favourite larval food plants are domestic fruit trees.



Mormon Metalmark

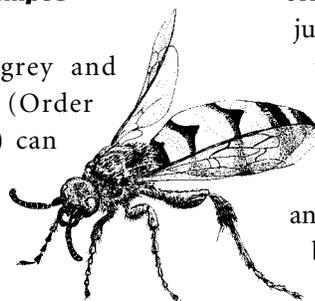
***Apodemia mormo* (Felder and Felder)**

This handsome butterfly (Order Lepidoptera) of western North America was formerly found at several sites in the region, but is now known only from one population near Keremeos. Elsewhere in Canada another subspecies is found in extreme southern Saskatchewan. The adults, which fly in August, sip nectar from wild buckwheats. The nocturnal larvae eat the leaves and stems of the same plants, living in a silken nest during the day.

Scollid Wasp

***Campsomeris pilipes* (Saussure)**

These huge, grey and yellow wasps (Order Hymenoptera) can be seen hovering low over sandy soil, where the



females seek out the burrowing larvae of big scarab beetles. They paralyse each grub and lay an egg directly on it – and the wasp larva consumes the beetle grub where it lies. The scarab beetles themselves are probably rare and have a restricted distribution. Thus far, these wasps are known only from Chopaka in the lower Similkameen Valley and the sandy benchlands east and north of Osoyoos Lake,

where much of their habitat was destroyed by fire in 1993.

What can we do?

One of the first priorities is to find out more about our rare invertebrates – where exactly are they, and what sort of habitats do they need? It is critical to bring together information from specimens that have already

One of the first priorities is to find out more about our rare invertebrates.

been collected and housed in museums across North America. This basic information is vital to our knowledge of invertebrate species' distribution and ecological needs. The

Royal British Columbia Museum and the Spencer Entomological Museum at the University of British Columbia have important collections of Okanagan insects. In conjunction with museums, the Conservation Data Centre in the Wildlife

Branch can keep track of this information in the same way it now manages data on rare vertebrates and plants. At the same time, detailed, but focused inventories of species and their habitats are urgently



ONLY ABOUT 15 PERCENT OF THE SOUTH OKANAGAN'S WETLANDS REMAIN IN A NATURAL STATE.
Steve Cannings photo



SUN SCORPIONS LACK THE STINGING TAIL OF TRUE SCORPIONS, AND RARELY VENTURE OUT IN THE SUNSHINE.
David Shackleton photo

needed to increase our knowledge.

Education is vital, too. Invertebrate conservation will not be supported if no one has heard of the animals in question. Invertebrates, despite their vast diversity and ecological importance, have not had the attention, either from researchers or managers, that other organisms such as mammals, fish, birds and trees have had.

But even before all the information is in, we must act quickly to protect the natural communities that still remain in these special valleys.

What can we do as individuals? We can get involved with local naturalist organizations to learn more about the natural world in our neighbourhood. We can encourage all levels of government to protect natural communities

on public land. We can get involved in public processes to develop land use plans and regulations that preserve, rather than destroy, natural diversity. And we can maintain natural habitat on our own property and encourage governments to develop incentives for others to do the same. 

FOR MORE INFORMATION ON RARE INVERTEBRATES OF THE SOUTH OKANAGAN, CONTACT:

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