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Source: Monographs of the Western North American Naturalist, 1(1) : 65-89

Published By: Monte L. Bean Life Science Museum, Brigham Young University

URL: https://doi.org/10.3398/1545-0228-1.1.65

Monographs of the Western North American Naturalist 1, © 2002, pp. 65–89

STONEFLIES (PLECOPTERA) OF SOUTHERN UTAH WITH AN UPDATED CHECKLIST OF UTAH SPECIES

Ronald G. Call[1,4] and Richard W. Baumann[2,3]

ABSTRACT.—Southern Utah comprises 4 major physiographic divisions: the Great Basin, Colorado Plateau, Central Rocky Mountains, and Southern Rocky Mountains, which have been partitioned into faunal regions. We discuss the uniqueness of southern Utah and the amount of land set aside for recreation and preservation, and we encourage the study and preservation of its water resources. The stonefly (Plecoptera) fauna of 13 counties in southern Utah was surveyed. We found 58 species representing 34 genera and 8 families. Three new state records for Utah and many new county records for southern Utah are presented, along with a discussion of distribution patterns and faunal affinities of each species. Distribution patterns indicate a historical connection between the Sevier River and the Colorado drainage and a separation of faunal areas within the Central Rocky Mountains at boundaries between the Wasatch Mountains, Wasatch Plateau, and the Southern High Plateau. The uniqueness of the isolated Abajo and LaSal Mountains, the Virgin River valley, and other faunal areas in southern Utah is presented.

Key words: Plecoptera, stoneflies, aquatic insects, Utah, species inventory.

Southern Utah is famous for its spectacular outdoor scenery. The area has long been appreciated and grows in popularity each year. Tourism in southern Utah is increasing, as are conservation efforts in the region. The designation of the 1.7-million-acre Grand Staircase–Escalante National Monument in southern Utah in 1997 (Maurer and Beath 1997) is perhaps the greatest evidence of growing interest in the preservation of the area. Greater understanding of southern Utah's living resources is essential to wise management decisions in the face of increasing tourism and population growth.

Utah has the 2nd highest birth rate and the 2nd lowest death rate of any state in the nation, which together contribute significantly to Utah's high population growth. With the addition of a high rate of in-migration, Utah has one of the fastest growing populations of any state. Although currently about 77% of Utah's population lives along the Wasatch Mountain Range in northern Utah, this condition is changing. From 1980 to 1996, northern Utah, which includes the urban centers of the Wasatch Mountain Range, experienced an average annual population growth of 1.67%, while southern Utah experienced a 1.74% average annual population growth. Washington County, in the southwestern corner of the state, experienced the largest increase in population. St. George, the largest city of Washington County, had the 2nd largest percentage population increase of any city in the state for the past 6 years, over 36% (Governor's Office of Planning and Budget 1998).

Utah is a treasure trove of natural beauty. Southern Utah contains all 5 of the state's national parks, 5 of its 7 national monuments, 4 of the state's 8 national forests, 1 national recreation area, 7 designated wilderness areas, and 20 state parks (Utah Travel Council 1999). With approximately 69% of its land federally owned (U.S. Department of the Interior, Bureau of Land Management, Utah State Office 1997), Utah ranks 2nd among states in amount of federally owned land, next to Nevada, which lists 77% of its land as federally owned (U.S. Department of the Interior, Bureau of Land Management 1999). However, nearly 4.5% of Nevada's land is federally managed under the Department of Defense (Nevada Division of State Lands 1995), while in Utah a higher percentage of federal land is set aside as national parks, national monuments, national recreation areas, and national forests. Utah ranks highest

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among the continental states in the proportion of its land designated for public recreation and preservation. While it is true that more federally owned land, over 50 million acres, is specified for preservation and recreation in Alaska than in Utah, which has approximately 11.7 million acres, nearly 9 million visits are made to public recreation sites in Utah annually compared to approximately 2 million annual visits in Alaska. Utah ranks 8th among the states for number of annual visits to recreational sites managed by the National Park Service (U.S. Department of the Interior, National Park Service 1998). Southern Utah, in particular, is unique. Nearly 7.7 million of approximately 30 million acres of land in southern Utah is publicly owned as national parks, national monuments, national recreation areas, national forests, and state parks. That is over 25% of the area of southern Utah (U.S. Department of the Interior, Bureau of Land Management, Utah State Office 1997; U.S. Department of the Interior, National Park Service 1998; Utah Travel Council 1999). No other area in the country has such a large proportion of land allocated for preservation and recreation by both state and federal agencies. These facts are presented to emphasize that Utah has both a large amount of land designated for recreation and preservation and an increasing number of people visiting these unique sites. Despite these facts, little research has been done regarding the biological components of the varied ecosystems of southern Utah.

Arid conditions throughout southern Utah place a premium on freshwater. Virtually all municipal waterworks systems in Utah tap groundwater resources through springs and wells. Expanding human population and agriculture will place even greater demands on southern Utah's freshwater supplies in the future, groundwater as well as streams and rivers. The city of St. George, southern Utah's largest city, already pays the highest price for water in the state (Governor's Office of Planning and Budget 1998). A large proportion of precipitation in southern Utah is received in the form of winter snows, which form the largest freshwater reserve in the area (Harper et al. 1994). Because of the importance and relative rarity of freshwater in this area, it is important to gain a greater understanding of all aspects of the area's aquatic resources. One method of gaining this insight is by studying aquatic insects such as stoneflies. Stoneflies typically inhabit cool streams and rivers. They are excellent indicators of changing water conditions and quality and can aid in understanding the diversity and uniqueness of areas. Information relative to stonefly species inhabiting the area may be useful in helping determine which areas are most critical to preserve and in making management decisions involving the use of water resources.

The species composition and distribution of stoneflies in Utah is perhaps the best known of any state in the western United States (Tanner 1940, Gaufin et al. 1966, Baumann 1975, Baumann et al. 1977). Previous knowledge of Plecoptera in Utah is primarily the result of the work of the late Arden R. Gaufin and his students at the University of Utah. In 1966, Gaufin listed 71 species, 18 genera, and 5 families of Plecoptera as occurring in Utah. Since that time many subgenera have been raised to generic status, and several subfamilies have been elevated to family status (Illies 1966). The most recent publication providing a state list of species occurring in Utah listed 75 species in 34 genera and 8 families (Baumann 1973). New records were added in 1977, documenting the occurrence in Utah of 77 stonefly species in 35 genera and 8 families (Baumann et al. 1977). Stanger and Baumann (1993) described a new species from the state, Surdick (1995) included the description of a near chloroperlid from southeastern Utah, and Houseman and Baumann (1997) recorded 5 species previously unrecorded from the state.

Most knowledge of stoneflies in Utah comes from sites in the Central Rocky Mountain, Uintah Basin, Columbia Plateau, and Great Basin areas in the northern part of the state (Gaufin et al. 1966, Baumann and Gaufin 1969, Baumann et al. 1977, Houseman and Baumann 1997). The southern Utah stonefly fauna is poorly known compared to that of northern Utah. This has resulted from the major universities in Utah all being located in the northern part of the state: University of Utah, Salt Lake City; Brigham Young University, Provo; and Utah State University, Logan. These 3 institutions have all been instrumental in providing researchers and facilities to house insect collections. Consequently, due to both time and budget constraints, much more research has been conducted in northern Utah than in southern Utah. Distance between suitable stonefly

habitats, the remoteness of some areas, and the rugged terrain of some areas of southern Utah have also been obstacles to stonefly research in this part of the state.

STUDY AREA

Some authors have divided Utah into 3 major physiographic provinces or physical divisions (Harper et al. 1994). The western portion of the state is occupied by the Great Basin, a part of the Basin and Range Province. The northeastern portion of the state consists of a portion of the Central Rocky Mountains. The southeastern portion of the state is part of the Colorado Plateau. Other authors have concluded that some isolated mountain regions of southern Utah are more correctly considered part of the Southern Rocky Mountain Province (Durrant 1952, MacMahon and Wieboldt 1978). These isolated mountains, such as the LaSal and Abajo Mountains, more closely resemble, faunally, the Southern Rocky Mountains of Colorado than the surrounding plateaus. A large portion of southern Utah is considered part of the Colorado Plateau Physiographic Province. This area consists of high-elevation plateaus incised by canyons. Another major portion of southern Utah is the Great Basin, a very arid region in the southwestern portion with few high-elevation mountains. Water in the area is primarily ephemeral streams from mountain runoff or desert rainstorms.

As sensitive aquatic insects, stoneflies are limited to freshwater lotic systems; therefore, distributions of stoneflies reflect the presence of streams and rivers. Northern Utah contains the Wasatch and Uinta Mountains, which include many streams and rivers that provide suitable habitat for stoneflies. Northern Utah contains 3 principal drainage areas. The Raft River Mountains in the extreme northwestern corner of the state drain northward into the Snake River of Idaho. The Wasatch Mountains and northwestern portion of the Uinta Mountains drain into Utah Lake and the Great Salt Lake. The southeastern portion of the Uinta Mountains drains into the Green River, which empties into the Colorado River. Southern Utah contains 2 principal drainage basins. The Sevier River and Beaver River flow to the north and eventually dissipate in the desert near Sevier Dry Lake in Millard County. The other major drainage is the flow of the Colorado River and its tributaries, including the Green River, San Juan River, and Virgin River, to the southwest (Fig. 1).

A large amount of information regarding stoneflies and other aquatic insects of Huntington Creek, a tributary of the San Rafael River, itself a tributary of the Green River, was compiled by R.N. Winget, E.C. Devenport, and M.K. Reichert during a study from 1970 to 1977. The principal report (Winget 1972), detailing the site and explaining the scope of the study, was published early in the study, but data were recorded for the entire 7-year study period. Huntington Creek has been more extensively studied, relative to aquatic insects, than any other drainage in southern Utah (Reichert 1975). The only other stream in southern Utah with aquatic invertebrates that have been studied to any degree is Pleasant Creek, which flows through Capitol Reef National Park. We are indebted to Colin Brammer and Dr. John MacDonald for their study of this creek (Brammer 1997).

Durrant (1952) partitioned Utah into faunal areas based on distributions of mammals. These divisions correlated fairly closely with the physiographic provinces but were subdivided into smaller regions. The Middle or Central Rocky Mountains he subdivided into the Wasatch Mountains, the Uinta Mountains, and the Northern and Southern High Plateau provinces. The Southern Rocky Mountains were divided into the Abajo subcenter and the LaSal subcenter. He divided the Colorado Plateau into the Virgin River Valley Province and the Canyon Lands Province, each of which was further subdivided. The Great Basin is the only province Durrant did not divide into smaller regions or zones, as the mammal fauna of that region was uniform.

Our study area includes the following Utah counties (Fig. 2): Beaver, Emery, Garfield, Grand, Iron, Kane, Millard, Piute, San Juan, Sanpete, Sevier, Washington, and Wayne (approximately 37°–39°30′N latitude, 109°05′–114°W longitude). The area covers approximately 30 million acres (Bureau of Land Management 2001) or 124,600 km^2 (48,100 square miles; DeLorme Mapping 1993).

METHODS

Collections were made at over 100 sites within the study area. We chose collection sites

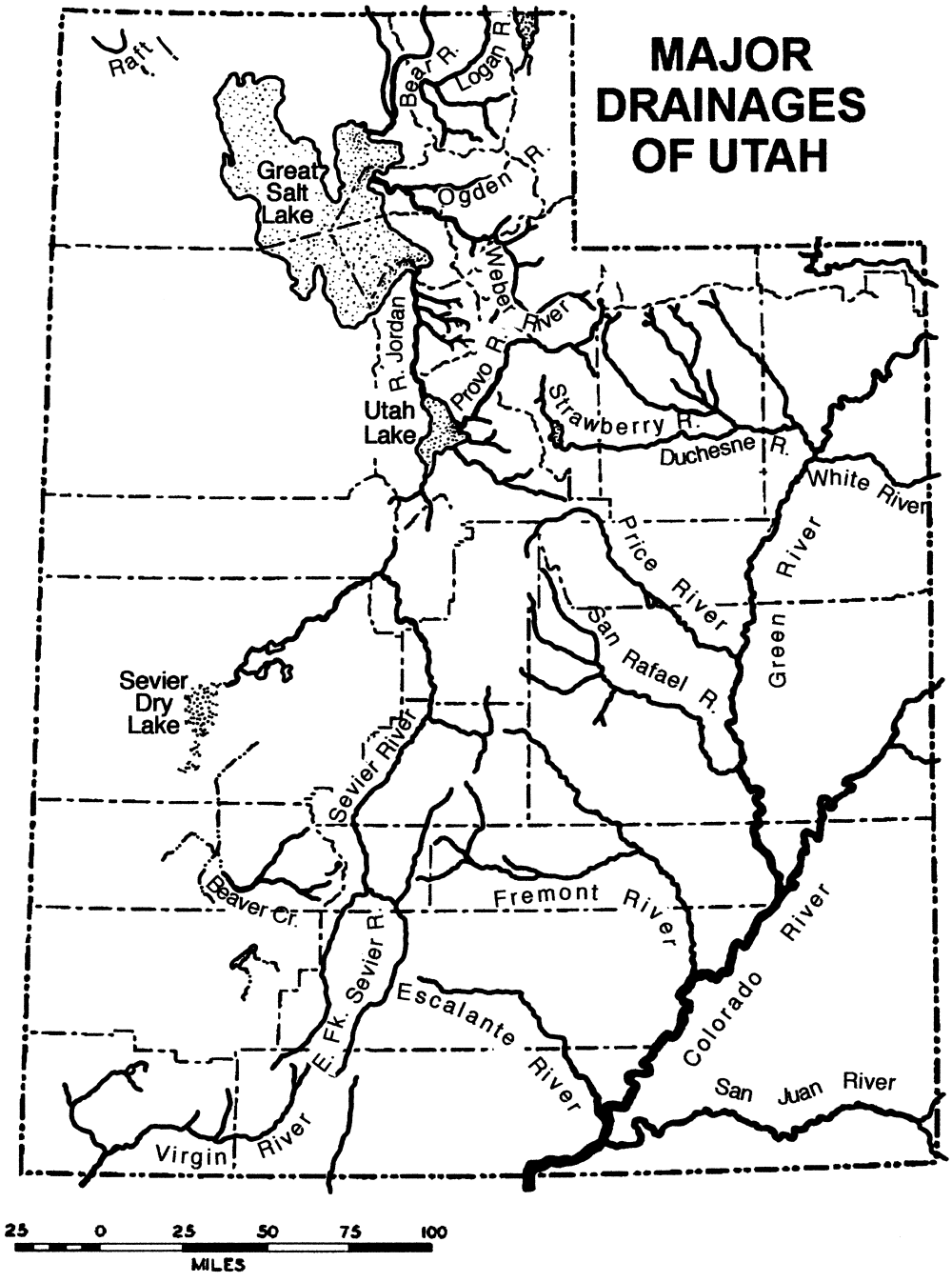


Fig. 1. Major drainages of Utah.

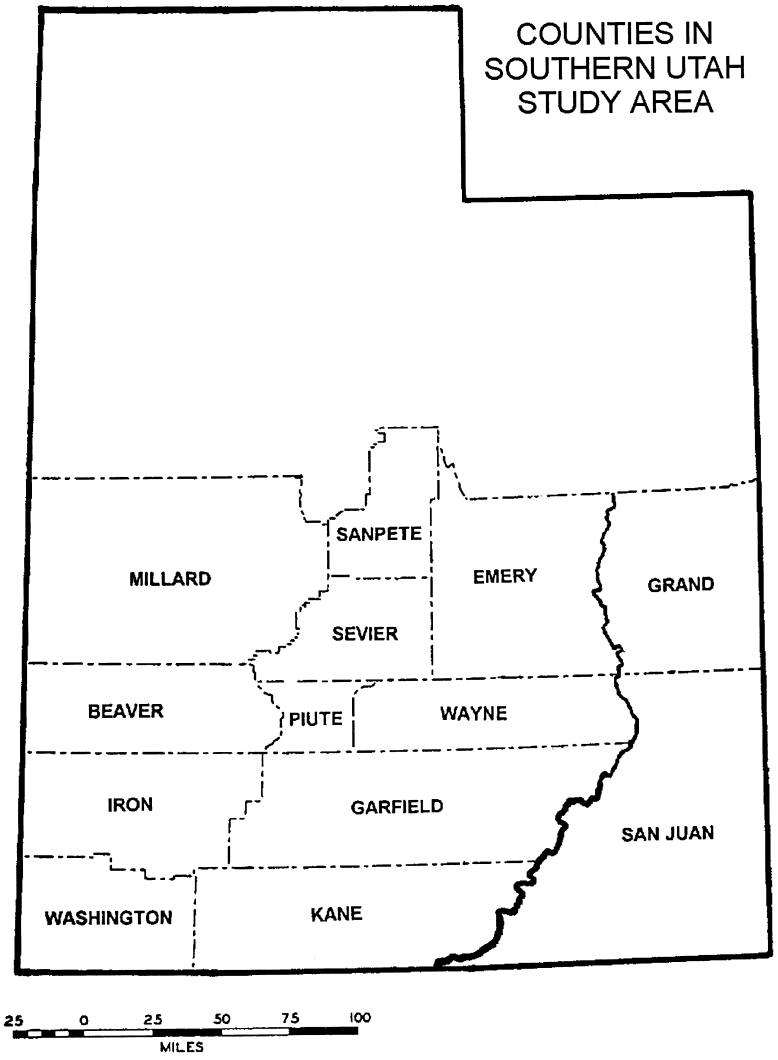


Fig. 2. Counties in southern Utah study area.

to achieve as much coverage of the area as possible, attempting to obtain samples from every major drainage and mountain range during each season of the year. Collections of fresh specimens were made from 1997 to 2000. We collected nymphs by disturbing the substratum of streams and catching specimens in kick nets held downstream. Adults were collected principally by beating riparian vegetation with sticks while we held beating sheets onto which specimens would fall from the vegetation. All specimens were preserved in 75% ethyl alcohol. In addition to field-collected specimens, we examined preserved specimens from the following institutions: Monte L. Bean Life Science Museum, Brigham Young University, Provo, Utah (BYUC); Canadian National Collection, Ottawa, Ontario, Canada (CNC); C.P. Gillette Museum of Arthropod Diversity, Colorado State University, Fort Collins, Colorado (CSUC); Dixie College, St. George, Utah (DCC); Illinois Natural History Survey, Champaign, Illinois (INHS); Purdue Entomological Research Collection, West Lafayette, Indiana (PERC); Utah State University, Logan, Utah (USUC). Specimens collected during the study

are deposited in the Monte L. Bean Life Science Museum.

Each specimen was identified to the lowest possible taxonomic level, usually to species. In the case of some nymphs, identification was possible only to genus. Locations of specimen collection sites were then plotted on maps of the study area to reveal the distribution of each species within the study area. We examined each species distribution and noted its pattern relative to physiographic provinces or faunal areas.

RESULTS

Fifty-eight species in 34 genera and 8 families of stoneflies were recorded from the southern Utah study area. Three species, *Isoperla phalerata* (Needham), *Malenka flexura* (Claassen), and *Sweltsa cristata* Surdick, are new state records. Many species listings are new county records, which help to establish more complete distributions for some species.

One of our most interesting findings was documenting 2 different species, *Acroneuria abnormis* (Newman) and *Isogenoides colubrinus* (Hagen), in the Sevier River, which flows north into the Great Basin. This was particularly noteworthy because these 2 species were previously believed to occur in Utah only in the large rivers of the Colorado drainage.

Also of much interest are isolated occurrences of 3 species. Single specimens of both *Isoperla phalerata* (Needham) and *Isoperla pinta* Frison are documented from high-elevation, isolated areas in southern Utah. Although the type locality of *Utaperla sopladora* Ricker is in southern Utah, only a single specimen of this species in addition to the type specimen has ever been collected from southern Utah. Obviously, this species is isolated and rare in this area.

During the course of our study, it became apparent how different the isolated Abajo and LaSal Mountains in the southeast corner of Utah are. Several stonefly species in these mountains occur nowhere else in southern Utah. *Zapada frigida* (Claassen), *Sweltsa cristata* Surdick, and *Malenka flexura* (Claassen) occur nowhere else in the state. Additionally, *Amphinemura banksi* (Baumann and Gaufin), *Triznaka pintada* (Ricker), and *Kogotus modestus* (Banks) are found nowhere else in southern Utah. Clearly, these mountains in the southeastern corner of Utah are faunally interesting and different from the rest of southern Utah. We feel this area needs much more study.

The stonefly species *Oemopteryx fosketti* (Ricker) and *Isoperla longiseta* Banks are limited in Utah to the large rivers of the Colorado drainage, indicating a unique aquatic faunal region in southern Utah. Additionally, *Acroneuria abnormis* (Newman) and *Isogenoides colubrinus* (Hagen) occur in Utah only in the Colorado drainage, with the exception of the Sevier River. We believe this indicates that the Sevier River was historically part of the Colorado drainage and that the large rivers of the Colorado drainage represent a unique faunal region.

Stonefly distributions indicate that the Wasatch Plateau, Southern High Plateau, Virgin River valley and Zion National Park area of the Virgin River, Abajo and LaSal Mountains, and rivers of the Colorado drainage are distinct faunal regions (Fig. 3). Stonefly distributions appear to confirm, for the most part, the Utah faunal divisions of Durrant, which were based on mammal distributions. Stonefly distribution patterns confirm Durrant's separation of the Central Rocky Mountains into the Wasatch Mountains, the Northern High Plateau (herein referred to as the Wasatch Plateau), and Southern High Plateau, based on the separation of ranges of *Amphinemura banksi* Baumann and Gaufin and *Amphinemura mogollonica* Baumann and Gaufin at the border between the Wasatch Mountains and the Wasatch Plateau. The distributions of *Paraleuctra vershina* (Gaufin and Ricker) and *Malenka californica* (Claassen) in northern Utah, south to the border between the Wasatch Mountains and the Wasatch Plateau, also support the concept that these are separate faunal regions.

The separation between the Wasatch Plateau and the Southern High Plateau, although less definite, is indicated by the distribution of *Malenka coloradensis* (Banks), which extends across the Southern High Plateau to the edge of the Wasatch Plateau.

The species *Amphinemura banksi* Baumann and Gaufin, *Malenka flexura* (Claassen), *Zapada frigida* (Claassen), and *Sweltsa cristata* Surdick, which are found at high elevations in the Abajo Mountains and LaSal Mountains, confirm Durrant's placement of these mountains as part of the Southern Rocky Mountains, similar to those of Colorado (Durrant 1952).

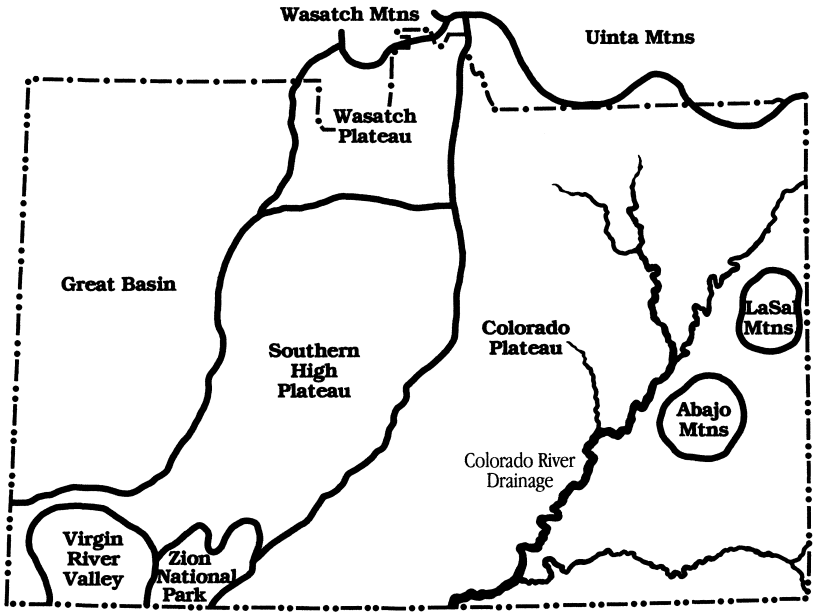


Fig. 3. Southern Utah faunal areas indicated by stonefly distributions.

Other subcenters designated by Durrant were not indicated by stonefly distributions. Durrant divided the Canyon Lands Province into the Kaiparowits, San Rafael, Grand Valley, San Juan, and Painted Desert subcenters. However, stonefly species occurring within this province appear to be widespread within it, indicating no divisions. This entire area is a desert plateau through which flow rivers that appear to have been connected with each other in the past as part of the Colorado drainage.

Durrant divided the Virgin River Valley Province into the St. George subcenter and the Beaver Dam Wash subcenter. This division, based on mammal distribution, is confirmed by plant distributions (Durrant 1952). Our data do not indicate a division within the Virgin River Valley Province at the boundary of these 2 areas, but they may indicate a boundary between the Virgin River in the Zion National Park area and the remainder of the drainage. *Amphinemura mogollonica* (Baumann and Gaufin) and *Isogenoides zionensis* Hansen occur in the Zion National Park area but are not recorded from the Virgin River west of the park. The Virgin River west of Zion National Park contains *Mesocapnia frisoni* (Baumann and Gaufin), *Hesperoperla pacifica* (Banks), and *Sweltsa lamba* (Needham and Claassen), which are not found in the Zion National Park area of the Virgin River. One species, *Mesocapnia frisoni* (Baumann and Gaufin), occurs in Utah exclusively within the Pine Valley Mountain area and the Virgin River Valley Province, indicating a unique faunal region. Certainly, the Virgin River valley is a biologically unique area of southern Utah.

Of southern Utah's 4 physiographic provinces, the Great Basin is the poorest in terms of numbers of stonefly species. Every species present in the Great Basin occurs also in the bordering Central Rocky Mountains or is widespread throughout southern Utah. *Isoperla mormona* Banks is the only species that is known in southern Utah to extend far into the Great Basin. Indeed, few stoneflies are present deep in the Great Basin, reflecting its general unsuitability as stonefly habitat (Nelson 1994). In fact, the delineation of the Great Basin as a faunal region is revealed by the lack of stoneflies in the region.

Boundaries between physiographic provinces in southern Utah appear to be barriers in the dispersal of some stonefly species. This study, along with previous records, indicates that the edge of the Colorado Plateau in southern Utah

is the eastern limit of *Capnia utahensis* Gaufin and Jewett and that its range extends into the Wasatch Mountains of northern Utah. Southern Utah appears to be the southern range limit of *Utacapnia lemoniana* (Nebeker and Gaufin) and *Utacapnia logana* (Nebeker and Gaufin).

Another result of our study is that several species previously unrecorded or recorded from only a few localities in southern Utah have now been documented from several localities. *Alloperla severa* (Hagen), previously unrecorded from southern Utah, was recorded from several localities. Previously listed from only 2 counties in southern Utah, *Megarcys signata* (Hagen) is now documented by this study as being widespread in the area. The validity of the recently designated species *Sweltsa cristata* Surdick from the isolated LaSal and Abajo Mountains was confirmed by examination of several excellent specimens.

CONCLUSIONS

The number of species recorded from southern Utah is less than that recorded from northern Utah (Call 1999). The Wasatch and Uintah Mountains in northern Utah form a fairly contiguous band of high-elevation mountains with suitable stonefly habitat. Only the Raft River Mountains in the northwestern corner of the state are an isolated range in the north. In contrast, southern Utah has more isolated, high-elevation mountains, such as the LaSal, Abajo, and Henry Mountains.

Although fewer species occur in southern Utah than in northern Utah, 58 species, which is over 70% of the total number of species in the state, occur in southern Utah. Possible explanations of species diversity in the area include speciation occurring in isolated areas, migration into the area from outside, and vicariance of ancestral populations. Only one species, *Sweltsa cristata* Surdick, is endemic to southern Utah. Lack of endemic species, especially given the isolated mountain ranges, argues against speciation having occurred recently or frequently in the area. Virtually all species that occur in southern Utah also occur outside southern Utah. Even *Sweltsa cristata* Surdick, the only species currently endemic to southern Utah, may in the future be found to occur in nearby mountains of Colorado. The distribution pattern for southern Utah is the result of colonization of the area from the outside or vicariance of ancestral populations. Given the widely disjunct distributions of some species in southern Utah such as *Isoperla phalerata* (Needham), *Isoperla pinta* Frison, and *Utaperla sopladora* Ricker, and the generally poor dispersal ability of stoneflies, vicariance of ancestral populations seems the more likely explanation.

Fifty-eight species of stoneflies from 34 genera and 8 families are reported from southern Utah. Three species represent new state records, and many others represent new county records. This publication enhances knowledge of stoneflies occurring in Utah by updating the state list of species. Also provided are distributional data for each species occurring in southern Utah. This study provides a higher degree of resolution of stonefly distributions in this area. Distribution patterns indicate that some species are widespread throughout the region. Many species occur in the Central Rocky Mountain region, while fewer species occur in the Southern Rocky Mountain and Colorado Plateau regions.

Distributions of stonefly species indicate the division of the Central Rocky Mountains region into the Wasatch Mountains, Wasatch Plateau, Southern High Plateau, and Virgin River valley as one moves from north to south within the Central Rocky Mountains of Utah. Distribution patterns also reveal the Abajo and LaSal Mountains are unique faunal regions with close affinities to the nearby Southern Rocky Mountains of Colorado.

The presence of stonefly species in the Sevier River, otherwise known only from the Colorado drainage, reveals that the Sevier River was connected to the Colorado drainage in the geologic past and flowed south rather than north as it does today. Additional study of the Sevier River is needed desperately. This river is a major source of freshwater for agriculture in southern Utah. With continued population growth throughout southern Utah, this river will be depleted even further. Little is known about the stoneflies and other aquatic macroinvertebrates of this river, but from previous collecting efforts this river appears strange indeed because it harbors so few stoneflies compared with other rivers of similar size, depth, and flow rate. Certainly, to preserve this unique river, we need to understand it better.

Our data also reveal that the Virgin River valley and the Zion National Park region of

the Virgin River are unique faunal regions. This river and its tributaries face increased pressure as the human population of southern Utah continues to expand. Efforts to preserve and study this river should be increased.

The occurrence of the isolated species *Isoperla phalerata* (Needham) and *Isoperla pinta* Frison from Panguitch Creek and Podunk Creek, respectively, illustrate how little we know about which species occur in southern Utah. Undoubtedly, there are more species that occur in isolated areas that we do not yet know exist. These species also demonstrate the fragility of freshwater ecosystems. Podunk Creek is a perfect example. An extremely shallow, narrow creek meandering through a meadow used for cattle pasture, it already has steeply cut banks typical of erosion due to grazing. How typical this situation is in southern Utah where many small creeks flow through land used by grazing cattle. It certainly did not look unique at first, and we easily could have missed the single specimen of *Isoperla pinta* Frison had we come at a different time of year. How many more seemingly uninteresting creeks in southern Utah harbor hidden biological treasures? We fear many undiscovered organisms will be lost by increased demands for water. Surely, more research needs to be done documenting and understanding species of stoneflies and other organisms inhabiting freshwater sources if we are to preserve our resources in the face of increased tourism and population growth in southern Utah. It is our hope that this study will enhance understanding of the biological properties of this unique area of the world and enable wiser decisions regarding conservation and management.

LIST OF STONEFLIES OF UTAH (1999)

∘ occurs only in southern Utah
† occurs only in northern Utah
* occurs in both northern and southern Utah

Order Plecoptera
- Suborder Arctoperlaria
  - Group Euholognatha
    - Family Capniidae
      - † *Capnia coloradensis* Claassen
      - * *C. confusa* Claassen
      - * *C. gracilaria* Claassen
      - † *C. nana* Claasen
      - † *C. petila* Jewett
      - † *C. uintahi* Gaufin
      - * *C. utahensis* Gaufin and Jewett
      - * *C. vernalis* Newport
      - † *Capnura intermontana* Nelson and Baumann
      - ∘ *C. wanica* (Frison)
      - * *Eucapnopsis brevicauda* (Claassen)
      - * *Isocapnia crinita* (Needham and Claassen)
      - † *I. grandis* (Banks)
      - † *I. hyalita* Ricker
      - † *I. missourii* Ricker
      - * *I. vedderensis* (Ricker)
      - ∘ *Mesocapnia frisoni* (Baumann and Gaufin)
      - * *Utacapnia lemoniana* (Nebeker and Gaufin)
      - * *U. logana* (Nebeker and Gaufin)
      - † *U. poda* (Nebeker and Gaufin)
    - Family Leuctridae
      - † *Paraleuctra jewetti* Nebeker and Gaufin
      - * *P. occidentalis* (Banks)
      - * *P. rickeri* Nebeker and Gaufin
      - * *P. vershina* Gaufin and Ricker
      - * *Perlomyia utahensis* Needham and Claassen
    - Family Nemouridae
      - * *Amphinemura banksi* Baumann and Gaufin
      - ∘ A. *mogollonica* Baumann and Gaufin
      - † *Malenka californica* (Claassen)
      - * *M. coloradensis* (Banks)
      - ∘ *M. flexura (Claassen)*
      - † *M. tina* (Ricker)
      - † *Podmosta decepta* (Frison)
      - * *P. delicatula* (Claassen)
      - * *Prostoia besametsa* (Ricker)
      - * *Zapada cinctipes* (Banks)
      - † *Z. columbiana* (Claassen)
      - ∘ *Z. frigida* (Claassen)
      - * *Z. haysi* (Ricker)
    - Family Taeniopterygidae
      - * *Doddsia occidentalis* (Banks)
      - * *Oemopteryx fosketti* (Ricker)
      - * *Taenionema pacificum* (Banks)
      - * *T. pallidum* (Banks)
      - † *T. uinta* Stanger and Baumann
      - † *Taeniopteryx nivalis* (Fitch)
  - Group Systellognatha
    - Family Chloroperlidae
      - * *Alloperla severa* (Hagen)
      - † *Paraperla frontalis* Banks
      - * *Plumiperla diversa* (Frison)
      - † *Suwallia lineosa* (Banks)
      - * *S. pallidula* (Banks)
      - * *Sweltsa borealis* (Banks)
      - * *S. coloradensis* (Banks)
      - ∘ *S. cristata* Surdick
      - † *S. gaufini* Baumann
      - * *S. lamba* (Needham and Claassen)
      - ∘ *Triznaka pintada* (Ricker)

* *T. signata* (Banks)
* *Utaperla sopladora* Ricker
Family Perlidae
* *Acroneuria abnormis* (Newman)
* *Claassenia sabulosa* (Banks)
† *Doroneuria* sp. A
* *Hesperoperla pacifica* (Banks)
Family Perlodidae
* *Cultus aestivalis* (Needham and Claassen)
* *Diura knowltoni* (Frison)
* *Isogenoides colubrinus* (Hagen)
† *I. elongatus* (Hagen)
* *I. zionensis* Hanson
* *Isoperla fulva* Claassen
* *I. longiseta* Banks
* *I. mormona* Banks
* *I. petersoni* Needham and Claassen
○ *I. phalerata* (Needham)
* *I. pinta* Frison
* *I. quinquepunctata* (Banks)
* *I. sobria* (Hagen)
* *Kogotus modestus* (Banks)
* *Megarcys signata* (Hagen)
† *Pictetiella expansa* (Banks)
* *Skwala americana* (Needham and Claassen)
Family Pteronarcyidae
* *Pteronarcella badia* (Hagen)
* *Pteronarcys californica* Newport
† *P. princeps* Banks

TOTAL NUMBER OF SPECIES 81

EXPLANATION OF UPDATED RECORDS.—The following species have been synonymized or reassigned in classification: *Capnia cygna* (Jewett), listed as occurring in the state (Baumann 1973), does not occur in Utah and is removed from the state list. *Capnia wanica* (Frison) was reassigned to the genus *Capnura* (Nelson and Baumann 1987). Records previously listed as *Paraleuctra sara* are now listed as *Paraleuctra vershina* (Gaufin and Ricker) (Gaufin and Ricker 1974). The former species has an eastern North American distribution while the latter has a western North American distribution. *Taenionema nigripennis* (Banks) has been synonymized under *Taenionema pallidum* (Banks) (Stanger and Baumann 1993), removing the former and adding the latter to the state list. *Taenionema pacifica* and *Taenionema pallida* have been corrected to *T. pacificum* (Banks) and *T. pallidum* (Banks), respectively (Steyskal 1976). Stanger and Baumann (1993) list *Taenionema uinta* Stanger and Baumann as occurring in several counties in northern Utah. This species also occurs in the Raft River Mountains of northwestern Utah but was unreported by Houseman and Baumann (1997). *Triznaka diversa* (Frison) was reassigned to the genus *Plumiperla* (Surdick 1985). *Isoperla ebria* has been synonymized under *Isoperla sobria* (Hagen) (Szczytko and Stewart 1979), removing the former and adding the latter to the state list. *Skwala parallela* has been synonymized under the older name *Skwala americana* (Needham and Claassen) (Zwick 1989).

The following species were recorded from Utah in previous publications and are listed here in this updated state list: *Capnia petila* Jewett, *Capnura intermontana* Nelson and Baumann, *Doroneuria* sp., *Malenka tina* (Ricker), *Taeniopteryx nivalis* (Fitch) (Houseman and Baumann 1997), *Suwallia lineosa* (Banks), *Acroneuria abnormis* (Newman), and *Perlesta decipiens* (Hagen) (Baumann et al. 1977). The identity of the *Doroneuria* species is unknown because to date only nymphs have been collected, and specific identification is possible only with adult males. This record is *D. baumanni, D. theodora,* or an undescribed species. *Capnia coloradensis* Claassen occurs in the Raft River Mountains of northwestern Utah but was omitted from the previous publication (Houseman and Baumann 1997). Baumann et al. (1977) record *Perlesta placida* as occurring in Uintah County. This species was synonymized under *Perlesta decipiens* (Hagen) (Stark 1989). We examined the *Perlesta* nymph from Sweetwater County, Wyoming, and are of the opinion that it is probably *Perlesta decipiens* (Hagen). This species is recorded from the Green River, Sweetwater County, Wyoming, and was thought to occur in Uintah County, where the Green River flows from Wyoming into Utah. Baumann et al. (1977) record this species as occurring in Uintah County; however, there is no confirmed record of *Perlesta* from Uintah County. Dr. Boris Kondratieff, who has collected extensively from the Green River just over the Utah border in Colorado, told us that he has not collected *Perlesta* from there. Consequently, we remove this species from the Utah state list of stoneflies and explain the previously published record as an error.

New state records added or confirmed from this study are *Isoperla phalerata* (Needham), *Malenka flexura* (Claassen), and *Sweltsa cristata* Surdick (Surdick 1995). A single female of *Isoperla phalerata* (Needham) collected by George Knowlton from Panguitch Creek is the

only specimen of this species in Utah. After examining this specimen, we concur that it is *I. phalerata* (Needham). The distribution of this species in other localities in the Central and Southern Rocky Mountains, however, does make its presence in Utah reasonable.

Malenka flexura (Claassen) was recorded by Gaufin et al. (1966) as occurring in Utah. This record was based on a single female collected at Huntsville, Weber County. After examining the specimen, Baumann (1973) found it to belong to *M. californica* (Claassen) and thus removed this species from the state list. We report 1 male specimen and 1 female specimen from Lake Oowah, San Juan County, reinstating *M. flexura* (Claassen) to the state list of stonefly species.

Sweltsa cristata Surdick, recently described (Surdick 1995), is known only from the Abajo and LaSal Mountains of southern Utah. Currently, this is the only species endemic to southern Utah. *Sweltsa cristata* Surdick specimens from this area of southern Utah were listed under *S. lamba* (Needham and Claassen) in the past (Baumann et al. 1977).

ANNOTATED LIST OF STONEFLY SPECIES OF SOUTHERN UTAH

Distributional data are presented below in the following format: major physiographic province, physiographic region, geographic area, locality. Code numbers are assigned to geographic areas, code letters to localities within the areas. Each species is then presented with a summary of distribution based on these codes. Counties in which the geographic areas occur are presented in parentheses alongside geographic areas to facilitate finding the localities on maps of the areas (Fig. 4). Presentation of the data is given in this format to save space. Anyone interested in the full data, available in an unpublished thesis (Call 1999), can contact the authors, who will gladly provide the information.

Central Rocky Mountains

SOUTHERN HIGH PLATEAUS

1 Aquarius Plateau (Garfield Co.)
- a Antimony Creek
- b Birch Creek, Main Canyon, NW Escalante
- c Center Creek, Osiris
- d Clay Creek, above Pine Lake
- e North Creek, NW Escalante
- f Pine Creek
- g Pine Lake Campground seep
- h Poison Creek

2 Awapa Plateau (Wayne Co.)
- a Fremont River, Bicknell

3 Beaver Valley (Beaver Co.)
- a Beaver Creek, Beaver
- b Birch Creek, SE Beaver
- c South Creek, S Beaver

4 Boulder Mountain (Garfield Co.)
- a Boulder Creek
- b Calf Creek
- c Carcass Creek
- d Durfey Creek
- e Pleasant Creek
- f Singletree Creek
- g Spruce Spring

5 Bull Valley Mountains (Washington Co.)
- a Magotsu Creek, N Veyo
- b Pine Park Creek, Pine Park Campground
- c Slaughter Creek

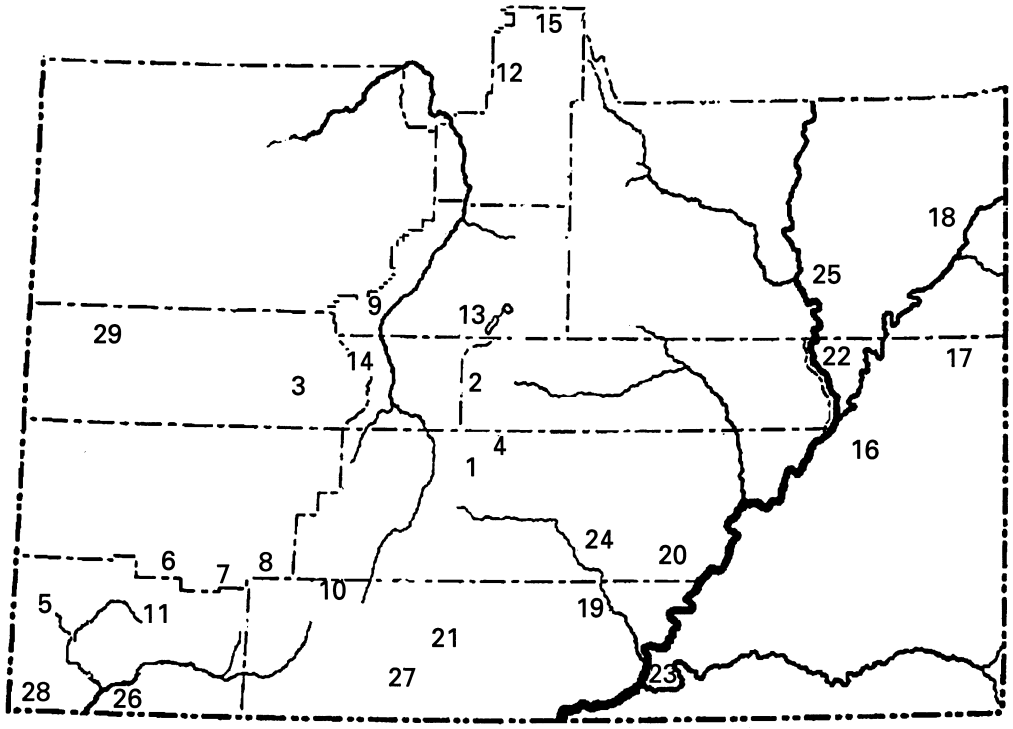
6 Harmony Mountains (Iron Co.)
- a Iron Creek, W Cedar City

7 Hurricane Cliffs (Iron Co., Washington Co.)
- a Ash Creek
- b Coal Creek, E Cedar City
- c LaVerkin Creek

8 Markagunt Plateau (Iron Co.)
- a Asay Creek, S Hatch
- b Bowery Creek, Parowan Canyon
- c Cedar Canyon Campground, near Cedar Breaks National Monument
- d Center Creek
- e Clear Creek, above Panguitch Lake
- f Duck Creek, near Aspen Mirror Lake
- g Lowder Creek, E Cedar Breaks National Monument
- h Mammoth Creek
- i Panguitch Creek, below Panguitch Lake
- j Parowan Creek, Parowan Canyon
- k Red Creek, above Red Creek Reservoir, E Paragonah
- l Yankee Lake Stream, above Parowan

9 Pahvant Range (Millard Co., Sevier Co.)
- a Chalk Creek, above Fillmore
- b Clear Creek, Clear Creek Canyon
- c Corn Creek, above Kanosh
- d Ivie Creek, above Scipio Lake
- e Oak Creek, above Oak City
- f Pole Creek, Clear Creek Canyon
- g Willow Creek, W Salina

10 Pansaugaunt Plateau (Garfield Co., Kane Co.)
- a Badger Creek
- b Blubber Creek
- c East Fork Creek
- d East Fork Sevier River



Southern High Plateaus
1 Aquarius Plateau
2 Awapa Plateau
3 Beaver Valley
4 Boulder Mountain
5 Bull Valley Mountains
6 Harmony Mountains
7 Hurricane Cliffs
8 Markagunt Plateau
9 Pahvant Range
10 Pansaugaunt Plateau
11 Pine Valley Mountains
12 Sanpitch Mountains
13 Sevier Plateau
14 Tushar Mountains
15 Wasatch Plateau

Southern Rocky Mountains
16 Abajo Mountains
17 LaSal Mountains

Grand Valley subcenter
18 Grand Valley

Kaiparowits Plateau
19 Escalante River Drainage
20 Henry Mountains
21 Paria River Drainage

San Juan subcenter
22 Canyonlands
23 Painted Desert

San Rafael subcenter
24 Capitol Reef
25 Green River

St. George subcenter
26 Virgin River
27 Vermillion Cliffs
28 Beaver Dam Wash

Great Basin
29 Great Basin Desert

Fig. 4. Geographic areas of southern Utah collection sites.

e Kanab Creek, above Alton
f Podunk Creek, S Tropic Reservoir
g Sevier River

11 Pine Valley Mountains (Washington Co.)
a Ash Creek, near Sawyer Spring
b Santa Clara River, Pine Valley Mountains
c Leap Creek, near Pintura
d Leeds Creek, Leeds Canyon

12 Sanpitch Mountains (Sanpete Co.)
a Fountain Green Spring, Fountain Green
b Maple Canyon, near Freedom
c Box Canyon, off Maple Canyon, near Freedom

13 Sevier Plateau (Garfield Co., Sevier Co.)
a Abes Creek, above Gooseberry Campground
b Bowery Creek, Fish Lake
c Dairy Creek, Fish Lake
d Fremont River, Mill Meadow Reservoir
e Fremont River, Zedds Meadow
f Gates Creek, below Gooseberry Campground
g Gooseberry Creek
h Ivie Creek
i Little Lost Creek
j Lost Creek
k Mamoits Spring, near Fremont River
l Monkey Fork, Sawmill Flat, SE Monroe
m Monroe Creek
n Niotche Creek, above Gooseberry Campground
o Otter Creek, above Koosharem Reservoir
p Peterson Creek, Kings Meadow Canyon
q Quitchupah Creek, near Emery
r Salina Creek
s Sanford Creek, NE Panguitch
t Sawmill Creek, tributary of Sevenmile Creek, N Fish Lake
u Sevenmile Creek, N Fish Lake
v South Last Chance Creek
w Twin Creeks, Fish Lake
x UM Creek, N Fish Lake
y Water Creek, S Glenwood Fish Hatchery

14 Tushar Mountains (Beaver Co., Piute Co., Sevier Co.)
a Beaver Creek
b Bullion Canyon Creek, Marysvale
c City Creek, City Creek Campground
d Cottonwood Creek
e Deer Creek, near Big Rock Candy Mountain
f Fish Creek, Clear Creek Canyon
g Griffeth Creek, NE Beaver
h Lott Creek, near Fremont Indian State Park
i Kents Lake
j Merchant Creek
k Mill Creek, SW of Castle Rock Campground
l Mud Lake, NE Beaver
m Pine Creek, Marysvale
n Pine Grove Creek, NE Beaver
o Poison Creek, S Mud Lake, NE Beaver
p Puffer Lake Campground stream
q Sevier River, Marysvale Canyon
r Shelly Baldy Creek, Big John Flat, NE Beaver
s Shingle Creek, Clear Creek Canyon

WASATCH PLATEAU

15 Wasatch Plateau (Emery Co., Sanpete Co.)
a Becks Creek, above junction Seely Creek
b Bougler Creek
c Cedar Creek, NE Spring City
d Cottonwood Creek, above Fairview
e Ephraim Creek, Ephraim Canyon
f Fairview Creek, Fairview Canyon
g Ferron Creek
h Flat Canyon (Flat Canyon Spring, O'dell Spring, Stanley Spring)
i Gooseberry Creek, Flat Canyon
j Huntington Creek, Huntington Canyon
k Joes Valley Reservoir
l Millstream, above Willow Lake
m Quitchupah Creek, Convulsion Canyon
n San Pitch River, Milburn
o Sixmile Creek, E Sterling
p Seely Creek, Olsen Canyon
q Thistle Creek, Coyote Springs near Indianola

Southern Rocky Mountains

16 Abajo Mountains (San Juan Co.)
a Dalton Springs
b Johnson Creek, N Blanding
c North Creek, above Dalton Springs Campground

17 LaSal Mountains (Grand Co., San Juan Co.)
a Bear Creek, above Hidden Lake
b Castle Creek, above LaSal Mountain Loop Road
c Fisher Creek
d Horse Creek
e Mill Creek, below Oowah Lake
f Oowah Lake, springs
g Pack Creek, Pack Creek Campground
h Placer Creek
i Warner Campground

Colorado Plateau
- GRAND VALLEY SUBCENTER
  - 18 Grand Valley (Grand Co.)
    - a Colorado River, near Moab
    - b Dolores River
- KAIPAROWITS PLATEAU
  - 19 Escalante River Drainage (Garfield Co.)
    - a Calf Creek
    - b Deer Creek
    - c Escalante River
    - d Main Creek
    - e Steep Creek
    - f Birch Creek
  - 20 Henry Mountains (Garfield Co.)
    - a Crescent Creek
    - b Dark Canyon
    - c Dugout Creek
    - d Slate Creek
    - e South Copper Creek
    - f Sweetwater Creek
    - g Trachyte Creek
    - h Willow Spring
  - 21 Paria River Drainage (Kane Co.)
    - a Cottonwood Creek
    - b Paria River
    - c Willis Creek
    - d Henrieville Creek
- SAN JUAN SUBCENTER
  - 22 Canyonlands (San Juan Co.)
    - a Big Springs, Canyonlands National Park
    - b Cave Springs, Canyonlands National Park
    - c Indian Creek, Newspaper Rock State Park
    - d Squaw Flat, Canyonlands National Park
  - 23 Painted Desert (Kane Co., San Juan Co.)
    - a Colorado River
    - b Lime Creek, near Mexican Hat
    - c San Juan River
- SAN RAFAEL SUBCENTER
  - 24 Capitol Reef (Wayne Co.)
    - a Carcass Creek, S Grover
    - b Deep Creek
    - c Fish Creek
    - d Fremont River, Capitol Reef National Park
    - e Pleasant Creek
    - f Singletree Creek
    - g Sulphur Creek
  - 25 Green River (Emery Co. and Uintah Co.)
    - a Green River, near Green River town
    - b Green River, Jensen
- ST. GEORGE SUBCENTER
  - 26 Virgin River (Kane Co., Washington Co.)
    - a Emerald Pools, Zion National Park
    - b Virgin River, East Fork
    - c Virgin River, North Fork, Zion National Park
  - 27 Vermillion Cliffs (Kane Co.)
    - a Kanab Creek, Kanab
- BEAVER DAM WASH SUBCENTER
  - 28 Beaver Dam Wash (Washington Co.)
    - a Beaver Dam Wash, below Slaughter Creek
    - b Beaver Dam Wash, East Fork
    - c Beaver Dam Wash, West Fork

Great Basin
- 29 Great Basin Desert (Iron Co.)
  - a Beaver Creek, Milford
  - b Duncan Creek, E Newcastle

Species are presented in alphabetical order by family, genus, and species. The classification system follows that used by Stewart et al. (1988) as outlined by Stark et al. (1986).

Order Plecoptera
Suborder Arctoperlaria
Group Euholognatha
Family Capniidae

Capnia confusa Claassen

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: e, Beaver Valley: a, Boulder Mountain: ab, Harmony Mountains: a, Markagunt Plateau: abh, Pahvant Range: be, Pine Valley Mountains: b, Sevier Plateau: m, Tushar Mountains: aem, Wasatch Plateau: fj, Abajo Mountains: b, LaSal Mountains: egh, Capitol Reef: ce.

DISCUSSION.—This species is the most widespread species of the genus in North America (Nelson and Baumann 1989). It occurs commonly throughout Utah and has been found in all physiographic regions in southern Utah except the Great Basin.

Capnia gracilaria Claassen

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Northern Great Plains.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: e, Beaver Valley: b, Boulder Mountain: cfg, Bull Valley Mountains: ab, Markagunt Plateau: bej, Pahvant Range: a, Pine Valley Mountains: b, Sevier Plateau: gmsx, Tushar Mountains: bemq, Wasatch Plateau: dfjl, Abajo Mountains: ab, LaSal Mountains: bg, Virgin River: c.

DISCUSSION.—A common species throughout western North America, it is widespread throughout southern Utah except in the Great Basin.

***Capnia utahensis* Gaufin and Jewett**

TYPE LOCALITY.—Beaver Creek, Beaver Co., Utah.

GEOGRAPHIC RANGE.—Basin and Range.

DISTRIBUTION IN SOUTHERN UTAH.—Beaver Valley: abc, Markagunt Plateau: bjl, Pahvant Range: abef, Pine Valley Mountains: abcd, Sevier Plateau: agmpz, Tushar Mountains: befhmq, Virgin River: a, Beaver Dam Wash: a, Great Basin Desert: b.

DISCUSSION.—This species ranges from the southern Sierra Nevada across the Great Basin of Nevada and California to the edge of the Colorado Plateau in central Utah, which appears to be the eastern distributional limit.

***Capnia vernalis* Newport**

GEOGRAPHIC RANGE.—Northern North America south to New Mexico.

DISTRIBUTION IN SOUTHERN UTAH.—Pahvant Range: b, Sevier Plateau: v.

DISCUSSION.—This northern species extends as far south as New Mexico. It occurs in northern and southern Utah. Nelson and Baumann (1989) list this species as occurring in Grand County in addition to the regions listed herein.

***Capnura wanica* (Frison)**

GEOGRAPHIC RANGE.—Southern Rocky Mountains, Colorado Plateau, and Great Basin.

DISTRIBUTION IN SOUTHERN UTAH.—Beaver Valley: abc, Boulder Mountain: ab, Bull Valley Mountains: b, Hurricane Cliffs: c, Pahvant Range: b, Pine Valley Mountains: bc, Escalante River Drainage: c, Henry Mountains: acfg, Escalante River Drainage: ace, Kaiparowits Plateau: a, Paria River Drainage: abc, Virgin River: b, Beaver Dam Wash: ab, Great Basin Desert: b.

DISCUSSION.—Southern Utah is in the middle of the total range of this species.

***Eucapnopsis brevicauda* (Claassen)**

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Beaver Valley: b, Markagunt Plateau: h, Pahvant Range: a, Sevier Plateau: m, Tushar Mountains: a, Wasatch Plateau: j, Abajo Mountains: ab.

DISCUSSION.—This species is widespread but uncommon in southern Utah.

***Isocapnia crinita* (Needham and Claassen)**

GEOGRAPHIC RANGE.—Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Pahvant Range: b, Wasatch Plateau: j.

DISCUSSION.—This rare species is known from only 2 areas in southern Utah. Full data are presented for this species.

Emery Co.: Huntington Creek, between North and South Hughes Canyons, 2-V-1978, E.C. Devenport and R.N. Winget, 2 ♀; Huntington Creek, Left Fork, 4-V-1971, E.C. Devenport and R.N. Winget, 2 ♂ 1 ♀; Huntington Creek, Stuart Station, 14-IV-1977, R.W. Baumann and R.N. Winget, 5 ♂ 1 ♀ 1 nymph; 4-V-1978, R.W. Baumann and R.N. Winget, 6 ♂ 7 ♀. **Sevier Co.**: Clear Creek, Hwy 89, Sevier, 29-III-1987, R.W. Baumann, 5-IV-1968, 2 ♂ 1 ♀; R.W. Baumann and P. Zwick, 1 ♂ 1 ♀.

***Isocapnia vedderensis* (Ricker)**

GEOGRAPHIC RANGE.—Cascade and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Wasatch Plateau: j, Capitol Reef: deg.

DISCUSSION.—This rare species is known from only 2 areas in southern Utah. Wayne County records have not previously been published and are given herein. Capitol Reef is the southern limit of its distribution.

Wayne Co.: Fremont River, jct Sulphur Creek, Capitol Reef National Park, 18-III-1989, R.W. Baumann, 8 ♂ 6 ♀; Pleasant Creek, Lower Canyon, Capitol Reef National Park, 4-IV-1994, J.F. MacDonald and C. Brammer, 1 ♀ (PERC).

***Mesocapnia frisoni* (Baumann and Gaufin)**

TYPE LOCALITY.—Ash Creek, Anderson Junction, Washington County, Utah.

GEOGRAPHIC RANGE.—Southwestern United States.

DISTRIBUTION IN SOUTHERN UTAH.—Bull Valley Mountains: a, Hurricane Cliffs: c, Pine Valley Mountains: abd, Beaver Dam Wash: a.

DISCUSSION.—Southern Utah represents the northern limit of this species. It occurs along the Colorado Plateau and Southern Rocky Mountain portions of Washington County, but not into the Great Basin. This is the only species in southern Utah that is unique to the Virgin River Valley Province, revealing that this province is a distinct faunal area. Other species occurring in the area are either widespread

throughout southern Utah or show affinities with the Central Rockies.

Utacapnia lemoniana (Nebeker and Gaufin)

GEOGRAPHIC RANGE.—Central Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: ef, Beaver Valley: b, Markagunt Plateau: e, Pahvant Range: b, Wasatch Plateau: jn.

DISCUSSION.—Southern Utah is the southern limit of this species, which is common in northern Utah, but does not extend into the Southern Rocky Mountains, Colorado Plateau, or Great Basin regions of southern Utah.

Utacapnia logana (Nebeker and Gaufin)

GEOGRAPHIC RANGE.—Central and Southern Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: ef, Boulder Mountain: ab, Harmony Mountains: a, Hurricane Cliffs: b, Pahvant Range: de, Sevier Plateau: grs, Wasatch Plateau: dfj, LaSal Mountains: eg, Escalante River Drainage: d, Virgin River: c.

DISCUSSION.—This species was previously recorded from few locations in southern Utah, but it is now known to be widespread in this area. New county records with full data are given below.

Garfield Co.: Main Creek, Main Canyon, 18-II-2000, R.W. Baumann, 1 ♀; North Creek, above North Creek Reservoir, 18-II-2000, R.W. Baumann, 1 ♀; Pine Creek, Death Box Hollow Trailhead, 18-II-2000, R.W. Baumann, 4 ♂ 20 ♀. **Grand Co.**: Mill Creek, Hwy 191, Moab, 4-II-1985, R.W. Baumann and C.R. Nelson, 1 ♂ 3 ♀. **Kane Co.**: Virgin River, North Fork, above Zion Narrows, 5-II-1977, R.W. Baumann, 24 ♂ 11 ♀. **San Juan Co.**: Pack Creek, Pack Creek Campground, LaSal Mountains, 5-II-1985, R.W. Baumann and C.R. Nelson, 2 ♂. **Sanpete Co.**: Cottonwood Creek, above Fairview, 19-III-1988, S.A. Wells, 21 ♂ 11 ♀; Fairview Creek, Fairview Canyon, 30-III-1978, R.W. Baumann, 7 ♂ 1 ♀. **Washington Co.**: Virgin River, North Fork, below Zion Narrows, Zion National Park, 20-II-1972, R.W. Baumann and R.N. Winget, 1 ♀.

Family Leuctridae

Paraleuctra occidentalis (Banks)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Sevier Plateau: m, Abajo Mountains: bc.

DISCUSSION.—This species is widespread throughout the mountains of western North America. It occurs in the Central and Southern Rocky Mountain regions of southern Utah. *Paraleuctra* females have been reported from Pleasant Creek, Boulder Mountain (Brammer 1997); these are probably *P. occidentalis.* However, males are needed to confirm the species. Because of the few available records from the area, full data are given below.

San Juan Co.: Johnson Creek, 14 mi NW of Blanding, 21-IV-1986, R.W. Baumann and S.A. Wells, 4 ♂ 2 ♀; North Creek, above Dalton Springs Campground, 7 mi W of Monticello, 11-V-1976, K.W. Stewart and S.W. Szczytko, 5 ♂ 4 ♀; 5-II-1976, 1 N. **Sevier Co.**: Monroe Creek, Monrovian Park, 29-IV-1998, R.G. Call, 1 ♂.

Paraleuctra rickeri Nebeker and Gaufin

GEOGRAPHIC RANGE.—Rocky Mountains and Alaska.

DISTRIBUTION IN SOUTHERN UTAH.—Capitol Reef: e.

Discussion.—This is the only known record of this species in southern Utah. Full data are given herein.

Garfield Co.: Pleasant Creek, 24-VI-1995, J.F. MacDonald and C. Brammer, 2 ♂ 2 ♀ (PERC).

Paraleuctra vershina Gaufin and Ricker

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Wasatch Plateau: q.

DISCUSSION.—Baumann et al. (1977) list this species as occurring abundantly in creeks and rivers; however, it is documented from only a single locality in southern Utah. Its absence from southern Utah is perplexing in light of its presence in the Central Rockies of northern Utah and the Southern Rockies of Colorado and New Mexico. Its distribution pattern reveals a border where the Wasatch Mountain Range and the Wasatch Plateau meet. Full data are presented.

Sanpete Co.: Thistle Creek, Coyote Springs stream, 10-VI-1986, S.M. Clark and B.S. Clark, 5 ♂ 4 ♀.

***Perlomyia utahensis* Needham and Claassen**

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Pahvant Range: c, Sevier Plateau: p.

DISCUSSION.—This species, previously known only from Millard County in southern Utah, is now known from Sevier County as well. Full data for these 2 localities are given.

Millard Co.: Kanosh Canyon, 27-V-1939, G.F. Knowlton and F.C. Harmston, 1 ♂ 1 ♀. **Sevier Co.**: Monroe Creek, Monrovian Park, 20-VI-1998, R.G. Call, 2 ♀.

Family Nemouridae

***Amphinemura banksi* Baumann and Gaufin**

GEOGRAPHIC RANGE.—Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Abajo Mountains: abd, LaSal Mountains: ae.

DISCUSSION.—This species is limited to the Abajo and LaSal Mountains in southern Utah. This pattern agrees with the placement of the Abajo and LaSal Mountains as a part of the Southern Rocky Mountain faunal region connected to the Southern Rockies of Colorado. Although both this species and its sister species *A. mogollonica* (Baumann and Gaufin) occur in southern Utah (Baumann and Gaufin 1972), their ranges do not overlap. *Amphinemura banksi* (Baumann and Gaufin) occurs commonly in Colorado and sporadically in northern Utah, but it is conspicuously absent from all of southern Utah except the Abajo and LaSal Mountains. The presence of *A. banksi* (Baumann and Gaufin) in the Abajo and LaSal Mountains of southern Utah and its absence from the Central Rocky Mountains in the remainder of southern Utah indicate that this species originally occurred in the Abajo and LaSal Mountains or migrated there from the southern Rocky Mountains of Colorado rather than from northern Utah.

***Amphinemura mogollonica* Baumann and Gaufin**

GEOGRAPHIC RANGE.—Southern Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: beg, Awapa Plateau: a, Boulder Mountain: de, Markagunt Plateau: fhj, Pahvant Range: cg, Pansaugaunt Plateau: e, Paria River Drainage: d, Sevier Plateau: begimoqtuwxy, Tushar Mountains: cks, Wasatch Plateau: dfj, Virgin River: bc.

DISCUSSION.—This species, although widespread in southern Utah, is not recorded from northern Utah. It occurs in Southern Rocky Mountain faunal regions as well as Colorado Plateau, Great Basin, and Central Rocky Mountain faunal regions. It is unclear why it occurs in the Central Rockies of southern Utah but does not extend into the Central Rockies of northern Utah. The northern limit of its range in Sanpete County coincides with the transition from the Wasatch Plateau to the Wasatch Mountain Range, providing further evidence of a faunal division between these 2 areas.

***Malenka coloradensis* (Banks)**

GEOGRAPHIC RANGE.—Central and Southern Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: cdg, Boulder Mountain: deg, Markagunt Plateau: cj. Pansaugaunt Plateau: ef, Paria River Drainage: d, Pine Valley Mountains: bd, Sevier Plateau: kw, Tushar Mountains: gi, Abajo Mountains: ab, LaSal Mountains: gi, Henry Mountains: ae, Virgin River: b.

DISCUSSION.—This species is widespread in southern Utah in the Colorado Plateau, Great Basin, Central Rocky Mountain, and Southern Rocky Mountain faunal regions. It does not occur in northern Utah (Baumann 1970). Gaufin et al. (1966) incorrectly reported it as occurring in Weber County and Salt Lake County as did Baumann et al. (1977) in Duchesne County. Instead, *M. californica* (Claassen) occurs commonly throughout northern Utah, while *M. coloradensis* (Banks) is limited to the southern part of the Central Rockies. There is a division between the 2 species within the Central Rocky Mountains. This distribution pattern indicates separate faunal regions for the Northern High Plateau subcenter and the Southern High Plateau subcenter within the Central Rockies.

***Malenka flexura* (Claassen)**

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—LaSal Mountains: f.

DISCUSSION.—This species is a new state record for Utah. It is rare and has been collected only from the LaSal Mountains. Full data are presented below. Its distribution pattern agrees with the placement of the LaSal Mountains as a part of the Southern Rocky

Mountains faunal region connected to the Southern Rockies of Colorado.

San Juan Co.: springs entering Lake Oowah, LaSal Mountains, 20-VI-1987, C.R. Nelson, 1 ♂ 1 ♀.

***Podmosta delicatula* (Claassen)**

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Wasatch Plateau: bj.

DISCUSSION.—This species' distribution pattern in southern Utah indicates this area is part of the Central Rocky Mountain faunal region.

***Prostoia besametsa* (Ricker)**

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Beaver Valley: b, Boulder Mountain: e, Bull Valley Mountains: b, Markagunt Plateau: ehj, Pahvant Range: ac, Sevier Plateau: gmv, Tushar Mountains: aemp, Wasatch Plateau: bdej, Abajo Mountains: b, LaSal Mountains: g, Virgin River: c.

DISCUSSION.—This species is common throughout its range including southern Utah.

***Zapada cinctipes* (Banks)**

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: cd, Beaver Valley: b, Boulder Mountain: e, Markagunt Plateau: ce, Pahvant Range: ade, Pine Valley Mountains: bd, Sanpitch Mountains: ab, Sevier Plateau: acgmpxz, Tushar Mountains: hmnop, Wasatch Plateau: abdhjlq, Abajo Mountains: abc, LaSal Mountains: bg, Capitol Reef: e, Virgin River: bc.

DISCUSSION.—This species is widespread across southern Utah and can be very common.

***Zapada frigida* (Claassen)**

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Abajo Mountains: b, LaSal Mountains: d.

DISCUSSION.—This uncommon species is known in Utah only from the Abajo and LaSal Mountains, but it occurs commonly in nearby mountains of Colorado, showing that these southern Utah mountains are faunally part of the Southern Rocky Mountains of Colorado. Complete data are given for the only known specimens. We regret having neither the time nor resources to collect from this area during our study to verify that this species is still present. Given the size of our study area and the fact that many stonefly species emerge as adults during a brief period in the spring, we simply could not be everywhere we wanted to be.

San Juan Co.: Horse Creek, LaSal Mountains, 9-VI-1954, Ross and Ross, 1 ♂ (INHS); Johnson Creek, 19 mi N of Blanding, Abajo Mountains, 18-VI-1946, S. and D. Muliak, 1 ♂.

***Zapada haysi* (Ricker)**

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: d, Beaver Valley: a, Markagunt Plateau: hj, Sevier Plateau: jlmx, Tushar Mountains: p, Wasatch Plateau: jq, Abajo Mountains: b, Capitol Reef: e.

DISCUSSION.—This species is widely distributed across southern Utah but is not common. Brammer (1997) reports females from Pleasant Creek, Boulder Mountain. Without associated males, the species identification is uncertain.

Family Taeniopterygidae

***Doddsia occidentalis* (Banks)**

GEOGRAPHIC RANGE.—Western North America.

DISTRIBUTION IN SOUTHERN UTAH.—Harmony Mountains: a, Sevier Plateau: m, Tushar Mountains: aem.

DISCUSSION.—Although recorded in northern Utah, this species was previously unknown from southern Utah. We document it in southern Utah with the following new county records. The distribution pattern shows a Central Rocky Mountain faunal affinity at the edge of the Great Basin.

Iron Co.: Iron Creek, 10 mi above Cedar City, 29-III-1987, R.W. Baumann and P. Zwick, 9 ♂ 4 ♀ 1 exuvium. **Piute Co.**: Beaver Creek, 21-IV-1977, R.D. Williams, 2 nymphs; Deer Creek, Hwy 89, Big Rock Candy Mountain, 6-IV-1968, R.W. Baumann, 1 ♀; Pine Creek, Marysvale, 28-III-1987, R.W. Baumann and P. Zwick, 1 ♂. **Sevier Co.**: Monroe Creek, Monrovian Park Campground, 21-II-1986, R.W.

Baumann and C.R. Nelson, 14 nymphs; 28-III-1987, R.W. Baumann and P. Zwick, 9 ♂ 13 ♀.

Oemopteryx fosketti (Ricker)

GEOGRAPHIC RANGE.—Western North America.

DISTRIBUTION IN SOUTHERN UTAH.—Grand Valley: ab, Green River: a.

DISCUSSION.—This species is limited in southern Utah to large rivers.

Taenionema pacificum (Banks)

GEOGRAPHIC RANGE.—Western United States and Canada.

DISTRIBUTION IN SOUTHERN UTAH.—Boulder Mountain: b, Pahvant Range: b, Pine Valley Mountains: d, Tushar Mountains: q, Wasatch Plateau: j, Grand Valley: c, Escalante River Drainage: abce, Paria River Drainage: b, Capitol Reef: dg, Virgin River: abc.

DISCUSSION.—Several new records show this to be an abundant and widespread species in rivers and larger creeks of southern Utah.

Taenionema pallidum (Banks)

GEOGRAPHIC RANGE.—Western United States and Canada.

DISTRIBUTION IN SOUTHERN UTAH.—Boulder Mountain: e, Markagunt Plateau: hj, Tushar Mountains: p, Wasatch Plateau: djkq, LaSal Mountains: df.

DISCUSSION.—This species was previously recorded in southern Utah only from San Juan County. We collected this species from several new localities. Using these new records plus those of previously unreported specimens which we verified, we now report this species as occurring in several other southern Utah counties. New county records are included below with full data.

Beaver Co.: Puffers Lake, Beaver Canyon, 11-VI-1943, G.F. Knowlton, 1 ♂ 3 ♀ (INHS); 1 ♂ 2 ♀ (INHS). **Emery Co.**: Huntington Creek, Coal Canyon, 24-VI-1975, M.K. Reichert and R.N. Winget, 4 ♂ 1 ♀; Olsen Canyon, above Joes Valley Reservoir, 30-VI-1992, R.W. Baumann, 1 ♀. **Garfield Co.**: Mammoth Creek, Mammoth Springs Campground, 2-VI-1998, R.G. Call, 7 ♂ 3 ♀; Pleasant Creek, 7 km W of Pleasant Creek Campground, Hwy 12, Boulder Mountains, 17-VI-1994, J.F. MacDonald, 6 ♀ (PERC); 24-VI-1995, J.F. MacDonald and C.A. Brammer, 6 ♂ 26 ♀ (PERC). **Grand Co.**: Lake Oowah, LaSal Mountains, 10-VI-1963, L.L. Wu, 1 ♂ (USUC). **Iron Co.**: Parowan Creek, 2 mi N of Brian Head Ski Area, 2-VI-1998, R.G. Call, 1 ♂ 1 ♀. **Sanpete Co.**: Cottonwood Creek, 6 mi above Fairview, 29-V-1981, S.M. Clark and J.A. Stanger, 10 ♂ 9 ♀; Thistle Creek, Coyote Springs, 25-V-1981, S.M. Clark, 1 ♀.

Group Systellognatha
Family Chloroperlidae

Alloperla severa (Hagen)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Markagunt Plateau: k, Pahvant Range: b, Pine Valley Mountains: d, Sanpitch Mountains: dku, Wasatch Plateau: j.

DISCUSSION.—This species was previously unrecorded from southern Utah. Previously unreported records and specimens we collected from several localities reveal its occurrence in the Central Rocky Mountain region of southern Utah. Its presence in the Pine Valley Mountains of Washington County in the southwestern corner of the state confirms that these mountains are a continuation of the Central Rockies. Because these records are new county records, the complete data are presented.

Emery Co.: Huntington Creek, Huntington Canyon, below Electric Lake, 12-VI-1972, E.C. Devenport and R.N. Winget, 2 ♂; 20-VI-1972, 1 ♂ 1 ♀; Huntington Creek, upper, 20-VI-1972, E.C. Devenport and R.N. Winget, 3 ♂ 1 ♀. **Iron Co.**: Red Creek, above Red Creek Reservoir, 15-VII-1998, B.O. Huntsman and K.L. Huntsman, 1 ♀. **Sevier Co.**: Clear Creek, Hwy 4 at Hwy I-70, 27-VI-1998, R.G. Call, 2 ♂ 2 ♀; Fremont River, above Mill Meadow Reservoir, 29-VI-1989, R.W. Baumann, 4 ♂ 10 ♀; Mamoits Spring, jct Fremont River, 24-VIII-1984, R.W. Baumann, 1 ♀; Sevenmile Creek, Hwy 36, above Johnson Valley Reservoir, 29-VI-1989, R.W. Baumann, 4 ♂ 3 ♀. **Washington Co.**: Leeds Canyon, 16-VI-1978, W.J. Hanson and G.F. Knowlton, 1 ♂ 5 ♀ (USUC); Leeds Creek, jct Twin Pine Creek, 31-V-1985, C.R. Nelson, 2 ♀.

Plumiperla diversa (Frison)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Boulder Mountain: e, Sevier Plateau: x, Abajo Mountains: b, LaSal Mountains, ef.

DISCUSSION.—Garfield, Grand, and San Juan are new county records with the full data presented. Together with previous records from Sevier County, the data reveal this species is widely distributed throughout southern Utah. It is found in the Central Rockies, Southern Rockies, and the Colorado Plateau regions.

Garfield Co.: Panguitch Creek, below Panguitch Lake, 16-VII-1959, A.R. Gaufin, 1 ♂ 4 ♀; Pleasant Creek, Pleasant Creek Campground, Hwy 12, Boulder Mountains, 20-VI-1986, R.W. Baumann, 3 ♂ 12 ♀; 24-VI-1995, J.F. MacDonald and C.A. Brammer, 3 ♂ (PERC). **Grand Co.**: Oowah Campground, LaSal Mountains, 11-VI-1963, W.J. Hanson, 1 ♂ (USUC). **San Juan Co.**: Mill Creek, LaSal Mountains, 9-VI-1954, 2 ♂ (INHS); LaSal Mountains (probably Mill Creek), 9-VI-1954, 1 ♂ (INHS); 20 miles SW of Monticello, 9-VII-1970, J.L. Petty, 2 ♀ (USUC).

Suwallia pallidula (Banks)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Beaver Valley: ab, Boulder Mountain: e, Markagunt Plateau: j, Sevier Plateau: lmuxy, Tushar Mountains: jloprs, Wasatch Plateau: deijkp.

DISCUSSION.—This is a very widespread species in the western United States, occurring in the Central Rocky Mountain and Colorado Plateau regions of southern Utah. In addition to our findings, Baumann et al. (1977) list this species as occurring in San Juan County; however, we could not find specimens to confirm this record and did not collect any new specimens from this area during our study. Bret Huntsman assisted us with collecting and obtained a single adult male from Iron County, resulting in a new county record for which full data are presented.

Iron Co.: unnamed spring entering Parowan Creek, Hwy 143 jct Hwy 49, 14-VII-1998, B.O. Huntsman, 1 ♂.

Sweltsa borealis (Banks)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: d, Pine Valley Mountains: bd, Sanpitch Mountains: b, Sevier Plateau: eklx, Tushar Mountains: go, LaSal Mountains: ab.

DISCUSSION.—This species is widespread throughout the mountains of the western United States, including the mountains of southern Utah.

Sweltsa coloradensis (Banks)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Boulder Mountain: e, Pahvant Range: be, Sanpitch Mountains: ab, Sevier Plateau: jmuy, Tushar Mountains: kp, Wasatch Plateau: jq, LaSal Mountains: acd.

DISCUSSION.—Widespread throughout the mountains of the western United States, this species is the most common and widespread chloroperlid species in southern Utah.

Sweltsa cristata Surdick

TYPE LOCALITY.—Johnson Creek, 19 miles north of Blanding, San Juan County, Utah.

GEOGRAPHIC RANGE.—Abajo and LaSal Mountains, Utah.

DISTRIBUTION IN SOUTHERN UTAH.—Abajo Mountains: b, LaSal Mountains: f.

DISCUSSION.—This species described by Surdick (1995) is extremely limited in distribution. The only known specimens have been collected from the Abajo and LaSal Mountains of southern Utah. A series of 40 male and 20 female specimens collected by C.R. Nelson near Lake Oowah were in excellent condition, allowing us to examine the range of morphology exhibited in the species, particularly the male epiproct and lamella on the aedeagus. We confirm *S. cristata* as a valid species. Further collecting in nearby mountains of Colorado may reveal its presence there, which would be strong evidence of previous water connections between these isolated mountains of southern Utah and nearby mountains of Colorado. *Sweltsa cristata* specimens from this area of southern Utah were listed under *S. lamba* in the past (Baumann et al. 1977).

Sweltsa lamba (Needham and Claassen)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Beaver Valley: b, Pine Valley Mountains: bd, Henry Mountains: bd, Virgin River: b.

DISCUSSION.—This species is common in the Central Rocky Mountain region of northern Utah. It also occurs in the Beaver Mountains, Pine Valley Mountains, Virgin River, and Henry Mountains of southern Utah. This distribution reveals the continuity of the Central

Rocky Mountains in Utah. It also shows that the Henry Mountains are faunally more similar to the rest of southern Utah than to the Abajo and LaSal Mountains. Baumann et al. (1977) list the occurrence of this species in San Juan County; however, this listing was from specimens that are now included in *Sweltsa cristata* (Surdick 1995).

Triznaka pintada (Ricker)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Abajo Mountains: b, LaSal Mountains: ac.

DISCUSSION.—This species occurs in the Southern Rocky Mountains of Colorado, but in Utah it is limited to the Abajo and LaSal Mountains, providing another example of the faunal similarities between these isolated mountains of southern Utah and the Southern Rocky Mountains of Colorado.

Triznaka signata (Banks)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Beaver Valley: ab, Boulder Mountain: a, Markagunt Plateau: hi, Pahvant Range: be, Pansaugaunt Plateau: g, Pine Valley Mountains: bd, Sevier Plateau: dej, Tushar Mountains: f, Wasatch Plateau: j, LaSal Mountains: g, Canyonlands: c.

DISCUSSION.—This species is widespread in southern Utah.

Utaperla sopladora Ricker

TYPE LOCALITY.—Puffers Lake, Beaver Co., Utah.

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Tushar Mountains: p, Wasatch Plateau: q.

DISCUSSION.—This species is uncommon in Utah. The complete data are given for the only 2 specimens recorded from southern Utah. Other than the type specimen, the Sanpete County record is the first time this species has been collected in southern Utah. It was collected in the Raft River Mountains (Houseman and Baumann 1997), and it occurs more commonly in northern Utah, particularly the Uinta Mountains, showing Central Rocky Mountain affinities. Southern Utah is the southern limit of its range.

Beaver Co.: Puffers Lake, 11-VI-1943, G.F. Knowlton and P.E. Telford, 1 ♂ (holotype). **Sanpete Co.**: Thistle Creek, Coyote Springs, stream, E of Indianola, 10-VI-1986, S.M. Clark and B.S. Clark, 1 ♀.

Family Perlidae

Acroneuria abnormis (Newman)

GEOGRAPHIC RANGE.—United States and Canada.

DISTRIBUTION IN SOUTHERN UTAH.—Sevier Plateau: v, Grand Valley: a, Green River: a.

DISCUSSION.—The distribution of this species in southern Utah presents one of the most interesting findings of our study. It is uncommon in southern Utah, having been recorded previously only from the large rivers of the Colorado drainage, the Colorado, Green, and White rivers, which all flow to the southwest. We record it from the Sevier River, a much smaller river that flows north. The presence of *A. abnormis* in the Sevier River indicates that it was previously connected to the Colorado drainage. Full data for the Sevier River specimens are given.

Sevier Co.: Sevier River, Hwy 89, Big Rock Candy Mountain, 7-VII-1999, R. Larsen, 1 ♀; Sevier River jct Elsinore canal head, 17-IV-1999, J. Paul, 1 nymph.

Claassenia sabulosa (Banks)

GEOGRAPHIC RANGE.—Western North America and eastern Canada.

DISTRIBUTION IN SOUTHERN UTAH.—Pahvant Range: b, Sevier Plateau: dj, Tushar Mountains: f, Grand Valley: a.

DISCUSSION.—Nymphs of this species can be abundant in larger creeks of southern Utah. The species occurs sporadically in both the Central and Southern Rocky Mountains.

Hesperoperla pacifica (Banks)

GEOGRAPHIC RANGE.—Western North America.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: c, Beaver Valley: b, Boulder Mountain: e Pahvant Range: abe, Pine Valley Mountains: bd, Sanpitch Mountains: a, Sevier Plateau: ackmosuxz, Tushar Mountains: aehks, Wasatch Plateau: gj, Abajo Mountains: a, LaSal Mountains: bdeg, Capitol Reef: e.

DISCUSSION.—This species is the most widely distributed stonefly species in the Rocky Mountains (Baumann et al. 1977).

Family Perlodidae

Cultus aestivalis (Needham and Claassen)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Pansaugaunt Plateau: dg, Sevier Plateau: dk.

DISCUSSION.—This species is uncommon in southern Utah. Several nymphs, which we have been unable to identify to species, were collected from Clear Creek, Monroe Creek, and Niotche Creek. These nymphs are from Sevier County, where adults are available, indicating that these nymphs represent *C. aestivalis.* The species ranges in the Central Rocky Mountains.

Diura knowltoni (Frison)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Beaver Valley: b, Markagunt Plateau: h, Sevier Plateau: m, Tushar Mountains: a, Wasatch Plateau: jk, Abajo Mountains: b, LaSal Mountains: g.

DISCUSSION.—This species is widespread but uncommon throughout the high mountains of southern Utah.

Isogenoides colubrinus (Hagen)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Pansaugaunt Plateau: dg, Grand Valley: ab.

DISCUSSION.—This species occurs in the large rivers of the Colorado drainage, but it is also found in the Sevier River, indicating that the Sevier River was connected in the past to the Colorado drainage. Baumann et al. (1977) list this species from San Juan County as well. We have confirmed the specimens from Grand County and Garfield County but were unable to find specimens from San Juan County. However, given its presence in the other large rivers of the Colorado drainage, we are certain it exists in San Juan County. The Sevier River record is given below.

Garfield Co.: Sevier River, Hwy 89 and Bryce Canyon Road, 12-VI-1950, W.E. Ricker, 3 ♂ 2 ♀ (CNC).

Isogenoides zionensis Hanson

Type locality.—Zion National Park, Utah.

GEOGRAPHIC RANGE.—Rocky Mountains and Alaska.

DISTRIBUTION IN SOUTHERN UTAH.—Hurricane Cliffs: b, Markagunt Plateau: h, Sanpitch Mountains: a, Sevier Plateau: fgjopqrsuv, Wasatch Plateau: gjm, Escalante River Drainage: bc, Canyonlands: cd, Capitol Reef: de, Virgin River: bc.

DISCUSSION.—This species is common and widespread throughout southern Utah. It is interesting to note its abundance and widespread occurrence throughout the Virgin River drainage but its absence from the Pine Valley Mountains and Santa Clara River drainage. There is a definite faunal division between these 2 regions. Common in the Virgin River drainage to the south, it ranges north to the Sevier and Wasatch plateaus and even as far north as the Spanish Fork River in northern Utah. Note its conspicuous absence from the Sevier River and Fremont River of Capitol Reef National Park. The presence of *I. zionensis* rather than *I. colubrinus* in the Virgin River indicates that the Virgin River was not always part of the Colorado drainage.

Isoperla fulva Claassen

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: c, Beaver Valley: a, Boulder Mountain: c, Markagunt Plateau: af, Pahvant Range: bc, Pansaugaunt Plateau: g, Pine Valley Mountains: b, Sevier Plateau: aegmnpuy, Tushar Mountains: fs, Wasatch Plateau: ijq, Abajo Mountains: b, LaSal Mountains: bcd, Escalante River Drainage: c, Capitol Reef: d, Virgin River: c.

DISCUSSION.—This species and *I. quinquepunctata* are the most commonly collected species of the genus in southern Utah.

Isoperla longiseta Banks

GEOGRAPHIC RANGE.—Great Plains to Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Grand Valley: ab, Canyonlands: abd, Painted Desert: abc, Green River: ab.

DISCUSSION.—In southern Utah this species occurs only in the large rivers of the Colorado drainage.

Isoperla mormona Banks

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Pahvant Range: b, Sevier Plateau: dkv, Tushar Mountains: mq, LaSal Mountains: g, Capitol Reef: dg, Virgin River: b, Great Basin Desert: a, Escalante River Drainage: b.

DISCUSSION.—This species is widespread and can be common in southern Utah. It is one of the few species commonly found in the Great Basin, being more tolerant of warmer and siltier lotic systems.

Isoperla petersoni Heedham and Christenson

GEOGRAPHIC RANGE.—Alaska, Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Wasatch Plateau: hi.

DISCUSSION.—The complete data for this species in southern Utah are given.

Sanpete Co.: Flat Canyon Spring, 18-VII-1999, R. Hansen, 44 nymphs; O'dell Spring, Flat Canyon, 17-VII-1999, R. Hansen, 4 nymphs; Stanley Spring, Flat Canyon, 19-VII-1999, R. Hansen, 12 nymphs; Gooseberry Creek, Flat Canyon, 19-VII-1999, R. Hansen and S. Hansen, 2 nymphs.

Isoperla phalerata (Needham)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Markagunt Plateau: i.

DISCUSSION.—Complete data for this record are included. This species is unrecorded elsewhere in Utah. Although we attempted to verify its presence in Panguitch Creek, we did not succeed in collecting any specimens. The distribution of this species in other localities in the Central and Southern Rocky Mountains, however, does make its presence in Utah plausible. We examined the specimen reported and concur that it is *I. phalerata.* We therefore believe it to be present in this area and include it in the list of stoneflies occurring in Utah. Because it is the only record for the state, full data are given.

Garfield Co.: Panguitch Creek, between Panguitch and Panguitch Lake, 27-VI-1967, G.F. Knowlton, 1 ♀ (INHS).

Isoperla pinta Frison

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Pansaugaunt Plateau: f.

DISCUSSION.—We collected only a single specimen of this species from a remote site during our study, the full data for which are given below. It is also reported from Garfield County (Baumann et al. 1977), but we were unable to obtain and examine these specimens.

Kane Co.: Podunk Creek, Hwy 99, S of Tropic Reservoir, R.W. Baumann and R.G. Call, 1 ♀.

Isoperla quinquepunctata (Banks)

GEOGRAPHIC RANGE.—Coast and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: a, Boulder Mountain: e, Bull Valley Mountains: a, Markagunt Plateau: bij, Pahvant Range: acde, Pine Valley Mountains: bd, Sanpitch Mountains: a, Sevier Plateau: mpqry, Tushar Mountains: en, Wasatch Plateau: ijq, LaSal Mountains: g, Grand Valley: a, Henry Mountains: ach, Capitol Reef: f, Virgin River: c.

DISCUSSION.—This species is widespread throughout southern Utah.

Isoperla sobria (Hagen)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Boulder Mountain: e, Wasatch Plateau: j, Abajo Mountains: c, Grand Valley: fj, Capitol Reef: e, Markagunt Plateau: f.

DISCUSSION.—This species is widely distributed, but uncommon in southern Utah.

Kogotus modestus (Banks)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—LaSal Mountains: df.

DISCUSSION.—This species is restricted in southern Utah to the LaSal Mountains. It also occurs in the Central Rocky Mountain region of northern Utah and the Southern Rocky Mountains of Colorado. The distribution of this species is another example of the uniqueness of this area compared with the rest of southern Utah. In the past these mountains must have been connected to either the mountains of Colorado or the mountains of northern Utah.

Megarcys signata (**Hagen**)

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains.

DISTRIBUTION IN SOUTHERN UTAH.—Boulder Mountain: e, Hurricane Cliffs: b, Markagunt Plateau: hj, Sevier Plateau: gjmnotu, Tushar Mountains: gkop, Wasatch Plateau: ehjp, Abajo Mountains: b.

DISCUSSION.—Prior to our study this species was known from only 3 counties in southern Utah. Several new records from our study show that this species is widespread in southern Utah. We document it from 7 counties.

Skwala americana (**Needham and Claassen**)

GEOGRAPHIC RANGE.—Western North America.

DISTRIBUTION IN SOUTHERN UTAH.—Wasatch Plateau: j.

DISCUSSION.—This rare species is known from only a single locality in southern Utah, as we define it. This record exemplifies the pitfalls of using political boundaries in a geographical study. It actually occurs at the southern end of the Wasatch Mountain range or northern edge of the Wasatch Plateau, showing a faunal division at this boundary. This boundary is likely the southern limit of its range in Utah.

Emery Co.: Huntington Creek, 15-VI-1948, collector ?, 1 ♂ 4 ♀.

Family Pteronarcyidae

Pteronarcella badia (**Hagen**)

GEOGRAPHIC RANGE.—Rocky Mountains and Alaska.

DISTRIBUTION IN SOUTHERN UTAH.—Aquarius Plateau: a, Beaver Valley: ab, Boulder Mountain: e, Escalante River Drainage: f, Markagunt Plateau: fhj, Pansaugaunt Plateau: dg, Pahvant Range: bce, Sevier Plateau: afgjmor, Tushar Mountains: aefhkms, Wasatch Plateau: gjopq, LaSal Mountains: bg, Capitol Reef: ade, Virgin River: c.

DISCUSSION.—This species is widespread and common throughout southern Utah in all geographic provinces.

Pteronarcys californica **Newport**

GEOGRAPHIC RANGE.—Coast, Cascade, and Rocky Mountains, and Sierra Nevada.

DISTRIBUTION IN SOUTHERN UTAH.—Beaver Valley: a, Markagunt Plateau: h, Pahvant Range: b, Pine Valley Mountains: b, Sevier Plateau: j, Tushar Mountains: f, Wasatch Plateau: j, Capitol Reef: ade.

DISCUSSION.—This species is sporadic and disjunct in its distribution throughout southern Utah.

ACKNOWLEDGMENTS

We thank Riley Nelson, Duane Jeffrey, and Bruce Schaalje for their assistance. Thanks to the Department of Zoology for the awards that have made this undertaking financially possible. Special thanks to D.E. Bright and E.C. Becker (Canadian National Collection), Boris C. Kondratieff (Colorado State University), Andrew H. Barnum (Dixie College), Ed Dewalt and Donald W. Webb (Illinois Natural History Survey), John A. MacDonald and Colin A. Brammer (Purdue University), Robert Hansen (Austin, Texas), Wilford J. Hanson (Utah State University), Nancy Adams and Oliver S. Flint, Jr. (United States National Museum), S.M. Clark (Charleston, West Virginia), Robert N. Winget (Brigham Young University–Hawaii), Bret O. Huntsman, Karen Rohner (Mammoth Creek Fish Hatchery, Utah Department of Fish and Game), and Brent Farnsworth (Utah Division of Wildlife Resources) for providing records or specimens used in this study or otherwise assisting in the project. Special thanks go to Harry Barber of the Grand Staircase–Escalante National Monument for helping us find isolated localities in the vast monument. We especially thank our families for their support throughout this project.

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Received 20 July 1999
Accepted 31 May 2000