

Invertebrate Biodiversity in the Northern Gulf of California

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Discovering the Northern Gulf and Its Invertebrate Biodiversity

Earliest Discoveries

Probably for over 10,000 years Native Americans have traveled through the Sonoran Desert to visit or live on the shores of the northern Gulf of California (Sea of Cortez). Here they found a stunning diversity and abundance of shellfish and finfish, easily harvested during the twice-daily low tides, and sea turtles that could be captured in shallow waters. They also found fresh water in the Colorado, Sonoyta, and Concepción rivers and in the *pozos* (springs) that welled up through fissures in the soil, fed by groundwater originating as far away as modern-day Arizona (Figure 29.1). Along the coast of the Gran Desierto many of these *pozos* are surrounded by vast beds of crystallized salt, a commodity that further enhanced the value of visits to the upper gulf (Figure 29.2). Ancient shell middens at least two thousand to six thousand years old, and perhaps much older (Brusca 2004a; Ritter 1985, 1998), inform us that native people exploited coastal shellfish (molluscs and crustaceans) in the northern Gulf of California for food and jewelry, some of which was traded far and wide, reaching northern Arizona and California.¹ To these early collectors of the upper gulf's rich invertebrate biodiversity, the region must have been important beyond imagination. There was reliable freshwater and a predictable and inexhaustible food supply (and shells and salt for trading). And because of the high seasonal turnover of coastal life in the subtropical upper gulf, the seafood varied through the year (Brusca 1980b, 2002a, 2002b, 2004b; Brusca et al. 2001; Chapters 14 and 15, this volume).

Belief in a sea passage through North America, connecting the Atlantic and Pacific oceans (the fabled "Strait of Anian"), brought the first Euro-

peans, led by Hernan Cortés, to the Gulf of California. Cortés made five explorations of the Pacific coast between 1527 and 1539, including a failed attempt to colonize Baja California in 1535 (Bowen 2000; Brusca 2004b). Cortés never saw the northernmost gulf, but assigned to his deputy, Francisco de Ulloa, the sailing expedition that reached the upper gulf in 1539. Thus Ulloa and his men were probably the first Europeans to set eyes on this region. Ulloa was also the first European to prove that the Baja California peninsula was not an island. Father Eusebio Francisco Kino (1645–1711) saw the upper gulf when he visited El Pinacate on his first trip in 1698, and again in 1706. On his second expedition to the Pinacate, from the top of the Sierra Pinacate, Kino saw the mouth of the Colorado River, and Baja was once again declared a peninsula, not an island. Just before his death, Kino drew a fairly accurate map of the Sea of Cortez, clearly indicating the Baja peninsula.²

Before the twentieth century, few European or U.S. explorers or naturalists spent time in the Gulf of California. One hundred and thirty-seven years after Kino's death Frederick Reigen, a Belgian citizen who lived in Mazatlán from 1848 to 1850, took up collecting molluscs in the gulf. Reigen amassed one of the largest collections of seashells of all time—14 tons of shells! The Reigen collection found its way to Liverpool, and from there it was partly dispersed. Much of it was published on by Philip Carpenter (Carpenter 1857; see Hendrickx & Toledano-Granados 1994).

Another early collector of marine invertebrates in the region was John Xantus (de Vesey), a controversial Hungarian hired by the U.S. Coast Survey as a tidal observer stationed at the tip of Baja California (April 1859 to mid-1861). Most of Xantus's collections are now at the Smithsonian Institution (e.g., Jordan & Gilbert 1882). From 1888 to 1894 the French chemical engineer Leon Diguët

studied natural history while employed by the famous Boleo Mine in Santa Rosalía. Diguét made many collections, most of which ended up at the Museum d'Histoire Naturelle in Paris. Ten marine invertebrates from the gulf have been named in Diguét's honor (six crustaceans, three molluscs, and one polychaete). Many conspicuous land plants also bear his name, such as the giant barrel cactus of Isla Catalina (*Ferocactus diguetii*) and the bushy ocotillo of the southern gulf coast (*Fouquieria diguetii*).

During the following three decades a few ichthyologists made collections of fishes at some readily accessible sites, notably Guaymas and Mazatlán, which were reported on mainly by David Starr Jordan and colleagues (e.g., Evermann & Jenkins 1891; Jordan 1895; see Chapter 26, this volume). Oceanographic data were recorded and some marine invertebrates were trawled by the U.S. Fish Commission steamer *Albatross* in the late 1880s and early 1890s, and again in 1911, and most of these specimens are also at the Smithsonian Institution (e.g., Gilbert 1892). Aside from a brief foray in 1889, the *Albatross* did not work in the northern gulf. However, from the *Albatross* expedition came the original description of a legendary fish, the totoaba (*Totoaba macdonaldi*), described by C. H. Gilbert, the ship's chief naturalist. The chief invertebrate biologist on the *Albatross* expeditions was the malacologist Paul Bartsch.

Daniel Trembly MacDougal (first director of Tucson's Desert Botanical Laboratory, later of the Carnegie Institution of Washington, D.C.) and his party explored the Pinacate area in 1907, but only one member of the group reached the gulf coast, the "official geographer" Godfrey Sykes (Hornaday 1908). In 1909–10 Carl Lumholtz explored the Pinacate and the entire upper gulf coast of Sonora (Lumholtz 1912). Lumholtz not only spent time on the shores of the upper gulf; he visited the coastal pozos and salinas, writing, "Judging from the extraordinary springs I encountered on the shore of the salt deposit, Salina Grande, near the coast, there must be a large sheet of fresh water underneath most of that western coastal desert" (Lumholtz 1912:ix). The "sheet of water" Lumholtz referred to is a shallow water table that probably originates in what is now Pinacate Biosphere Reserve and Cabeza Prieta National Wildlife Refuge (Brusca 2004b; Ezcurra et al. 1988). Lumholtz eventually arrived on the beach at what is today El

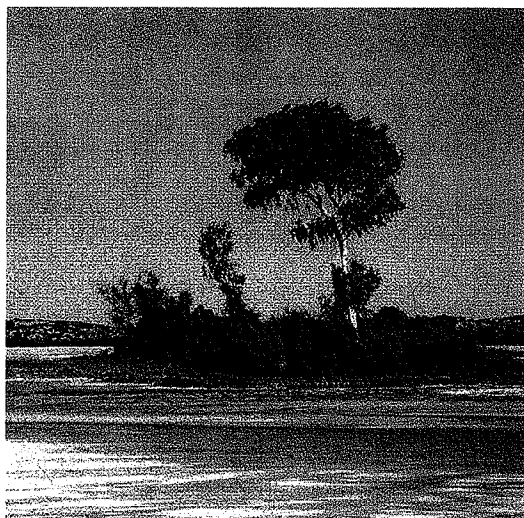


Figure 29.1. Coastal pozos in the Gran Desierto, south of El Golfo de Santa Clara. (Photo by R. C. Brusca)

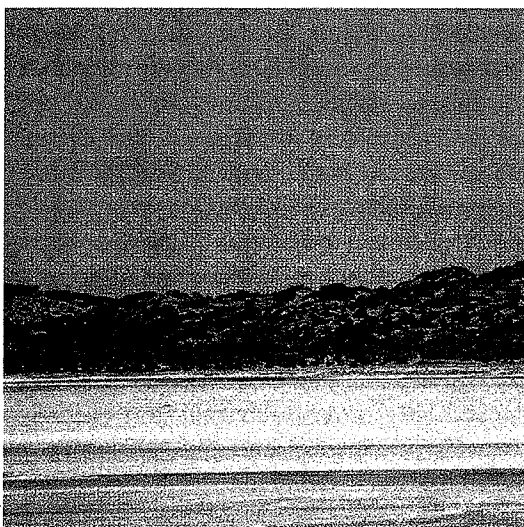


Figure 29.2. Coastal salinas in the Gran Desierto, south of El Golfo de Santa Clara. (Photo by R. C. Brusca)

Golfo de Santa Clara, finding it littered with giant branches and trunks of cottonwood and willow from the once great Colorado River riparian forests. Lumholtz's travel log notes that "the upper part of the Gulf abounds in fish" (1912:258), which he and his party, on occasion, took in great numbers by tossing sticks of dynamite into the water from the shoreline!

Lumholtz spent considerable time with the O'odham people and talked with leaders of their salt expeditions, a trek that used to take them from as far away as the Gila River in Arizona to the pozos, salinas, and shores of the upper gulf. Lumholtz met "El Doctor Pancho," one of the Sand Papago (Areneños), who was then living in the O'odham settlement at Quitobaquito. The Hia C'ed O'odham (Sand Papagos) are said to have been a hardy lot, living a nomadic lifestyle in the Gran Desierto. However, the fact that they had a

reliable supply of fresh water from the scattered but known pozos and tinajas, as well as access to the rich biodiversity of the upper gulf (including an abundance of shellfish), suggests to me that their life might not have been so difficult. In addition to fish and crustaceans, they are known to have taken sea lions and at least some sea turtles along the coast, as well as foraging on small game and insects and on many coastal and inland plants of the region (Chapter 15, this volume), including the fabled “sandfood,” or “root of the sands” (*Pholisma sonorae*).

Another of the earliest oceanographic expeditions to the Sea of Cortez was William Beebe’s, 1936 expedition under the auspices of the New York Zoological Society—the “Zaca,” or “Templeton Crocker,” expedition (*Zaca* was the ship, Templeton Crocker its owner). The *Zaca* expedition was, as typical of Beebe’s expeditions, weak on science and heavy on Beebe’s own brand of machismo. Beebe’s narrative of the journey (*The Zaca Venture*, 1938) makes better reading for testosterone-laden sport fishermen than for those with a sincere interest in natural history. Nevertheless, the expedition produced a large number of invertebrate specimens that provided a source of taxonomic research material for several subsequent decades (by such great invertebrate zoologists as Jocelyn Crane, Steve Glassell, Fenner Chace, Aaron Treadwell, Elisabeth Deichmann, Fred Ziesenhenné, and Martin Burkenroad). Unlike most expeditions, Beebe made the decision to concentrate collecting efforts at just three localities: Bahía Inez, Cabo San Lucas and the adjoining Arena and Gorda banks, and Clarion Island. Thus the *Zaca* never reached the northern gulf. However, Beebe culled some cogent information about the Sea of Cortez in 1936. His interviews with Mexican fishermen indicated that upward of 20 million tuna and skipjack were being caught annually along the coast of northwestern Mexico, with no apparent diminution in their numbers over the years—testimony to the highly productive waters of the region. Beebe also encountered Japanese fishing boats in the gulf, probably some of the first Japanese penetrations into this sea, establishing a pattern that has persisted, episodically, ever since. Although Beebe was well aware of the beauty and diversity of life in the Sea of Cortez, he had an exploitative view of nature, and some of the most descriptive passages in his account describe shooting sharks and

manta rays (with rifles and pistols) from the deck of the *Zaca* for “sport.” The last line of his book reads, “At my next formal dinner, when the guests are absorbed in the delicacy of their green turtle soup, I will rejoice in the memory of the brooding turtles of Clarion Island.”

John Steinbeck and Ed Ricketts Visit the Sea of Cortez

In 1940, four years after the *Zaca* expedition, modern marine biology in the Gulf of California had its birth with the remarkable pioneering expedition of Ed Ricketts and John Steinbeck aboard the *Western Flyer*, a purse seiner out of Monterey, California (Figure 29.3).³ The biology (and philosophy) of that amazing voyage is chronicled in their 1941 book, *Sea of Cortez: A Leisurely Journal of Travel and Research* (also see Astro & Hayashi 1971; Beegel et al. 1997; Brusca 1993, 2004a; Hedgpeth 1978). It was this expedition that first documented, in an organized way, the seashore life of the gulf. Using funds from Steinbeck’s successful writing career, the two men chartered the *Western Flyer* for a six-week expedition to the gulf.⁴ The Ricketts-Steinbeck expedition just reached the upper gulf, its northernmost collecting sites being the Midriff Islands (Puerto Refugio, Isla Ángel de la Guarda, and Red Bluff Point, Isla Tiburón). Their landmark voyage had a profound impact, bringing the Sea of Cortez into the consciousness of both the American public and the scientific world. The expedition visited 24 sites and collected over 400 species of marine invertebrates (Table 29.1), 93 of which have found their way to the Smithsonian Institution and are today available in the collections of the National Museum of Natural History. For more than thirty years, their expedition report was the only place anyone could turn for a synoptic view of invertebrate life in the Sea of Cortez (Brusca 2004a).⁵

Since Steinbeck and Ricketts

Expeditions from Scripps Institution of Oceanography, the University of California at Los Angeles, Stanford University, the California Academy of Sciences (actually beginning as early as 1888), and the University of Southern California’s Allan Hancock Foundation in the 1940s and 1950s ushered in an era of organized research effort in the gulf. The expeditions and taxonomic publications of the once glorious but now defunct Allan Hancock

Foundation stand above all others in documenting the biodiversity of the gulf (Brusca 1980a). Between 1942 and 1983 the Hancock Foundation publications on Pacific marine life produced an astonishing 22,469 pages of primarily invertebrate taxonomic text that stands as a watershed in marine biodiversity research (University of Southern California 1985).

Between 1958 and 1972 the Belvedere Scientific Fund of San Francisco also sponsored several investigations and publications on the Sea of Cortez. It was through the personal interest of Kenneth Bechtel (sponsor of the fund) and Lewis Wayne Walker (of the Arizona-Sonora Desert Museum) that the Isla Rasa Reserve was established in the gulf, and the Desert Museum continued funding the reserve (and Bernardo Villa's research) well into the 1970s. From 1960 to 1969 the San Diego Museum of Natural History operated the Vermilion Sea Field Station at Bahía de los Angeles, and in 1962 it undertook a major expedition in the gulf (funded, again, by the Belvedere Fund).

Despite all this previous work, when I arrived in the gulf in 1969, the only synoptic compilation of information on marine invertebrates was the Ricketts and Steinbeck volume (1941), and there

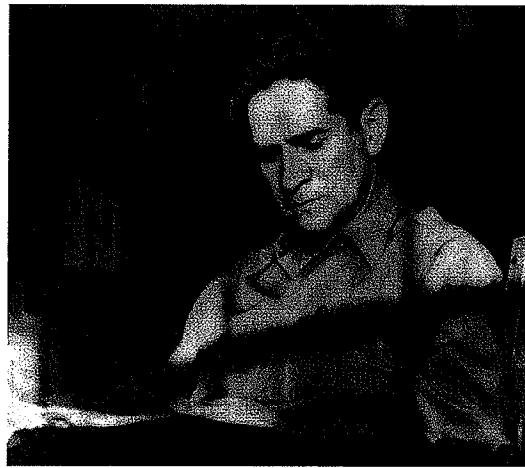


Figure 29.3. Ed Ricketts, circa 1938. (Photo courtesy Joel Hedgpeth)

were no keys to assist one in identifying the invertebrates of the region. I realized this after I began a two-year residence in Mexico working for the University of Arizona's Marine Biology Program. I quickly discovered that if I wanted students to know what they were looking at in gulf tidepools, I would have to write the keys myself. Thus it came to be that, in 1969, I gave up my lifestyle of chasing waves and Grateful Dead concerts in California and moved to Puerto Peñasco to live on the shores of the Sea of Cortez for two years. There I designed and built a small marine lab for the University of Arizona, made countless

TABLE 29.1. Numbers of (named) invertebrate species/subspecies treated in the three synoptic compilations of Gulf of California invertebrates.

PHYLUM	STEINBECK & RICKETTS 1941	BRUSCA 1980B	HENDRICKX ET AL. 2005
Porifera	14	22	86
Cnidaria	10	54	253
Ctenophora	0	2	4
Platyhelminthes (Turbellaria)	5	14	22
Nemertea	1	10	17
Sipuncula	6	9	11
Echiura	2	3	4
Annelida	48	137	718
Arthropoda: Crustacea	143	279	1,051
Arthropoda: Pycnogonida	0	9	15
Mollusca	113	262	2,193
Ectoprocta (Bryozoa)	14	110	169
Brachiopoda		3	5
Echinodermata	61	60	262
Chaetognatha	0	0	20
Hemichordata (enteropneusts)	2	3	3
Chordata, Urochordata (tunicates, appendicularians)	10	10	37
Chordata, Cephalochordata (lancelets)	1	0	1
TOTAL	430	987	4,871

field trips throughout the gulf, and shipped specimens of invertebrates to specialists around the world. Out of that emerged the first edition of *Common Intertidal Invertebrates of the Gulf of California* (Brusca 1973; 2d ed. 1980b). Much of those two years was spent exploring the shores of the gulf with J. Laurens Barnard, a good friend and colleague who was on loan from the Smithsonian Institution to the University of Arizona (Brusca 1993).

Since 1973, knowledge of the upper gulf and its biodiversity has increased substantially through research by scientists at the University of Arizona, Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE), Universidad de Sonora (UNISON), Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM)—Campus Guaymas, Universidad Autónoma de Baja California Sur (UABCS), Centro de Investigaciones Biológicas del Noroeste (CIBNOR), Centro de Investigación en Alimentación y Desarrollo (CIAD), and the Facultad de Ciencias of the Universidad Nacional Autónoma de México (UNAM) as well as its Instituto de Ciencias del Mar y Limnología (ICML-UNAM) Mazatlán field station and Instituto de Biología (IB-UNAM). This body of work has resulted in many publications describing the flora, fauna, and environment of the region, much of it catalogued in Brusca et al. 2001, Brusca et al. 2004, Hendrickx et al. 2005, Schwartzlose et al. 1992, and Thomson et al. 2000. Today 5,970 species of animals (macrofauna) are known from the Sea of Cortez, 2,261 of them from the northern gulf. However, compared with knowledge about much of the world's coastline, exploration and documentation of the biodiversity of the Sea of Cortez, especially the northern gulf, is still in its early stages, and I estimate that more than half the gulf's invertebrate fauna remains undescribed, while the natural history of almost all species is still unknown.

The Northern Gulf of California: A Unique Oceanographic Region

The Sea of Cortez exists today because 5–10 million years ago a 1,800-km-long continental sliver attached itself to the eastern margin of the great Pacific Plate and peeled away from mainland Mexico to begin a slow journey northwestward. Today the southern half of this sliver comprises the Baja California peninsula, one of the most

remote peninsulas in the world and exceeded in length only by the Malay and Kamchatka peninsulas. The gulf itself covers 258,593 km² (99,843 mi²), has a coastline of 3,260 km, and spans over nine degrees of latitude, traversing the Tropic of Cancer in its southern reaches. The northern gulf, that area from (and including) the Midriff Islands to the delta of the Colorado River, covers about 60,000 km² (24,000 mi²) of ocean surface and is a unique body of water in many ways. It lies in the driest part of the Sonoran Desert. The estimated mean evaporation rate for the northern gulf is 1.1 m/yr, while precipitation is only 4–8 cm/yr (Alvarez-Borrego 1983; Lavín et al. 1998). Because evaporation far exceeds freshwater input, the entire gulf is regarded as an “evaporation basin,” and most of this deficit occurs in its northern part (Bray & Robles 1991). Lavín et al. (1998) regard the entire upper gulf (that region with a depth less than 100 m) as a “negative estuary” (a semi-enclosed embayment with little or no freshwater input and with decreasing salinities from the uppermost region toward the mouth). Salinities also have increased here in response to a dramatic reduction of freshwater (river) discharge over the past 70 years, the increase of saline agricultural drainage, and probably global warming (enhancing evaporation). Summer surface salinities reach 40 ppt in the various coastal *esteros* and inner areas of the Colorado River delta, whereas over deeper water in the northern gulf surface salinities are 35.3 to 37.2 ppt. The year-round salinity pump at the head of the gulf generates a pressure gradient that results in gravity currents that drive dense saline surface waters to the bottom—to depths of 30 m in the summer and 200 m in the winter (i.e., into the Wagner Basin, and out of the northern gulf by way of the Salsipuedes Basin and Channel). In the central and southern gulf, salinities are closer to typical oceanic waters (35.0 to 35.8 ppt) (on the oceanography of the central and southern gulf, see Alvarez-Borrego 1983; Bray & Robles 1991; Brusca 2004a).

The northern gulf is further distinguished by having some of the greatest tides in the world. The annual tidal range (amplitude) at San Felipe and Puerto Peñasco is about 7 m, and on the Colorado River delta at the head of the gulf it is nearly 10 m. Much of the low delta islands of Montague and Pelicano (= Isla Gore) is under water during high spring tides. In fact, most of the northern gulf itself

(north of the Midriff Islands) is shallow, largely less than 100 m in depth, with the deepest areas reaching about 230 m in the small Wagner Basin and in the larger Dolphin Basin above Isla Ángel de la Guarda and extending into the deeper Salsipuedes Basin that separates the island from the peninsula (Alvarez-Borrego 1983; Brusca 2004a; Maluf 1983). Circulation in the upper Gulf of California has not been well studied, but limited evidence suggests it is primarily clockwise in the winter (October to April) and primarily counterclockwise in the summer (May to September).

Another important distinguishing feature of the northern gulf is its strong biseasonal hydrographic regime. Coastal seawater temperatures throughout the northern gulf are low in the winter, dropping to 8–12°C (equivalent to southern California's warm-temperate shores), but rising to 30°C or more in the summer (Brusca 1980b, 2004a; Brusca et al. 2005). Because of its cold winter water temperatures and associated temperate fauna, the northern gulf should be classified as a subtropical region, like the Gulf of Mexico coastal region in the United States.

Still another distinguishing feature of the northern gulf is its exceptionally high rates of primary productivity, comparable to those of the Bay of Bengal or the great upwelling areas off the west coasts of Baja California, Peru, and North Africa (Alvarez-Borrego 1983). High nutrient levels, shallow waters, abundant solar radiation, and strong tidal mixing combine to make the northern gulf one of the most productive marine regions in the world. Primary productivity in the northern gulf is two to three times greater than that of the open Atlantic or open Pacific at similar latitudes (Zeitzschel 1969). Nutrient levels and standing crops of both phytoplankton and zooplankton in the northern gulf are high year round and show little seasonality, although in recent years important sources of nutrients have probably been agricultural drainage and the release of ancient nutrients trapped in Colorado River sediments that are now eroding. Bray and Robles (1991) suggest that influx of cold deep water into the southern gulf brings nutrients into the Sea of Cortez and elevates productivity where it upwells, but it is not clear to what extent these nutrients reach the northern gulf. Large fishes, sea turtles, and at least twelve species of whales and dolphins, including the critically endangered vaquita porpoise, exploit

the productive northern gulf waters. Suspension-feeding clams, crustaceans, and polychaete worms also occur in great abundance throughout this region.

Older estimates of oxygen concentrations in the northern gulf tended to be high, decreasing from about saturation values at the surface (5–6 ml/l) to about 1 ml/l at 300–500 m depth in the Dolphin Basin. However, almost no contemporary data exist for bottom conditions in this region. Although strong tidal currents in the northern gulf keep the water column well mixed, it seems almost certain that bottom areas chronically disturbed by the numerous shrimp trawlers (and accumulation of their discarded bycatch on the sea floor) experience hypoxia (less than 0.2 ml/l dissolved oxygen) or even anoxia (Pérez-Mellado & Findley 1985).

Invertebrate Biodiversity

Origins and Maintenance of Faunal Diversity

The flora and fauna that inhabit the northern gulf arrived there from diverse sources: tropical Central America, the Caribbean Sea (before the final closure of the Panama seaway about 3.2 million years ago), the temperate shores of California (during the 15–20 glacial periods that pushed cold waters south and into the gulf over the past two million years), and even across the vast stretch of the Pacific Ocean from the tropical West Pacific (Briggs 1974; Brusca 1980b, 2002b, 2004a; Brusca & Wallerstein 1979; Castro-Aguirre & Torres-Orozco 1993; Duque-Caro 1990; Rosenblatt 1967; Rosenblatt & Waples 1986; Thomson et al. 1979, 2000; Walker 1960). These various biotic sources have enriched the diversity of the gulf over the past three million years. During past glacial events, temperate “California species” were able to extend their ranges into the gulf as cold isotherms pushed below the tip of the Baja California peninsula, trapping these species in the northern gulf during subsequent warm interglacials. Most of these cold-water species disappeared from the gulf during the warm periods, such as seen today, but some were adaptable enough to survive as isolated populations in the uppermost gulf. Many of these now comprise the California–northern gulf disjunct temperate fauna, which includes species such as the long-fingered shrimp (*Betaeus longidactylus*) and the purse crab (*Randallia ornata*). Still others appear

to have undergone speciation events and probably now represent California/gulf sister-species pairs, although phylogenetic studies on invertebrates have not yet investigated this probability.

Invertebrate community composition at any given locality in the upper gulf comprises a reasonably predictable mix of species, combined with a much larger suite of “unpredictable” species, the unpredictability being driven by complex networks of interacting physical and biological factors. However, *relative* species diversity is predictable and largely a function of habitat and substrate type. Benthic (bottom-dwelling) invertebrate species diversity (i.e., species richness) is highest on rocky bottoms, relatively stable shores, and intertidal or shallow bottoms composed of softer sedimentary rocks such as sandstones or eroded volcanic tuffs and rhyolites. Benthic invertebrate diversity is lowest on beaches composed of smooth hard rocks such as granites and basalts and on unstable beaches of sand or cobble, the latter perhaps having the lowest (benthic) diversity of any coastal habitat. Areas that have a variety of substrate types harbor more species than do more homogeneous ones. *Esteros* (moderately hypersaline coastal lagoons, or “negative estuaries”) are notably diverse areas, and these habitats provide important nursery and feeding grounds for the young of many coastal fish and shellfish species, including the majority of Mexico’s commercial finfish and shrimp species (Glenn et al. 2005). There have been no comprehensive surveys of any *esteros*, or other wetlands, in the Gulf of California. Analysis of the Macrofauna Golfo Project database produced a list of 212 species of invertebrates from the mangrove lagoons of Baja California Sur (Whitmore et al. 2005). The islands of the gulf also harbor an extraordinarily high species diversity, and these areas serve as important refugia for species that have been extirpated on the mainland coast. In addition, these islands commonly harbor a fauna more typical of coastal communities hundreds of kilometers to the south.

Species diversity and composition are heavily influenced by seasonal oceanographic conditions in the northern gulf, where marked seasonal changes occur. The climate of the surrounding Sonoran Desert has a strong bearing on this shallow region, and as noted earlier, it experiences extreme seasonal variations in seawater temperatures. As a result, the northern gulf is essentially a

warm-temperate marine environment during the winter but a tropical marine environment during the summer. The distinct seasonal species turnover in invertebrates and algae is striking, as tropical species disappear during the cold winters (e.g., *Gnathophyllum panamense*, *Ocyrode occidentalis*, *Pentacaster cumingi*, *Nidorellia armata*) and temperate species vanish during the warm summers (e.g., *Pachygrapsus crassipes*, *Aplysia californica*, *Betaeus longidactylus*). The central gulf shows far less seasonality in water temperatures, and the southern gulf shows almost no seasonality.

An Extraordinary Diversity

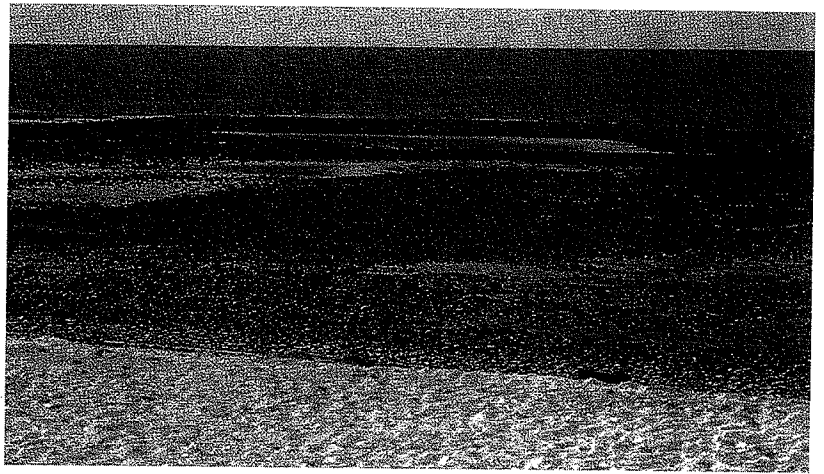
The accumulation of species diversity since the Sea of Cortez opened has produced one of the most biologically rich marine regions on earth. The benthic habitats and the pelagic waters of the gulf are famous for supporting high numbers of species and large population sizes among all marine taxa: invertebrates, fishes, marine mammals, sea turtles, and marine birds. At least 40 percent of Mexico’s fisheries production comes from the gulf and 15 percent from the northern gulf alone (Brusca & Bryner 2004; Brusca et al. 2001; Cudney-Bueno 2000). In the northern gulf, remarkably high biodiversity occurs on the very limited intertidal beachrock (“coquina”) formations that occur at just four sites: Puerto Peñasco and Punta Borrascosa in Sonora, and San Felipe and Coloradito in Baja California. These small, rare, eroding beachrock habitats harbor disproportionately high species diversity, giving them high priority for protection (Figure 29.4). High diversity is also found at Isla San Jorge and Rocas Consag, both of which serve as refugia and recruitment sources for the mainland shores. And exceptionally high biodiversity, including rich pelagic diversity (and abundance) driven by year-round upwelling, distinguishes the Midriff Islands. The offshore benthic region of the northern gulf formerly maintained a high species diversity and biomass. However, in subtidal areas that are susceptible to heavy bottom trawling (i.e., shallower than 100 m) much diversity has been lost over the past 50 years due to excessive disturbance (see below). Nevertheless, we have almost no empirical data on community composition and food web structure for the northern gulf’s offshore benthic or pelagic habitats. One of the most pressing research needs is to achieve an understanding of benthic

community structure in this region and a sense of how profound the effects of bottom trawling have actually been on this system.

Marine macrofaunal diversity in the Gulf of California is exceptionally high, comprising 5,965 named species: 4,852 invertebrates and 1,113 vertebrates (891 fishes; 222 nonfish vertebrates) (Brusca 2004a; Brusca et al. 2005; Hendrickx et al. 2005).⁶ Owing to the presence of many undescribed invertebrate species, including many members of the planktonic and offshore communities, this total is estimated to be about half the actual animal diversity of the gulf (Table 29.2). Overall faunal diversity decreases gradually from the south to the north. In the northern gulf, in addition to the four beachrock formations noted above, Puerto Refugio (at the northern end of Isla Ángel de la Guarda) and the isolated Rocas Consag have long been recognized as “biodiversity hot spots.”

Forty-seven percent of the gulf’s macroinvertebrate species occur in the northern gulf (2,261 species), and 1,045 (18 percent of the gulf species) are known from the Reserva de la Biosfera Alto Golfo de California y Delta del Río Colorado (Table 29.3). In the northern gulf, molluscs (1,000 species), arthropods (509 species), and annelids (polychaetes) (287 species) are the most diverse phyla. Within the Mollusca the gastropods and bivalves stand out with 656 and 285 species, respectively. Among the Arthropoda the brachyuran crabs and amphipods are most diverse with 167 and 126 species, respectively. Of the invertebrate species known from the northern gulf, 128 (5.7 percent) are unique to this area (endemic).⁷

Examination of Table 29.3 reveals further interesting patterns of invertebrate biodiversity in the northern gulf. Even though no coral reefs occur in this region (indeed, the only true coral reef in the gulf is at Bahía Pulmo, near La Paz; Brusca & Thomson 1977), 17 species of corals occur in the northern gulf, making the coral diversity richer than that of sea anemones (12 species). Notably rich diversity also occurs among the gastropods (657 species), bivalves (285 species), polychaetes (285 species), true (brachyuran) crabs (167 species), echinoderms (138 species), ectoprocts (119 species), gammaridean amphipods (85 species), hydroids (60 species), isopods (41 species), tidepool (caridean) shrimps (40 species), chitons (38 species), hyperiidean amphipods (31 species), and porcelain crabs (29 species). Also notable is a single species



of marine earthworm (Annelida: Oligochaeta), *Bacescuella parvithecata*, which occurs rarely in the northern (and central) gulf. The 5 species of sea fans reported from the region are only a small percentage of the actual gorgonian diversity, and I have recorded at least 10 undescribed species from the northern gulf. Similarly, only a single species of jellyfish has been reported from the northern gulf, although I have recorded at least a half-dozen others in these waters. And the 9 species of tunicates reported from the northern gulf probably represent only 10 percent of the actual diversity of this region.

Among the 128 species of invertebrates endemic to the northern gulf are two elegant and giant aphroditid polychaetes (*Aphrodita mexicana*, *A. sonorae*), sometimes called “sea mice,” both of which are now greatly reduced in numbers and threatened because of excessive bottom (shrimp) trawling (Figure 29.5). The beautiful coral *Astrangia sanfelipensis*, today known only from the San Felipe and Coloradito “coquina reefs,” is also threatened by habitat destruction at those two upper gulf sites. In addition, seven species of pea crabs (Pinnotheridae) are endemic to the northern Gulf, as are two goneplacid crabs (*Glyptoplax consagae*, *Speocarcinus spinicarpus*), the cone snail *Conus angulatus* (previously considered a synonym of *C. regularis*), the scallop *Leptopecten palmeri*, the carpet anemone *Palythoa ignota*, the aggressive samurai hydroid *Samuraia tabularosa* (so far known only from a single site, Punta Pelicano, near Puerto Peñasco), and 11 species of sea slugs (Gastropoda: Nudibranchiata) including the beautiful giant black slug *Aplysia vaccaria*. Among the caridean shrimps are three species of the uncommon genus *Ambidexter* that are endemic to the northern gulf (in

Figure 29.4. Beachrock (“coquina”) littoral habitat, one of the rarest habitats in the Sea of Cortez. Only four such coastal formations are known from the gulf, two in Sonora (Puerto Peñasco, Punta Borrascosa) and two in Baja California (San Felipe, Coloradito). The Puerto Peñasco and San Felipe sites have been largely destroyed biologically, though they remain recoverable. (Photo by R. C. Brusca)

TABLE 29.2. *Known and predicted species diversity in major invertebrate groups in the entire Gulf of California.*

PHYLUM	NO. OF SPECIES RECORDED FROM GULF	NO. OF SPECIES PREDICTED TO OCCUR IN GULF
Porifera	86	860
Cnidaria	253	526
Hydrozoa	146	292
Anthozoa	102	204
Scyphozoa	5	30
Ctenophora	4	20
Platyhelminthes	22	110
Nemertea	17	30
Sipuncula	11	22
Echiura	4	7
Annelida	717	820
Oligochaeta	1	3
Polychaeta	715	816
Pogonophora	1	1
Arthropoda	1,044	1,522
Pycnogonida	15	45
Cirripedia	45	47
Copepoda	?	25
Ostracoda	?	25
Stomatopoda	28	33
Mysida	3	10
Amphipoda	232	464
Isopoda	81	110
Tanaidacea	2	20
Cumacea	8	20
Euphausiacea	14	20
Dendrobranchiata	26	42
Stenopodidea	2	4
Caridea	130	145
Astacidea	1	1
Thalassinidea	19	24
Palinura	8	9
Anomura	129	192
Brachyura	301	336
Mollusca	2,196	2,590
Monoplacophora	1	2
Polyplacophora	57	62
Gastropoda	1,532	1,630
Bivalvia	566	848
Scaphopoda	20	25
Cephalopoda	20	23
Bryozoa (Ectoprocta)	169	338
Brachiopoda	5	7
Echinodermata	263	300
Chaetognatha	20	25
Hemichordata	2	5
Chordata	39	292
Ascidia	17	250
Appendicularia	21	40
Cephalochordata	1	2
TOTAL	4,852	7,474

Note: *Phylum names and species numbers are in boldface.*

fact, these are the only members of this genus in the entire Sea of Cortez). A group of intertidal isopods also occurs as endemics in the northern gulf (e.g., *Synidotea francesae*, *Erichsonella cortezi*, *Colidotea findleyi*, *Mesanthura nubifera*, *Colanthura bruscai*, *Probopyrus pandalicola*, and *Schizobopyrina striata*). One of the many unsolved mysteries in the Sea of Cortez is the appearance of the Atlantic barnacle, *Balanus subalbidus*, in Laguna Salada during flood years. This barnacle has not been reported from anywhere in the Gulf of California or Pacific Ocean, yet in years when floodwaters from the Colorado delta and upper gulf invade the lagoon, live *B. subalbidus* are found attached to the branches of dead (flooded) terrestrial trees and shrubs (Van Syoc 1992). Dead specimens are easily collected when the lakebed is dry.

Destruction of Biodiversity in the Northern Gulf

Before the 1960s, pressure on the northern gulf's environment was minimal, and anyone visiting the region would have witnessed a seemingly endless bounty of sea life, probably not differing substantially from the diversity encountered by indigenous people over past millennia. A walk in the intertidal zone during low tide revealed dozens of species of large-bodied invertebrates, especially echinoderms and molluscs. Common under most large rocks and boulders were large seastars (*Oreaster occidentalis*, *Nidorellia armata*, *Astropecten armatus*, *Pharia pyramidata*, *Linckia columbiae*, *Heliaster kubiniji*, *Astrometis sertulifera*, *Luidia columbia* and *L. phragma*), spectacular huge brittlestars (*Ophioderma teres* and *O. panamense*, *Ophiocoma aethiops* and *O. alexandri*), and large urchins (*Eucidaris thouarsii*, *Centrostephanus coronatus*, *Arbacia incisa*, *Lytechinus pictus*, *Echinometra vanbrunti*). Also common were large cucumbers, such as *Brandtothuria arenicola* and *B. impatiens*, *Fossothuria rigida*, and *Isostichopus fuscus*. Large molluscs that were equally common included many spectacular murexes, cones, olives, and cowries (e.g., *Haustellum elenesis*, *Hexaplex nigrinus*, *Hexaplex princeps*, *Phyllonotus erythrostomus*, many species of *Conus*). There are no longer any sites on the northern gulf mainland where these large invertebrates exist in abundance in the intertidal zone. In fact, these spectacular large-bodied invertebrates have become rare or extirpated altogether from most of the mainland northern gulf's inter-

tidal regions. The chocolate sea cucumber (*Isostichopus fuscus*) is now reduced to so few sites, because of overfishing, that it is federally listed in Mexico as a threatened species. Before the 1970s, sorting through a shrimp trawl was also an extraordinary experience, and in those days the bycatch provided a living library of the animal kingdom—a veritable textbook of invertebrate zoology. This too is no longer the case.

Beginning in the 1950s three factors began to have synergistic, negative impacts on the biodiversity of the northern (indeed, the entire) gulf. First was the establishment of Mexico's national fisheries program, which led to an overgrowth of fishing efforts and subsidized the exploitation of marine resources. Second was the realization that tourism held the potential to generate enormous income, which led to national and regional policies and practices that set a path toward wholesale destruction of coastal resources. And third has been the disruption of all the rivers that once flowed into the gulf, including all the once-perennial rivers of Sonora—among them the mighty Colorado River. Exacerbating these issues has been an explosive and unchecked population growth in the southwestern United States and northwestern Mexico.⁸ These environmental challenges are reviewed in some detail in Brusca 2004a, Brusca & Bryner 2004, Brusca et al. 2001, and Brusca et al. 2005.

Fisheries

Today every fishery in the gulf is probably overfished (Brusca 2004a; Brusca et al. 2001; Brusca et al. 2005; Greenberg and Vélez-Ibáñez 1993; Musick et al. 2000; Sala et al. 2002; Sala et al. in press). In the northern gulf large serranids (groupers, *cabrilas*) and sciaenids (corvinas, *chanos*), some of which are endemic or nearly endemic to the gulf, are especially at risk. These species are sensitive to overharvesting because of their late maturity and formation of localized spawning aggregations. In addition, most sciaenids in the northern gulf require estuarine habitats once provided by the Colorado River delta for spawning and nursery grounds. The American Fisheries Society lists the gulf, especially its northern part, as one of five geographic "hot spots" in North America, where numerous fish species are at risk. Commercially valuable invertebrate species are facing the same fates, as population sizes of black murex



Figure 29.5. Shrimp boats in Puerto Peñasco, Sonora. (Photo by R. C. Brusca)

(*Muricanthus nigritus*), pink-mouth murex (*Hexaplex erythrostomus*), chocolate sea cucumber (*Parastichopus fuscus*), shrimps (*Penaeus* spp.), octopuses, and others have plummeted over the past decade.⁹

Industrial shrimp fishing exacts a harsh toll on the northern gulf's benthic environment (Figure 29.6). The ocean bottom in this region is estimated to be dragged by shrimp nets as frequently as four times per year (Brusca et al. 2001; García-Caudillo 1999; Pérez-Mellado & Findley 1985). Shrimp nets are indiscriminate killers, raking the sea floor like vacuum cleaners, trapping and killing everything in their path (Dayton et al. 2002; Engel & Kvitek 1998; Watling & Norse 1998). This high rate of bottom trawling has seriously damaged these fragile benthic habitats, and the nets capture an average of 10–30 kg bycatch per kilogram shrimp (depending on the time of year) in the northern gulf (Brusca 2004a; Brusca et al. 2005). The number of commercial shrimp trawlers in the gulf grew from 700 in 1970 to a high of 1,700 in 1989 and then decreased to 1,200 in 1999 (J. M. García-Caudillo & S. Carroll, personal communication 2001), despite warnings as early as the 1970s of a possible crisis resulting from overexploitation (e.g., Snyder-Conn & Brusca 1977). As of 2002, hundreds of shrimp boats were still

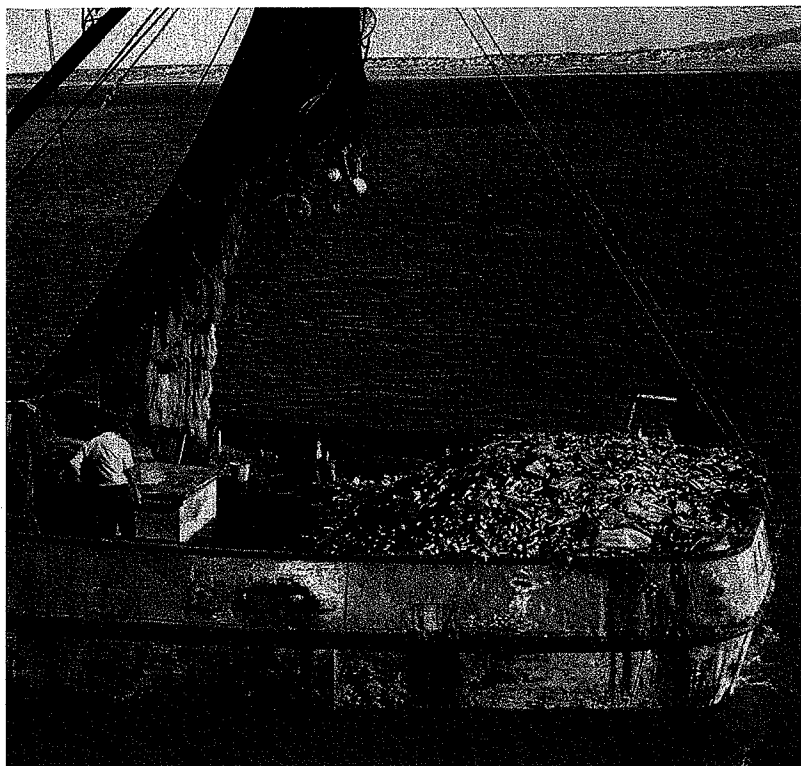


Figure 29.6. Shrimp fishing bycatch being sent to a rendering plant for conversion into fertilizer and stock feed. (Photo by R. C. Brusca)

working within the Alto Golfo Biosphere Reserve, and perhaps 1,000 small-scale fishers were using gill nets in the northern gulf. Catch per unit of effort has been declining for decades, but government subsidies continue to artificially sustain the overcapacity of the industrial fishing fleet. Without government subsidies the current level of commercial trawling would not be economically feasible. In fact, the economics of commercial shrimping shifted so much at the beginning of the twenty-first century that the number of bottom trawlers working out of the three main fishing ports in the northern gulf fell to just 130 boats (115 in Puerto Peñasco, 15 in San Felipe, and none in El Golfo de Santa Clara). Limited scientific and anecdotal information suggests that sweeping changes in benthic/demersal community structure have taken place over the past 50 years as a result of this disturbance, including an accelerating decrease in the diversity and biomass of the bycatch, possibly heralding a regional benthic/demersal ecosystem collapse (Brusca 2004a; Brusca et al. 2005). In the late 1960s, sorting through the bycatch of a shrimp trawl produced hundreds of species of invertebrates, in most known phyla. Today these same bottom trawl nets (in the northern gulf) capture primarily scavenging species (e.g., portunid crabs, skates, rays), and the diver-

sity of the past is gone. The destruction of the benthic ecosystem has disrupted the food web of the entire northern gulf, probably altering the pool of available prey for the endangered vaquita. Gill nets kill vaquita directly, at an estimated rate of 30 to 80 annually (D'Agrosa et al. 1995; Vidal 1995; see Navarro, this volume).

Commercial fishing boats using gill nets and long-lines overexploit offshore waters, and small boat (*panga*) fishers often take shrimp and finfish from estuaries and other coastal lagoons before they have reached reproductive maturity. Narcotraffickers using the Sea of Cortez to transport drugs from Mexico to the United States present a new and growing threat to biodiversity. They abandon or trade their *pangas* (skiffs) in the upper gulf in such high numbers that the local fishers have greatly increased their boat presence, and impact, in the region.

Tourism

In areas of heavy and increasing tourism in the northern gulf, such as Puerto Peñasco and San Felipe, littoral biodiversity is but a shadow of what it was just 20 years ago. Part of the tourism-driven loss comes from the hand collecting of animals by visitors and the trampling underfoot of fragile habitats exposed at low tide. But also important is the collection of large molluscs and echinoderms by residents for sale to tourists as curios or to local restaurants, where they are served in seafood cocktails (e.g., large bivalve and gastropod molluscs, octopuses). Today in the northern gulf these large-bodied species are found almost exclusively on island refugia or highly inaccessible stretches of the mainland coast, although many still occur in reduced numbers subtidally.

Increasing losses of coastal habitats due to encroaching housing and resort developments, poorly designed marinas, and aquaculture installations lacking environmental controls are threatening the rich *estero* habitats of the northern gulf that serve as critical spawning and nursery grounds for shrimp and other invertebrate and fish species (Glenn et al. 2005).¹⁰ Loss of these wetlands also reduces important stopover sites for migratory birds. Mexico's planned "Nautical Ladder" (Escala Náutica) proposes 23 marinas around both sides of the Baja California peninsula and south on the mainland all the way to Teacapán (Sinaloa). The marinas themselves will cause permanent

loss of wetlands, and building the infrastructure required to connect them with roads and services will certainly also be damaging.

Rivers That Are No More

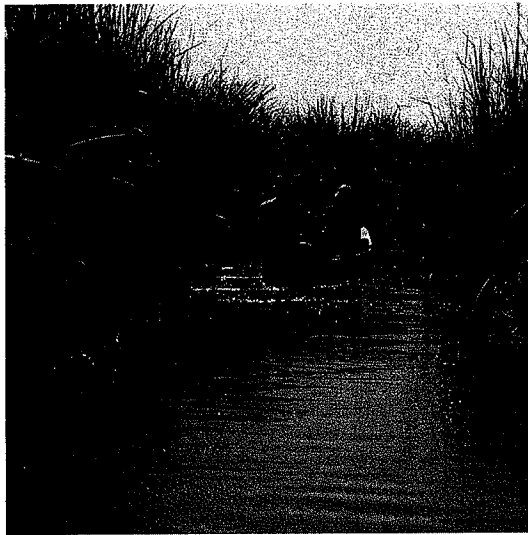
All the rivers that once reached the Gulf of California have been drastically altered or destroyed by overdraft and diversion, and none of the rivers of Sonora now reach the sea (i.e., Ríos Colorado, Sonoyta, Concepción, Magdalena-Asunción, San Ignacio, Sonora, Yaqui, Mayo, and Fuerte). Historically, the Colorado River carried an estimated 16.7 million acre-feet (maf) of water to the delta annually (Carriquiry & Sánchez 1999). In the nineteenth century, especially from 1850 to 1880, riverboats steamed from the Sea of Cortez up the lower Colorado/Gila River system into Arizona. Until completion of Hoover (Boulder) Dam in 1935, creating Lake Mead, freshwater from the Colorado River flowed into the northern gulf throughout the year, with great seasonal floods resulting from spring snow-pack melt in the Rocky Mountains. By the time Glen Canyon Dam was completed in 1962, input of Colorado River water to the delta and northern gulf had ceased. For 20 years after completion of Glen Canyon Dam, as Lake Powell filled, virtually no water from the river reached the sea. In 1968, flow readings at the southernmost measuring station on the river were discontinued, since there was nothing left to measure. Today 20 dams (58 if the Colorado River's tributaries are included) and thousands of kilometers of canals, levees, and dikes have converted the Colorado River into a highly controlled plumbing system in which every drop of water is carefully counted, managed, and fought over. The original water allocations, set in the 1920s, were based on Colorado River data from an unusually wet period, and the allocation assumed an average river flow of about 22 maf/year. Thus 17.5 maf/year of legal entitlements exist to the river's water. But the river's average flow over the last 500 years has actually been about 14 maf/year: there are more legal claims to the water than are possible to meet (Brusca & Bryner 2004; Brusca et al. 2001)! It is no wonder that today little water reaches the delta. In addition, most of the delta's wetlands have been converted into farmland. What was once 2 million acres of wetlands has been reduced to about 150,000 acres. Owing to the greatly reduced freshwater flow, the powerful tides of this region now overwhelm the

river channel. During spring tides, seawater creates an estuarine basin for 50–60 km upriver, averaging 2–8 km wide and 16 km wide at the mouth. This marine intrusion has killed most of the freshwater flora and fauna that used to live along the lowermost river corridor (e.g., Felger 2000).

Native ecosystems on the delta of the Colorado River have been under siege for many decades from urban and agricultural expansion and upstream water management decisions in the United States and Mexico. Many good reviews of this subject exist (e.g., Brusca & Bryner 2004; Brusca et al. 2001; Brusca et al. 2005; Glenn et al. 1996, 1999). Although the lower delta is part of the Alto Golfo Biosphere Reserve (Diario Oficial 1993; Morales-Abril 1994), the ecological future of the region remains critically threatened. The small remaining wetlands on the delta provide important habitat for shorebirds and migratory waterfowl and support the largest remaining populations of at least two endangered species, the desert pupfish and Yuma clapper rail (Glenn et al. 2005; see Hinojosa-Huerta et al., this volume). The indigenous Cucapá people still use the riparian zone of the delta for subsistence (see Williams, this volume). Since Lake Powell filled in 1981, occasional flood flows have again been reaching the delta, which has led to regeneration of some of the river floodplain. In addition, two important anthropogenic wetlands now exist on the delta, the 4,400-ha Ciénega de Santa Clara and the 15,000–20,000-ha Río Hardy wetland, which together contain most of the nonmarine aquatic habitat on the delta (Figure 29.7). In their natural state they were supported by the Colorado River flow, but they are now sustained by the disposal of brackish agricultural drainage water into the lower delta (plus occasional flood flows). There is no guarantee that these wetlands will continue to receive the secondary runoff water that now sustains them. And given climate predictions and possible reduction in Colorado River flows over coming decades, the threat to these critical habitats will only increase. As of 2004, there existed no published studies of the water quality or invertebrate fauna of these wetlands.

Before construction of Hoover Dam the annual sediment discharge from the Colorado River into the gulf was enormous, estimated to have ranged from 45 to 455 million metric tons/year. Accumulated river sediments on the delta are

Figure 29.7. The *Ciénega de Santa Clara*, on the Colorado delta. (Photo by R. C. Brusca)



thousands of feet thick. The entire northern gulf is considered the Colorado River Sedimentary Province. The name of the river itself, *Colorado*, is Spanish for a red or ruddy color. However, the reduction of freshwater input and sediment discharge since 1935 has modified the hydrography of the Colorado River delta/northern gulf system, initiating a regime of deltaic erosion. New deltaic deposition no longer takes place, and the entire delta is now exposed to the hydrodynamic forces of tides, currents, and storms, promoting resuspension, erosion of ancient river sediments, and the gradual export of sediments to the west and eventually out of the northern gulf. These changes are altering the littoral wetlands and biological equilibrium of the region. They are also destroying habitat for an estimated 340 species of marine invertebrates that inhabit the sand/mud benthic ecosystem of the delta region.

It is likely that the reduction of freshwater input into the northern gulf, in combination with other anthropogenic factors, has driven some species to (or nearly to) extinction. However, we have so few historical or baseline data for marine organisms of this region that extinctions (or local extirpations) would go unnoticed for commercially unimportant or otherwise little-known species. There has never been a comprehensive dedicated survey of the marine fauna of the northern gulf and Colorado River delta ecosystem.

The delta clam, *Mulinia coloradoensis*, was once one of the most abundant animals of the uppermost gulf. Windrows of its shells line the beaches of the delta and western shores of the northern gulf. This species was thought to be ex-

tinct until its recent rediscovery in small numbers near the mouth of the river (Kowalewski et al. 2000; Rodriguez et al. 2001). It has been speculated that the near demise of this clam is the result of decreased benthic productivity resulting from upstream diversion of the Colorado River's flow. However, there is no indication that nutrient levels (and hence productivity) have decreased significantly in the northern gulf, and nutrients that have been lost by depletion of riverine input may have been regained in the form of agricultural runoff and delta erosion (releasing ancient trapped nutrients). Hence the near extinction of this species may be linked to another, as yet unknown, factor related to reduction of freshwater input to the delta.

Freshwater input from the Colorado River is also important to the life history of commercial shrimps of the region. Commercial shrimp catches have been falling since the 1960s, owing to a combination of overfishing and loss of habitat for young. It has been estimated that an influx of just 250,000 acre-feet/year of Colorado River water would double shrimp production in the northern gulf (Galindo-Bect et al. 2000). The young of these shrimp use the shallow wetlands and *esteros* of the region, including the tidelands of the delta, as a nursery, migrating into these areas before their offshore planktonic larval phase. When the shrimp reach a juvenile or subadult stage, they migrate offshore once again. In combination with historical overfishing and capture of juveniles in shrimp nets, reduction of brackish estuarine habitat has likely driven the giant northern gulf endemic totoaba to near extinction as well. Continued absence of freshwater input could also seriously affect the endemic Palmer's saltgrass (*Distichlis palmeri*), which appears to need periodic freshwater flooding to germinate (Felger 2000). In addition, aquatic birds rely heavily on the gulf's coastal lagoons and wetlands, all of which are on the great western flyway (Glenn et al. 2005; see also Hinojosa-Huerta et al., this volume).

Rescuing Biodiversity

Since the mid-1980s a growing conservation movement has emerged in northwestern Mexico, led by such organizations as the Arizona-Sonora Desert Museum, the Sonoran Institute, CoBi (Comunidad y Biodiversidad), Conservation International, Proesteros, Pronatura, Sierra Madre, World Wild-

life Fund, CEDO (Centro Intercultural de Estudios de Desiertos y Océanos), and many smaller grassroots organizations often associated with local communities and *ejidos*. These organizations are beginning to have a powerful influence on conservation in the northern gulf. Their participation was critical to the setting aside of the Reserva de la Biosfera Alto Golfo de California y Delta del Río Colorado; to the establishment of conservation priorities for the gulf and its islands; to the development, with artisanal fishers and indigenous people (e.g., Seris, Cucapás), of sustainable fisheries; and to the improvement, with state and federal governmental agencies, of protection of the marine and coastal environment. Over the past decade, as a result of the efforts of these groups, fisheries laws are tightening up, gillnetting is on the verge of becoming illegal, bottom trawling is becoming better regulated (soon to be banned, we hope), and high-visibility species such as totoaba and vaquita are attracting the attention of conservationists all over North America. Much of this conservation work is described in Brusca 2004a, Brusca & Bryner 2004, Brusca et al. 2001, and Brusca et al. 2005. New laws prohibit the use of gillnets with mesh sizes greater than six inches and the "destruction of the marine floor" (e.g., shrimp trawling) in all protected areas in the gulf, including the Alto Golfo Biosphere Reserve. These laws could go a long way toward reducing the incidental take of vaquita and sea turtles and protecting the sea floor, but it will be up to the federal government (PROFEPA, the enforcement arm of SEMARNAT) to enforce these laws (and fishers are protesting them). As for the Colorado River delta, however, it is unlikely that its ecological and water issues will be resolved until the debate reaches the U.S. and Mexican State Departments and executive offices. There are also many fundamental questions that remain unanswered regarding the upper gulf's ecosystems: What is the nature of the benthic/water column food web of the upper gulf, and how does energy flow through the system? How has this system been impacted by bottom (shrimp) trawlers over the past few decades? Where do the migratory waterfowl enter this food web and what do they feed on? Where are the key commercial and sport fish spawning and nursery grounds? How are commercial species such as shrimp affected by freshwater input (e.g., from the Colorado River)? How important are

annual freshwater pulses from the Colorado River to the marine ecosystems?

Despite the considerable damage that has already been inflicted on northern gulf environments, and the many lingering threats, there is cause for optimism. If the conservation movement in the Sea of Cortez continues with its present momentum, new areas will be protected and all protections will be better enforced. Most urgent is to ban *all* bottom trawling in the northern gulf, to protect the four "coquina reefs" in the upper gulf, to improve enforcement of existing laws in protected areas, to increase public education, and to better understand the marine ecosystems of the upper gulf. Fortunately, one still can find island and coastal refugia, areas not easily accessible by road or large fishing boats, which serve as important shelters for species extirpated elsewhere in the northern gulf. Current discussions on a biodiversity action and sustainable management plan for the gulf, spearheaded by regional non-governmental conservation organizations as well as several government agencies, are focusing on protection of the island refugia, but mainland coastal habitats need to be on their agenda as well.

Acknowledgments

Thanks to Wendy Moore, Tom Van Devender, Richard Felger, Bill Broyles, and Larry Marshall for critiquing this chapter. Thanks to Joel Hedgpeth and Dave Montgomery, who, 40 years ago, introduced me to the complex world of John Steinbeck and Ed Ricketts, and to Lindsey Haskin, who recently rekindled this lifelong interest.

Notes

1. Ancient peoples who exploited the northern gulf's rich coastal biodiversity left behind huge piles of shells, or middens. Some of these shell middens are more than a mile across, and some have depths of more than one meter. Estero Morua, near the town of Puerto Peñasco, is encircled by ten discrete shell middens covering about 50 percent of its shoreline, each containing tens of thousands of mollusc shells (comprising more than 30 species) and pottery from at least four distinct cultures. I have radiocarbon-dated (^{14}C) two food shells (*Cardita affinis* and *Hexaplex erythrostomus*) from two fire sites (ash layers) at Estero Morua at calibrated ages (Stuiver & Reimer 1993) of 1969 YrBP (radiocarbon age 2010 ± 55) and 2024 YrBP (radiocarbon age 2075 ± 40) (radiocarbon dates determined by the University of

Arizona/National Science Foundation Accelerator Mass Spectrometry Laboratory). The only remains from crab dining at Estero Morua are the large claws of the blue crab (*Callinectes bellicosus*); no remains of carapaces or walking legs have been found. In the past, Estero Morua received freshwater from the Sonoyta River, which used to empty into the Gulf of California via the eastern arm of the estero (at least during flood years), although this river has not reached the gulf with any regularity at least since the turn of the last century (a good turn-of-the-century map of the river can be found in Hornaday 1908). See Gifford 1946 and Foster 1975 for additional information on the middens of this estero.

2. The earliest map to show Baja California as a peninsula might have been the "chart series" of Battista Agnese (1538-48), probably capitalizing on Ulloa's 1539 discovery. It was also correctly depicted on Sebastian Cabot's 1544 map and of course the superlative maps of Mercator (1569) and Ortelius (1570: *Theatrum Orbis Terrarum*). However, the majority of the European maps produced before the early seventeenth century still depicted Baja California as an island, and it was the work of Padre Eusebio Kino that finally laid the issue to rest for European cartography.

3. Members of the expedition were Ed Ricketts, John Steinbeck, Carol Henning (the first of Steinbeck's three wives), Hall ("Tex") Travis (engineer), Anthony Berry (captain), Sparky Enea (Berry's brother-in-law), and Tiny Colleto (crewman). Spencer Tracy was supposed to go on the trip but got tied up on a motion picture. Steinbeck paid Berry \$2,500 for the six-week charter of the *Western Flyer*. At least five species of invertebrates from the Sea of Cortez have been named in honor of Ed Ricketts: *Mysidium rickettsi* (a mysid), *Longiprostatum rickettsi* (a flatworm), *Isometridium rickettsi* (a sea anemone), *Palythoa rickettsi* (a zoanthid), *Adesia rickettsi* (a sea slug).

4. The northern gulf region extends from the marine-influenced Colorado River delta south to (and including) the Midriff Islands (las Islas del Cinturón), the largest being Islas Tiburón and Ángel de la Guarda, and to Bahía San Francisquito (Baja California) and Bahía Kino (Sonora). Within the northern gulf is the Reserva de la Biosfera Alto Golfo de California y Delta del Río Colorado, extending from the delta to a line running from Punta Pelicano (= Roca del Toro; the southern margin of Bahía Cholla and the larger Bahía Adair, Sonora, across the gulf to Punta El Machorro (= Punta San Felipe), at San Felipe.

5. Steinbeck grew up in the Salinas Valley of California and early on developed a strong fascination with the sea. In his youth he took a few classes at Stanford University, including a summer marine biology course at Hopkins Marine Station, in Monterey, California, in 1923. In part, it was his love of the sea that drove him to

move to Pacific Grove (near Monterey) in 1929, the year his first book was published (*Cup of Gold*), thus setting the stage for his inevitable meeting with maverick marine biologist Ed Ricketts. *Cannery Row* (1945) was written after Steinbeck had moved to New York, shaken by the death of his long-time friend. The book was an exercise in grieving Ed's death and finding peace after the turbulent years Steinbeck had endured. "Doc," in *Cannery Row*, is Steinbeck's idealized image of Ed and the vehicle through which Steinbeck expresses his own (and presumably Ed's) philosophy of life, which celebrates the wisdom of experiencing life without preconception and the joy of savoring each moment as it occurs. As a natural followup to *Cannery Row*, Steinbeck went full circle with *East of Eden* (1952), also written in New York, which celebrates his own life growing up in the Salinas Valley, his family, and the fundamental human power to choose between good and evil, expressed also through the observation of tidepools in *The Log from the Sea of Cortez*.

6. Marine macrofauna is defined here as those animals 0.5 mm or larger in size, or easily visible to the naked eye (this excludes copepods and ostracods but includes all other nonmicroscopic animal species).

7. Overall invertebrate endemism in the gulf is 16% (767 species). At the phylum level, the highest endemism occurs in Brachiopoda (80%), Ctenophora (50%), Platyhelminthes (41%), Echiura (25%), and Mollusca (21%). At lower taxonomic levels, highest endemism occurs among Anthozoa (34%), Polyplacophora (26%), Gastropoda (26%), and Cumacea (25%). However, these figures should be viewed with caution because many taxa are very poorly studied in the gulf and the tropical eastern Pacific in general (e.g., Brachiopoda, Cnidaria, Ctenophora, Platyhelminthes, Echiura, Cumacea, Tanaidacea, micromolluscs, Urochordata, Hemichordata).

8. Approximately 23 million people live in the lower Colorado River basin today, a population that is largely dependent on water from the Colorado River. By 2020 it is estimated that more than 38 million people will be living in this region. The population of the Sonoran Desert itself now exceeds 7 million and has experienced a sevenfold increase in the past 50 years, with a doubling between 1970 and 1990. This is the fastest growth and most massive land conversion in North America's history. Hermosillo (the capital of Sonora) grew by 116% during this period. There are no signs that this growth is tapering off.

9. Even marine algae are overharvested in northwestern Mexico (mainly along the Baja peninsula), a region that provides 10% of the world production of agarophytes. The most important commercial species is the red alga *Gelidium robustum*, harvested since 1945 but never regulated.

10. Much of the coastline of Sinaloa and southern Sonora has been carved up into aquaculture farms. Most of these are shrimp farms, and 95% (64 million pounds in 2000) of this farm-raised shrimp makes its way to the United States. About 90% of the world's aquaculture facilities are in developing nations, and they are essentially "slash-and-burn" in their approach: bulldozers tear out mangrove forests and other coastal habitats and replace them with fish or shrimp ponds. In concept, these coastal ponds are cheap and easy to

construct; a pipe at one end of the pond pulls clean ocean water in, and a pipe at the other end spits water out, laden with shrimp (or fish) wastes, excess food, antibiotics, disease organisms, and parasites. Therein lies the next insult—not only is coastal habitat destroyed by the bulldozers, but the coastal waters themselves are polluted with the outfall. Inland, closed, nonpolluting systems are possible, but they are more expensive to build and operate.

TABLE 29.3. Annotated list of macroinvertebrates known from the northern Gulf of California.

TAXA	AUTHOR(S)	DISTRIBUTION IN GULF	HABITAT	DEPTH	RANGE (M)
PHYLUM PORIFERA (SPONGES)					
CALCAREA					
<i>Leucosolenia cf. irregularis</i>	Jenkin, 1908	NGC;CGC;SGC;BR	BEN;LIT	0	8
<i>Leucetta losangelensis</i>	(de Laubenfels, 1930)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	III
DEMOSPONGIAE					
? <i>Laxosuberites ? rugosus</i>	(Schmidt, 1868)	NGC	BEN;LIT	0	?
<i>Acarinus erithiacus</i>	de Laubenfels, 1927	NGC;CGC;BR	BEN;LIT	0	700
<i>Adocia ambrosia</i>	Dickinson, 1945	NGC;CGC;BR	BEN;LIT	I	24
<i>Adocia gellindra</i>	(de Laubenfels, 1932)	NGC	BEN;LIT	0	?
<i>Antho lithopenix</i>	(de Laubenfels, 1927)	NGC;CGC	BEN;LIT	0	90
<i>Anthosigmella varians</i>	(Duchassaing & Michelotti, 1864)	NGC;CGC;BR	BEN;LIT	0	24
<i>Aplysina sp. A</i>		NGC;CGC;BR	BEN;LIT	0	100
<i>Aulospongos cerebella</i>	(Dickinson, 1945)	NGC	BEN	?	90
<i>Axinella mexicana</i>	de Laubenfels, 1935	NGC	BEN	6	140
<i>Bienna rhadia</i>	de Laubenfels, 1930	NGC	BEN	18	700
<i>Chondrilla nucula</i>	Schmidt, 1862	NGC;CGC;SGC;BR	BEN;LIT	0	5
<i>Clabtria pennata californiana</i>	de Laubenfels, 1932	NGC;BR	BEN;LIT	0	51
<i>Cliona celata</i>	Grant, 1826	NGC;CGC;SGC;BR;SWB	BEN;LIT;PAR	0	120
<i>Cliona cf. chilensis</i>	Thiele, 1905	NGC;CGC;BR;SWB	BEN;LIT	0	46
<i>Dragnacionon opisclera</i>	de Laubenfels, 1935	NGC;CGC;SGC	BEN	10	137
<i>Dysidea fragilis</i>	(Montagu, 1814)	NGC;BR	BEN;LIT	0	640
<i>Endectyon hyle</i>	(de Laubenfels, 1930)	NGC;CGC;SGC;SWB	BEN	3	396
<i>Erylus discastera</i>	Dickinson, 1945	NGC	BEN	?	140
<i>Geodia japonica</i>	(Sollas, 1888)	NGC	BEN	?	90
<i>Geodia mesotriaena</i>	Lendenfeld, 1910	NGC;CGC;SGC;SWB	BEN;LIT	0	369
<i>Halichondria cf. panicea</i>	(Pallas, 1766)	NGC;CGC;SGC	BEN;LIT	0	127
<i>Haliclona cf. bogarbi</i>	Hechtel, 1965	NGC;CGC;SGC;BR	BEN;LIT	0	16
<i>Halisarca cf. sacra</i>	de Laubenfels, 1930	NGC;CGC;SGC	BEN;LIT	0	?
<i>Hymeniacidon adreissiformis</i>	Dickinson, 1945	NGC;BR	BEN;LIT	0	?
<i>Hymeniacidon rubiginosa</i>	Thiele, 1905	NGC	BEN;LIT	0	?
<i>Hymeniacidon sinapium</i>	de Laubenfels, 1930	NGC;CGC;BR	BEN;LIT	0	103

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Iophon pattersoni</i>	(Bowerbank, 1866)	NGC;CGC;SGC	BEN	15	970
<i>Laxosaberites cf. rugosus</i>	(Schmidt, 1868)	NGC;CGC;SGC	BEN;LIT	0	?
<i>Microtylostylifer partita</i>	Dickinson, 1945	NGC	BEN	?	140
<i>Mycale cf. fascifibula</i>	(Topsent, 1904)	NGC	BEN	?	90
<i>Myrmekeioderma</i> sp.		NGC;BR	BEN	?	?
<i>Myxibela microtoxa</i>	Dickinson, 1945	NGC	BEN	40	?
<i>Pachastrella dilifera</i>	de Laubenfels, 1934	NGC	BEN;LIT	0	250
<i>Pachastrella multipora</i>	Dickinson, 1945	NGC	BEN	20	90
<i>Sphinctrella osculanigera</i>	Dickinson, 1945	NGC	BEN	13	?
<i>Sphinctrella tricornis</i>	(Wilson, 1904)	NGC;CGC;SGC	BEN	364	693
<i>Spirastrella coccinea</i>	(Duchassaing & Michelotti, 1864)	NGC;CGC;BR	BEN;LIT	0	?
<i>Stelletta clarella</i>	de Laubenfels, 1930	NGC;CGC;BR	BEN;LIT	0	396
<i>Stylissa ? oxeon</i>	(Dickinson, 1945)	NGC	BEN	100	140
<i>Suberites mineri</i>	(de Laubenfels, 1935)	NGC;CGC	BEN;LIT	0	40
<i>Terpios zeteki</i>	(de Laubenfels, 1936)	NGC;CGC;SGC;BR	BEN;LIT	0	5
<i>Tethya aurantia</i>	(Pallas, 1766)	NGC;CGC;SGC;BR	BEN;LIT	0	440
<i>Tetilla arb</i>	(de Laubenfels, 1930)	NGC;CGC;SWB	BEN;LIT	0	150
<i>Tetilla mutabilis</i>	de Laubenfels, 1930	NGC	BEN	?	?
PHYLUM CNIDARIA (SEA ANEMONES, CORALS AND THEIR KIN)					
ANTHOZOA					
CERIANTHARIA (CERIANTHARIANS)					
<i>Botryanthus benedeni</i>	(Torrey & Kleeberger, 1909)	NGC;CGC	BEN	?	?
<i>Cerianthus vas</i>	McMurrich, 1893	NGC	BEN	?	80
<i>Isarachnanthus panamensis</i>	Carlgreen, 1924	NGC;BR	BEN;LIT	0	3
<i>Pachycerianthus aestuari</i>	(Torrey & Kleeberger, 1909)	NGC	BEN;LIT	0	1
HEXACORALLIA					
ACTINIARIA (SEA ANEMONES)					
<i>Aiptasia californica</i>	Carlgreen, 1952	NGC;CGC;SGC;BR	BEN;LIT	0	3
<i>Anthopleura dowii</i>	Verrill, 1869	NGC;CGC;SGC;BR	BEN;LIT	0	3
<i>Anthothoe carcinophila</i>	(Verrill, 1869)	NGC;BR	COM	1	?
<i>Anthothoe panamensis</i>	(Verrill, 1869)	NGC	LIT	0	?
<i>Bunodactis mexicana</i>	Carlgreen, 1951	NGC;CGC;BR	BEN;LIT;LACS	0	2
<i>Bunodosoma californica</i>	Carlgreen, 1951	NGC;CGC;SGC;BR	BEN;LIT	0	3

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Calamactis praelongus</i>	Carlgren, 1951	NGC;CGC;BR	BEN;LIT;LACS	?	?
<i>Calliactis polypus</i>	(Verrill, 1869)	NGC;CGC;SGC;SWB	BEN;LIT;LACS	0	3
<i>Diadumene leucolena</i>	(Verrill, 1866)	NGC;BR	BEN;LIT;LACS	0	2
<i>Phyllactis bradleyi</i>	(Verrill, 1869)	NGC;CGC;BR	BEN;LIT	0	63
<i>Phyllactis concinnata</i>	(Drayton, in Dana, 1846)	NGC;CGC;SGC;BR	BEN;LIT	?	?
<i>Telmatactis panamensis</i>	Verrill, 1869	NGC;CGC;SGC	BEN;LIT	0	?
SCLERACTINIA (CORALS)					
<i>Astrangia californica</i>	Durham & Barnard, 1952	NGC	BEN	29	?
<i>Astrangia conceptionensis</i>	Durham, 1947	NGC;CGC;SGC;BR	BEN	0	73
<i>Astrangia coronadoensis</i>	Durham, 1947	NGC;CGC	BEN	4	29
<i>Astrangia cortezi</i>	Durham & Barnard, 1952	NGC	BEN	18	46
<i>Astrangia haimel</i>	Verrill, 1866	NGC;CGC;SGC;BR;SWB	BEN	0	83
<i>Astrangia pedersenii</i>	Verrill, 1870	NGC;CGC;SGC	BEN	7	11
<i>Astrangia sanfelipensis</i>	Durham & Barnard, 1952	NGC;BR	BEN	4	?
<i>Balanophyllia cedrosensis</i>	Durham, 1947	NGC;CGC	BEN	63	119
<i>Dendrophyllia oldroydae</i>	Oldroyd, 1924	NGC;CGC	BEN	121	576
<i>Desmophyllum dianthus</i>	(Esper, 1794)	NGC	BEN	32	2,460
<i>Endopachys grayi</i>	Milne Edwards & Haime, 1848	NGC;CGC;SGC	BEN	36	400
<i>Heterocyathus aequicostatus</i>	Milne Edwards & Haime, 1848	NGC;CGC;SGC	BEN	18	109
<i>Paracyathus stearnsii</i>	Verrill, 1869	NGC;CGC	BEN	0	360
<i>Phyllangia consagensis</i>	(Durham & Barnard, 1952)	NGC;CGC;SGC;SWB	BEN	18	82
<i>Porites panamensis</i>	(Verrill, 1866)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	10
<i>Porites sverdrupi</i>	Durham, 1947	NGC;CGC;SGC	BEN	15	28
<i>Sphenotrochus hancocki</i>	Durham & Barnard, 1952	NGC	BEN	18	270
ZOANTHIDEA (ZOANTHIDS)					
<i>Epizoanthus gabrieli</i>	Carlgren, 1951	NGC;CGC;SGC;BR	BEN;LIT	0	1
<i>Palythoa ignota</i>	Carlgren, 1951	NGC;BR	BEN;LIT	0	1
<i>Palythoa rickettsi</i>	Carlgren, 1951	NGC	BEN;LIT	0	5
OCTOCORALLIA					
GORGONACEA (SEA FANS AND SEA WHIPS)					
<i>Engorgia ampla</i>	Verrill, 1864	NGC;BR	BEN	?	?
<i>Engorgia aurantiaca</i>	(Verrill, 1864)	NGC;CGC;SGC;SWB	BEN;LIT	0	20

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Lophogorgia alba</i>	Duchassaing & Michelotti, 1864	NGC;CGC;BR	BEN	?	?
<i>Muricea californica</i>	Aurivillius, 1931	NGC;CGC;SGC;BR;SWB	BEN	?	?
<i>Pacificogorgia adamsi</i>	(Verrill, 1868)	NGC;CGC;SGC;BR;SWB	BEN	?	?
PENNATULACEA (SEA PENS AND SEA PANSIES)					
<i>Cavernularia darwini</i>	Hickson, 1921	NGC;CGC;SGC	BEN	100	150
<i>Ptilosarcus ?undulatus</i>	(Verrill, 1865)	NGC;CGC;SGC;SWB	BEN	5	?
<i>Stylatula elongata</i>	(Gabb, 1863)	NGC;CGC;SGC;BR	BEN;LACS	0	70
HYDROZOA (HYDROZOANS)					
CAPITATA					
<i>Samuraita tabularasa</i>	Mangin, 1991	NGC;CGC	BEN;LIT	0	1
CHONDROPHORA					
<i>Porpita pacifica</i>	Lesson, 1826	NGC;CGC;SGC;BR	PEL;FLOT;NEUS	N/A	N/A
<i>Physalia utriculus</i>	La Martiniere, 1787	GCN;GCC;GCS;BR;SWB	PEL;FLOT;NEUS	N/A	N/A
FILIFERA					
<i>Janaria mirabilis</i>	Stechow, 1921	NGC;CGC;SGC;BR;SWB	BEN;COM	7	137
HYDROIDA					
<i>Aglaophenia diegenis</i>	Torrey, 1902	NGC;CGC;SGC	BEN;LIT	0	243
<i>Aglaophenia inconspicua</i>	Torrey, 1902	NGC;BR	BEN;LIT	0	72
<i>Aglaophenia pinguis</i>	Fraser, 1938	NGC;CGC;SGC;SWB	BEN;LIT	0	135
<i>Aglaophenia triplex</i>	Fraser, 1948	NGC	BEN	21	24
<i>Antennularia compacta</i>	Fraser, 1938	NGC	BEN	18	37
<i>Antennularia irregularis</i>	Fraser, 1938	NGC	BEN	18	99
<i>Antennularia reversa</i>	Fraser, 1938	NGC	BEN	92	137
<i>Antennularia septata</i>	Fraser, 1938	NGC	BEN	37	137
<i>Antennularia tetraseriata</i>	Fraser, 1938	NGC;SWB	BEN	11	137
<i>Bimeria gracilis</i>	Clarke, 1876	NGC;CGC;SGC	BEN	0	450
<i>Campanularia castellata</i>	Fraser, 1925	NGC	BEN	37	128
<i>Campanularia denticulata</i>	Clarke, 1876	NGC;CGC;SGC;BR	BEN;LIT	0	66
<i>Campanularia emarginata</i>	Fraser, 1938	NGC;CGC;SWB	BEN	8	137
<i>Campanularia hincksi</i>	Alder, 1857	NGC	BEN	0	165
<i>Campanulina forskalea</i>	(Peron & LeSueur, 1809)	NGC;CGC	BEN	90	135
<i>Clytia acutidentata</i>	Fraser, 1938	NGC	BEN	0	82
<i>Clytia edwardsi</i>	(Nutting, 1901)	NGC;CGC	BEN	0	136

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Clytia irregularis</i>	Fraser, 1938	NGC	BEN	9	136
<i>Clytia kincaidi</i>	(Nutting, 1899)	NGC	BEN;LIT	0	126
<i>Clytia universitatis</i>	Torrey, 1904	NGC;CGC;SGC;BR	BEN;LIT;COM	0	183
<i>Endendrium carneum</i>	Clarke, 1882	NGC;CGC;SGC	BEN	3	108
<i>Endendrium eximium</i>	Allman, 1877	NGC;BR	BEN;LIT	0	18
<i>Endendrium ramosum</i>	(Linnaeus, 1767)	NGC;CGC;SGC;BR	BEN;LIT	0	171
<i>Endendrium tenellum</i>	Allman, 1877	NGC;CGC;SWB	BEN;LIT	0	270
<i>Endendrium tenue</i>	A. Agassiz, 1865	NGC	BEN;LIT	0	137
<i>Filellum serpens</i>	(Hassall, 1852)	NGC;CGC;SWB	BEN	18	165
<i>Gonothyraca gracilis</i>	(Sars, 1851)	NGC;CGC;SGC;BR	BEN;LIT	0	165
<i>Halecium beani</i>	(Johnston, 1838)	NGC;CGC;SGC	BEN	2	139
<i>Halecium bermudense</i>	Congdon, 1907	NGC	BEN	82	108
<i>Halecium fasciculatum</i>	Fraser, 1938	NGC	BEN	64	108
<i>Halecium flexum</i>	Fraser, 1948	NGC	BEN	2	82
<i>Halecium gracile</i>	Verrill, 1874	NGC	BEN	0	81
<i>Halecium insolens</i>	Fraser, 1938	NGC;CGC;SGC	BEN	0	45
<i>Halecium nanum</i>	Alder, 1859	NGC	BEN	14	82
<i>Halecium parvulum</i>	Bale, 1888	NGC	BEN	18	64
<i>Halecium regulare</i>	Fraser, 1938	NGC	BEN	18	81
<i>Halecium tenellum</i>	Hincks, 1861	NGC;CGC	BEN	82	270
<i>Halecium tenue</i>	Fraser, 1938	NGC	BEN	18	144
<i>Hebella calcarata</i>	(A. Agassiz, 1865)	NGC;CGC;SGC	BEN	22	82
<i>Lafocia dumosa</i>	(Fleming, 1828)	NGC	BEN	82	92
<i>Lafocia intermedia</i>	Fraser, 1938	NGC;CGC;SGC	BEN	18	274
<i>Lictorella adhaerens</i>	Fraser, 1938	NGC;CGC;SGC	BEN	81	216
<i>Lictorella convallaria</i>	(Allman, 1877)	NGC;CGC;SWB	BEN	5	220
<i>Lictorella reflexa</i>	Fraser, 1948	NGC;CGC;SWB	BEN	84	220
<i>Lictorella rigida</i>	Fraser, 1948	NGC	BEN	84	139
<i>Lovenella producta</i>	(Sars, 1873)	NGC;CGC	BEN	81	137
<i>Monostaechas quadridentis</i>	(McCrary, 1859)	NGC;CGC;SGC	BEN	5	92
<i>Obelia byalina</i>	Clarke, 1879	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	63
<i>Obelia plicata</i>	Hincks, 1869	NGC;CGC	BEN;LIT	0	270
<i>Pasya quadridentata</i>	(Ellis & Solander, 1786)	NGC	BEN	9	46

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Plumularia corrugata</i>	Nutting, 1900	NGC;CGC	BEN	15	144
<i>Plumularia lagenifera</i>	Allman, 1885	NGC;CGC;SGC;SWB	BEN;LIT	0	270
<i>Plumularia meganema</i>	Fraser, 1948	NGC;CGC;SGC	BEN	33	137
<i>Plumularia reversa</i>	Fraser, 1948	NGC	BEN	36	117
<i>Plumularia sinuosa</i>	Fraser, 1938	NGC;CGC;SGC	EPIF;LIT	0	54
<i>Scandia expansa</i>	Fraser, 1938	NGC	BEN	11	165
<i>Sertularella exilis</i>	Fraser, 1938	NGC	BEN	81	139
<i>Sertularella pedrensis</i>	Torrey, 1904	NGC;CGC;SGC;SWB	BEN	9	165
<i>Sertularella similis</i>	Fraser, 1948	NGC	BEN	81	128
<i>Sertularia cornicina</i>	(McCrary, 1859)	NGC	BEN	108	82
<i>Sertularia desmoides</i>	Torrey, 1902	NGC	BEN;LIT	0	45
<i>Sertularia exigua</i>	Allman, 1877	NGC;CGC;SGC;SWB	BEN;LIT	0	102
<i>Sertularia stabilis</i>	Fraser, 1948	NGC	BEN	21	24
<i>Sertularia stookeyi</i>	Nutting, 1904	NGC;SWB	BEN;LIT	0	128
SIPHONOPHORA					
<i>Dromalia alexandri</i>	Bigelow, 1911	NGC;CGC;SGC	BEN;PEL	99	273
<i>Physalia utriculus</i>	La Martiniere, 1787	NGC;CGC;SGC;BR;SWB	PEL;FLOT;NEUS	?	?
SCYPHOZOA (JELLYFISHES)					
<i>Stomalophus</i> sp.	NA	NGC;BR	PEL	?	?
PHYLUM CTENOPHORA (COMB JELLIES)					
<i>Pleurobrachia</i> sp.	NA	NGC;CGC;SGC;BR	PEL	?	?
PHYLUM PLATYHELMINTHES (FLATWORMS)					
TURBELLARIA (FREE-LIVING FLATWORMS)					
<i>Alleena mexicana</i>	Hyman, 1953	NGC;CGC;SGC;BR	LIT;BEN	0	?
<i>Alloiplana sandiegensis</i>	(Boone, 1929)	NGC;CGC;BR	LIT;BEN	0	?
<i>Longiprostatum rickettsi</i>	Hyman, 1953	NGC	BEN;LIT	0	?
<i>Marcusia ernesti</i>	Hyman, 1953	NGC;CGC;SGC;BR	LIT;BEN	0	?
<i>Ommatoplana levis</i>	(Hyman, 1953)	NGC;BR	LIT;BEN	0	?
<i>Ommatoplana mexicana</i>	(Hyman, 1953)	NGC;CGC;BR	LIT;BEN	0	?
<i>Prosthiostomum multichelis</i>	Hyman, 1953	NGC;CGC;BR	LIT;BEN	0	?
<i>Pseudoceros bajae</i>	Hyman, 1953	NGC;CGC;SGC;BR	LIT;BEN	0	?
<i>Pseudoceros mexicanus</i>	Hyman, 1953	NGC;CGC;BR	LIT;BEN	0	?
<i>Pseudostylochus burchami</i>	(Heath & McGregor, 1912)	NGC;BR	LIT;BEN	0	2
			BEN	20	70

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Thysanozoon</i> sp.		NGC;BR	LIT;BEN	0	2
<i>Zygantroplana stylifera</i>	Hyman, 1953	NGC	LIT;BEN	0	3
PHYLUM NEMERTEA (RIBBON WORMS)					
<i>Baseodiscus delineatus</i>	(Delle Chiaje, 1823-1829)	NGC;CGC;SGC;BR	BEN;LIT	0	1
<i>Baseodiscus punnetti</i>	(Coe, 1904)	NGC;BR	BEN;LIT	0	380
<i>Carinoma mutabilis</i>	Griffin, 1898	NGC	BEN;LIT	0	40
<i>Cerebratulus lineolatus</i>	Coe, 1905	NGC	BEN	0	70
<i>Lineus flavescens</i>	Coe, 1904	NGC;CGC;SGC;SWB	BEN;LIT	0	3
<i>Lineus geniculatus</i>	(Delle Chiaje, 1828)	NGC;CGC	BEN	0	30
PHYLUM MOLLUSCA (MOLLUSCS)					
CEPHALOPODA (SQUIDS AND OCTOPUSES)					
<i>Octopus alecto</i>	Berry, 1953	NGC;CGC;SGC;BR	BEN;LIT;NER	0	155
<i>Octopus bimaculatus</i>	Verrill, 1883	NGC;CGC;SGC;BR	BEN;LIT;NER	0	55
<i>Octopus digneti</i>	Perrier & Rochebrune, 1894	NGC;CGC;SGC;BR	BEN;LIT;NER	0	?
<i>Octopus fitchi</i>	Berry, 1953	NGC;CGC;BR	BEN;LIT;NER	0	?
<i>Octopus penicillifer</i>	Berry, 1954	NGC;CGC;SGC	BEN	21	?
GASTROPODA (SNAILS AND SLUGS)					
PROSOBRANCHIA					
ARCHAEOGASTROPODA					
<i>Anatoma keenae</i>	(McLean, 1970)	NGC;CGC;SGC	?	73	146
<i>Arene lurida</i>	(Dall, 1913)	NGC;CGC	BEN;LIT;NER	0	30
<i>Arene balboai</i>	(Strong & Hertlein, 1939)	NGC;CGC;SGC;BR	BEN	5	37
<i>Calliostoma gordanum</i>	McLean, 1980	NGC;CGC;SGC	BEN	999	128
<i>Calliostoma leanum</i>	(C.B. Adams, 1852)	NGC	BEN;LIT	0	180
<i>Calliostoma marsballi</i>	Lowe, 1935	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	35
<i>Calliostoma mcleani</i>	Shasky & Campbell, 1964	NGC;CGC	BEN;LIT	0	90
<i>Calliostoma nepheleide</i>	Dall, 1913	NGC;CGC;SGC;SWB	BEN	9	128
<i>Calliostoma palmeri</i>	Dall, 1871	NGC;CGC;BR	BEN;LIT	12	45
<i>Diodora alta</i>	(C.B. Adams, 1852)	NGC;CGC;SGC;BR	BEN	0	35
<i>Diodora inaequalis</i>	(Sowerby, 1835)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	36
<i>Diodora pusilla</i>	Berry, 1959	NGC;CGC;BR	BEN	9	146
<i>Diodora saturnalis</i>	(Carpenter, 1864)	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	35

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Emerginula velascoensis</i>	Shasky, 1961	NGC;CGC;SGC	?	73	550
<i>Eulitbidium cyclostoma</i>	(Carpenter, 1864)	NGC;CGC;SGC	BEN	6	37
<i>Eulitbidium substriata</i>	(Carpenter, 1864)	NGC;CGC;SGC	BEN;LIT;NER	0	?
<i>Eulitbidium variegata</i>	(Carpenter, 1864)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	0	35
<i>Fissurella rubropicta</i>	Pilsbry, 1890	NGC;CGC;SGC	BEN	35	?
<i>Fissurellidea bimaculata</i>	Dall, 1871	NGC;BR	?	?	?
<i>Iothia lindbergi</i>	McLean, 1985	NGC	BEN	?	183
<i>Lottia acutapex</i>	(Berry, 1960)	NGC;CGC;SGC;BR	BEN;LIT	0	20
<i>Lottia atrata</i>	(Carpenter, 1864)	NGC;CGC;SGC;BR;SWB	BEN;LIT;LACS	0	?
<i>Lottia dalliana</i>	(Pilsbry, 1891)	NGC;CGC;BR	BEN;LIT	0	?
<i>Lottia stanfordiana</i>	(Berry, 1957)	NGC;CGC;BR	BEN;LIT	0	?
<i>Lottia strigatella</i>	(Carpenter, 1864)	NGC;CGC;SGC	BEN;LIT	0	12
<i>Lottia strongiana</i>	(Hertlein, 1958)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	20
<i>Lottia turveri</i>	(Hertlein & Strong, 1951)	NGC;CGC;BR	BEN;LIT	0	12
<i>Lucapinella milleri</i>	Berry, 1959	NGC;CGC;SGC;BR	BEN;LIT;NER	0	35
<i>Macrarena californica californica</i>	(Dall, 1908)	NGC;CGC;SGC	BEN	37	183
<i>Macrarena farallonensis</i>	(A. G. Smith, 1952)	NGC;CGC;SGC	BEN	64	137
<i>Nerita funiculata</i>	Menke, 1851	NGC;CGC;SGC;BR	BEN;LIT	0	41
<i>Otollonia fricki</i>	(Crosse, 1865)	NGC;CGC;SGC;BR	BEN	3	75
<i>Parviturbo stearnsii</i>	(Dall, 1918)	NGC;CGC;BR	BEN	3	41
<i>Patelloida semirubida</i>	(Dall, 1914)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	35
<i>Plesiothyreus malonei</i>	(Vanatta, 1912)	NGC;CGC;SGC;BR	BEN	0	100
<i>Rimula mexicana</i>	Berry, 1969	NGC;CGC	BEN	30	80
<i>Solariella peramabilis</i>	Carpenter, 1864	NGC	?	?	183
<i>Solariella triplostephanus</i>	Dall, 1910	NGC;CGC;SGC;BR	BEN	12	55
<i>Tectura ubiquita</i>	(Lindberg & McLean, 1981)	NGC;CGC;SGC;SWB	BEN	0	5
<i>Tegula corteziana</i>	McLean, 1970	NGC;CGC;BR	BEN;LIT;NER	0	30
<i>Tegula felipensis</i>	McLean, 1970	NGC;BR	BEN;LIT;NER	0	?
<i>Tegula globulus</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN;LIT;NER	0	9
<i>Tegula mariana</i>	(Dall, 1919)	NGC;CGC;BR	BEN;LIT	0	20
<i>Tegula rubroflammulata</i>	(Koch in Philippi, 1843)	NGC;CGC;BR	BEN;LIT	0	114
<i>Tegula rugosa</i>	(A. Adams, 1853)	NGC;CGC;BR	BEN;LIT	0	?
<i>Theodoxus luteofasciatus</i>	(Miller, 1879)	NGC;CGC;BR	BEN;LIT;LACS	0	?
<i>Titiscania limacina</i>	(Bergh, 1875)	NGC;CGC;SGC;BR	BEN;LIT	0	?

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Turbo fluctuosus</i>	Wood, 1828	NGC;CGC;SGC;BR	BEN;LIT;NER	0	40
<i>Turbo mazatlanicus</i>	Pilsbry & Lowe, 1932	NGC;CGC;SGC	BEN;LIT;NER	0	37
<i>Turbo squamiger</i>	Reeve, 1843	NGC;CGC	BEN	6	61
<i>Turcica admirabilis</i>	Berry, 1969	NGC;CGC;SGC	BEN	50	180
CAENOGASTROPODA					
<i>Acanthina lugubris angelica</i>	Oldroyd, 1918	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	?
<i>Acanthina lugubris lugubris</i>	(Sowerby, 1822)	NGC;CGC;SGC	BEN;LIT	0	2
<i>Acanthotrophon sorenseni</i>	(Hertlein & Strong, 1951)	NGC;CGC;SGC	BEN	100	110
<i>Acirsa cerraikooensis</i>	(DuShane, 1970)	NGC;CGC;SGC	BEN	7	38
<i>Aesopus sanctus</i>	Dall, 1919	NGC;CGC;SGC	BEN	6	41
<i>Agathotoma alcippe</i>	(Dall, 1918)	NGC;CGC;BR	BEN;LIT	0	100
<i>Agathotoma kiasmida</i>	Shasky, 1971	NGC;CGC;SGC	BEN	20	40
<i>Agatrix strongi</i>	(Shasky, 1961)	NGC;CGC;SGC	BEN	37	200
<i>Alaba interruptelinaea</i>	Pilsbry & Lowe, 1932	NGC;CGC	BEN	11	41
<i>Alaba jeannettae</i>	Bartsch, 1910	NGC;CGC;SGC	?	?	?
<i>Alaba supralirata</i>	Carpenter, 1857	NGC;CGC;SGC	BEN	9	35
<i>Alleorus deprellus</i>	Strong, 1938	NGC;CGC;BR	?	6	12
<i>Alvania inconspicua</i>	(C.B. Adams, 1852)	NGC;CGC	BEN	12	35
<i>Anachis lilliana</i>	Withney, 1978	NGC;CGC;SGC;BR	BEN	0	?
<i>Anachis scalarina</i>	(Sowerby, 1832)	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Anticlimax occidens</i>	Pilsbry & Olsson, 1952	NGC;CGC;BR	BEN	12	37
<i>Antillophos veraguensis</i>	(Hinds, 1843)	NGC;CGC;SGC;BR	BEN;LIT	0	402
<i>Aorotrema humboldti</i>	(Hertlein & Strong, 1951)	NGC;CGC	BEN	18	35
<i>Asperiscala canna</i>	(Dall, 1919)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	?
<i>Asperiscala elenense</i>	(Sowerby, 1844)	NGC;CGC;SGC;SWB	BEN	0	?
<i>Asperiscala gradata</i>	(Sowerby, 1844)	NGC	BEN	0	?
<i>Asperiscala buffmani</i>	(DuShane & McLean, 1968)	NGC;CGC;BR	BEN;LIT	0	?
<i>Asperiscala lowei</i>	(Dall, 1906)	NGC;CGC	BEN;LIT	0	183
<i>Asperiscala walkerianum</i>	(Hertlein & Strong, 1951)	NGC;CGC;BR	BEN	0	23
<i>Assiminea compacta</i>	(Carpenter, 1864)	NGC;CGC;SGC	BEN;LIT;LACS	0	?
<i>Attiliosa nodulosa</i>	(A. Adams, 1855)	NGC;CGC;BR	BEN	0	80
<i>Austrotrophon cerrosensis</i>	(Dall, 1891)	NGC;CGC	BEN	100	183
<i>Axelella campbelli</i>	(Shasky, 1961)	NGC;CGC	BEN	18	91
<i>Babelomurex costata</i>	(Blainville, 1832)	NGC;CGC;SGC	BEN	0	41

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Babelomurex hindsi</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN;PAR	11	99
<i>Bailya anomala</i>	(Hinds, 1844)	NGC;CGC;SGC	BEN;LIT	0	15
<i>Bellaspina acclivicosta</i>	McLean & Poorman, 1970	NGC;CGC	BEN	20	40
<i>Bellaspina melea</i>	Dall, 1919	NGC;CGC	BEN	10	183
<i>Bizetiella carmen</i>	(Lowe, 1935)	NGC;CGC	BEN	12	118
<i>Buchema granulosa</i>	(Sowerby, 1834)	NGC;CGC;SGC	BEN	0	55
<i>Caducifer biliratus</i>	(Reeve, 1846)	NGC;CGC;SGC	BEN	2	146
<i>Caecum elongatum</i>	Carpenter, 1857	NGC;CGC;SGC	?	?	?
<i>Caecum firmatum</i>	C.B. Adams, 1852	NGC;CGC;SGC	BEN	11	27
<i>Caecum limnetes</i>	Long, 1972	NGC;BR	?	?	?
<i>Caecum quadratum</i>	Carpenter, 1857	NGC;CGC;SGC;BR	BEN	11	27
<i>Calliclava aegina</i>	(Dall, 1919)	NGC;CGC;SGC	BEN	15	30
<i>Calliclava alcmena</i>	(Dall, 1919)	NGC;CGC;SGC	BEN	35	70
<i>Calliclava palmeri</i>	(Dall, 1919)	NGC;CGC;SGC	BEN;LIT	0	20
<i>Calyptraea conica</i>	Broderip, 1834	NGC;CGC;SGC;SWB	BEN	5	183
<i>Calyptraea mamillaris</i>	Broderip, 1834	NGC;BR;SWB	BEN;LIT;LACS	0	81
<i>Cancellaria cassidiformis</i>	Sowerby, 1832	NGC;CGC;BR	BEN;LIT	0	37
<i>Cancellaria bivetia jayana</i>	Keen, 1958	NGC;BR	BEN	18	75
<i>Cancellaria obesa</i>	Sowerby, 1832	NGC;CGC	BEN;LIT	0	90
<i>Cantharus macrospira</i>	(Berry, 1957)	NGC;CGC;SGC;BR	BEN	0	81
<i>Cantharus pallidus</i>	(Broderip & Sowerby, 1829)	NGC;BR	BEN	0	73
<i>Carinodrillica adonis</i>	Pilsbry & Lowe, 1932	NGC;CGC;SGC	BEN	35	100
<i>Carinodrillica dichroa</i>	Pilsbry & Lowe, 1932	NGC;CGC	BEN	9	100
<i>Carinodrillica halis</i>	(Dall, 1919)	NGC;CGC;SGC	BEN	18	100
<i>Carinodrillica hexagona</i>	(Sowerby, 1834)	NGC;CGC;SGC;BR	BEN;LIT	0	40
<i>Casmaria vibexmexicana</i>	(Stearns, 1894)	NGC;CGC;SGC	BEN;LIT	0	22
<i>Cerithidea californica mazatlanica</i>	Carpenter, 1857	NGC;CGC;SGC	BEN;LIT;LACS	0	?
<i>Cerithiopsis bristolae</i>	Baker, Hanna & Strong, 1938	NGC;CGC;SGC	BEN	35	?
<i>Cerithiopsis tuberculoides</i>	Carpenter, 1857	NGC;CGC;SGC;BR	BEN	12	25
<i>Cerithium maculosum</i>	Kiener, 1841	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	9
<i>Cerithium stercusmuscarum</i>	Valenciennes, 1833	NGC;CGC;SGC;SWB	BEN;LIT;LACS	0	12
<i>Cerodrillica cybele</i>	(Pilsbry & Lowe, 1932)	NGC;CGC;SGC	BEN	10	100
<i>Cheilea cepacea</i>	(Broderip, 1834)	NGC;CGC;BR	BEN;LIT	0	183

TABLE 29-3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Cirsotrema togatum</i>	(Herulein & Strong, 1951)	NGC;CGC;SGC	BEN	18	100
<i>Cirsotrema vulpinum</i>	(Hinds, 1844)	NGC;CGC	BEN	9	100
<i>Clatburella rigida</i>	(Hinds, 1843)	NGC;CGC;SGC	BEN;LIT	0	35
<i>Cochlespira cedonulli</i>	(Reeve, 1843)	NGC;CGC;SGC	BEN	20	275
<i>Cochliolepis cornis</i>	Hertz, Myers & Gemmell, 1992	NGC; BR	BEN	0	25
<i>Columbella aureomexicana</i>	(Howard, 1963)	NGC;CGC;SGC;BR	BEN;LIT	0	40
<i>Columbella strombiformis</i>	Lamarck, 1822	NGC;CGC;SGC;BR	BEN;LIT	0	20
<i>Compsodrillia albonodosa</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN;LIT	0	20
<i>Compsodrillia alcestis</i>	(Dall, 1919)	NGC;CGC;SGC	BEN	20	100
<i>Compsodrillia duplicata</i>	(Sowerby, 1834)	NGC;CGC	BEN	11	100
<i>Compsodrillia haliplexa</i>	(Dall, 1919)	NGC;CGC;SGC;BR;SWB	BEN	10	55
<i>Compsodrillia opaca</i>	McLean & Poorman, 1971	NGC;CGC;SGC	BEN	95	140
<i>Compsodrillia thestia</i>	(Dall, 1919)	NGC;CGC;BR	BEN	0	20
<i>Conus brunneus</i>	Wood, 1828	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	20
<i>Conus dalli</i>	Stearns, 1873	NGC;CGC;SGC	BEN;LIT	0	15
<i>Conus princeps</i>	Linnaeus, 1758	NGC;CGC;BR	BEN;LIT	0	35
<i>Conus lucidus</i>	Wood, 1828	NGC;CGC;SGC;BR;SWB	BEN	0	41
<i>Conus poormani</i>	Berry, 1968	NGC;CGC;BR	BEN	55	165
<i>Conus archon</i>	Broderip, 1833	NGC;CGC;SGC	BEN	9	400
<i>Conus regularis</i>	Sowerby, 1833	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	100
<i>Conus perplexus</i>	Sowerby, 1857	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	73
<i>Conus angulatus</i>	A. Adams, 1854	NGC;BR	?	?	?
<i>Conus tornatus</i>	Sowerby, 1833 ex Broderip, MS	NGC;CGC;BR	BEN	0	57
<i>Conus ximenes</i>	Gray, 1839	NGC;CGC;SGC	BEN;LIT	0	90
<i>Coralliophila macleani</i>	Shasky, 1970	NGC;CGC;SGC;BR	BEN;LIT;PAR	0	30
<i>Cosmioconcha palmeri</i>	(Dall, 1913)	NGC;CGC;SGC;BR	BEN	9	108
<i>Cosmioconcha pergracilis</i>	(Dall, 1913)	NGC;SWB	BEN	27	106
<i>Costoanachis berryi</i>	(Shasky, 1970)	NGC;CGC;SGC	BEN	1	66
<i>Costoanachis coronata</i>	(Sowerby, 1832)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	72
<i>Costoanachis hilli</i>	(Pilsbry & Lowe, 1932)	NGC;CGC;SGC;BR	BEN;LIT	0	30
<i>Costoanachis sanfelipensis</i>	(Lowe, 1935)	NGC;BR	BEN;LIT	0	?
<i>Costoanachis varia</i>	(Sowerby, 1832)	NGC;CGC;BR	BEN;LIT	0	30
<i>Costoanachis vexillum</i>	(Reeve, 1858)	NGC;CGC;BR	BEN;LIT	0	?

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Cotonopsis hirundo</i>	(Gaskoin, 1852)	NGC;CGC;BR	BEN;LIT	2	236
<i>Crassispina appressa</i>	(Carpenter, 1864)	NGC;CGC;SGC	BEN;LIT	0	5
<i>Crassispina bifurca</i>	(E. A. Smith, 1888)	NGC;CGC;BR	BEN;LIT	0	35
<i>Crassispina curvini</i>	McLean & Poorman, 1971	NGC;CGC;SGC	BEN;LIT	0	2
<i>Crassispina discors</i>	(Sowerby, 1834)	NGC;CGC;SGC	BEN;LIT	0	41
<i>Crassispina incrassata</i>	(Sowerby, 1834)	NGC;CGC;SGC;BR	BEN;LIT	0	35
<i>Crassispina kluthi</i>	E. K. Jordan, 1936	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	50
<i>Crassispina maura</i>	(Sowerby, 1834)	NGC;CGC;SGC	BEN	0	60
<i>Crassispina monilifera</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN;LIT	0	?
<i>Crassispina pluto</i>	Pilsbry & Lowe, 1932	NGC;CGC;SGC;BR	BEN;LIT	0	72
<i>Crassispina rustica</i>	(Sowerby, 1834)	NGC;CGC	BEN;LIT	0	100
<i>Crassispina tepocana</i>	Dall, 1919	NGC;CGC	BEN	20	72
<i>Crassispina unicolor</i>	(Sowerby, 1834)	NGC;CGC;SGC;BR	BEN;LIT	0	45
<i>Crassispina xanti</i>	Hertlein & Strong, 1951	NGC;CGC;SGC	BEN	7	55
<i>Crepidula excavata</i>	(Broderip, 1834)	NGC;CGC;SGC;BR	BEN;LIT	0	100
<i>Crepidula incurva</i>	(Broderip, 1834)	NGC;CGC;SGC;BR	BEN;LIT	0	35
<i>Crepidula lessonii</i>	Broderip, 1834	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Crepidula oryx</i>	Sowerby, 1824	NGC;CGC;SGC;BR	BEN	0	80
<i>Crepidula striolata</i>	Menke, 1851	NGC;CGC;SGC;BR	BEN;LIT	0	30
<i>Crepidula uncata</i>	Menke, 1847	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	?
<i>Crossata californica sonorana</i>	(Berry, 1960)	NGC;CGC	BEN;PAR	0	178
<i>Crucibulum concameratum</i>	Reeve, 1859	NGC;CGC;SGC	BEN	9	81
<i>Crucibulum lignarium</i>	(Broderip, 1834)	NGC;CGC;SGC	BEN;LIT	0	100
<i>Crucibulum monticulus</i>	Berry, 1969	NGC;CGC;SGC	BEN	35	183
<i>Crucibulum personatum</i>	Keen, 1958	NGC;CGC;SGC;BR	BEN	12	50
<i>Crucibulum scutellatum</i>	(Wood, 1828)	NGC;CGC;BR	BEN;LIT	0	181
<i>Crucibulum spinosum</i>	(Sowerby, 1824)	NGC;CGC;BR	BEN;LIT;LACS	0	61
<i>Cyclostremiscus bailyi</i>	(Hertlein & Strong, 1951)	NGC;CGC;BR	BEN	22	24
<i>Cyclostremiscus bifrontia</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN	10	35
<i>Cyclostremiscus janus</i>	(C.B. Adams, 1852)	NGC;CGC;SGC	?	?	?
<i>Cyclostremiscus parvus</i>	(C.B. Adams, 1852)	NGC;CGC	BEN	11	35
<i>Cyclostremiscus perparvus</i>	(C.B. Adams, 1852)	NGC;BR	?	?	?
<i>Cyclostremiscus psix</i>	Pilsbry & Olsson, 1952	NGC;BR	BEN	0	?

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Cyclostremiscus salvatierrensis</i>	Hertz, Myers & Gemmell, 1992	NGC;CGC;SGC	BEN	1	55
<i>Cyclostremiscus spiciferi</i>	(Baker, Hanna & Strong, 1938)	NGC;CGC;BR	BEN	1	20
<i>Cyclostremiscus tenuisculptus</i>	(Carpenter, 1865)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	?
<i>Cyclostremiscus tricarminatus</i>	(C.B. Adams, 1852)	NGC;CGC;BR	BEN	12	35
<i>Cyclostremiscus trigonatus</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN	35	?
<i>Cymatium corrugatum amictum</i>	(Reeve, 1844)	NGC;CGC;SGC	BEN	30	118
<i>Cymatium gibbosum</i>	(Broderip, 1833)	NGC;CGC;SGC;BR	BEN;LIT	0	100
<i>Cymatium paribenopetum keenae</i>	(Beu, 1970)	NGC;CGC;SGC	BEN;LIT	0	100
<i>Cymbula bratcheriae</i>	Cate, 1973	NGC;CGC;SGC;BR	?	?	?
<i>Cyphoma emarginata</i>	(Sowerby, 1830)	NGC;CGC;SGC;BR	BEN;PAR	11	118
<i>Cypraea albuginosa</i>	Gray, 1825	NGC;CGC;SGC	BEN	0	38
<i>Cypraea annettiae annettiae</i>	Dall, 1909	NGC;CGC;SGC;BR	BEN;LIT	0	38
<i>Cypraea cervinetta</i>	Kiener, 1843	NGC;CGC;BR	BEN;LIT	0	41
<i>Cypraea isabellamexicana</i>	Stearns, 1893	NGC;CGC;SGC	BEN	0	12
<i>Cypraeacassis coarctata</i>	(Sowerby, 1825)	NGC;CGC;SGC;BR	BEN;LIT	0	41
<i>Daphnella allemani</i>	(Bartsch, 1931)	NGC;CGC	BEN;LIT	0	73
<i>Daphnella bartsi</i>	Dall, 1919	NGC;CGC;SGC;SWB	BEN	12	35
<i>Daphnella mazatlanica</i>	Pilsbry & Lowe, 1932	NGC;CGC;SGC;BR	BEN;LIT	0	40
<i>Daphnella retusa</i>	McLean & Poorman, 1971	NGC;CGC;SGC	BEN	12	100
<i>Decipifus gracilis</i>	McLean, 1959	NGC;CGC;SGC	BEN;LIT	0	2
<i>Decipifus lyra</i>	(Baker, Hanna & Strong, 1938)	NGC;BR	BEN;LIT	0	3
<i>Decipifus macleani</i>	Keen, 1971	NGC;BR	BEN;LIT	0	20
<i>Delonovola aequalis</i>	(Sowerby, 1832)	NGC;CGC;SGC;BR	BEN	4	100
<i>Depressicula polita</i>	(Sowerby, 1844)	NGC	BEN;LIT	11	393
<i>Dermomurex cunninghamae</i>	(Berry, 1964)	NGC;CGC	BEN	18	100
<i>Diastoma fastigiatum</i>	(Carpenter, 1864)	NGC	BEN	20	30
<i>Distorsio constricta</i>	(Broderip, 1833)	NGC;CGC;SGC	BEN	2	118
<i>Distorsio decussata</i>	(Valenciennes, 1832)	NGC;CGC;SGC	BEN	11	99
<i>Distorsio jenniernestae</i>	Emerson & Piech, 1992	NGC;CGC;SGC	BEN;LIT	0	183
<i>Distorsio minoruobnishi</i>	Parth, 1989	NGC;CGC;SGC	BEN	15	165
<i>Drillia acapulcana</i>	(Hertlein & Strong, 1951)	NGC;CGC;SGC	BEN	20	72
<i>Drillia aerope</i>	(Dall, 1919)	NGC;CGC;SGC;SWB	BEN	20	100

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Drillia berryi</i>	McLean & Poorman, 1971	NGC;CGC;SGC	BEN	50	183
<i>Drillia cunninghamae</i>	McLean & Poorman, 1971	NGC;CGC;SGC	BEN	25	100
<i>Drillia inornata</i>	McLean & Poorman, 1971	NGC;CGC;SGC	BEN	50	100
<i>Drillia roseola</i>	(Hertlein & Strong, 1955)	NGC;CGC;SGC;BR	BEN	12	70
<i>Drillia salvadorica</i>	(Hertlein & Strong, 1951)	NGC;CGC;SGC	BEN	6	45
<i>Drillia tumida</i>	McLean & Poorman, 1971	NGC;CGC;SGC;BR;SWB	BEN	20	74
<i>Elephantulum heptagonum</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN	11	27
<i>Elephantulum liratoctinctum</i>	(Carpenter, 1857)	NGC;CGC;BR	BEN	3	17
<i>Euaeta cumingi</i>	(Broderip, 1832)	NGC;CGC;SWB	BEN;LIT	0	49
<i>Engina jugosa</i>	(C.B. Adams, 1852)	NGC;CGC;SGC;BR	BEN	12	162
<i>Engina solida</i>	Dall, 1917	NGC;CGC;SGC	BEN	0	35
<i>Episcynia bolivari</i>	Pilsbry & Olsson, 1946	NGC;CGC;BR	BEN	12	35
<i>Euaetes centiquadra</i>	(Valenciennes, 1846)	NGC;CGC;BR	BEN	?	100
<i>Euclathurella carissima</i>	(Pilsbry & Lowe, 1932)	NGC;CGC;BR	BEN;LIT	0	10
<i>Eulima recta</i>	C.B. Adams, 1852	NGC;CGC;BR	BEN	12	?
<i>Eulima townsendi</i>	(Bartsch, 1917)	NGC;CGC	BEN	20	30
<i>Eulimetta pagoda</i>	Warén, 1992	NGC;CGC;SGC	BEN	3	44
<i>Eulimostraca linearis</i>	(Carpenter, 1857)	NGC;CGC;SGC	?	?	?
<i>Eupleura muriciformis</i>	(Broderip, 1833)	NGC;CGC;BR	BEN;LIT	0	180
<i>Finella excurvata</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN;LIT	0	18
<i>Finella monicensis</i>	(Bartsch, 1911)	NGC	?	?	?
<i>Fusinus turris</i>	(Valenciennes, 1832)	NGC	BEN;LIT	0	200
<i>Fusinus cinereus</i>	(Reeve, 1847)	NGC;CGC;SGC	BEN;LIT	0	35
<i>Fusinus colpoicus</i>	Dall, 1915	NGC;CGC;SGC	BEN	9	165
<i>Fusinus consagensis</i>	Poorman, 1981	NGC;BR	BEN	20	30
<i>Fusinus dupetitthouarsi</i>	(Kienet, 1840)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	200
<i>Fusinus felipensis</i>	Lowe, 1935	NGC;BR	BEN;LIT	0	?
<i>Fusinus fredbakeri</i>	Lowe, 1935	NGC;CGC;BR	BEN	12	104
<i>Fusinus sonorae</i>	Poorman, 1981	NGC;CGC	BEN	100	183
<i>Fusiturricula armilda</i>	(Dall, 1908)	NGC;CGC;SGC	BEN	35	280
<i>Gemmula hindiana</i>	Berry, 1958	NGC;CGC;SGC;SWB	BEN	40	225
<i>Globidrililia ferminiana</i>	(Dall, 1919)	NGC	BEN	20	45
<i>Globidrililia micans</i>	(Hinds, 1843)	NGC;CGC;SGC;BR	BEN	10	30
<i>Globidrililia strobbeeni</i>	(Hertlein & Strong, 1951)	NGC;CGC;SGC	BEN	8	40

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Glyptostoma candida</i>	(Hinds, 1843)	NGC;CGC;SGC;SWB	BEN	40	183
<i>Glyptostoma neglecta</i>	(Hinds, 1843)	NGC;CGC;BR	BEN	20	50
<i>Glyptostoma thalassoma</i>	(Dall, 1908)	NGC	BEN	70	183
<i>Granulina margaritula</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN;LIT	0	110
<i>Haustorium elenensis</i>	(Dall, 1909)	NGC;CGC;BR	BEN;LIT	0	36
<i>Hespererato columbella</i>	(Menke, 1847)	NGC;CGC;SGC;BR	BEN;LIT	0	145
<i>Hexaplex nigrinus</i>	(Philippi, 1845)	NGC;CGC;SGC;BR	BEN;LIT	0	60
<i>Hexaplex princeps</i>	(Broderip, 1833)	NGC;CGC;SGC	BEN	0	41
<i>Hindsiclava andromeda</i>	(Dall, 1919)	NGC;CGC;SGC	BEN	40	160
<i>Hindsiclava militaris</i>	(Reeve, 1843, ex Hinds, MS)	NGC;CGC;SGC	BEN	18	102
<i>Hirtoscala reflexa</i>	(Carpenter, 1856)	NGC;CGC;SGC;BR	BEN	9	41
<i>Hirtoscala replicatum</i>	(Sowerby, 1844)	NGC;CGC;SGC;BR	BEN	5	108
<i>Hormospira maculosa</i>	(Sowerby, 1834)	NGC;CGC;SGC;BR	BEN;LIT	0	117
<i>Imaclava pilsbryi</i>	Bartsch, 1950	NGC;CGC;SGC;BR	BEN	13	30
<i>Imaclava unimaculata</i>	(Sowerby, 1834)	NGC;CGC;SGC	BEN	10	80
<i>Jenneria pustulata</i>	(Lightfoot, 1786)	NGC;CGC;SGC;BR	BEN;LIT;PAR	0	40
<i>Knefastia dalli</i>	Bartsch, 1944	NGC;CGC;BR	BEN;LIT	0	80
<i>Knefastia tuberculifera</i>	(Broderip & Sowerby, 1829)	NGC;CGC;SGC;BR	BEN;LIT	0	88
<i>Knefastia walkeri</i>	Berry, 1958	NGC;CGC;SGC	BEN	18	102
<i>Kurtzia aethra</i>	(Dall, 1919)	NGC;CGC	BEN	20	70
<i>Kurtzia arteaga</i>	(Dall & Bartsch, 1910)	NGC;CGC;BR	BEN	20	100
<i>Kurtzia granulatissima</i>	(Mörch, 1860)	NGC;CGC;BR;SWB	BEN	11	40
<i>Kurtziella antiochroa</i>	(Pilsbry & Lowe, 1932)	NGC;CGC;BR	BEN	10	50
<i>Kurtziella antipyrgus</i>	(Pilsbry & Lowe, 1932)	NGC;CGC	BEN;LIT	20	100
<i>Kurtziella cyrene</i>	(Dall, 1919)	NGC;CGC;BR	BEN	10	70
<i>Kurtziella plumbea</i>	(Hinds, 1843)	NGC;CGC;SGC;BR	BEN	10	100
<i>Kurtziella powelli</i>	Shasky, 1971	NGC;BR	BEN;LIT	20	40
<i>Kylix alcyone</i>	(Dall, 1919)	NGC	BEN	?	139
<i>Kylix becula</i>	(Dall, 1919)	NGC;CGC;SGC;BR	BEN	14	35
<i>Kylix iantbe</i>	(Dall, 1919)	NGC;CGC;SGC;BR	BEN	13	50
<i>Kylix paziana</i>	(Dall, 1919)	NGC;CGC;SGC	BEN	20	80
<i>Kylix zacae</i>	Hertlein & Strong, 1951	NGC;CGC	BEN	10	183
<i>Lamellaria diegoensis</i>	Dall, 1885	NGC;CGC;BR	BEN;LIT	0	139
<i>Lamellaria inflata</i>	(C.B. Adams, 1852)	NGC;CGC	BEN	0	35

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Lamellaria perspicua</i>	(Linnaeus, 1758)	NGC;CGC;BR	BEN	0	1,287
<i>Lapsigyrus mutans</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN	20	?
<i>Latirus praestantior</i>	Melville, 1892	NGC;CGC;SGC	BEN	10	35
<i>Liocerithium judithae</i>	Keen, 1971	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	?
<i>Lioglyphostoma ericea</i>	(Hinds, 1843)	NGC;CGC;SGC	BEN	40	183
<i>Lirobarleia albolirata</i>	(Carpenter, 1864)	NGC;CGC;SGC	?	?	?
<i>Lirobarleia clarionensis</i>	(Bartsch, 1911)	NGC;CGC	BEN	35	?
<i>Lirobarleia lirata</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN	8	?
<i>Littoraria aberrans</i>	(Philippi, 1846)	NGC;BR	?	?	?
<i>Littoraria rosewateri</i>	Reid, 1999	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	0
<i>Lydiopsis cymatotropis</i>	Pilsbry & Olsson, 1945	NGC;CGC;SGC	?	?	?
<i>Maesiella maesae</i>	McLean & Poorman, 1971	NGC;CGC	BEN	15	35
<i>Malea ringens</i>	(Swainson, 1822)	NGC;CGC;SGC;BR	BEN;LIT	0	53
<i>Mancinella tuberculata</i>	(Sowerby, 1835)	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Marseniopsis sharonae</i>	(Willett, 1939)	NGC;BR	BEN	0	5
<i>Melanelia gibba</i>	(de Folin, 1867)	NGC;CGC;BR	BEN	12	40
<i>Melanelia retexta</i>	(Carpenter, 1857)	NGC;CGC;SGC	?	?	?
<i>Melanelia yod</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN	0	35
<i>Melongena patula</i>	(Broderip & Sowerby, 1829)	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	2
<i>Metaxia convexa</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN	2	40
<i>Microdaphne trichodes</i>	(Dall, 1919)	NGC;CGC;SGC;BR	BEN	0	146
<i>Miraculaburella bicanalifera</i>	(Sowerby, 1834)	NGC;CGC;SGC;BR	BEN	0	72
<i>Mitra fultroni</i>	E. A. Smith, 1892	NGC;CGC;SGC;BR	BEN;LIT	0	90
<i>Mitra tristis</i>	Broderip, 1836	NGC;CGC;SGC;BR	BEN;LIT	0	20
<i>Mitrella dorma</i>	Baker, Hanna & Strong, 1938	NGC;CGC;SGC;BR	BEN	0	50
<i>Mitrella granti</i>	Lowe, 1935	NGC;CGC;BR	BEN	0	?
<i>Mitrella millepunctata</i>	(Carpenter, 1864)	NGC;CGC	BEN	0	35
<i>Mitrella ocellata</i>	(Gmelin, 1791)	NGC;CGC;SGC;BR	BEN	0	30
<i>Mitromorpha mitriformis</i>	(Shasky, 1961)	NGC;CGC;SGC	BEN	22	183
<i>Mitromorpha baileyi</i>	(McLean & Poorman, 1971)	NGC;CGC;SGC	BEN	20	60
<i>Murexiella humilis</i>	(Broderip, 1833)	NGC;CGC;SGC;BR	BEN;LIT	0	99
<i>Murexiella mildredae</i>	Poorman, 1980	NGC;CGC	BEN	100	183
<i>Muricopsis zeteki</i>	Hertlein & Strong, 1951	NGC;CGC;BR	BEN	3	27
<i>Nannodiella fraternalis</i>	(Dall, 1919)	NGC;CGC;SGC	BEN	11	70

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Nannodiella nana</i>	(Dall, 1919)	NGC;CGC	BEN	11	70
<i>Nassarina belenae</i>	Keen, 1971	NGC;CGC;SGC;BR	BEN	7	100
<i>Nassarinus brunneostoma</i>	(Stearns, 1893)	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Nassarinus cerritensis</i>	(Arnold, 1903)	NGC;CGC	BEN	35	100
<i>Nassarinus guaymasensis</i>	(Pilsbry & Lowe, 1932)	NGC;CGC;BR	BEN;LIT	0	100
<i>Nassarinus howardae</i>	Chace, 1958	NGC;CGC;BR	BEN	18	276
<i>Nassarinus insculptus</i>	(Carpenter, 1864)	NGC;CGC;BR	BEN	20	135
<i>Nassarinus iodes</i>	(Dall, 1917)	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	18
<i>Nassarinus limacinus</i>	(Dall, 1917)	NGC;CGC;SGC;BR	BEN;LIT	0	24
<i>Nassarinus nodicinctus</i>	(A. Adams, 1852)	NGC;CGC;SGC;BR	BEN	18	97
<i>Nassarinus pagodus</i>	(Reeve, 1844)	NGC;CGC;SWB	BEN	0	118
<i>Nassarinus shaskyi</i>	McLean, 1970	NGC;CGC;SGC;SWB	BEN	18	100
<i>Nassarinus taeniolatus</i>	(Philippi, 1845)	NGC;CGC;BR	BEN	10	40
<i>Nassarinus tiarula</i>	(Kiener, 1841)	NGC;CGC;SGC;BR	BEN;LIT	0	2
<i>Nassarinus versicolor</i>	(C.B. Adams, 1852)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	81
<i>Natica broderipiana</i>	Récluz, 1844	NGC;CGC;SGC;BR	BEN	2	118
<i>Natica chemnitzii</i>	Pfeiffer, 1840	NGC;CGC;BR;SWB	BEN;LIT	0	30
<i>Natica lunaris</i>	(Berry, 1964)	NGC;CGC;BR;SWB	BEN;LIT	13	46
<i>Natica scethra</i>	Dall, 1908	NGC;CGC	BEN;LIT	0	281
<i>Neorapana muricata</i>	(Broderip, 1832)	NGC;CGC	BEN;LIT	0	78
<i>Neverita reclusiana</i>	(Deshayes, 1839)	NGC;CGC;SGC;BR	BEN;LIT	0	50
<i>Niso baueri</i>	Emerson, 1965	NGC;CGC	BEN	35	80
<i>Niso excolpa</i>	Bartsch, 1917	NGC;CGC;BR	BEN	12	100
<i>Niso hipolitensis</i>	Bartsch, 1917	NGC;CGC	BEN	5	41
<i>Niso lomana</i>	Bartsch, 1917	NGC	BEN	9	183
<i>Niso splendida</i>	(Sowerby, 1834)	NGC;CGC;SGC	BEN	10	110
<i>Nitidiscala arcana</i>	(Dushane, 1979)	NGC;BR	BEN;LIT	0	18
<i>Nitidiscala durhamianum</i>	(Hertlein & Strong, 1951)	NGC;BR	BEN	9	27
<i>Nitidiscala hexagona</i>	(Sowerby, 1844)	NGC;CGC;SGC;SWB	BEN;LIT	0	1
<i>Nitidiscala hindsi</i>	(Carpenter, 1856)	NGC;CGC;BR	BEN	0	198
<i>Nodilittorina albicarinata</i>	(McLean, 1970)	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Nodilittorina aspera</i>	(Philippi, 1846)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	41
<i>Nodilittorina modesta</i>	(Philippi, 1846)	NGC;CGC;SGC	BEN;LIT	0	41
<i>Oliva polypasta</i>	Duclos, 1833	NGC;CGC;SWB	BEN	20	35

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Olivia spicata spicata</i>	(Röding, 1798)	NGC;CGC;SGC;BR	BEN;LIT	0	29
<i>Olivia subangulata corteziana</i>	Petuch & Sargent, 1986	NGC	BEN	20	?
<i>Olivia undatella</i>	Lamarck, 1811	NGC;CGC;SGC;SWB	BEN;LIT	0	29
<i>Olivella dama</i>	(Wood, 1828 ex Mawe MS)	NGC;CGC;SGC;BR	BEN;LIT	0	35
<i>Olivella fletcheriae</i>	Berry, 1958	NGC;CGC;BR	BEN;LIT	0	41
<i>Olivella gracilis</i>	(Broderip & Sowerby, 1829)	NGC;CGC;SGC	BEN	12	41
<i>Olivella sponhi</i>	Burch & Campbell, 1963	NGC;CGC;SGC	BEN	4	37
<i>Olivella steveni</i>	Burch & Campbell, 1963	NGC;CGC;SGC;BR	BEN;LIT	0	37
<i>Olivella zanoeta</i>	(Duclos, 1835)	NGC;CGC;SGC;BR	BEN	10	49
<i>Olivella zonalis</i>	(Lamarck, 1811)	NGC;CGC;SGC	BEN;LIT	0	?
<i>Opalia crenatoides</i>	(Carpenter, 1864)	NGC;CGC;SGC	BEN	0	30
<i>Opalia funiculata</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN;LIT	0	30
<i>Opalia sanjuanensis</i>	(Lowe, 1932)	NGC;CGC;BR	BEN;LIT	0	36
<i>Opalia spongiosa</i>	Carpenter, 1864	NGC;CGC;SGC	BEN	16	72
<i>Opelostoma pseudodon</i>	(Burrow, 1815)	NGC;CGC;SGC;BR	BEN;LIT	0	41
<i>Parametaria dupontii</i>	(Kiener, 1850)	NGC;CGC;SGC	BEN	0	40
<i>Parvanachis gaskoini</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN;LIT	0	?
<i>Pascula ferruginosa</i>	(Reeve, 1846)	NGC;CGC;BR	BEN;LIT	0	?
<i>Persicula phrygia</i>	(Sowerby, 1846)	NGC;SWB	BEN;LIT	0	20
<i>Petalonchus flavescens</i>	Carpenter, 1857	NGC;CGC;SGC	?	?	?
<i>Petalonchus innumerabilis</i>	Pilsbry & Olsson, 1935	NGC;CGC;SGC	BEN	35	?
<i>Philbertia doris</i>	Dall, 1919	NGC;CGC;SGC;BR	BEN	12	50
<i>Phos dejanira</i>	(Dall, 1919)	NGC;CGC;SGC;BR	BEN	12	33
<i>Phos gaudens</i>	Hinds, 1844	NGC;CGC;SGC;BR	BEN	18	110
<i>Phyllonotus erythrostromus</i>	(Swainson, 1831)	NGC;CGC;SGC;BR	BEN;LIT	0	100
<i>Pilosabia pilosa</i>	(Deshayes, 1832)	NGC;CGC;SGC;BR	BEN;LIT	0	180
<i>Pilsbryspira bacchia</i>	(Dall, 1919)	NGC;CGC;SGC;BR	BEN	0	35
<i>Pilsbryspira nymphia</i>	(Pilsbry & Lowe, 1932)	NGC;CGC;SGC;BR	BEN;LIT	0	6
<i>Pleuroploca princeps</i>	(Sowerby, 1825)	NGC;CGC;SGC;BR	BEN	3	41
<i>Plicopurpura patula pansa</i>	Gould, 1853	NGC;CGC;SGC;SWB	BEN;LIT	0	41
<i>Polinices bifasciatus</i>	(Griffith & Pidgeon, 1834)	NGC;CGC;BR;SWB	BEN;LIT	0	60
<i>Polinices intemeratus</i>	(Philippi, 1853)	NGC	BEN;LIT	0	333
<i>Polinices uber</i>	(Valenciennes, 1832)	NGC;CGC;SGC	BEN;LIT	0	100
<i>Polystira nobilis</i>	(Hinds, 1843)	NGC;CGC;SGC;BR	BEN	18	183
<i>Polystira oxytropis</i>	(Sowerby, 1834)	NGC;CGC;SGC	BEN	20	110

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Polystira picta</i>	(Reeve, 1843)	NGC;CGC;SGC;BR	BEN	20	70
<i>Pteropurpura erinacoides</i>	(Valenciennes, 1832)	NGC;CGC	BEN;LIT	0	88
<i>Pteropurpura macroptera</i>	(Deshayes, 1839)	NGC	BEN	?	183
<i>Pteryonotus pinniger</i>	(Broderip, 1833)	NGC;CGC	BEN	11	82
<i>Pyrgocythara danae</i>	(Dall, 1919)	NGC;CGC;BR	BEN	10	30
<i>Pyrgocythara emersoni</i>	Shasky, 1971	NGC;CGC;BR	BEN;LIT	0	?
<i>Pyrgocythara belena</i>	(Dall, 1919)	NGC;CGC;SGC	BEN	11	40
<i>Pyrgocythara melita</i>	(Dall, 1919)	NGC;CGC;SGC;BR	BEN	20	40
<i>Pyrgocythara phaeothusa</i>	(Dall, 1919)	NGC;CGC;BR	BEN	0	40
<i>Pyrgocythara scammoni</i>	(Dall, 1919)	NGC;CGC;BR;SWB	BEN;LIT	0	35
<i>Pyrgospira obeliscus</i>	(Reeve, 1843)	NGC;CGC;SGC;BR	BEN	20	90
<i>Recluzia palmeri</i>	(Dall, 1871)	NGC;CGC;SGC	?	?	?
<i>Rhinocoryne humboldti</i>	(Valenciennes, 1832)	NGC;CGC;BR	BEN;LACS	?	27
<i>Rissoina burragei</i>	Bartsch, 1915	NGC;CGC;BR	?	?	?
<i>Rissoina clandestina</i>	(C.B. Adams, 1852)	NGC;CGC;BR	BEN	11	41
<i>Rissoina stricta</i>	Menke, 1850	NGC;CGC;SGC;SWB	BEN;LIT	0	?
<i>Rissoina woodwardi</i>	Carpenter, 1857	NGC;CGC;SGC;BR	BEN	35	?
<i>Rissoina zeltneri</i>	(De Folin, 1867)	NGC;CGC;SGC	?	11	41
<i>Rissoina mexicana</i>	Bartsch, 1915	NGC;CGC;SGC;BR	BEN	0	0
<i>Sabinella shaskyi</i>	Warén, 1992	NGC;CGC;SGC	BEN	5	45
<i>Seila assimilata</i>	(C.B. Adams, 1852)	NGC;CGC;SGC;BR	BEN;LIT	0	41
<i>Seila kanoni</i>	(de Folin, 1867)	NGC;CGC;SGC	BEN;LIT	0	41
<i>Seila pulmoensis</i>	DuShane & Draper, 1975	NGC;CGC;SGC;BR	BEN;LIT	0	41
<i>Serpulorbis eruciformis</i>	(Mörch, 1862)	NGC;BR	?	?	?
<i>Simmidena rufa</i>	(Sowerby, 1832)	NGC;CGC;SGC;BR	?	11	27
<i>Sincola gibberula</i>	(Sowerby, 1832)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	183
<i>Sinum grayi</i>	(Deshayes, 1853)	NGC;CGC;SGC	BEN	25	160
<i>Sinum sanctijohannis</i>	(Pilsbry & Lowe, 1932)	NGC;CGC	BEN	18	165
<i>Solariorbis ametabolus</i>	Pilsbry & Olsson, 1952	NGC	BEN	2	18
<i>Solariorbis annulatus</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	?	?	?
<i>Solariorbis carinatus</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN	2	7
<i>Solariorbis concinnus</i>	(C.B. Adams, 1852)	NGC;CGC	?	9	18
<i>Solariorbis cortezi</i>	Myers, Hertz & Gemmill, 1991	NGC;CGC	BEN;LIT;NER	0	1
<i>Solariorbis ditropis</i>	Pilsbry & Olsson, 1952	NGC;CGC	BEN	35	?

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Solariorbis gibraleonis</i>	Pilsbry & Olsson, 1952	NGC	?	?
<i>Solariorbis bambachi</i>	(Strong & Hertlein, 1939)	NGC;CGC;BR	BEN	35
<i>Solariorbis hypolius</i>	Pilsbry & Olsson, 1952	NGC;BR	?	?
<i>Solariorbis minutus</i>	(C.B. Adams, 1852)	NGC;CGC	BEN	?
<i>Solariorbis regularis</i>	(C.B. Adams, 1852)	NGC;CGC	BEN;LIT	?
<i>Splendrilla bratcherae</i>	McLean & Poorman, 1971	NGC;CGC	BEN	100
<i>Steironepion tinctoria</i>	(Carpenter, 1864)	NGC;CGC;SGC	BEN	41
<i>Strictispira ericana</i>	(Hertlein & Strong, 1951)	NGC;CGC;SGC	BEN	100
<i>Strictispira stillmani</i>	Shasky, 1971	NGC;CGC;SGC;BR	BEN;LIT	41
<i>Strombina angularis</i>	(Sowerby, 1832)	NGC;CGC;SGC	BEN	300
<i>Strombina carmencita</i>	Lowe, 1935	NGC;CGC;SGC	BEN	165
<i>Strombus galeatus</i>	Swainson, 1823	NGC;CGC;SGC;BR	BEN;LIT	41
<i>Strombus gracilior</i>	Sowerby, 1825	NGC;CGC;BR	BEN;LIT;LACS	48
<i>Strombus granulatus</i>	Swainson, 1822	NGC;CGC;SGC	BEN;LIT	75
<i>Subcancilla attenuata</i>	(Broderip, 1836)	NGC;CGC;SGC;BR	BEN	91
<i>Subcancilla erythrogramma</i>	(Tomlin, 1931)	NGC;CGC;SGC	BEN	165
<i>Tectarius muricatus</i>	(Linnaeus, 1758)	NGC;BR	?	?
<i>Teinostoma ecuadorianum</i>	Pilsbry & Olsson, 1941	NGC;CGC;BR	BEN	35
<i>Teinostoma bembilli</i>	Strong & Hertlein, 1939	NGC;CGC;BR	BEN	35
<i>Teinostoma herbertianum</i>	Hertlein & Strong, 1951	NGC;CGC;BR;SWB	BEN	35
<i>Teinostoma imperfectum</i>	Pilsbry & Olsson, 1945	NGC;BR	?	?
<i>Teinostoma politum politum</i>	A. Adams, 1853	NGC;CGC;BR	BEN	15
<i>Teinostoma politum ultimum</i>	Pilsbry & Olsson, 1945	NGC;BR	BEN;LIT	1
<i>Teinostoma amplectans</i>	Carpenter, 1857	NGC;CGC;SGC;BR;SWB	BEN	?
<i>Tenaturris merita</i>	(Hinds, 1843)	NGC;CGC;BR	BEN;LIT	35
<i>Terebra affinis</i>	Gray, 1834	NGC	BEN;LIT	100
<i>Terebra argosya</i>	Olsson, 1971	NGC;CGC	?	41
<i>Terebra armillata</i>	Hinds, 1844	NGC;CGC;SGC;BR;SWB	BEN	110
<i>Terebra berryi</i>	Campbell, 1961	NGC;CGC;BR	BEN	37
<i>Terebra brandi</i>	Bratcher & Burch, 1970	NGC;CGC;SGC	BEN;LIT	76
<i>Terebra bridgessi</i>	Dall, 1908	NGC;CGC;BR	BEN;LIT	25
<i>Terebra churea</i>	Campbell, 1964	NGC;CGC;BR	BEN	108
<i>Terebra corintoensis</i>	Pilsbry & Lowe, 1932	NGC;CGC;BR	BEN;LIT	41
<i>Terebra crenifera</i>	Deshayes, 1859	NGC;CGC;SGC;BR	BEN;LIT	110

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Terebra elata</i>	Hinds, 1844	NGC;SWB	BEN;LIT	0	90
<i>Terebra glauca</i>	Hinds, 1844	NGC;CGC;SGC	BEN;LIT	0	90
<i>Terebra larviformis</i>	Hinds, 1844	NGC;CGC;SGC;BR;SWB	BEN	5	73
<i>Terebra ornata</i>	Gray, 1834	NGC;CGC	BEN;LIT	0	85
<i>Terebra petiveriana</i>	Deshayes, 1857	NGC;CGC;BR	BEN;LIT	11	90
<i>Terebra puncturosa</i>	Berry, 1959	NGC;CGC;SWB	BEN;LIT	0	90
<i>Terebra robusta</i>	Hinds, 1844	NGC;CGC;SGC;SWB	BEN;LIT	0	110
<i>Terebra roperi</i>	Pilsbry & Lowe, 1932	NGC;CGC;SGC;BR;SWB	BEN	4	31
<i>Terebra tuberculosa</i>	Hinds, 1844	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	100
<i>Terebra variegata</i>	Gray, 1834	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	110
<i>Thais kiosquiformis</i>	(Duclos, 1832)	NGC;CGC;SGC;BR;SWB	BEN;LIT;LACS	0	?
<i>Turriturris spectabilis</i>	Berry, 1958	NGC	BEN	35	90
<i>Trachypollia lugubris</i>	(C.B. Adams, 1852)	NGC;CGC;SGC	BEN	0	40
<i>Trigonostoma goniostoma</i>	(Sowerby, 1832)	NGC;CGC;BR	BEN;LIT	0	36
<i>Trigonostoma bullatum</i>	(Sowerby, 1832)	NGC;CGC;BR	BEN	21	82
<i>Tripchora excolpa</i>	Bartsch, 1907	NGC;CGC;BR	BEN	11	41
<i>Tripchora hannai</i>	Baker, 1926	NGC;CGC;SGC;BR	BEN	4	35
<i>Tripyscha tripsycha</i>	(Pilsbry & Lowe, 1932)	NGC;CGC;SGC;BR	BEN;LIT	0	40
<i>Tripterytyphis lowei lowei</i>	(Pilsbry, 1931)	NGC;CGC;SGC;BR	BEN;LIT	0	150
<i>Tritonoharpa siphonata</i>	(Reeve, 1844)	NGC;CGC;SGC	BEN	18	180
<i>Trivia californica californica</i>	(Sowerby, 1832 ex Gray, MS)	NGC;CGC;SWB	?	?	?
<i>Trivia campus</i>	(Cate, 1979)	NGC;BR	?	?	?
<i>Trivia elisiae</i>	Howard & Sphon, 1960	NGC	?	?	?
<i>Trivia myrae</i>	Campbell, 1961	NGC;CGC;SGC;BR	BEN	18	146
<i>Trivia solandri</i>	(Sowerby, 1832 ex Gray, MS)	NGC;CGC;SGC;BR	BEN;LIT	0	35
<i>Trophonopsis diazi</i>	(Durham, 1942)	NGC	?	1573	1,720
<i>Trophonopsis lorenzoensis</i>	(Durham, 1942)	NGC	?	1573	1,720
<i>Truncatella californica</i>	Pfeiffer, 1857	NGC;BR;SWB	BEN;LIT	0	?
<i>Turritella anactor</i>	Berry, 1957	NGC;BR	BEN;LIT	0	49
<i>Turritella clarionensis</i>	Hertlein & Strong, 1951	NGC;CGC;SGC	BEN	27	100
<i>Turritella gonostoma</i>	Valenciennes, 1832	NGC;CGC;SGC;BR	BEN;LIT	0	2
<i>Turritella leucostoma</i>	Valenciennes, 1832	NGC;CGC;SGC;BR	BEN;LIT	0	50
<i>Turritella mariana</i>	Dall, 1908	NGC;CGC;SGC	BEN	22	150
<i>Turritella nodulosa</i>	King & Broderip, 1832	NGC;CGC;SGC;BR;SWB	BEN	4	170

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Turritella rubescens</i>	Reeve, 1849	NGC;GGC;SGC	BEN	20	55
<i>Turveria encopendema</i>	Berry, 1956	NGC;CGC;BR	BEN;PAR;COM	?	?
<i>Turveria pallida</i>	Warén, 1992	NGC;CGC	BEN;COM	0	?
<i>Typhisala clarki</i>	(Keen & Campbell, 1964)	NGC;CGC;BR;SWB	BEN;LIT	0	99
<i>Typhisopsis coronatus</i>	(Broderip, 1833)	NGC;GGC;SWB	BEN	18	80
<i>Vanikoro aperta</i>	(Carpenter, 1864)	NGC;CGC;SGC	BEN	6	41
<i>Vermetus contortus</i>	(Carpenter, 1857)	NGC;GGC;SGC	BEN;LIT	0	?
<i>Vermetus indentatus</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN;LIT	0	35
<i>Vermicularia frisbeyae</i>	McLean, 1970	NGC;GGC;SGC	BEN	12	110
<i>Vitrinella ?naticoides</i>	Carpenter, 1857	NGC;CGC;SGC;BR	?	?	?
<i>Vitrinella dalli</i>	(Bartsch, 1911)	NGC;GGC;BR	BEN	10	?
<i>Vitrinella goniomphala</i>	Pilsbry & Olsson, 1952	NGC;CGC;BR	?	?	?
<i>Vitrinella subquadrata</i>	Carpenter, 1857	NGC;GGC;SGC;BR	?	?	?
<i>Vitrinella tiburonensis</i>	Durham, 1942	NGC	?	393	?
<i>Vitrinella zonitoides</i>	Pilsbry & Olsson, 1952	NGC	?	?	?
<i>Xenophora conchyliophora</i>	(Born, 1780)	NGC;CGC;BR	BEN	18	635
<i>Zanassarina anitae</i>	(Campbell, 1961)	NGC;GGC;BR	BEN	0	100
<i>Zanassarina atella</i>	(Pilsbry & Lowe, 1932)	NGC;CGC	BEN	0	60
<i>Zanassarina pammicra</i>	(Pilsbry & Lowe, 1932)	NGC	BEN	?	?
<i>Zebina preposterum</i>	(Berry, 1958)	NGC;BR	?	?	?
<i>Zonulispira grandimaculata</i>	(C.B. Adams, 1852)	NGC;GGC;SGC;BR	BEN;LIT	0	35
HETEROBRANCHIA					
<i>Architectonica nobilis</i>	Röding, 1798	NGC;GGC;SGC;BR;SWB	BEN;LIT	0	183
<i>Chrysalida oonisca</i>	(Dall & Bartsch, 1909)	NGC;CGC;SGC	BEN	?	?
<i>Chrysalida reigeni</i>	(Carpenter, 1857)	NGC;GGC;SGC;BR	BEN	?	?
<i>Chrysalida telescopium</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN	?	?
<i>Chrysalida torrita</i>	(Dall & Bartsch, 1909)	NGC;GGC;SGC	BEN	?	?
<i>Discotectonica placentalis</i>	(Hinds, 1844)	NGC;CGC;SGC;SWB	BEN	18	100
<i>Evalea palmeri</i>	(Bartsch, 1912)	NGC;BR	BEN	?	?
<i>Helicacis mazatlanicus</i>	Pilsbry & Lowe, 1932	NGC;CGC;SGC;BR	BEN	3	38
<i>Helicacis planispira</i>	Pilsbry & Lowe, 1932	NGC;GGC;SGC	BEN	36	?
<i>Helicacis bicaniculatus</i>	(Valenciennes, 1832)	NGC;CGC;SGC;BR	BEN	0	36
<i>Herviera gliriella</i>	(Melvill & Standen, 1896)	NGC;CGC	?	8	37
<i>Hoffmannola hansii</i>	Marcus & Marcus, 1967	NGC;CGC;SGC	BEN;LIT	0	?

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Iselica kochi</i>	Strong & Hertlein, 1939	NGC;BR	BEN	5	15
<i>Iselica ovoidea</i>	(Gould, 1853)	NGC;CGC;SGC;BR	BEN	12	35
<i>Miralda terebellum</i>	(C.B. Adams, 1852)	NGC;CGC	BEN	12	41
<i>Odostomia lacunata</i>	Carpenter, 1857	NGC;CGC;SGC	BEN	35	?
<i>Odostomia herrerai</i>	Baker, Hanna & Strong, 1928	NGC;CGC	BEN	?	?
<i>Odostomia convexa</i>	Carpenter, 1857	NGC;CGC;SGC;BR	BEN	26	45
<i>Odostomia gabrieliensis</i>	Baker, Hanna & Strong, 1928	NGC;CGC;BR	BEN	?	?
<i>Odostomia excolpa</i>	Bartsch, 1912	NGC;BR	BEN	?	?
<i>Odostomia scalariformis</i>	Carpenter, 1857	NGC;CGC;SGC	BEN	35	?
<i>Onchidella binneyi</i>	Stearns, 1893	NGC;CGC;BR	BEN;LIT	0	30
<i>Onchidella hildae</i>	(Hoffman, 1928)	NGC;BR	BEN;LIT	0	?
<i>Peristichia hermosa</i>	(Lowe, 1935)	NGC;CGC;BR	BEN	12	35
<i>Pseudotorinia archidae panamensis</i>	Bartsch, 1918	NGC;CGC;SGC;BR	?	7	41
<i>Pyramidella adamsi</i>	Carpenter, 1864	NGC;CGC;BR	BEN;LIT	0	35
<i>Pyramidella linearum</i>	Pilsbry & Lowe, 1932	NGC;CGC;BR	BEN	18	37
<i>Pyramidella panamensis</i>	Dall & Bartsch, 1909	NGC;CGC;SGC;BR	BEN	18	91
<i>Pyramidella mazatlanica</i>	Dall & Bartsch, 1909	NGC;CGC;SGC	BEN	0	81
<i>Pyramidella auricoma</i>	Dall, 1889	NGC;CGC;SGC;BR	BEN	?	97
<i>Turbonilla ceratova</i>	Dall & Bartsch, 1909	NGC;CGC;BR	BEN	?	?
<i>Turbonilla sinaloana</i>	Strong, 1949	NGC;CGC;SGC	BEN	35	?
<i>Turbonilla sonitiana</i>	Hertlein & Strong, 1951	NGC;CGC;BR	BEN	12	?
<i>Turbonilla hannai</i>	Strong, 1938	NGC;CGC;SGC	BEN	18	45
<i>Turbonilla subangulata</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN	0	?
<i>Turbonilla stenogyra</i>	Dall & Bartsch, 1909	NGC;BR	BEN	?	?
<i>Turbonilla kelseyi</i>	Dall & Bartsch, 1909	NGC;CGC;SGC	BEN	35	?
<i>Turbonilla paramoia</i>	Dall & Bartsch, 1909	NGC	?	?	?
<i>Turbonilla coyotensis</i>	Baker, Hanna & Strong, 1928	NGC;CGC	BEN	20	40
<i>Turbonilla sedilina</i>	Dall & Bartsch, 1909	NGC;CGC;SGC	BEN	35	?
<i>Turbonilla alarconi</i>	Strong, 1949	NGC;CGC	BEN	?	?
<i>Turbonilla peñascoensis</i>	Lowe, 1935	NGC;CGC;BR	BEN	18	20
<i>Turbonilla azteca</i>	Baker, Hanna & Strong, 1928	NGC;CGC	BEN	2	6
<i>Turbonilla franciscuitana</i>	Baker, Hanna & Strong, 1928	NGC	BEN	?	?
<i>Turbonilla balidorna</i>	Dall & Bartsch, 1909	NGC;CGC;SGC	BEN	12	?
<i>Turbonilla bistias</i>	Dall & Bartsch, 1909	NGC;CGC	BEN	35	38

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Turbonilla kalivana</i>	Strong, 1949	NGC	BEN	?	?
<i>Turbonilla macbridei</i>	Dall & Bartsch, 1909	NGC;CGC;BR	BEN	16	18
<i>Turbonilla mayana</i>	Baker, Hanna & Strong, 1928	NGC;BR	BEN	?	?
<i>Turbonilla porteri</i>	Baker, Hanna & Strong, 1928	NGC	BEN	?	?
<i>Turbonilla sanctorum</i>	Dall & Bartsch, 1909	NGC;CGC;BR	BEN	18	?
<i>Turbonilla sealai</i>	Strong & Hertlein, 1939	NGC;BR	BEN	5	15
<i>Turbonilla gonzagensis</i>	Baker, Hanna & Strong, 1928	NGC;CGC	BEN	?	?
<i>Turbonilla pazana</i>	Dall & Bartsch, 1909	NGC;CGC;BR	BEN	18	35
<i>Turbonilla stylina</i>	(Carpenter, 1865)	NGC;CGC;BR	?	?	?
<i>Turbonilla excolpa</i>	Dall & Bartsch, 1909	NGC;CGC;SGC;BR	BEN	?	?
OPISTHOBRANCHIA (SEA SLUGS)					
<i>Acanthodoris pina</i>	Marcus & Marcus, 1967	NGC;BR	BEN;LIT	0	?
<i>Acanthodoris serpentinotus</i>	Williams & Gosliner, 1979	NGC;BR	BEN;LIT	0	?
<i>Acteocina angustior</i>	Baker & Hanna, 1927	NGC;CGC;SGC;BR	BEN	3	40
<i>Acteocina carinata</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN	2	45
<i>Acteocina gonzagensis</i>	(Baker & Hanna, 1927)	NGC	BEN	20	30
<i>Acteocina inculca</i>	(Gould & Carpenter, 1857)	NGC;CGC	BEN;LACS	?	?
<i>Acteocina infrequens</i>	(C.B. Adams, 1852)	NGC;CGC;SGC;BR;SWB	BEN;LACS	2	30
<i>Acteocina labogaensis</i>	(Strong & Hertlein, 1939)	NGC;BR	BEN	18	34
<i>Acteon panamensis</i>	Dall, 1908	NGC	BEN	?	2,320
<i>Aegires albopunctatus</i>	MacFarland, 1905	NGC	BEN	0	18
<i>Aeolidiella chromosoma</i>	(Cockerell & Eliot, 1905)	NGC;CGC;BR	BEN;LIT	0	30
<i>Ancula leniginosa</i>	Farmer & Sloan, 1964	NGC	BEN;LIT	0	?
<i>Aplysia californica</i>	Cooper, 1863	NGC;CGC;SGC;BR	BEN;LIT	0	30
<i>Aplysia juliana</i>	Quoy & Gaimard, 1832	NGC;CGC;BR	BEN	?	?
<i>Aplysia parvula</i>	Mörch, 1863	NGC;CGC;BR	BEN	0	?
<i>Aplysia vaccaria</i>	Winkler, 1955	NGC	BEN;LIT	0	?
<i>Aplysiopsis smithi</i>	(Marcus, 1961)	NGC;CGC	BEN	?	?
<i>Armina californica</i>	(Cooper, 1863)	NGC;CGC;SGC;BR	BEN;LIT	0	80
<i>Atys casta</i>	Carpenter, 1864	NGC;CGC;SGC	BEN	9	41
<i>Bajaeolis bertschi</i>	Gosliner & Behrens, 1986	NGC	?	?	?
<i>Berthella stellata</i>	(Risso, 1826)	NGC;CGC;BR	?	1	10
<i>Berthellina engeli</i>	Gardiner, 1936	NGC;CGC;BR	BEN;LIT	0	18
<i>Bulla gouldiana</i>	Pilsbry, 1895	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	35

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Bulla punctulata</i>	A. Adams in Sowerby, 1850	NGC;CGC;SGC;SWB	BEN;LIT	0	35
<i>Cadlina flavomaculata</i>	MacFarland, 1905	NGC;BR	BEN;LIT	0	220
<i>Cerberilla pungoarena</i>	Collier & Farmer, 1964	NGC	BEN	?	?
<i>Chromodoris norrisi</i>	Farmer, 1963	NGC;CGC;SGC;BR	BEN;LIT	0	20
<i>Conualevia marcus</i>	Collier & Farmer, 1964	NGC	BEN	?	?
<i>Conualevia mizuna</i>	Marcus & Marcus, 1967	NGC;BR	BEN	0	30
<i>Cuthona longi</i>	Behrens, 1985	NGC	BEN	3	?
<i>Cylichna atabualpa</i>	(Dall, 1908)	NGC	BEN	?	590
<i>Cylichna fantasia</i>	(Baker & Hanna, 1927)	NGC;CGC	BEN	9	30
<i>Dendrodoris krebsii</i>	(Mörch, 1863)	NGC;CGC;BR	BEN;LIT	0	5
<i>Dendronotus nanus</i>	Marcus & Marcus, 1967	NGC;BR	CST	4	?
<i>Diaulula sandiegensis</i>	(Cooper, 1863)	NGC;CGC;SGC;BR	BEN;LIT	0	37
<i>Dirona picta</i>	MacFarland in Cockerell & Eliot, 1905	NGC;BR	BEN;LIT	0	10
<i>Discodoris mavis</i>	Marcus & Marcus, 1967	NGC;BR	BEN	?	?
<i>Dolabrifera dolabrifera</i>	(Rang, 1828)	NGC;CGC;SGC;BR	BEN	0	?
<i>Doriopsisilla albopunctata</i>	(Cooper, 1863)	NGC;BR	BEN;LIT	0	30
<i>Doriopsisilla gemela</i>	Gosliner, Schaefer & Millen, 1999	NGC	BEN;LIT	0	9
<i>Doriopsisilla janaina</i>	Marcus & Marcus, 1967	NGC	BEN;LIT	0	?
<i>Doriopsisilla rowena</i>	Marcus & Marcus, 1967	NGC;CGC;SGC;BR	BEN	20	30
<i>Doris pickensi</i>	Marcus & Marcus, 1967	NGC;CGC;BR	BEN;LIT	0	?
<i>Doto amyra</i>	Marcus, 1961	NGC;BR	?	?	?
<i>Doto lancei</i>	Marcus & Marcus, 1967	NGC;CGC;BR	?	?	?
<i>Elysia hedgpethi</i>	Marcus, 1961	NGC;CGC	BEN	0	?
<i>Embletonia gracilis</i>	Risbec, 1928	NGC	?	?	?
<i>Embranchus cucullus</i>	Behrens, 1985	NGC	BEN	0	?
<i>Embranchus rustynus</i>	(Marcus, 1961)	NGC;BR	BEN;EPIF	0	?
<i>Flabellina bertschi</i>	Gosliner & Kuzirian, 1990	NGC;CGC;BR	BEN	0	22
<i>Flabellina cymata</i>	(Marcus & Marcus, 1967)	NGC;CGC;SGC;BR	BEN;LIT	0	72
<i>Flabellina iodinea</i>	(Cooper, 1863)	NGC;CGC;SGC;BR	BEN;LIT	0	39
<i>Flabellina marcusorum</i>	Gosliner & Kuzirian, 1990	NGC;CGC;SGC	BEN	10	22
<i>Flabellina stobleri</i>	Berstch & Ferreira, 1974	NGC	BEN;LIT	0	?
<i>Glossodoris dalli</i>	(Bergh, 1879)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	30

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Glossodoris sedna</i>	(Marcus & Marcus, 1967)	NGC;CGC;SGC;BR	BEN;LIT	0	20
<i>Haminoea virescens</i>	(Sowerby, 1833)	NGC;CGC;BR	BEN;LIT;LACS	0	36
<i>Haminoea angelensis</i>	Baker & Hanna, 1927	NGC;CGC;BR	BEN	7	30
<i>Hemissenda crassicornis</i>	(Eschscholtz, in Rathke, 1831)	NGC;BR	BEN;LIT	0	37
<i>Hermæa hillae</i>	Marcus & Marcus, 1967	NGC;BR	BEN	?	?
<i>Histiomena convolvula</i>	(Lance, 1962)	NGC;CGC;BR	BEN;LIT	0	30
<i>Hypselodoris agassizii</i>	(Bergh, 1894)	NGC;CGC;SGC;BR	BEN	0	3
<i>Hypselodoris californiensis</i>	(Bergh, 1879)	NGC;CGC;SGC;BR	BEN;LIT	0	31
<i>Hypselodoris ghiselini</i>	Bertsch, 1978	NGC;CGC;SGC;BR	BEN;LIT	0	4
<i>Inuda luarna</i>	Marcus & Marcus, 1967	NGC;BR	BEN;LIT	0	?
<i>Janolus barbarensis</i>	(Cooper, 1863)	NGC;CGC;BR	BEN;LIT	0	?
<i>Laila cockerelli</i>	MacFarland, 1905	NGC;CGC;SGC	BEN	0	34
<i>Melibe leonina</i>	(Gould, 1852)	NGC	BEN;LIT	0	37
<i>Navanax inermis</i>	(Cooper, 1863)	NGC;CGC;SGC;BR	BEN;LIT	0	30
<i>Okenia angelensis</i>	Lance, 1966	NGC	BEN;LIT	0	?
<i>Phidiana hiltoni</i>	(O'Donoghue, 1927)	NGC	BEN;LIT	0	220
<i>Phyllaplysia padinae</i>	Williams & Gosliner, 1973	NGC;CGC	?	?	?
<i>Pleurobranchus areolatum</i>	(Mörch, 1863)	NGC;CGC;SGC;BR	BEN;LIT	0	30
<i>Polycera alabe</i>	Collier & Farmer, 1964	NGC;CGC;BR	BEN	20	30
<i>Polycera hedgpethi</i>	Marcus, 1964	NGC;BR	BEN;LIT	0	30
<i>Polycerella glandulosa</i>	Behrens & Gosliner, 1988	NGC;CGC	BEN	0	20
<i>Rostanga pulchra</i>	MacFarland, 1905	NGC;BR	BEN;LIT	0	102
<i>Spurilla major</i>	(Eliot, 1903)	NGC	?	?	?
<i>Stiliger cf. fuscata</i>	(Gould, 1870)	NGC;BR	BEN	?	?
<i>Stiliger fuscovittata</i>	Lance, 1962	NGC	BEN	?	?
<i>Stylocheilus longicauda</i>	(Quoy & Gaimard, 1824)	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	?
<i>Sulcoretusa paziana</i>	(Dall, 1919)	NGC;CGC;BR	BEN	22	40
<i>Tambja eliora</i>	(Marcus & Marcus, 1967)	NGC;CGC;SWB	BEN;LIT	0	30
<i>Taranga arica timia</i>	Marcus & Marcus, 1967	NGC;BR	BEN	0	?
<i>Tayuva ketos</i>	Marcus & Marcus, 1967	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Tridachnella diomedea</i>	(Bergh, 1894)	NGC;CGC	BEN;LIT	0	15
<i>Tritonia pickensi</i>	Marcus & Marcus, 1967	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Tyrimma evelinae</i>	(Ernst Marcus, 1958)	NGC;CGC;BR	BEN;LIT	0	?
<i>Volvella cylindrica</i>	(Carpenter, 1864)	NGC;CGC;BR	BEN	12	75

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Volvulella panamica</i>	Dall, 1919	NGC;BR	BEN	II	4I
PULMONATA (PULMONATE SNAILS)					
<i>Marinula rhoadsi</i>	Pilsbry, 1910	NGC;BR	BEN;LIT;LACS	0	?
<i>Melampus olivaceus</i>	Carpenter, 1857	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	?
<i>Melampus mousleyi</i>	Berry, 1964	NGC;BR	BEN	20	30
<i>Pedipes angulatus</i>	C.B. Adams, 1852	NGC;CGC;BR	BEN	II	4I
<i>Sarnia mexicana</i>	(Berry, 1964)	NGC	?	?	?
<i>Williamia peltoides</i>	(Carpenter, 1864)	NGC;CGC;SGC;BR	BEN;LIT	0	4I
BIVALVIA (CLAMS AND THEIR KIN)					
<i>Abra tepicana</i>	Dall, 1915	NGC;BR	BEN;NER	18	26
<i>Adrana exoptata</i>	(Pilsbry & Lowe, 1932)	NGC;CGC;SGC;BR	BEN;NER	7	48
<i>Adrana penascoensis</i>	(Lowe, 1935)	NGC;CGC;SGC;BR	BEN;NER	18	30
<i>Aligena cokei</i>	Dall, 1909	NGC;CGC;BR	BEN;LIT;NER	0	25
<i>Aligena nucea</i>	Dall, 1913	NGC;CGC;BR	BEN;LIT;NER	0	33
<i>Aligena obliqua</i>	Harry, 1969	NGC;CGC;SGC;BR	BEN;LIT;NER	0	18
<i>Anadara adamsi</i>	Olsson, 1961	NGC;CGC;SGC	BEN;NER	20	70
<i>Anadara cepoides</i>	(Reeve, 1844)	NGC;CGC	BEN;NER	18	84
<i>Anadara concinna</i>	(Sowerby, 1833)	NGC;CGC;SGC	BEN;NER	9	180
<i>Anadara formosa</i>	(Sowerby, 1833)	NGC;CGC;SGC	BEN;NER	8	122
<i>Anadara multicosata</i>	(Sowerby, 1833)	NGC;CGC;SGC;SWB	BEN;LIT;EPIF;NER	0	130
<i>Anadara obesa</i>	(Sowerby, 1833)	NGC;CGC;SGC	BEN;EPIF	10	112
<i>Anadara reinharti</i>	(Lowe, 1935)	NGC;CGC;SGC;BR	BEN;LIT;EPIF;NER	2	122
<i>Anadara tuberculosa</i>	(Sowerby, 1833)	NGC;CGC;SGC	BEN;LIT;EPIF;LACS	0	32
<i>Anatina cyprinus</i>	(Wood, 1828)	NGC;CGC	BEN;NER	20	50
<i>Anomia adamas</i>	Gray, 1850	NGC;CGC;SGC	BEN;LIT;NER	0	393
<i>Anomia peruviana</i>	d'Orbigny, 1846	NGC;CGC;SGC;BR	LIT;BEN;CST;EPIF	0	130
<i>Arca mutabilis</i>	(Sowerby, 1833)	NGC;CGC;SGC;SWB	BEN;LIT;CST;NER	0	82
<i>Arca pacifica</i>	(Sowerby, 1833)	NGC;CGC;SGC;BR;SWB	BEN;LIT;EPIF;LACS	0	150
<i>Arcinella californica</i>	(Dall, 1903)	NGC;CGC;SGC	BEN;NER	18	110
<i>Arcopsis solida</i>	(Sowerby, 1833)	NGC;CGC;SGC;BR	BEN;LIT;EPIF;NER	0	30
<i>Argopecten circularis</i>	(Sowerby, 1835)	NGC;CGC;SGC;BR;SWB	CST;BEN;NER	1	150
<i>Asthenothaerus colpoica</i>	(Dall, 1915)	NGC;CGC;SGC	BEN;LIT;NER	0	110
<i>Asthenothaerus diegensis</i>	(Dall, 1915)	NGC;CGC;SWB	BEN;LIT;NER	0	119
<i>Asthenothaerus villosior</i>	Carpenter, 1864	NGC;CGC;SGC;BR	BEN;LIT;NER	0	73

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Atrina tuberculosa</i>	(Sowerby, 1835)	NGC;CGC;BR	BEN;LIT;NER	0	23
<i>Barbatia alternata</i>	(Sowerby, 1833)	NGC;CGC;BR	BEN;LIT;NER	0	27
<i>Barbatia gradata</i>	(Broderip & Sowerby, 1829)	NGC;CGC;SGC;SWB	BEN;LIT;EP;IF;NER	0	70
<i>Barbatia lurida</i>	(Sowerby, 1833)	NGC;CGC	BEN;LIT;NER	0	55
<i>Barbatia reeveana</i>	(d'Orbigny, 1846)	NGC;CGC;SGC	BEN;LIT;CST;LAGS	0	120
<i>Barnea subtruncata</i>	(Sowerby, 1834)	NGC;CGC;BR	BEN;LIT;NER	0	30
<i>Basterotia californica</i>	Durham, 1930	NGC;CGC;SGC;BR	BEN;LIT	0	100
<i>Basterotia panamica</i>	Coan, 1999	NGC;CGC;SGC;BR	BEN;LIT	0	119
<i>Basterotia peninsularis</i>	(Jordan, 1936)	NGC;CGC;BR;SWB	BEN;LIT;NER	0	46
<i>Basterotia quadrata</i>	(Hinds, 1843)	NGC;CGC;BR	BEN;LIT	6	119
<i>Basterotina rectangularis</i>	Coan, 1999	NGC;CGC;SGC	BEN;LIT	6	119
<i>Bornia chicalaya</i>	Olsson, 1961	NGC;BR	BEN	?	?
<i>Brachidontes adamsianus</i>	(Dunker, 1857)	NGC;CGC;SGC	BEN;LIT;NER	0	1
<i>Brachidontes semilaevis</i>	(Menke, 1849)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	31
<i>Bushia philipsi</i>	Coan, 1990	NGC;CGC	BEN;NER	38	183
<i>Cardiomya costata</i>	(Sowerby, 1834)	NGC;CGC;SGC;BR;SWB	BEN;NER	4	84
<i>Cardiomya didyma</i>	(Hinds, 1843)	NGC;BR	BEN;NER	18	48
<i>Cardiomya ecuadoriana</i>	(Olsson, 1961)	NGC	BEN;NER	55	146
<i>Cardiomya isolirata</i>	Bernard, 1969	NGC;CGC	BEN;NER	55	183
<i>Cardiomya lanieri</i>	(Strong & Hertlein, 1937)	NGC;CGC;SGC	BEN;NER	15	238
<i>Carditamera affinis</i>	(Sowerby, 1833)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	27
<i>Cardites crassicostata</i>	(Sowerby, 1825)	NGC;CGC;SGC	BEN;LIT;NER	0	55
<i>Chama arcana</i>	Bernard, 1976	NGC;CGC	BEN;LIT;NER	0	50
<i>Chama buddiana</i>	C.B. Adams, 1852	NGC;CGC;SGC;BR	BEN;LIT;NER	0	80
<i>Chama echinata</i>	Broderip, 1835	NGC;CGC;SGC;SWB	BEN;LIT;NER	0	25
<i>Chama frondosa</i>	Broderip, 1835	NGC;CGC;SGC;BR	BEN;LIT;EP;IF;NER	0	32
<i>Chama sordida</i>	Broderip, 1835	NGC;CGC;SGC;BR	BEN;LIT;NER	0	82
<i>Chama venosa</i>	Reeve, 1847	NGC;CGC	BEN;LIT;NER	0	4
<i>Chione californiensis</i>	(Broderip, 1835)	NGC;CGC;SGC;BR	BEN;LIT;NER;LAGS	0	80
<i>Chione cortezi</i>	(Carpenter, 1864)	NGC;CGC;BR;SWB	BEN;LIT;NER	0	1
<i>Chione fluctifraga</i>	(Sowerby, 1853)	NGC;CGC;SGC	BEN;LIT;NER	0	25
<i>Chione mariae</i>	(d'Orbigny, 1846)	NGC;CGC;SGC;BR	BEN;NER	9	180
<i>Chione tumens</i>	Verrill, 1870	NGC;CGC;SGC;SWB	BEN;LIT;NER	0	10
<i>Chione undatella</i>	(Sowerby, 1835)	NGC;CGC;SGC;BR	BEN;LIT;NER;LAGS	0	90

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Chionopsis amatbusia</i>	(Philippi, 1844)	NGC;CGC;SGC	BEN;NER	22	110
<i>Chionopsis gnidia</i>	(Broderip & Sowerby, 1829)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	42
<i>Chionopsis pulicaria</i>	(Broderip, 1835)	NGC;CGC;SGC;BR	BEN;NER	9	92
<i>Chionopsis purpurissata</i>	Dall, 1902	NGC;CGC;SGC	BEN;NER	0	80
<i>Chlamys lowei</i>	(Hertlein, 1935)	NGC;CGC;SGC;SWB	BEN;NER	37	180
<i>Codakia distinguenda</i>	(Tryon, 1872)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	0	47
<i>Compsomyax subdiaphana</i>	(Carpenter, 1864)	NGC;CGC;BR	BEN	7	23
<i>Condylocardia digneti</i>	Lamy, 1916	NGC;CGC;SGC	BEN;LIT;NER	0	40
<i>Cooperella subdiaphana</i>	(Carpenter, 1864)	NGC;CGC;BR	BEN;NER	7	72
<i>Corbula ira</i>	Dall, 1908	NGC;CGC	BEN;NER	47	330
<i>Corbula luteola</i>	Carpenter, 1864	NGC;CGC;SGC;SWB	BEN;LIT;NER	0	120
<i>Corbula marmorata</i>	Hinds, 1843	NGC;CGC;SGC;BR	BEN;NER	3	90
<i>Corbula nasuta</i>	Sowerby, 1833	NGC;CGC;SGC;BR;SWB	BEN;NER	3	90
<i>Corbula speciosa</i>	Reeve, 1843	NGC;CGC;SGC	BEN;NER	13	110
<i>Crassinella pacifica</i>	(C.B. Adams, 1852)	NGC;CGC;SGC;BR;SWB	BEN;NER	3	158
<i>Crassinella varians</i>	(Carpenter, 1857)	NGC;CGC;SGC;SWB	BEN;LIT;NER	1	1,720
<i>Ctena mexicana</i>	(Dall, 1901)	NGC;CGC;SGC;SWB	BEN;LIT;NER	0	80
<i>Cumingia lamellosa</i>	Sowerby, 1833	NGC;CGC;SGC;SWB	BEN;LIT;NER	0	25
<i>Cumingia pacifica</i>	(Dall, 1915)	NGC;CGC;BR	BEN;NER	22	90
<i>Cyathodontia dubiosa</i>	Dall, 1915	NGC;CGC	BEN;NER	13	183
<i>Cyathodontia undulata</i>	Conrad, 1849	NGC;CGC;SWB	BEN;LIT;NER	0	64
<i>Cyclinella singleyi</i>	Dall, 1902	NGC;CGC;SGC	BEN;LACS;NER	15	12
<i>Cyclinella ulloana</i>	Hertlein & Strong, 1948	NGC;CGC;SGC	BEN;NER	10	81
<i>Cyclopecten catalinensis</i>	(Willet, 1931)	NGC	BEN;NER	29	180
<i>Cyclopecten exquisitus</i>	Grau, 1959	NGC	BEN;NER	22	274
<i>Cymatoica undulata</i>	(Hanley, 1844)	NGC;CGC;BR	BEN;NER	7	100
<i>Delectopecten zacaе</i>	(Hertlein, 1935)	NGC;CGC;SGC	BEN;NER	10	1,840
<i>Dinrya californiana</i>	Berry, 1936	NGC;CGC	BEN;NER	84	1,227
<i>Diplodonta inezensis</i>	(Hertlein & Strong, 1947)	NGC;CGC	BEN;NER	11	64
<i>Diplodonta orbella</i>	(Gould, 1851)	NGC;CGC;BR	BEN;LIT;NER	0	110
<i>Diplothyra curta</i>	(Sowerby, 1834)	NGC;BR	BEN;LIT;NER	10	18
<i>Divalga eburnea</i>	(Reeve, 1850)	NGC;CGC;SGC;SWB	BEN;LIT;NER	0	180
<i>Donax caelatus caelatus</i>	Carpenter, 1857	NGC;CGC;SGC	BEN;LIT;CST;NER	0	3
<i>Donax californicus</i>	Conrad, 1837	NGC;CGC;SGC;BR;SWB	BEN;LIT;LAGS;NER	0	70

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Donax gracilis</i>	Hanley, 1845	NGC;CGC;SGC;SWB	BEN;LIT;NER	0	50
<i>Dosinia ponderosa</i>	(Gray, 1838)	NGC;CGC;SGC;BR	BEN;NER;LACS	3	110
<i>Ennucula colombiana</i>	Dall, 1908	NGC;CGC;BR	BEN;LIT;NER	11	730
<i>Ennucula linki</i>	(Dall, 1916)	NGC;CGC;BR	BEN;LIT;NER	0	44
<i>Ensis nitidus</i>	(Clessin, 1888)	NGC;BR;SWB	BEN;LIT;NER	0	50
<i>Ensis tropicalis</i>	Hertlein & Strong, 1955	NGC;BR	BEN;NER	11	25
<i>Ensitellops bertleini</i>	Emerson & Puffer, 1957	NGC;CGC;SGC;BR	BEN;LIT	9	100
<i>Entodesma lucasanum</i>	(Bartsch & Rehder, 1939)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	20
<i>Entodesma pictum</i>	(Sowerby, 1834)	NGC;CGC;SGC;BR	BEN;NER	3	35
<i>Eucrassatella antillarum</i>	(Reeve, 1842)	NGC;CGC;SGC	BEN;LIT;CST;EPHF	5	206
<i>Eucrassatella gibbosa</i>	Sowerby, 1832	NGC;CGC;SGC;BR;SWB	BEN;EPHF;NER	5	110
<i>Fabella stearnsi</i>	(Dall, 1899)	NGC;CGC;SWB	BEN;LIT	4	32
<i>Flabelligerina sericeus</i>	(Hinds, 1845)	NGC;CGC;SGC	BEN;LACS;NER	13	183
<i>Fugleria illota</i>	(Sowerby, 1833)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	73
<i>Galeommella peruviana</i>	(Olsson, 1961)	NGC;BR	BEN;LIT;NER	0	15
<i>Gari fucata</i>	(Hinds, 1844)	NGC;CGC;SGC;SWB	BEN;NER	5	140
<i>Gari helena</i>	Olsson, 1961	NGC;CGC;BR	BEN;LIT;NER	0	47
<i>Gari maxima</i>	(Deshayes, 1855)	NGC;BR	BEN;LIT;NER	0	1
<i>Gastrochaena ovata</i>	Sowerby, 1834	NGC;CGC;SGC;BR	BEN;LIT;NER	0	31
<i>Globioenus fordii</i>	(Yates, 1890)	NGC	BEN;NER	10	70
<i>Globioenus isocardia</i>	(Verrill, 1870)	NGC;CGC;SGC	BEN;LIT;NER	0	110
<i>Glycymeris gigantea</i>	(Reeve, 1843)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	0	92
<i>Glycymeris maculata</i>	(Broderip, 1832)	NGC;CGC;BR;SWB	BEN;LIT;NER	0	84
<i>Glycymeris septentrionalis</i>	(Middendorff, 1849)	NGC	BEN;LIT;NER	?	?
<i>Gregariella chenui</i>	(Récluz, 1842)	NGC;BR	BEN;LIT;NER	30	90
<i>Gregariella coralliophaga</i>	(Gmelin, 1791)	NGC;CGC;SGC;BR	BEN;NER	4	100
<i>Haliris aequacostata</i>	(A. Howard, 1950)	NGC	BEN;NER	165	190
<i>Halodactyla subtrigona</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	41
<i>Here excavata</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN;NER	5	110
<i>Heterodonax pacificus</i>	(Conrad, 1837)	NGC	BEN;LIT;NER	0	2
<i>Hiatella arctica</i>	(Linnaeus, 1767)	NGC;CGC;BR	BEN;LIT;NER	0	800
<i>Hyotissa hyotis</i>	Linnaeus, 1758	NGC;CGC	BEN;NER	2	25
<i>Isognomon janus</i>	Carpenter, 1857	NGC;CGC;SGC;BR	BEN;LIT;NER	0	35
<i>Isognomon recognitus</i>	(Mabille, 1895)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	10

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Laevicardium elatum</i>	(Sowerby, 1833)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	65
<i>Laevicardium elenense</i>	(Sowerby, 1840)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	0	161
<i>Leiosolenus spatiosa</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	27
<i>Lepton lediformis</i>	Olsson, 1961	NGC	BEN	0	?
<i>Leptopecten palmeri</i>	(Dall, 1897)	NGC;BR	BEN;LIT;NER	0	100
<i>Leptopecten velero</i>	(Hertlein, 1935)	NGC;CGC	BEN;NER	5	100
<i>Limaria orbigny</i>	(Lamy, 1930)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	34
<i>Limaria pacifica</i>	(d'Orbigny, 1846)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	?
<i>Limatula similaris</i>	(Dall, 1908)	NGC;CGC	BEN;NER	18	106
<i>Linga cancellaris</i>	(Philippi, 1846)	NGC;CGC;SGC	BEN;LIT;NER	0	100
<i>Linga leucocymoides</i>	(Lowe, 1935)	NGC;CGC;SGC	BEN;NER	18	110
<i>Linga undatoides</i>	(Hertlein & Strong, 1945)	NGC;CGC	BEN;LIT;NER	0	30
<i>Lioberus sabadoricens</i>	(Hertlein & Strong, 1946)	NGC;BR	BEN;NER	4	40
<i>Litobphaga aristata</i>	(Dillwyn, 1817)	NGC;CGC;SGC	BEN;LIT;NER	0	300
<i>Litobphaga attenuata</i>	(Deshaves, 1836)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	30
<i>Litobphaga plumula</i>	(Hanley, 1844)	NGC;CGC;SGC	BEN;COM;NER	5	37
<i>Lucina fenestrata</i>	Hinds, 1845	NGC;CGC;SGC	BEN;NER	13	74
<i>Lucina lampra</i>	(Dall, 1901)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	55
<i>Lucina nutalli</i>	Conrad, 1837	NGC;CGC;SGC;BR	BEN;NER	10	461
<i>Lucinoma annulata</i>	(Reeve, 1850)	NGC;CGC	BEN;NER	55	183
<i>Lyonisia californica</i>	Conrad, 1837	NGC;CGC;SGC	BEN;NER	4	97
<i>Macoma carlottensis</i>	Whiteaves, 1880	NGC	BEN;NER	5	1,550
<i>Macoma elytrum</i>	Keen, 1958	NGC;CGC;SGC;BR	BEN;NER	22	180
<i>Macoma siliqua</i>	(C.B. Adams, 1852)	NGC;CGC;SGC;BR	BEN;NER	20	180
<i>Macra dolabriformis</i>	(Conrad, 1867)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	28
<i>Mayrakeena angelica</i>	(Rochebrune, 1895)	NGC;CGC;BR	BEN;LIT;NER	0	35
<i>Megapitaria avarantiaca</i>	(Sowerby, 1831)	NGC;CGC;SGC	BEN;LIT;NER	0	30
<i>Megapitaria squalida</i>	(Sowerby, 1835)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	180
<i>Modiolus capax</i>	(Conrad, 1837)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	180
<i>Modiolus rectus</i>	(Conrad, 1837)	NGC;CGC;SGC	BEN;LIT;NER	0	45
<i>Mulinia coloradoensis</i>	Dall, 1894	NGC;BR	BEN;NER	9	92
<i>Mysella compressa</i>	(Dall, 1913)	NGC;CGC;BR	BEN;NER	0	64
<i>Mysella grippi</i>	(Dall, 1912)	NGC	BEN;NER	12	60
<i>Mytella guyanensis</i>	(Lamarck, 1819)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	30

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Myrella strigata</i>	(Hanley, 1843)	NGC;CGC;SGC	BEN;LACS;LIT;NER	0	2
<i>Nemocardium annettiae</i>	(Dall, 1889)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	64
<i>Nemocardium pazianum</i>	(Dall, 1916)	NGC;CGC;SGC;BR	BEN;NER	10	126
<i>Nodipecten subnodosus</i>	(Sowerby, 1835)	NGC;CGC	BEN;LIT;NER;LACS	0	110
<i>Noetia reversa</i>	(Sowerby, 1833)	NGC;CGC;SGC	BEN;EPIF;NER	15	92
<i>Nucinella subdola</i>	(Strong & Hertlein, 1937)	NGC;CGC;SGC	BEN;NER	3	46
<i>Nucula declivis</i>	Hinds, 1843	NGC;CGC;SGC;BR	BEN;NER	2	64
<i>Nucula exigua</i>	Sowerby, 1833	NGC;CGC;SGC	BEN;NER	11	1,900
<i>Nucula schenckei</i>	Hertlein & Strong, 1940	NGC	BEN;NER	13	45
<i>Nuculana costellata</i>	(Sowerby, 1833)	NGC;CGC;SGC;BR	BEN;NER	15	64
<i>Odontorhina cyclica</i>	Berry, 1947	NGC	BEN;NER	11	1,886
<i>Oppenbeimopecten vogdesi</i>	(Arnold, 1906)	NGC;CGC;BR	BEN;LACS;NER	0	220
<i>Ostreola conchaphila</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	100
<i>Pandora brevifrons</i>	Sowerby, 1835	NGC;BR	BEN;NER	15	20
<i>Pandora cornuta</i>	C.B. Adams, 1832	NGC;CGC;BR	BEN	9	18
<i>Pandora granulata</i>	Dall, 1915	NGC;CGC;BR	BEN;LIT;NER	0	72
<i>Pandora uncinifera</i>	Pilsbry & Lowe, 1932	NGC;CGC;SGC	BEN;LIT;NER	0	35
<i>Panopea globosa</i>	Dall, 1898	NGC;CGC;SGC;BR	BEN;NER	9	60
<i>Papyridea aspersa</i>	(Sowerby, 1833)	NGC;CGC;SGC;SWB	BEN;LIT;CST;NER	0	60
<i>Parahyotissa quercinus</i>	(Sowerby, 1871)	NGC;CGC;SGC;BR	BEN	0	?
<i>Parvilucina approximata</i>	(Dall, 1901)	NGC;CGC;SGC	BEN;LIT;NER	0	1,043
<i>Parvilucina mazatlanica</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN;LIT;NER	0	1,043
<i>Periploma planiusculum</i>	Sowerby, 1834	NGC;CGC;SGC;BR	BEN;LIT;NER	0	26
<i>Periploma stearnsi</i>	Dall, 1896	NGC;CGC;SGC	BEN;NER	14	44
<i>Petricola lucasana</i>	Hertlein & Strong, 1948	NGC;CGC;SGC;BR	BEN;LIT;NER	0	10
<i>Petricola robusta</i>	Sowerby, 1834	NGC;CGC;SGC;BR	BEN;NER	11	23
<i>Phlyctiderma discrepans</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN;NER	9	35
<i>Pholas chilensis</i>	Molina, 1782	NGC;CGC;BR	BEN;LIT;NER	0	10
<i>Pinna rugosa</i>	Sowerby, 1835	NGC;CGC;SGC;BR	BEN;LIT;NER	0	12
<i>Pitar concinnus</i>	(Sowerby, 1835)	NGC;CGC;SGC;BR;SWB	BEN;LIT;LACS;NER	0	73
<i>Pitar frizzelli</i>	Hertlein & Strong, 1948	NGC;CGC;SGC	BEN;NER	35	110
<i>Pitar belenae</i>	Olsson, 1961	NGC;CGC;BR	BEN;NER	22	45
<i>Pitar hesperius</i>	Berry, 1960	NGC;CGC;SGC;BR	BEN;NER	15	40
<i>Pitar newcombianus</i>	(Gabb, 1865)	NGC;CGC;BR	BEN;LIT;NER	0	220

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Pitar perfragilis</i>	Pilsbry & Lowe, 1932	NGC;CGC	BEN;NER	14	183
<i>Pitar pollicaris</i>	(Carpenter, 1864)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	20
<i>Plicatula anomiooides</i>	Keen, 1958	NGC;CGC;SGC;BR	BEN;LIT;NER	0	29
<i>Plicatula inezana</i>	Durham, 1950	NGC;CGC	BEN;NER	45	140
<i>Plicatula penicillata</i>	Carpenter, 1857	NGC;CGC;SGC	BEN;NER	20	80
<i>Pristes oblongus</i>	Carpenter, 1864	NGC;BR	BEN;LIT;NER	0	2
<i>Protothaca grata</i>	(Say, 1831)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	390
<i>Psammotreta aurora</i>	(Hanley, 1844)	NGC;CGC;SGC	BEN;NER	14	35
<i>Psammotreta mazatlanica</i>	(Deshayes, 1855)	NGC;CGC;SGC	BEN;NER	20	183
<i>Psammotreta viridotincta</i>	(Carpenter, 1856)	NGC;CGC	BEN;NER	10	30
<i>Psephidia cymata</i>	Dall, 1913	NGC;BR	BEN;NER	25	82
<i>Pseudochama corrugata</i>	(Broderip, 1835)	NGC;CGC;SGC	BEN;LIT;NER	0	5
<i>Pseudochama janus</i>	(Reeve, 1847)	NGC;BR	BEN;NER	10	47
<i>Pseudochama panamensis</i>	(Reeve, 1847)	NGC;CGC;SGC	BEN;LIT;NER	0	70
<i>Pseudochama saavedrai</i>	Hertlein & Strong, 1946	NGC;CGC;SGC;BR	BEN;LIT;NER	0	70
<i>Pteria sterna</i>	(Gould, 1851)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	45
<i>Pythinella sublaevis</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN;NER	11	35
<i>Raeta undulata</i>	(Gould, 1851)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	29
<i>Rangia mendica</i>	(Gould, 1851)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	1
<i>Rupellaria denticulata</i>	(Sowerby, 1834)	NGC;CGC;SGC	BEN;LIT;NER	0	2
<i>Sacella acrita</i>	(Dall, 1908)	NGC;CGC;SGC;BR	BEN;NER	6	90
<i>Sacella elenensis</i>	(Sowerby, 1833)	NGC;CGC;BR	BEN;NER	4	180
<i>Sacella impar</i>	(Pilsbry & Lowe, 1932)	NGC;CGC;BR	BEN;NER	4	72
<i>Saccostrea palmula</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN;LIT;COM;NER	0	36
<i>Sanguinolaria tellinoides</i>	Adams, A., 1850	NGC;CGC;SGC	BEN;LIT;CST;NER	0	10
<i>Semele bicolor</i>	(C.B. Adams, 1852)	NGC;CGC;SGC	BEN;LIT;NER	0	20
<i>Semele californica</i>	(Reeve, 1853)	NGC;CGC;SWB	BEN;LIT;NER	0	3
<i>Semele craneana</i>	Hertlein & Strong, 1949	NGC;CGC;SGC;BR	BEN;NER	32	110
<i>Semele flavescens</i>	(Gould, 1851)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	0	5
<i>Semele guaymasensis</i>	Pilsbry & Lowe, 1932	NGC;CGC;SGC;BR	BEN;LIT;NER	0	110
<i>Semele jamesi</i>	Coan, 1988	NGC;CGC;SGC;SWB	BEN;NER	5	161
<i>Semele jovis</i>	(Reeve, 1853)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	100
<i>Semele lenticularis</i>	(Sowerby, 1833)	NGC;CGC;SGC	BEN;LIT;NER	0	44
<i>Semele rosea</i>	(Sowerby, 1833)	NGC;CGC;SWB	BEN;LIT;NER	0	113

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Semele rubropicta</i>	Dall, 1871	NGC;CGC	BEN;LIT;NER	0	55
<i>Semele venusta</i>	(Reeve, 1853)	NGC;CGC;SGC	BEN;LIT;NER	10	183
<i>Semele verrucosa pacifica</i>	Dall, 1915	NGC;CGC;SGC;BR	BEN;LIT;NER	0	128
<i>Septifer zeteki</i>	Hertlein & Strong, 1946	NGC;CGC;BR	BEN;NER	3	90
<i>Solecardia eburnea</i>	Conrad, 1849	NGC;CGC;BR	BEN;LIT;NER	0	60
<i>Solemia valvulus</i>	Carpenter, 1864	NGC;CGC;SGC;BR	BEN;NER	2	400
<i>Solen gemmelli</i>	Cosel, 1992	NGC	BEN	0	?
<i>Solen pfeifferi</i>	Dunker, 1862	NGC;CGC;BR	BEN;NER	7	24
<i>Solen rostriformis</i>	Dunker, 1862	NGC;CGC;SGC;BR	BEN;LIT;NER	0	45
<i>Spheniopsis frankeberardi</i>	Coan, 1990	NGC;SWB	BEN;NER	13	91
<i>Spondylus calcifer</i>	Carpenter, 1857	NGC;CGC;SGC;BR	BEN;LIT;NER	0	55
<i>Spondylus ursipes</i>	Berry, 1959	NGC;CGC	BEN;NER	0	36
<i>Strigilla cicercula</i>	(Philippi, 1846)	NGC;CGC;SGC;BR	BEN;NER	0	90
<i>Strigilla dichotoma</i>	(Philippi, 1846)	NGC;CGC;SGC	BEN;NER	7	8
<i>Strigilla serrata</i>	Mörch, 1860	NGC;CGC;SGC;BR	BEN	?	?
<i>Strophocardia megastrophia</i>	(Gray, 1825)	NGC;CGC;SGC	BEN;LIT;EPIF	0	100
<i>Tagelus affinis</i>	(C.B. Adams, 1852)	NGC;CGC;SGC	BEN;LIT;NER	0	73
<i>Tagelus peruvianus</i>	Pilsbry & Olsson, 1941	NGC;CGC	BEN;LIT;NER	0	2
<i>Tagelus polius</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	180
<i>Tellidora burneti</i>	(Broderip & Sowerby, 1829)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	29
<i>Tellidorella cristulata</i>	Berry, 1963	NGC	BEN;NER	27	110
<i>Tellina amianta</i>	Dall, 1900	NGC;CGC;SGC;BR	BEN;NER	3	72
<i>Tellina brevirostris</i>	Deshayes, 1855	NGC;CGC;SGC	BEN;NER	10	70
<i>Tellina carpenteri</i>	Dall, 1900	NGC;CGC;SGC;SWB	BEN;NER	1	500
<i>Tellina coani</i>	Keen, 1971	NGC;CGC;BR	BEN;LIT;NER	0	30
<i>Tellina cumingi</i>	Hanley, 1844	NGC;CGC;SGC;SWB	BEN;NER	3	73
<i>Tellina hiberna</i>	Hanley, 1844	NGC;CGC;SGC	BEN;NER	4	55
<i>Tellina lyrica</i>	Pilsbry & Lowe, 1932	NGC;CGC;SGC	BEN;NER	7	180
<i>Tellina meropsis</i>	Dall, 1900	NGC;CGC;SGC;BR	BEN;LIT;NER	0	180
<i>Tellina pacifica</i>	Dall, 1900	NGC;CGC	BEN;NER	7	180
<i>Tellina pristiphora</i>	Dall, 1900	NGC;CGC;SGC	BEN;NER	22	155
<i>Tellina prora</i>	Hanley, 1844	NGC;CGC;SGC;BR	BEN;NER	11	42
<i>Tellina reclusa</i>	Dall, 1900	NGC;CGC;SGC;BR	BEN;NER	5	70
<i>Tellina recurvata</i>	Hertlein & Strong, 1949	NGC;CGC;SGC	BEN;NER	9	72

TABLE 29-3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Tellina rhynchoscuta</i>	(Olsson, 1961)	NGC;CGC;SGC	BEN;LIT;NER	0	24
<i>Tellina simulans</i>	C.B. Adams, 1852	NGC;CGC;SGC	BEN;LIT;NER	0	180
<i>Tellina ulloana</i>	Hertlein, 1968	NGC;BR;SWB	BEN;NER	22	48
<i>Tellina virgo</i>	Hanley, 1844	NGC;CGC;SGC;SWB	BEN;LIT;NER	0	15
<i>Temnoconcha cognata</i>	(C.B. Adams, 1852)	NGC;CGC;SGC	BEN;NER	8	77
<i>Thracia bereniceae</i>	Coan, 1990	NGC;CGC;SGC;BR	BEN;LIT;NER	0	46
<i>Thracia curta</i>	Conrad, 1837	NGC;CGC;SGC	BEN;LIT;NER	0	48
<i>Timoclea squamosa</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN;NER	3	50
<i>Tivela argentina</i>	(Sowerby, 1835)	NGC;CGC;SGC;BR	BEN;NER	13	23
<i>Tivela byronensis</i>	(Gray, 1838)	NGC;CGC;SGC;BR	BEN;NER	0	90
<i>Trachycardium biangulata</i>	(Broderip & Sowerby, 1829)	NGC;CGC;SGC	BEN;LIT;NER	0	161
<i>Trachycardium consors</i>	(Sowerby, 1833)	NGC;CGC;SGC	BEN;LIT;NER	0	100
<i>Trachycardium panamense</i>	(Sowerby, 1833)	NGC;CGC;BR	BEN;LIT;NER	0	65
<i>Trachycardium procerum</i>	(Sowerby, 1833)	NGC;CGC;SGC	BEN;LIT;NER	0	92
<i>Trachycardium senticosum</i>	(Sowerby, 1833)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	72
<i>Transennella humilis</i>	(Carpenter, 1857)	NGC;CGC;SGC	BEN;LIT;NER	0	24
<i>Trigoniocardia granifera</i>	(Broderip & Sowerby, 1829)	NGC;CGC;SGC;SWB	BEN;LIT;NER	1	65
<i>Trypomyx mexicanus</i>	(Berry, 1959)	NGC;CGC;SGC;BR	BEN;NER	5	37
<i>Tucetona multicotata</i>	(Sowerby, 1833)	NGC;CGC;SGC	BEN;NER	40	90
<i>Undulostrea megodon</i>	(Hanley, 1846)	NGC;CGC;SGC;BR	BEN;NER	27	180
<i>Verticordia ornata</i>	(d'Orbigny, 1846)	NGC;CGC;SGC	BEN;NER	18	168
<i>Vesicomya suavis</i>	Dall, 1913	NGC	BEN	?	1,345
POLYPLACOPHORA (CHITONS)					
<i>Acanthochitona angelica</i>	Dall, 1919	NGC;CGC;SGC	BEN;LIT	9	50
<i>Acanthochitona avicula</i>	(Carpenter, 1866)	NGC;CGC;SGC;BR;SWB	BEN;CST	2	60
<i>Acanthochitona exquisita</i>	(Pilsbry, 1893)	NGC;CGC;SGC	BEN;LIT;NER	0	2
<i>Acanthochitona birudiniiformis</i>	Sowerby, 1832	NGC	BEN;LIT;CST	0	41
<i>Callistochiton elenensis</i>	(Sowerby, 1832)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	90
<i>Callistochiton palmulatus</i>	Dall, 1879 ex Carpenter MS	NGC	BEN	40	60
<i>Chaetopleura euryplax</i>	Berry, 1945	NGC;CGC;SWB	BEN;LIT;NER	0	2
<i>Chaetopleura mixta</i>	(Dall, 1919)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	162
<i>Chaetopleura sbyana</i>	Ferreira, 1983	NGC;CGC	BEN;LIT;NER	0	5
<i>Chaetopleura unilineata</i>	Leloup, 1954	NGC;CGC;SGC;BR	BEN	0	90
<i>Hanleyella oldroydi</i>	(Dall, 1919)	NGC	BEN	120	170

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Ichnochiton carolinianus</i>	Ferreira, 1984	NGC;CGC	BEN	61	182
<i>Ichnochiton chaceorum</i>	Kaas & van Belle, 1990	NGC;BR	BEN;LIT;NER	0	1
<i>Ichnochiton guatemalensis</i>	(Thiele, 1910)	NGC;CGC;BR;SWB	BEN;LIT;NER	0	12
<i>Ichnochiton tridentatus</i>	(Pilsbry, 1893)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	30
<i>Lepidochitona bearii</i>	(Carpenter, 1857)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	230
<i>Lepidochitona laurae</i>	(Berry, 1963)	NGC	BEN;NER	10	90
<i>Lepidochitona lirulata</i>	(Berry, 1963)	NGC;CGC;BR	BEN;LIT;NER	0	1
<i>Lepidozonia clathrata</i>	(Reeve, 1847)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	10
<i>Lepidozonia crockeri</i>	(Willett, 1951)	NGC;CGC;SGC	BEN;LIT;NER	0	109
<i>Lepidozonia formosa</i>	Ferreira, 1974	NGC;CGC;SGC	BEN;LIT;NER	5	60
<i>Lepidozonia laurae</i>	Ferreira, 1985	NGC;CGC	BEN	60	183
<i>Lepidozonia pectinulata</i>	(Pilsbry, 1893, ex Carpenter)	NGC;SWB	BEN;LIT	0	40
<i>Lepidozonia serrata</i>	(Carpenter, 1864)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	0	15
<i>Lepidozonia sirenkoii</i>	Kaas & van Belle, 1990	NGC;BR	BEN;LIT;NER	0	1
<i>Lepidozonia skoglundii</i>	(Ferreira, 1986)	NGC;CGC;SGC;BR	BEN	6	15
<i>Lepidozonia stobleri</i>	Ferreira, 1985	NGC;CGC	BEN	12	60
<i>Lepidozonia subtilis</i>	Berry, 1956	NGC;CGC;BR	BEN	2	3
<i>Lepidozonia tenuicostata</i>	Kaas & van Belle, 1990	NGC;BR	BEN;LIT;NER	0	1
<i>Leptochiton nexus</i>	Carpenter, 1864	NGC	LIT;BEN;CST	12	144
<i>Leptochiton rugatus</i>	(Pilsbry, 1892)	NGC;CGC;SWB	LIT	0	458
<i>Nuttallina crosota</i>	Berry, 1956	NGC;CGC;BR	BEN;LIT;NER	0	1
<i>Placiphorella hanseimani</i>	Clark, 1994	NGC;CGC;BR	BEN;LIT;NER	0	39
<i>Stenoplax boogii</i>	(Haddon, 1886)	NGC;CGC;SGC	BEN;LIT;NER	0	64
<i>Stenoplax circumscissa</i>	Berry, 1956	NGC;CGC	BEN;LIT;NER	0	72
<i>Stenoplax limaciformis</i>	(Sowerby, 1832)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	41
<i>Stenoplax magdalenensis</i>	(Hinds, 1845)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	0	?
<i>Stenoplax sonorana</i>	(Berry, 1956)	NGC;CGC;BR	BEN;LIT;NER	0	?
SCAPHOPODA (TUSK SHELLS)					
<i>Cadulus austinclarki</i>	Emerson, 1951	NGC;CGC;SGC	BEN;NER	2	405
<i>Dentalium neohexagonum</i>	Sharp & Pilsbry, 1897	NGC;BR	BEN;NER	1	256
<i>Dentalium oerstedii oerstedii</i>	Mörch, 1860	NGC;CGC;SGC;BR	BEN;NER	4	145
<i>Dentalium pretiosum berryi</i>	Smith & Gordon, 1948	NGC	BEN;NER	37	298
<i>Dentalium quadrangulare</i>	Sowerby, 1832	NGC;CGC;SGC;BR	BEN;NER	5	73
<i>Dentalium sectum</i>	Deshayes, 1826	NGC;CGC	BEN;NER	0	9

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Dentalium vallicolens</i>	Raymond, 1904	NGC	BEN;NER	5	477
<i>Fustiaria immerabilis</i>	(Pilsbry & Sharp, 1897)	NGC;CGC;SGC	BEN;NER	11	165
<i>Gadila fusiformis</i>	(Pilsbry & Sharp, 1898)	NGC;CGC;SGC	BEN;NER	7	365
<i>Gadila perpusilla</i>	(Sowerby, 1832)	NGC;CGC;SGC;BR	BEN;NER	11	3,450
<i>Graptacme inversum</i>	(Deshayes, 1826)	NGC;CGC;BR;SWB	BEN;NER	13	37
<i>Graptacme semipolita</i>	(Broderip & Sowerby, 1829)	NGC;CGC;SGC	BEN;NER	2	75
<i>Laevidentalium splendidum</i>	(Sowerby, 1832)	NGC;CGC;SGC;BR	BEN;NER	2	110
<i>Siphonodentalium quadrifissatum</i>	(Pilsbry & Sharp, 1898)	NGC;CGC;SGC;BR	BEN;NER	4	365
<i>Tesseracme Hancocki</i>	(Emerson, 1956)	NGC;CGC;SGC;BR	BEN;NER	15	42
PHYLUM SIPUNCULA (PEANUT WORMS)					
<i>Apionsoma misakianum</i>	(Ikeda, 1904)	NGC;CGC;SGC;BR	BEN;LIT;COM	0	5
<i>Phascolosoma agassizii</i>	Kieferstein, 1866	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	1
<i>Phascolosoma perlucens</i>	Baird, 1868	NGC;CGC;BR	BEN;LIT	0	3
<i>Sipunculus nudus</i>	Linnaeus, 1766	NGC;CGC;SGC;BR;SWB	BEN;LIT;LACS	0	1
<i>Themiste bennabi</i>	Gray, 1828	NGC;CGC;BR	BEN;LIT	0	1
PHYLUM ECHIURA (SPOON WORMS)					
<i>Ochetostoma edax</i>	Fisher, 1946	NGC;CGC;SGC	LIT; BEN	0	?
<i>Thalassema steinbecki</i>	Fisher, 1946	NGC;CGC;SGC	BEN	18	300
PHYLUM ANNELIDA (SEGMENTED WORMS)					
OLIGOCHAETA (EARTH WORMS)					
<i>Bacesuella parvithecata</i>	Erséus, 1978	NGC;CGC;BR	BEN;LIT	0	0
POLYCHAETA (POLYCHAETES)					
<i>Acoetes pacifica</i>	(Treadwell, 1914)	NGC;CGC	BEN	10	640
<i>Acrocirrus crassifilis</i>	Moore, 1923	NGC	BEN	354	505
<i>Acrocirrus incisa</i>	Kudenov, 1975	NGC;BR	BEN;LIT	0	?
<i>Aglaophamus dicirris</i>	Hartman, 1950	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	200
<i>Aglaophamus fossae</i>	Fauchald, 1972	NGC	BEN	864	1,395
<i>Aglaophamus lyrochaetus</i>	(Fauvel, 1902)	NGC;CGC;BR	BEN;LIT	0	100
<i>Amaeana occidentalis</i>	(Hartman, 1944)	NGC;CGC	BEN;LIT	0	200
<i>Amphicteis scaphobranchiata</i>	Moore, 1906	NGC;CGC;SGC;BR	BEN;LIT	0	1,188
<i>Anaitides mucosa</i>	(Oersted, 1843)	NGC	BEN	57	200
<i>Anaitides williamsi</i>	Hartman, 1936	NGC;CGC;SGC	BEN;LIT	0	?
<i>Ancistargis barnata</i>	(Hartman, 1960)	NGC;CGC;SGC	BEN;LIT	0	0

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Anobothrus bimaculatus</i>	Fauchald, 1972	NGC;CGC	BEN;OCE	720	1,620				
<i>Anotomastus gordiodes</i>	(Moore, 1909)	NGC	BEN;LIT	0	200				
<i>Aphrodita mexicana</i>	Kudenov, 1975	NGC;BR	BEN	29	39				
<i>Aphrodita sonorae</i>	Kudenov, 1975	NGC;BR	BEN	36	?				
<i>Apoprionospio dayi</i>	Foster, 1969	NGC;BR	BEN;LIT	3	200				
<i>Apoprionospio pygmaea</i>	(Hartman, 1961)	NGC;CGC;SGC;BR	BEN;LIT	21	200				
<i>Arabella iricolor</i>	(Montagu, 1804)	NGC;CGC;SGC;BR;SWB	BEN;LIT	2	90				
<i>Arabella mutans</i>	(Chamberlin, 1919)	NGC;CGC;SGC	BEN	2	36				
<i>Arabella semimaculata</i>	(Moore, 1911)	NGC;CGC;SGC	BEN	2	83				
<i>Arenicola glasselli</i>	Berkeley & Berkeley, 1939	NGC;BR	BEN	?	?				
<i>Aricidea fragilis</i>	Webster, 1879	NGC;CGC;SGC;BR	BEN;LIT	28	106				
<i>Aricidea pacifica</i>	Hartman, 1944	NGC;CGC;SGC;BR	BEN;LIT	0	?				
<i>Aricidea simplex</i>	Day, 1963	NGC;CGC;SGC;BR	BEN;LIT	35	1,072				
<i>Armandia brevis</i>	Moore, 1906	NGC;CGC;SGC	BEN;LIT	0	100				
<i>Armandia intermedia</i>	Fauvel, 1902	NGC;CGC;SGC	BEN;LIT	0	104				
<i>Asabellides lineata</i>	(Berkeley & Berkeley, 1943)	NGC;CGC;SGC	BEN	45	102				
<i>Asychis disparidentata</i>	(Moore, 1904)	NGC	BEN	83	1,409				
<i>Axiobella rubrocincta</i>	(Johnson, 1901)	NGC;CGC;SGC;BR	BEN;LIT	0	200				
<i>Bhewania goodii</i>	Webster, 1884	NGC;CGC;BR	BEN;LIT	0	80				
<i>Bispira monroi</i>	(Hartman, 1961)	NGC;BR	BEN;LIT	0	?				
<i>Boccardia anophthalma</i>	(Rioja, 1962)	NGC;BR	BEN;COM	15	22				
<i>Boccardia tricuspa</i>	(Hartman, 1939)	NGC;BR	BEN;LIT;COM	0	15				
<i>Brada villosa</i>	(Rathke, 1843)	NGC	BEN;LIT	0	2,000				
<i>Brania limbata</i>	(Claparède, 1868)	NGC	BEN;LIT	0	?				
<i>Capitella capitata</i>	(Fabricius, 1780)	NGC;CGC;SGC	BEN;LIT;LAGS	0	1				
<i>Capitella ambiseta</i>	Hartman, 1947	NGC	BEN;LIT	0	200				
<i>Carrazziella calafra</i>	Blake, 1979	NGC	BEN;LIT	0	37				
<i>Caulerliella alata</i>	(Southern, 1914)	NGC;CGC;SGC	BEN;LIT	0	200				
<i>Caulerliella hamata</i>	(Hartman, 1948)	NGC;CGC;SGC	BEN	?	100				
<i>Ceratocephale oculata</i>	Banse, 1977	NGC;CGC;SGC;BR	BEN;LIT	22	106				
<i>Ceratocephale pacifica</i>	Hartman, 1960	NGC;CGC	BEN	840	2,545				
<i>Ceratonereis singularis</i>	Treadwell, 1929	NGC;CGC;SGC	BEN;LIT	0	?				
<i>Ceratonereis tentaculata</i>	Kinberg, 1866	NGC;CGC;SGC	BEN	7	72				
<i>Chaetopterus varriopedatus</i>	(Renier, 1804)	NGC;CGC;BR	BEN;LIT	0	27				

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Chaetozona corona</i>	Berkeley & Berkeley, 1941	NGC;CGC;SGC	BEN;LIT	4	119
<i>Chloëia entypa</i>	Chamberlin, 1919	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	118
<i>Chloëia viridis</i>	Schmarda, 1861	NGC;CGC;SGC;BR;SWB	BEN	9	270
<i>Chone mollis</i>	(Bush, 1904)	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	?
<i>Chrysopetalum occidentale</i>	Johnson, 1897	NGC;CGC;BR	BEN;LIT	0	?
<i>Cirriiformia luxuriosa</i>	(Moore, 1904)	NGC;CGC;SGC;BR	BEN;LIT	0	18
<i>Cirriiformia spirabrancha</i>	(Moore, 1904)	NGC;CGC;SGC	BEN;LIT	0	78
<i>Cossura candida</i>	Hartman, 1955	NGC;CGC;SGC	BEN	12	2,440
<i>Dasybranchus lumbricoides</i>	(Grube, 1878)	NGC;CGC;SGC	BEN	30	207
<i>Dasybranchus parplatyceps</i>	Kudenov, 1975	NGC;CGC	BEN;LIT	0	?
<i>Dasybranchus platyceps</i>	Hartman, 1947	NGC	BEN;LIT	0	?
<i>Decamastus nudus</i>	Thomassin, 1970	NGC;CGC;SGC	BEN;LIT	26	114
<i>Diopatra neotridens</i>	Hartman, 1944	NGC;CGC;SGC;BR;SWB	BEN	8	100
<i>Diopatra obliqua</i>	Hartman, 1944	NGC;CGC;SGC;BR;SWB	BEN	3	45
<i>Diopatra ornata</i>	Moore, 1911	NGC;CGC;SGC;SWB	BEN	10	90
<i>Diopatra papillata</i>	Fauchald, 1968	NGC	BEN	72	108
<i>Diopatra splendidissima</i>	Kinberg, 1857	NGC;CGC;SGC;SWB	BEN;LIT	0	117
<i>Diopatra tridentata</i>	Hartman, 1944	NGC;CGC;SGC;BR;SWB	BEN	9	207
<i>Dispio uncinata</i>	Hartman, 1951	NGC;CGC	BEN;LIT	0	106
<i>Dorvillea annulata</i>	(Moore, 1906)	NGC;CGC;SGC	BEN	72	260
<i>Dorvillea cerasina</i>	(Ehlers, 1901)	NGC;CGC;SGC	BEN;LIT;COM	0	27
<i>Dorvillea falcata</i>	Moore, 1911	NGC;CGC;SGC;BR;SWB	BEN	29	2,500
<i>Dorvillea nuda</i>	Moore, 1909	NGC	BEN	5	144
<i>Echysippe vanelli</i>	(Fauvel, 1936)	NGC;CGC;SGC	BEN	15	313
<i>Eteone dilatata</i>	Hartman, 1936	NGC	BEN;LIT	0	200
<i>Euarche tubifex</i>	Ehlers, 1887	NGC;BR	BEN	13	450
<i>Eulalia mexicana</i>	Fauchald, 1972	NGC	BEN	720	770
<i>Eulalia myriacyclum</i>	(Schmarda, 1861)	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Eumida sanguinea</i>	(Oersted, 1843)	NGC;CGC;SGC	BEN;LIT	0	200
<i>Eumida uschakovi</i>	Kudenov, 1979	NGC;BR	BEN;LIT	0	?
<i>Eunice afra</i>	Peters, 1854	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	?
<i>Eunice antennata</i>	(Savigny, 1820)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	270
<i>Eunice aphroditois</i>	(Pallas, 1788)	NGC;CGC;SGC;BR	BEN;LIT	0	36
<i>Eunice cariboea</i>	Grube, 1856	NGC;CGC;SGC;BR	BEN;LIT	0	36

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Ennice filamentosa</i>	Grube, 1856	NGC;CGC;SGC;BR	BEN;LIT	0	40
<i>Ennice mexicana</i>	Fauchald, 1970	NGC;CGC;SGC;SWB	BEN	14	108
<i>Ennice sonorae</i>	Fauchald, 1970	NGC;CGC;SGC	BEN;LIT	0	?
<i>Ennice vittata</i>	(delle Chiaje, 1828)	NGC;CGC;SGC;SWB	BEN;LIT	1	200
<i>Ennice vittatopsis</i>	Fauchald, 1970	NGC;CGC;SGC;BR	BEN;LIT	0	33
<i>Ennice websteri</i>	Fauchald, 1969	NGC;CGC;SGC	BEN	10	100
<i>Eupomatius recurvispina</i>	(Rioja, 1941)	NGC;CGC;BR	BEN;LIT	0	?
<i>Eurythoe complanata complanata</i>	(Pallas, 1766)	NGC;CGC;SGC;BR;SWB	BEN;EPIF	0	108
<i>Exogone lowrei</i>	Berkeley & Berkeley, 1938	NGC;CGC;SGC	BEN;LIT	0	200
<i>Fabricinuda limnicola</i>	(Hartman, 1951)	NGC;CGC;SGC	BEN;LIT	0	?
<i>Glycera americana</i>	Leidy, 1855	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	309
<i>Glycera convoluta</i>	Kieferstein, 1862	NGC;CGC;SGC;BR	BEN;LIT	0	47
<i>Glycera dibranchiata</i>	Ehlers, 1868	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	1,139
<i>Glycera longipinnis</i>	Grube, 1878	NGC;BR	BEN	32	60
<i>Glycera oxycephala</i>	Ehlers, 1887	NGC;CGC;BR	BEN;LIT	0	705
<i>Glycera papillosa</i>	Grube, 1857	NGC	BEN;LIT	33	35
<i>Glycera profundus</i>	Chamberlin, 1919	NGC;CGC	BEN	1020	2560
<i>Glycera robusta</i>	Ehlers, 1868	NGC;CGC	BEN;LIT	0	298
<i>Glycera sphyrabrancha</i>	Schmarda, 1861	NGC;CGC;BR	BEN;LIT	30	49
<i>Glycera tessellata</i>	Grube, 1863	NGC;CGC;SGC;BR;SWB	BEN;LIT	5	1,386
<i>Glycinde armigera</i>	Moore, 1911	NGC;CGC;SGC;SWB	BEN	18	1,197
<i>Glycinde polygnatha</i>	Hartman, 1950	NGC;CGC;SGC	BEN;LIT	0	122
<i>Glycinde solitaria</i>	(Webster, 1879)	NGC;BR	BEN	60	60
<i>Goniada acicula</i>	Hartman, 1940	NGC;CGC;SGC	BEN	5	72
<i>Goniada littorea</i>	Hartman, 1950	NGC	BEN;LIT	0	?
<i>Goniadella gracilis</i>	(Verrill, 1873)	NGC	BEN;LIT	0	34
<i>Grubelepis mexicana</i>	(Berkeley & Berkeley, 1939)	NGC;CGC;SGC	BEN;LIT;CST	0	50
<i>Gyptis arenicolus glabrus</i>	Hartman, 1961	NGC	BEN	37	660
<i>Halosydna brevisetosa</i>	Kinberg, 1855	NGC;CGC;SGC;BR	BEN;LIT;COM	0	522
<i>Halosydna glabra</i>	Hartman, 1939	NGC;CGC;SGC	BEN;LIT	0	21
<i>Halosydna johnsoni</i>	(Darboux, 1899)	NGC;CGC;SGC;BR	BEN;LIT	0	21
<i>Haploscoloplos elongatus</i>	(Johnson, 1901)	NGC;CGC;SGC	BEN;LIT	0	293
<i>Harmothoe hirsuta</i>	Johnson, 1897	NGC;CGC;SGC	BEN;LIT	0	8
<i>Hesione intertexta</i>	Grube, 1878	NGC;CGC;SGC;BR	BEN;LIT;CST	0	45

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Hyalinoecia juvenalis</i>	Moore, 1911	NGC;CGC;SGC;SWB	BEN	9	405
<i>Hydroides crucigera</i>	Morch, 1863	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Idanthyrsus armatopsis</i>	Fauchald, 1972	NGC	BEN	1227	1,386
<i>Isolda pulchella</i>	Müller, 1858	NGC;CGC;SGC	BEN	10	50
<i>Kinbergonuphis microcephala</i>	(Hartman, 1944)	NGC;CGC;SGC;BR	BEN;LIT	0	27
<i>Kinbergonuphis pulchra</i>	(Fauchald, 1980)	NGC;CGC;SGC;BR	BEN;EPIF	0	50
<i>Kinbergonuphis vermillionensis</i>	(Fauchald, 1968)	NGC	BEN;LIT	0	126
<i>Kinbergonuphis virgata</i>	(Fauchald, 1980)	NGC	BEN;LIT	0	68
<i>Laborostratus zaragozensis</i>	Hernández & Solís, 1998	NGC;BR	BEN;PAR	30	34
<i>Langerhansia heterochaeta</i>	(Moore, 1909)	NGC	BEN;LIT	0	720
<i>Laonice cirrata</i>	(Sars, 1851)	NGC;CGC;SGC;BR	BEN;LIT	0	200
<i>Leiocapitella labra</i>	Hartman, 1947	NGC;CGC	BEN	36	100
<i>Leitoscoloplos mexicanus</i>	(Fauchald, 1972)	NGC	BEN	1360	1,400
<i>Leitoscoloplos pugettensis</i>	(Petubone, 1937)	NGC	BEN;LIT	0	163
<i>Lepidasthenia gigas</i>	(Johnson, 1897)	NGC;CGC;SGC;BR	BEN;LIT;COM	0	50
<i>Lepidonotus purpureus</i>	Potts, 1910	NGC	BEN;LIT	0	72
<i>Lepidonotus squamatus</i>	(Linnaeus, 1767)	NGC;CGC;SGC	BEN;LIT	?	1,410
<i>Lepidonotus versicolor</i>	Ehlers, 1901	NGC;CGC;SGC	BEN;LIT	0	297
<i>Lopadorhynchus krohnii</i>	(Claparède, 1870)	NGC;CGC;SGC	PEL	?	?
<i>Lumbrineris crassidentata</i>	Fauchald, 1970	NGC;CGC;SGC;BR	BEN;LIT	0	2,520
<i>Lumbrineris erecta</i>	(Moore, 1904)	NGC;CGC;SGC	BEN;LIT	0	43
<i>Lumbrineris index</i>	Moore, 1911	NGC	BEN	30	1,267
<i>Lumbrineris januarii</i>	(Grube, 1878)	NGC;CGC	BEN	23	54
<i>Lumbrineris lagunae</i>	Fauchald, 1970	NGC;CGC;SGC	BEN	9	1,197
<i>Lumbrineris latreilli</i>	Audouin & M. Edwards, 1834	NGC;CGC;SGC;SWB	BEN;LIT	0	2,376
<i>Lumbrineris limicola</i>	Hartman, 1944	NGC;CGC;SGC	BEN	11	105
<i>Lumbrineris minima</i>	Hartman, 1944	NGC	BEN;LIT	0	?
<i>Lumbrineris penascensis</i>	Fauchald, 1970	NGC;BR	BEN;LIT	0	?
<i>Lumbrineris platylobata</i>	Fauchald, 1970	NGC;CGC;SGC	BEN;LIT	0	30
<i>Lumbrineris simplicis</i>	Hartman, 1959	NGC	BEN;LIT	0	?
<i>Lumbrineris tetraura</i>	(Schmarda, 1861)	NGC;CGC;SGC;BR	BEN;LIT	0	72
<i>Lumbrineris zonata</i>	(Johnson, 1901)	NGC;CGC;BR	BEN;LIT	0	80
<i>Lysidice ninetta</i>	Audouin & M. Edwards, 1833	NGC;CGC;SGC;SWB	BEN;LIT	0	108
<i>Lysippe aff. mexicana</i>	Fauchald, 1972	NGC;CGC;SGC;BR	BEN	19	2,439

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Magelona californica</i>	Hartman, 1944	NGC;CGC;SGC;BR	BEN;LIT	0	1,458
<i>Maldane cristata</i>	Treadwell, 1923	NGC;CGC;SGC	BEN	579	2,763
<i>Maldane sarsi</i>	Malmgren, 1865	NGC;CGC;SGC;BR	BEN;LIT	0	3,537
<i>Malmgrenia hartmanae</i>	Kudenov, 1975	NGC;BR	BEN;COM	40	40
<i>Marphysa aenea</i>	(Blanchard, 1849)	NGC;CGC;SGC;SWB	BEN;LIT	0	22
<i>Marphysa angelensis</i>	Fauchald, 1970	NGC;CGC;SGC	BEN	20	40
<i>Marphysa sanguinea</i>	(Montagu, 1815)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	200
<i>Mediomastus californiensis</i>	Hartman, 1944	NGC;CGC;SGC	BEN;LIT	1	517
<i>Megalomma pigmentum</i>	Reish, 1963	NGC;CGC;SGC	BEN;LIT;LACS	0	45
<i>Megalomma splendida</i>	(Moore, 1905)	NGC;CGC;SGC;BR	BEN	?	200
<i>Mesochaetopterus alipes</i>	Monro, 1928	NGC;BR	BEN	2	?
<i>Mesochaetopterus mexicanus</i>	Kudenov, 1975	NGC;BR	BEN	2	?
<i>Microbthalmus riojai</i>	Reish, 1968	NGC	BEN	?	?
<i>Mooreonuphis cirrata</i>	(Hartman, 1944)	NGC	BEN	20	40
<i>Mooreonuphis nebulosa</i>	(Moore, 1911)	NGC;CGC;SGC;SWB	BEN	12	309
<i>Myxicola infundibulum</i>	(Renier, 1804)	NGC;BR	BEN;LIT	0	71
<i>Naineris dendritica</i>	(Kinberg, 1867)	NGC;CGC;SGC	BEN;LIT	0	10
<i>Neanthes caudata</i>	(delle Chiaje, 1828)	NGC;CGC;SGC;BR	BEN;LIT	0	21
<i>Neanthes cortezi</i>	Kudenov, 1979	NGC;BR	BEN;LIT	0	?
<i>Neanthes micromma</i>	Harper, 1979	NGC;CGC;SGC;BR	BEN;LIT	28	79
<i>Neanthes pelagica</i>	Linnaeus, 1761	NGC;CGC;SGC	BEN;LIT	0	100
<i>Neanthes succinea</i>	(Frey & Leuckart, 1847)	NGC;CGC;SGC	BEN;LIT	0	?
<i>Nematoneis unicomis</i>	(Grube, 1840)	NGC	BEN;LIT	0	?
<i>Neoleprea californica</i>	(Moore, 1904)	NGC;BR	BEN;LIT	0	200
<i>Nephtys bilobatus</i>	Kudenov, 1975	NGC	BEN	?	?
<i>Nephtys capensis</i>	Day, 1953	NGC	BEN;LIT	0	30
<i>Nephtys magellanica</i>	Augener, 1912	NGC;CGC;SGC	BEN;LIT	0	135
<i>Nephtys panamensis</i>	Monro, 1928	NGC;CGC;SGC;BR	BEN;LIT	0	108
<i>Nephtys picta</i>	Ehlers, 1868	NGC	BEN;LIT	20	50
<i>Nephtys squamosa</i>	Ehlers, 1887	NGC;CGC;SGC;BR	BEN;LIT	0	216
<i>Nereis engeniae</i>	(Kinberg, 1866)	NGC;CGC	BEN;LIT	0	500
<i>Nereis procera</i>	Ehlers, 1868	NGC	BEN	9	1,944
<i>Nereis riisei</i>	Grube, 1857	NGC;CGC;SGC	BEN;LIT	5	99
<i>Nereis zonata</i>	Malmgren, 1867	NGC	BEN;LIT	0	255

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Nicon moniloceras</i>	(Hartman, 1940)	NGC	BEN;LIT	0	198
<i>Ninoe dolicoognatha</i>	Rioja, 1941	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Ninoe foliosa</i>	Fauchald, 1972	NGC	BEN	216	1,355
<i>Notocirrus californiensis</i>	Hartman, 1944	NGC;BR	BEN	14	104
<i>Notomastus americanus</i>	Day, 1973	NGC;CGC;SGC	BEN	30	100
<i>Notomastus hemipodius</i>	Hartman, 1947	NGC;CGC;SGC;BR	BEN;LIT	0	120
<i>Notomastus latericens</i>	Sars, 1850	NGC;CGC;SGC	BEN;LIT	0	4,360
<i>Notomastus lineatus</i>	Claparède, 1870	NGC;CGC;SGC;SWB	BEN;LIT	0	298
<i>Notomastus lobatus</i>	Hartman, 1947	NGC;CGC;SGC;BR	BEN	52	527
<i>Notomastus sonorae</i>	Kudenov, 1975	NGC;CGC;BR	BEN;LIT	0	?
<i>Notomastus tenuis</i>	Moore, 1909	NGC;CGC;SGC;BR	BEN;LIT	0	2,520
<i>Notopygos ornata</i>	Grube, 1876	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	126
<i>Odontosyllis phosphorea</i>	Moore, 1909	NGC;CGC;SGC	BEN;LIT	0	21
<i>Oenone fulgida</i>	(Savigny, 1818)	NGC;CGC;SGC;BR	BEN;LIT	0	40
<i>Onuphis vexillaria</i>	Moore, 1911	NGC;CGC;SGC;BR	BEN	14	1,980
<i>Onuphis zebra</i>	Berkeley & Berkeley, 1939	NGC;CGC;SGC	BEN	0	36
<i>Ophelina acuminata</i>	Oersted, 1843	NGC;CGC;SGC;BR	BEN;LIT	10	5,000
<i>Ophiodromus pugettensis</i>	(Johnson, 1901)	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Orbinia johnsoni</i>	(Moore, 1909)	NGC	BEN;LIT	0	14
<i>Orbinia riseri</i>	(Pettibone, 1957)	NGC;CGC;SGC	BEN;LIT	0	160
<i>Owenia collaris</i>	Hartman, 1955	NGC;CGC;SGC;BR	BEN	31	2,000
<i>Owenia fusiformis</i>	delle Chiaje, 1844	NGC	BEN	1	?
<i>Paleanotus bellis</i>	(Johnson, 1897)	NGC	BEN;LIT	0	?
<i>Palola paloloides</i>	(Moore, 1909)	NGC;CGC;SGC;BR	BEN;LIT	0	165
<i>Palola siciliensis</i>	(Grube, 1840)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	33
<i>Paradoneis lyra</i>	(Southern, 1914)	NGC;CGC;SGC	BEN	20	2,160
<i>Paranaites polynoides</i>	(Moore, 1909)	NGC	BEN	?	2,480
<i>Parandalia fauweli</i>	(Berkeley & Berkeley, 1941)	NGC;CGC;SGC	BEN;LIT	0	107
<i>Paraprionospio pinnata</i>	(Ehlers, 1901)	NGC;CGC;SGC;BR	BEN;LIT	0	2,000
<i>Pareurythoe californica</i>	(Johnson, 1897)	NGC;CGC	BEN;LIT	0	?
<i>Pectinaria hartmanae</i>	Reish, 1968	NGC	BEN	?	?
<i>Pelagobia longicirrata</i>	Greeff, 1879	NGC;CGC;SGC	PEL	?	?
<i>Perrineris elenacasi</i>	Rioja, 1947	NGC;CGC;SGC;BR	BEN;LIT	0	?
<i>Perrineris monterea</i>	(Chamberlin, 1918)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	?

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Perimereis osoriotafalli</i>	León González & Solís, 1998	NGC;CGC;SGC;BR	BEN;LIT	0	0
<i>Petaloproctus borealis</i>	Ardwidsen, 1907	NGC;BR	BEN;LIT	30	1,680
<i>Phalacroporus pictus</i>	Greiff, 1879	NGC;CGC;SGC	PEL	?	?
<i>Pherusa neopapillata</i>	(Hartman, 1961)	NGC;CGC;SGC	BEN;LIT	0	556
<i>Phyllochaetopterus limicolus</i>	Hartman, 1960	NGC;CGC	BEN	119	1,910
<i>Phyllodoce tuberculosa</i>	Kudenov, 1975	NGC;BR	BEN;LIT	0	?
<i>Phylo felix</i>	Kinberg, 1866	NGC	BEN	7	99
<i>Phylo nudus</i>	(Moore, 1911)	NGC	BEN	?	590
<i>Pionosyllis gigantea</i>	Moore, 1908	NGC	BEN	122	198
<i>Piromis americana</i>	(Monro, 1928)	NGC	BEN;LIT	0	32
<i>Piromis arenosus</i>	Kinberg, 1867	NGC;BR	BEN;LIT	0	30
<i>Pista cristata</i>	(Muller, 1776)	NGC;CGC;SGC	BEN;LIT	0	82
<i>Pista elongata</i>	Moore, 1909	NGC;CGC	BEN;LIT	0	21
<i>Platynereis bicanauliculata</i>	(Baird, 1863)	NGC;CGC;SGC	BEN;LIT	0	1,620
<i>Platynereis dumerilii</i>	(Audouin & M. Edwards, 1833)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	200
<i>Poecilochaetus johnsoni</i>	Hartman, 1939	NGC	BEN;LIT	15	2,300
<i>Polycirrus californicus</i>	Moore, 1909	NGC;CGC;SGC	BEN;LIT	0	2,000
<i>Polydora barbilla</i>	Blake, 1980	NGC;BR	BEN;COM	15	15
<i>Polydora convexa</i>	Blake & Woodwick, 1972	NGC	BEN;COM	15	15
<i>Polydora giardi</i>	Mesnil, 1896	NGC;CGC;BR	BEN;LIT;COM	0	180
<i>Polydora heterochaeta</i>	Rioja, 1939	NGC	BEN;LACS	0	?
<i>Polydora nuchalis</i>	Woodwick, 1953	NGC;BR	BEN;LIT;LACS	0	?
<i>Polydora socialis</i>	(Schmarda, 1861)	NGC;CGC;SGC;BR	BEN;LIT;LACS;COM	0	68
<i>Polydora websteri</i>	Hartman, 1943	NGC;CGC;SGC;BR	BEN;COM	15	30
<i>Polyodontes frons</i>	Hartman, 1939	NGC	BEN	13	293
<i>Polyodontes oculus</i>	(Treadwell, 1901)	NGC;CGC;SGC;BR	BEN	7	36
<i>Polyophthalmus pictus</i>	(Dujardin, 1839)	NGC;CGC;SGC	BEN;LIT	0	9
<i>Pontogenia laeviseta</i>	Hartman, 1939	NGC;CGC;SGC	BEN	18	144
<i>Prionospio bocki</i>	Söderström, 1920	NGC	BEN;LIT	0	104
<i>Prionospio cirrifera</i>	(Wirén, 1883)	NGC;CGC;SGC	BEN	1	1,775
<i>Prionospio eblersi</i>	Fauvel, 1928	NGC;CGC;SGC	BEN	29	1,700
<i>Prionospio heterobranchia heterobranchia</i>	Moore, 1907	NGC;CGC;SGC	BEN	0	102
<i>Prionospio multibranchiata</i>	Berkeley, 1927	NGC	BEN;LIT	0	104

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Prionospio steenstrupi</i>	Malingren, 1867	NGC;CGC;SGC;BR	BEN;LIT	0	1,500
<i>Protodorvillea gracilis</i>	(Hartman, 1938)	NGC;CGC;SGC	BEN;LIT	0	117
<i>Protula tubularia balboensis</i>	Monro, 1933	NGC;BR	BEN;LIT	0	?
<i>Sabellides manriquei</i>	Salazar-Vallejo, 1996	NGC	BEN	46	380
<i>Sagitella kowalewskii</i>	Wagner, 1872	NGC;CGC;SGC	PEL	0	2,000
<i>Scalibregma inflatum</i>	Rathke, 1843	NGC;CGC;SGC	BEN	36	2,250
<i>Scionella japonica</i>	Moore, 1903	NGC;CGC	BEN;LIT	102	1,620
<i>Scolecopsis acuta</i>	(Treadwell, 1914)	NGC	BEN;LIT	0	?
<i>Scolecopsis maculata</i>	(Hartman, 1961)	NGC;BR	BEN;LIT	0	?
<i>Scolecopsis pigmentata</i>	Reish, 1959	NGC	BEN	?	2,000
<i>Scoloplos ?chevalieri</i>	(Fauvel, 1901)	NGC;BR	BEN;LIT	0	?
<i>Scoloplos acmeceps</i>	Chamberlain, 1919	NGC;CGC;SGC	BEN;LIT	0	200
<i>Scoloplos texana</i>	Maciolek & Holland, 1978	NGC	BEN	1	90
<i>Sigambra bassi</i>	(Hartman, 1947)	NGC;CGC;SGC	BEN;LIT	0	74
<i>Spiochaetopterus costarum costarum</i>	Claparède, 1870	NGC;CGC;SGC;BR	BEN;LIT	1	90
<i>Spiochaetopterus costarum monroi</i>	Gitay, 1969	NGC;BR	BEN;LIT	0	?
<i>Spiophanes bombyx</i>	(Claparède, 1870)	NGC;CGC;SGC;BR	BEN;LIT	0	2,000
<i>Spiophanes missionensis</i>	Hartman, 1941	NGC;CGC;SGC;BR	BEN;LIT	0	300
<i>Sibnelanella uniformis</i>	Moore, 1910	NGC	BEN;LIT	0	320
<i>Streblosoma crassibranchia</i>	Treadwell, 1914	NGC	BEN;LIT	0	475
<i>Streblosoma longifilis</i>	Rioja, 1962	NGC;CGC;SGC;BR	BEN	22	22
<i>Syllidia limiata</i>	Hartmann-Schroder, 1962	NGC;CGC	BEN	?	?
<i>Syllis elongata</i>	(Johnson, 1901)	NGC;CGC;SGC;BR	BEN;LIT	0	66
<i>Thalenessa lewissi</i>	(Berkeley & Berkeley, 1939)	NGC;CGC;SGC	BEN	5	57
<i>Tharyx monilaris</i>	Hartman, 1960	NGC;CGC;SGC;SWB	BEN	6	3,060
<i>Tharyx multifilis</i>	Moore, 1909	NGC;CGC;SGC;SWB	BEN	255	2,390
<i>Tharyx parvus</i>	Berkeley, 1929	NGC;CGC;SGC	BEN	35	78
<i>Tharyx tessellata</i>	Hartman, 1960	NGC;CGC;SGC	BEN;LIT	0	70
<i>Thelepus hamatus</i>	Moore, 1905	NGC	BEN;LIT	83	1,386
<i>Thormora johnstoni</i>	(Kinberg, 1855)	NGC;CGC;SGC	BEN;LIT	0	270
<i>Tomopteris elegans</i>	Chun, 1887	NGC;CGC;SGC	PEL	?	?
<i>Tomopteris planktonis</i>	Apstein, 1900	NGC;CGC;SGC	PEL	?	?
<i>Travisia fusiformis</i>	Kudenov, 1975	NGC;BR	BEN;LIT	0	?
<i>Travisia gigas</i>	Hartman, 1938	NGC;CGC;SGC	BEN;LIT	0	?

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

Species	Author	NGC	BEN;LIT	IO	106
<i>Travisia hobsonae</i>	Santos, 1977	NGC	BEN;LIT	10	106
<i>Typhloscolex mulleri</i>	Busch, 1851	NGC;CGC;SGC	PEL	0	2,000
<i>Typosyllis fasciata</i>	(Malmgren, 1867)	NGC;BR	BEN;LIT	0	?
PHYLUM ARTHROPODA (ARTHROPODS)					
CRUSTACEA (CRUSTACEANS)					
MALACOSTRACA					
EUMALACOSTRACA					
EUCARIDA					
DECAPODA (CRABS, SHRIMPS, CRAYFISHES, AND LOBSTERS)					
DENDROBRANCHIATA (COMMERCIAL SHRIMPS)					
<i>Farfantepenaeus californiensis</i>	(Holmes, 1900)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	2	180
<i>Litopenaeus stylirostris</i>	(Stimpson, 1874)	NGC;CGC;SGC	BEN;LIT;NER	5	45
<i>Metapenaeopsis beebei</i>	(Burkenroad, 1938)	NGC;CGC;SGC	BEN;LIT;NER	5	91
<i>Metapenaeopsis mineri</i>	(Burkenroad, 1934)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	3	115
<i>Rimapenaeus pacificus</i>	(Burkenroad, 1934)	NGC;CGC;SGC;BR	BEN;LIT;NER	12	45
<i>Sicyonia aliaffinis</i>	(Burkenroad, 1934)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	4	242
<i>Sicyonia disdorsalis</i>	(Burkenroad, 1934)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	5	139
<i>Sicyonia disedwardsi</i>	(Burkenroad, 1934)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	5	249
<i>Sicyonia disparri</i>	(Burkenroad, 1934)	NGC;CGC;SGC	BEN;LIT;NER	0	82
<i>Sicyonia ingentis</i>	(Burkenroad, 1938)	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	5	307
<i>Sicyonia martini</i>	Pérez Farfante & Booth, 1981	NGC;CGC;SGC;SWB	BEN;LIT;NER	9	242
<i>Sicyonia penicillata</i>	Lockington, 1879	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	1	180
<i>Sicyonia picta</i>	Faxon, 1893	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	16	400
<i>Solenocera mutator</i>	Burkenroad, 1938	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	2	380
PLEOCYEMATA					
ANOMURA					
GALATHEIDAE (GALATHEIDS)					
<i>Janetogalathea californiensis</i>	(Benedict, 1902)	NGC;CGC	BEN;NER	87	3,998
<i>Munida mexicana</i>	Benedict, 1902	NGC;CGC;SGC;SWB	BEN;NER	16	145
<i>Munida tenella</i>	Benedict, 1902	NGC;CGC;SGC	BEN;NER	27	130
<i>Pleuroncodes planipes</i>	Stimpson, 1860	NGC;CGC;SGC	BEN;PEL;NER;OCE	48	3,000
PORCELLANIDAE (PORCELAIN CRABS)					
<i>Euceramus transversilimeatus</i>	(Lockington, 1878)	NGC;CGC;SGC;BR;SWB	BEN;NER	3	63
<i>Heteroporcellana corbicola</i>	(Haig, 1960)	NGC;BR	BEN;COM;NER	18	45

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Megalobrachium erosum</i>	(Glassell, 1936)	NGC;CGC;SGC;SWB	BEN;NER	9	45
<i>Megalobrachium sinuimanus</i>	(Lockington, 1878)	NGC;CGC;SGC	BEN;LIT;COM	0	5
<i>Megalobrachium smithi</i>	(Glassell, 1936)	NGC;CGC;BR	BEN;LIT;COM	0	5
<i>Megalobrachium tuberculipes</i>	(Lockington, 1878)	NGC;CGC;SGC;BR;SWB	LIT;BEN;COM;NE	2	18
<i>Miryocerus kirkei</i>	Glassell, 1938	NGC;CGC;SGC;BR	BEN;COM;NER	0	24
<i>Pachycheles calcosus</i>	Haig, 1960	NGC;CGC;SGC;BR	LIT;BEN;COM;NE	0	7
<i>Pachycheles marcortezensis</i>	Glassell, 1936	NGC;CGC;SGC;SWB	BEN;COM;NER	3	82
<i>Pachycheles panamensis</i>	Faxon, 1893	NGC;CGC;SGC;SWB	LIT;BEN;COM;NE	0	7
<i>Pachycheles setimanus</i>	(Lockington, 1878)	NGC;CGC;SGC;BR	BEN;LIT;NER	0	50
<i>Petrolisthes armatus</i>	(Gibbes, 1850)	NGC;CGC;SGC;BR	LIT;BEN;LACS;NER	0	18
<i>Petrolisthes crenulatus</i>	Lockington, 1878	NGC;CGC;SGC;BR;SWB	LIT;BEN;COM;NE	2	27
<i>Petrolisthes edwardsii</i>	(de Saussure, 1853)	NGC;CGC;SGC;BR;SWB	LIT;BEN;COM;NE	0	40
<i>Petrolisthes galapagensis</i>	Haig, 1960	NGC;CGC	BEN;LIT;COM	0	1
<i>Petrolisthes gracilis</i>	Stimpson, 1859	NGC;CGC;SGC;BR;SWB	LIT;BEN;COM;NE	18	45
<i>Petrolisthes hirtipes</i>	Lockington, 1878	NGC;CGC;SGC;BR;SWB	LIT;BEN;COM;NE	9	40
<i>Petrolisthes hirtispinosus</i>	Lockington, 1878	NGC;CGC;SGC;BR	LIT;BEN;COM;NE	1	40
<i>Petrolisthes lewisi</i>	(Glassell, 1936)	NGC;CGC;SGC	BEN;LIT	0	6
<i>Petrolisthes nigrunguiculatus</i>	Glassell, 1936	NGC;CGC;SGC	BEN;LIT	0	1
<i>Petrolisthes sanfelpensis</i>	Glassell, 1936	NGC;CGC;SGC;BR;SWB	BEN;LIT;NER	0	50
<i>Petrolisthes schmitti</i>	Glassell, 1936	NGC;CGC;BR	BEN;LIT	0	1
<i>Petrolisthes tiburonensis</i>	Glassell, 1936	NGC;CGC;BR	BEN;LIT	0	1
<i>Polyonyx nitidus</i>	Lockington, 1878	NGC;CGC;SGC	BEN;COM;NER	6	48
<i>Polyonyx quadringulatus</i>	Glassell, 1935	NGC;CGC;SGC;BR	BEN;COM	3	47
<i>Porcellana cancrisocialis</i>	Glassell, 1936	NGC;CGC;SGC;BR;SWB	LIT;BEN;COM;NE	0	115
<i>Porcellana hancocki</i>	Glassell, 1938	NGC;CGC;SGC	BEN;NER	45	103
<i>Porcellana paguriconviva</i>	Glassell, 1936	NGC;CGC;SGC;BR;SWB	LIT;BEN;COM;NER	0	90
<i>Ulloaia perpusillia</i>	Glassell, 1938	NGC;CGC;SGC;BR	BEN;COM;NER	0	15
HIPPOIDEA (MOLE AND SAND CRABS)					
<i>Albunea lucasia</i>	(de Saussure, 1853)	NGC;CGC;SGC	BEN;LIT;NER	0	45
<i>Emerita analoga</i>	(Stimpson, 1857)	NGC;CGC;SWB	BEN;LIT	0	1
<i>Emerita ratbbunae</i>	Schmitt, 1935	NGC;CGC;SGC	BEN;LIT	0	1
<i>Lepidopa californica</i>	Efford, 1971	NGC;CGC	BEN;LIT;NER	0	152
<i>Lepidopa esposa</i>	Efford, 1971	NGC;CGC;SGC;BR	BEN;LIT;NER	0	2
<i>Lepidopa mearnsi</i>	Benedict, 1903	NGC;CGC;SGC;BR	BEN;LIT;NER	0	2

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

PAGUROIDEA (HERMIT CRABS)

<i>Calcinus californiensis</i>	Bouvier, 1898	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	7
<i>Clibanarius albidigitus</i>	Nobili, 1901	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	2
<i>Clibanarius digneti</i>	Bouvier, 1898	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	1
<i>Clibanarius panamensis</i>	Stimpson, 1859	NGC;CGC;SGC;BR;SWB	BEN;LIT;LACS	0	3
<i>Coenobita compressus</i>	H. Milne Edwards, 1837	NGC;CGC;SGC;SWB	BEN;CST	0	1
<i>Dardanus sinistripes</i>	(Stimpson, 1859)	NGC;CGC;SGC;SWB	BEN;NER	9	110
<i>Enallopaguropsis guatemoci</i>	(Glassell, 1937)	NGC;CGC;SGC	BEN;NER	20	270
<i>Enallopagurus spinicarpus</i>	(Glassell, 1938)	NGC;CGC;SGC	BEN;NER	16	146
<i>Iridopagurus occidentalis</i>	(Faxon, 1893)	NGC;CGC;SGC	BEN;NER	55	120
<i>Manucomplanus cervicornis</i>	(Benedict, 1892)	NGC;CGC;SGC	BEN;NER	54	200
<i>Manucomplanus varians</i>	(Benedict, 1892)	NGC;CGC;SGC;BR;SWB	BEN;NER	11	183
<i>Paguristes anahuac</i>	Glassell, 1938	NGC;CGC;SGC;BR	BEN;LIT	0	18
<i>Paguristes bakeri</i>	Holmes, 1900	NGC;CGC;SGC;BR;SWB	BEN;NER	40	232
<i>Paguristes praedator</i>	Glassell, 1937	NGC;CGC;SGC;BR;SWB	BEN;NER	40	155
<i>Paguristes sanguinimanus</i>	Glassell, 1938	NGC;CGC;SGC;BR	BEN;LIT	0	24
<i>Pagurus albus</i>	(Benedict, 1892)	NGC;CGC;SGC;BR	BEN;NER	5	30
<i>Pagurus arenisaxatilis</i>	Harvey & McLaughlin, 1991	NGC;CGC;BR	BEN;LIT	0	6
<i>Pagurus benedicti</i>	(Bouvier, 1898)	NGC;CGC;SGC;BR;SWB	BEN;NER	2	84
<i>Pagurus gladius</i>	(Benedict, 1892)	NGC;CGC;SGC;BR;SWB	BEN;NER	33	111
<i>Pagurus lepidus</i>	(Bouvier, 1898)	NGC;CGC;SGC;BR;SWB	BEN;LIT	1	40
<i>Pagurus smitibi</i>	(Benedict, 1892)	NGC;CGC;SGC;BR;SWB	BEN;NER	33	111
<i>Petrochirus californiensis</i>	Bouvier, 1895	NGC;CGC;SGC;BR;SWB	BEN;NER	0	110
<i>Phimochirus californiensis</i>	(Benedict, 1892)	NGC;CGC;SGC;BR;SWB	BEN;NER	2	129
<i>Phimochirus roseus</i>	(Benedict, 1892)	NGC;CGC;SGC;BR;SWB	BEN;LIT	1	8
<i>Pylopagurus longicarpus</i>	Walton, 1954	NGC;BR	BEN;NER	44	110
<i>Tomopagurus purpuratus</i>	(Benedict, 1892)	NGC;CGC;SGC	BEN;NER	27	90
BRACHYURA ("TRUE" CRABS)					
<i>Ala cornuta</i>	(Stimpson, 1860)	NGC;CGC;SGC;BR	BEN;LIT;COM;EPIF	0	22
<i>Arenaeus mexicanus</i>	(Gerstaecker, 1856)	NGC;CGC;SGC;SWB	BEN;LACS;NER	0	80
<i>Austinothores angelicus</i>	(Lockington, 1877)	NGC;CGC;BR	BEN;COM;NER	?	?
<i>Bathyrhombila furcata</i>	Hendrickx, 1998	NGC;CGC	BEN	55	644
<i>Calappa convexa</i>	de Saussure, 1853	NGC;CGC;SGC;BR;SWB	BEN;NER	3	75
<i>Calappa saussurei</i>	Rathbun, 1898	NGC;CGC;SGC;SWB	BEN;COM;NER	1	274

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Callinectes arcuatus</i>	Ordway, 1863	NGC;CGC;SGC;BR;SWB	BEN;LACS;NER	0	75
<i>Callinectes bellicosus</i>	(Stimpson, 1859)	NGC;CGC;SGC;BR;SWB	BEN;LACS	0	20
<i>Calyptraeotheres granti</i>	(Glassell, 1933)	NGC;CGC;SGC;BR;SWB	BEN;LIT;COM	0	1
<i>Cancer amphioetus</i>	Rathbun, 1898	NGC;CGC;SGC;BR;SWB	BEN;NER	8	380
<i>Cataleptodius occidentalis</i>	(Stimpson, 1871)	NGC;CGC;SGC;BR;SWB	BEN;LIT;LACS	0	1
<i>Chacellus pacificus</i>	Hendrickx, 1989	NGC;CGC;SGC	BEN;NER	56	103
<i>Chasmocarcinus latipes</i>	Rathbun, 1898	NGC;CGC;SGC;SWB	BEN;NER	27	114
<i>Collodes tenuirostris</i>	Rathbun, 1893	NGC;CGC;SGC;BR;SWB	BEN;NER	6	365
<i>Collodes tumidus</i>	Rathbun, 1898	NGC;CGC;SGC;SWB	BEN;NER	20	128
<i>Cronius ruber</i>	(Lamarck, 1818)	NGC;CGC;SGC;BR;SWB	LIT;BEN;NER	0	60
<i>Cryptodromiopsis sarraburei</i>	(Rathbun, 1910)	NGC;CGC;SGC;BR;SWB	BEN;COM;NER	0	110
<i>Cryptopodia bassleri</i>	Rathbun, 1925	NGC;CGC;SGC;SWB	BEN;NER	3	81
<i>Cyclograpsus escondidensis</i>	Rathbun, 1933	NGC;CGC	BEN;LIT	0	1
<i>Cycloxanthops vitiatius</i>	(Stimpson, 1860)	NGC;CGC;SGC	BEN;LIT;COM	0	55
<i>Cyrtoplax panamensis</i>	Ziesenhenne, 1940	NGC;CGC;SGC;BR	BEN;LIT	0	128
<i>Daira americana</i>	Stimpson, 1860	NGC;CGC;SGC	BEN;LIT;COM	0	5
<i>Deilocerus hendrickxi</i>	Tavares, 1993	NGC	BEN;NER	162	175
<i>Deilocerus laminatus</i>	Rathbun, 1935	NGC	BEN;NER	65	82
<i>Dissodactylus lockingtoni</i>	Glassell, 1935	NGC;BR	BEN;COM;NER	1	?
<i>Dissodactylus nitidus</i>	Smith, 1870	NGC;CGC;BR;SWB	BEN;COM;NER	1	10
<i>Dissodactylus xantusi</i>	Glassell, 1936	NGC;CGC;SGC;BR	BEN;COM;NER	1	?
<i>Ebalia cristata</i>	Rathbun, 1898	NGC;CGC;SGC	BEN;NER	66	146
<i>Ebalia magdalenensis</i>	Rathbun, 1933	NGC;CGC;BR;SWB	BEN;NER	3	33
<i>Epiatoides paradigmus</i>	Garth, 1958	NGC;CGC;SGC;BR	BEN;LIT	0	24
<i>Epiatus minimus</i>	Lockington, 1877	NGC;CGC;SGC;BR	LIT;BEN;COM;NE	0	31
<i>Erioleptus spinosus</i>	Rathbun, 1893	NGC;CGC;SGC;BR	BEN;NER	5	549
<i>Eriphia squamata</i>	Stimpson, 1859	NGC;CGC;SGC;BR;SWB	BEN;LIT;COM	0	1
<i>Eibusa lata</i>	Rathbun, 1893	NGC;CGC;SGC;BR;SWB	BEN;NER	3	180
<i>Eibusa panamensis</i>	Finnegan, 1931	NGC;CGC;SGC	BEN;NER	2	45
<i>Euclinetops lucasi</i>	Stimpson, 1860	NGC;CGC;SGC;BR	BEN;LIT;PEPIF;COM	0	1
<i>Euclinetops panamensis</i>	Rathbun, 1923	NGC;CGC;SGC	BEN;LIT	0	1
<i>Euphyllax robustus</i>	A. Milne Edwards, 1874	NGC;CGC;SGC;BR	BEN;NER	10	75
<i>Euprognatha bifida</i>	Rathbun, 1893	NGC;CGC;SGC;SWB	BEN;NER	2	175
<i>Eurypanopeus confragosus</i>	Rathbun, 1933	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	1

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Eurypanopeus ovatus</i>	(Benedict & Rathbun, 1891)	NGC;CGC;SGC;BR	BEN;LIT	0	1
<i>Eurypanopeus planissimus</i>	(Stimpson, 1860)	NGC;CGC;SGC;SWB	BEN;LIT	0	1
<i>Eurypanopeus planus</i>	(Smith, 1869)	NGC;CGC;SGC	BEN;LIT	0	1
<i>Eurytium affine</i>	(Streets & Kingsley, 1879)	NGC;CGC;SGC;BR;SWB	BEN;LIT;LACS	0	1
<i>Eurytium albidigitum</i>	Rathbun, 1933	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	1
<i>Fabia carvachoi</i>	Campos, 1986	NGC;BR	BEN;LIT;COM	0	?
<i>Gecarcinus quadratus</i>	de Saussure, 1853	NGC;CGC;SGC;BR	BEN;LACS;CST		SUPRALITTORAL
<i>Geograpsus lividus</i>	(H. Milne Edwards, 1837)	NGC;CGC;SGC	BEN;LIT	0	?
<i>Glyptoplax consagae</i>	Hendrickx, 1990	NGC;BR	BEN;NER	28	?
<i>Glyptoxanthus meandricus</i>	(Lockington, 1877)	NGC;CGC;SGC;BR	BEN;LIT	0	4
<i>Goetice americanus</i>	Rathbun, 1923	NGC;CGC	BEN;LIT	0	1
<i>Gonopanope areolata</i>	(Rathbun, 1898)	NGC;CGC;SGC;BR	BEN;NER	18	53
<i>Gonopanope nitida</i>	(Rathbun, 1898)	NGC;CGC;SGC	BEN;NER	13	20
<i>Grapsus grapsus</i>	(Linnaeus, 1758)	NGC;CGC;SGC;SWB	BEN;LIT	0	?
<i>Hemigrapsus nudus</i>	(Dana, 1851)	NGC	BEN;LIT	0	?
<i>Hemigrapsus oregonensis</i>	(Dana, 1851)	NGC;BR	BEN;LIT	0	?
<i>Hemus finneganae</i>	Garth, 1958	NGC;CGC;SGC	BEN;NER	1	59
<i>Hepatus kossmanni</i>	Neumann, 1878	NGC;CGC;SGC;BR;SWB	BEN;NER	3	75
<i>Hepatus lineatus</i>	Rathbun, 1898	NGC;CGC;SGC;BR;SWB	BEN;NER	1	185
<i>Herbstia camptacantha</i>	(Stimpson, 1871)	NGC;CGC;SGC	BEN;LIT;COM	0	69
<i>Herbstia pubescens</i>	Stimpson, 1871	NGC;CGC	BEN;LIT;COM	0	10
<i>Heteractaea lunata</i>	(H. Milne Edwards & Lucas, 1843)	NGC;CGC;SGC	BEN;LIT;COM	0	5
<i>Heterocrypta macrobrachia</i>	Stimpson, 1871	NGC;CGC;SGC;BR;SWB	BEN;NER	21	92
<i>Hexapanopeus orchitti</i>	Rathbun, 1930	NGC;CGC;SGC;BR	LIT;BEN;NER	0	28
<i>Hexapanopeus rubicundus</i>	Rathbun, 1933	NGC;CGC;BR	BEN;LIT	0	1
<i>Hypoconcha lowei</i>	Rathbun, 1933	NGC;BR	BEN;NER	13	100
<i>Hypoconcha panamensis</i>	Smith, 1869	NGC;CGC;SGC;BR	BEN;NER	2	180
<i>Iliacantha schmitti</i>	Rathbun, 1935	NGC;CGC;SGC;SWB	BEN;NER	16	275
<i>Inachoides laevis</i>	Stimpson, 1860	NGC;CGC;SGC;BR;SWB	LIT;EPTF;BEN;NER	3	102
<i>Juxtafabia muliniarum</i>	Rathbun, 1918	NGC;CGC;BR	BEN;COM;NER	?	?
<i>Kraussia americana</i>	Garth, 1939	NGC;CGC;SGC	BEN;NER	7	72
<i>Leiolambrus punctatissimus</i>	(Owen, 1839)	NGC;CGC;SGC;SWB	BEN;NER	22	98
<i>Leucostilia jurinei</i>	(de Saussure, 1853)	NGC;CGC;SGC	BEN;NER	0	17

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Libinia mexicana</i>	Rathbun, 1892	NGC;CGC;SGC;BR	BEN;NER	15	72
<i>Lipaeobesius leeanus</i>	Rathbun, 1898	NGC;CGC;SGC	BEN;NER	7	73
<i>Lissa aurivillinsi</i>	Rathbun, 1898	NGC;CGC;SGC;SWB	BEN;NER	3	128
<i>Lithadia cumingii</i>	Bell, 1855	NGC;CGC;SGC;BR;SWB	BEN;NER	3	93
<i>Lophopanopeus frontalis</i>	(Rathbun, 1893)	NGC;CGC;SGC;BR	BEN;LIT	0	8
<i>Malacoplax californiensis</i>	(Lockington, 1877)	NGC;CGC;SGC;BR	LIT;BEN;LACS;NER	1	114
<i>Medaesus pelagius</i>	(Glassell, 1936)	NGC;CGC;SGC;BR;SWB	BEN;NER	23	91
<i>Mesorhoea belli</i>	(A. Milne Edwards, 1878)	NGC;CGC;SGC;BR;SWB	BEN;NER	11	110
<i>Microphrys branchialis</i>	Rathbun, 1898	NGC;CGC;SGC;SWB	BEN;NER	9	90
<i>Microphrys platysoma</i>	(Stimpson, 1860)	NGC;CGC;SGC;BR	ARCO;COM;LIT;BEN;NER	0	73
<i>Mithrax denticulatus</i>	Bell, 1835	NGC;CGC;SGC	ARCO;COM;LIT;BEN;NER	0	24
<i>Mithrax sinensis</i>	Rathbun, 1892	NGC;CGC;SGC	BEN;NER	0	100
<i>Nanocassiope polita</i>	(Rathbun, 1893)	NGC;CGC;SGC;SWB	BEN	5	275
<i>Neopanope peterseni</i>	Glassell, 1933	NGC;CGC	BEN;LIT	0	1
<i>Notolopas lamellatus</i>	Stimpson, 1871	NGC;CGC;SGC;BR	BEN;NER	1	100
<i>Notoscoles ecuadoriensis</i>	(Rathbun, 1935)	NGC;CGC;SGC	BEN;NER	55	114
<i>Ocylope occidentalis</i>	Stimpson, 1860	NGC;CGC;SGC	BEN;LIT;LACS	0	1
<i>Oediplax granulata</i>	Rathbun, 1893	NGC;CGC;SGC;BR	BEN;NER	22	80
<i>Opisthopus transversus</i>	Rathbun, 1893	NGC;BR;SWB	BEN;LIT;COM	0	91
<i>Orthoheres unguifalcula</i>	(Glassell, 1936)	NGC;BR	BEN;LIT	0	1
<i>Osachila levis</i>	Rathbun, 1898	NGC;CGC;SGC	BEN;NER	22	110
<i>Pachygrapsus crassipes</i>	Randall, 1839	NGC;CGC;BR;SWB	BEN;LIT	0	1
<i>Pachygrapsus transversus</i>	(Gibbes, 1850)	NGC;CGC;SGC;SWB	BEN;LIT;LACS;COM	0	1
<i>Palicus fragilis</i>	(Rathbun, 1893)	NGC;CGC;SGC	BEN;LIT;LACS;COM	35	270
<i>Palicus lucasii</i>	Rathbun, 1898	NGC;CGC;SGC	BEN;COM;NER	9	110
<i>Palicus zonata</i>	(Rathbun, 1893)	NGC;CGC;SGC;SWB	BEN;COM;NER	15	73
<i>Panopeus diversus</i>	Rathbun, 1933	NGC;BR	?	?	?
<i>Panopeus purpureus</i>	Lockington, 1877	NGC;CGC;SGC;BR;SWB	BEN;LIT;LACS	0	1
<i>Panoplax mundata</i>	Glassell, 1935	NGC;CGC;SGC;BR	BEN;NER	13	35
<i>Paractaea sulcata</i>	(Stimpson, 1860)	NGC;CGC;SGC	BEN;COM;NER	5	30
<i>Paradasygius depressus</i>	(Bell, 1835)	NGC;CGC;SGC;BR	BEN;NER	9	146
<i>Parapinnixa nitida</i>	(Lockington, 1877)	NGC;CGC;BR;SWB	BEN;LIT;COM	0	42
<i>Parthenope excavata</i>	(Stimpson, 1871)	NGC;CGC;SGC	BEN;NER	3	54
<i>Petia tumida</i>	(Lockington, 1877)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	128

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Persephona subovata</i>	(Rathbun, 1893)	NGC;CGC;SGC	BEN;NER	36	95
<i>Persephona townsendi</i>	(Rathbun, 1893)	NGC;CGC;SGC;BR	BEN;NER	3	104
<i>Pilumnoides rotundus</i>	Garth, 1940	NGC;CGC;BR	BEN;COM;NER	18	300
<i>Pilumnus gonzalensis</i>	Rathbun, 1893	NGC;CGC;SGC;BR	BEN;LIT	0	5
<i>Pilumnus limosus</i>	Smith, 1869	NGC;CGC;SGC;BR	BEN;LIT	0	55
<i>Pilumnus spinobirsutus</i>	(Lockington, 1877)	NGC;SWB	BEN;LIT	0	34
<i>Pilumnus tectus</i>	Rathbun, 1933	NGC;BR	BEN;LIT	0	1
<i>Pilumnus townsendi</i>	Rathbun, 1923	NGC;CGC;SGC;BR;SWB	BEN;LIT;COM;NER	2	90
<i>Pinnaxodes gigas</i>	Green, 1992	NGC;CGC;BR	BEN;LIT	20	?
<i>Pinnixa abbotti</i>	Glassell, 1935	NGC;BR	?	?	?
<i>Pinnixa felipensis</i>	Glassell, 1935	NGC;BR	?	?	?
<i>Pinnixa fusca</i>	Glassell, 1935	NGC;BR	?	?	?
<i>Pinnixa buffmani</i>	Glassell, 1935	NGC;BR	BEN;COM	?	?
<i>Pinnixa pembedoni</i>	Glassell, 1935	NGC;CGC;SGC;BR	LIT;BEN;COM	0	11
<i>Pinnixa plectrophoros</i>	Glassell, 1935	NGC;BR	BEN;LIT;COM	0	1
<i>Pinnixa tomentosa</i>	Lockington, 1877	NGC;BR	BEN;COM;NER	18	121
<i>Pinnixa transversalis</i>	(H. Milne Edwards & Lucas, 1844)	NGC;CGC;SGC;BR	BEN;COM;NER	0	128
<i>Pinnotheres orcutti</i>	Rathbun, 1918	NGC;CGC;SGC;BR	BEN;NER	32	37
<i>Pitbo picteti</i>	(de Saussure, 1853)	NGC;CGC;SGC;SWB	LIT;EPIF;BEN;NER	0	82
<i>Pitbo sexdentata</i>	Bell, 1835	NGC;CGC;SGC	BEN;LIT	0	36
<i>Platypodiella rotundata</i>	(Stimpson, 1860)	NGC;CGC;SGC;SWB	BEN;LIT;COM	0	1
<i>Podochela bembilli</i>	(Lockington, 1877)	NGC;CGC;SGC;SWB	BEN;NER	0	166
<i>Podochela latimanus</i>	(Rathbun, 1893)	NGC;CGC;SGC;BR	BEN;LIT	0	67
<i>Podochela lobifrons</i>	Rathbun, 1893	NGC;CGC;SGC	BEN;NER	33	230
<i>Podochela vestita</i>	(Stimpson, 1871)	NGC;CGC;SGC;BR;SWB	BEN;NER	3	55
<i>Portunus iridescens</i>	(Rathbun, 1893)	NGC;CGC;SGC;SWB	BEN;NER	27	241
<i>Portunus xantusii minimus</i>	Rathbun, 1898	NGC;CGC;SGC;BR;SWB	BEN;NER	0	241
<i>Pyromiaia tuberculata</i>	(Lockington, 1877)	NGC;CGC;SGC;BR;SWB	BEN;NER	0	412
<i>Quadrella nitida</i>	Smith, 1869	NGC;CGC;SGC	BEN;COM;NER	45	150
<i>Randallia americana</i>	(Rathbun, 1893)	NGC;CGC;SGC;BR	BEN;NER	18	175
<i>Randallia ornata</i>	(Randall, 1839)	NGC;CGC;SWB	BEN;NER	10	185
<i>Ramita angustata</i>	Stimpson, 1860	NGC;CGC;SGC	BEN;NER	18	?
<i>Raninoides benedicti</i>	Rathbun, 1935	NGC;CGC;SGC;BR	BEN;NER	3	103

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Raymondia clavapedata</i>	(Glassell, 1935)	NGC;BR;SWB	BEN;LIT;COM	0	27
<i>Sesarma sulcatum</i>	Smith, 1870	NGC;CGC;SGC;SWB	BEN;LIT;LACS	0	?
<i>Solenolambrus arcuatus</i>	Stimpson, 1871	NGC;CGC;SGC	BEN;COM;NER	2	110
<i>Spelaeophorus digueti</i>	(Bouvier, 1898)	NGC;CGC;SGC;BR	BEN;NER	24	114
<i>Spelaeophorus schmitti</i>	Glassell, 1935	NGC;BR	BEN;LIT	0	1
<i>Speocarcinus granulimanus</i>	Rathbun, 1893	NGC;CGC;SGC;BR	BEN;NER	7	102
<i>Speocarcinus spinicarpus</i>	Guinot, 1969	NGC;BR	BEN;NER	9	73
<i>Sphenocarcinus agassizi</i>	Rathbun, 1893	NGC;CGC;SGC	BEN;NER	55	165
<i>Stenocionops angusta</i>	(Lockington, 1877)	NGC;CGC;SGC;BR;SWB	BEN;NER	0	55
<i>Stenocionops beebeti</i>	Glassell, 1936	NGC;CGC;SGC;BR;SWB	BEN;NER	27	110
<i>Stenocionops oviata</i>	(Bell, 1835)	NGC;CGC;SGC;SWB	BEN;COM;EPIF;NE	15	275
<i>Stenorhynchus debilis</i>	(Smith, 1871)	NGC;CGC;SGC;BR;SWB	BEN;NER	0	154
<i>Symethis garthi</i>	Goeke, 1980	NGC;CGC;SGC	BEN;NER	9	55
<i>Teleobryas cristulipes</i>	Stimpson, 1860	NGC;CGC;SGC;SWB	BEN;COM;NER	0	128
<i>Tetragrapsus jonyi</i>	(Rathbun, 1893)	NGC;CGC;SGC;BR	BEN;LIT	0	1
<i>Thoe sulcata sulcata</i>	Stimpson, 1860	NGC;CGC;SGC	BEN;COM;LIT	0	5
<i>Thyrolambrus glasselli</i>	Garth, 1958	NGC;CGC;SGC;SWB	BEN;COM;NER	3	70
<i>Trizocarcinus dentatus</i>	(Rathbun, 1893)	NGC;CGC;SGC;BR	BEN;NER	27	139
<i>Tumidotheres margarita</i>	(Smith, 1869)	NGC;CGC	BEN;COM;NER	1	?
<i>Uca crenulata coloradensis</i>	(Rathbun, 1893)	NGC;CGC;BR	BEN;LIT;LACS	0	1
<i>Uca crenulata crenulata</i>	(Lockington, 1877)	NGC;CGC;SGC;BR;SWB	BEN;LIT;LACS	0	1
<i>Uca latimanus</i>	(Rathbun, 1893)	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	1
<i>Uca musica musica</i>	Rathbun, 1914	NGC;CGC;SGC;BR;SWB	BEN;LIT;LACS	0	1
<i>Uca princeps monilifera</i>	Rathbun, 1914	NGC;CGC;BR	BEN;LIT;LACS	0	1
<i>Uca princeps princeps</i>	(Smith, 1870)	NGC;CGC;SGC	BEN;LIT;LACS	0	1
<i>Uhlus ellipticus</i>	Stimpson, 1871	NGC;CGC	BEN;LIT;COM	0	1
<i>Xanthodius sternbergii</i>	Stimpson, 1859	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	1
CARIDEA (TIDEPOOL SHRIMP)					
<i>Alpheus bellimanus</i>	Lockington, 1877	NGC;CGC;SGC	BEN;NER	0	300
<i>Alpheus felgenhaueri</i>	Kim & Abele, 1988	NGC;CGC;SGC	BEN;LIT	0	1
<i>Alpheus floridanus</i>	Kingsley, 1878	NGC;CGC;SGC	BEN;LIT;COM	0	37
<i>Alpheus bebes</i>	Kim & Abele, 1988	NGC;CGC;SGC	BEN;COM;NER	0	74
<i>Alpheus hyeoungae</i>	Kim & Abele, 1988	NGC;CGC;SGC	BEN;LIT;COM	0	1
<i>Alpheus normanni</i>	Kingsley, 1878	NGC;CGC;SGC;BR	BEN;NER	2	73

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Apheus sulcatus</i>	Kingsley, 1878	NGC;CGC;SGC;SWB	BEN;LIT;COM	0	1
<i>Apheus umbo</i>	Kim & Abele, 1988	NGC;CGC;SGC	BEN;LIT;COM	0	1
<i>Apheus villus</i>	Kim & Abele, 1988	NGC	BEN;LIT;COM	0	6
<i>Ambidexter panamensis</i>	Abele, 1972	NGC;BR	BEN;LIT	0	1
<i>Ambidexter swifti</i>	Abele, 1972	NGC;BR	BEN;NER	0	70
<i>Ambidexter symmetricus</i>	Manning & Chace, 1971	NGC	BEN;LIT	0	1
<i>Automate dolichognatha</i>	de Man, 1888	NGC;CGC;SGC	BEN;NER	0	100
<i>Betaeus longidactylus</i>	Lockington, 1877	NGC;BR	BEN;LIT	0	1
<i>Gnathophyllum panamense</i>	Faxon, 1893	NGC;CGC;SGC;BR	BEN;LIT;COM	0	20
<i>Hippolyte californiensis</i>	Holmes, 1895	NGC;CGC	BEN;LIT	0	10
<i>Hippolyte williamsi</i>	Schmitt, 1924	NGC;BR	BEN;LIT	0	10
<i>Latreutes antiborealis</i>	Holthuis, 1952	NGC;CGC;SGC;BR;SWB	BEN;LIT	4	46
<i>Leptochela serratorbita</i>	Bate, 1888	NGC;CGC;SGC	LIT;BEN;NER	20	110
<i>Lucifer typus</i>	H. Milne Edwards, 1837	NGC;CGC;SGC;SWB	PEL;OCE	200	730
<i>Lyismata californica</i>	(Stimpson, 1866)	NGC;CGC;SGC;SWB	BEN;LIT	0	33
<i>Neocrangon zaeae</i>	(Chace, 1937)	NGC	BEN;LIT	9	37
<i>Neopontonides dentiger</i>	Holthuis, 1951	NGC;CGC;SGC	BEN;NER	1	66
<i>Palaemon ritteri</i>	Holmes, 1895	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	40
<i>Palaemonella holmesi</i>	(Nobili, 1907)	NGC;CGC;SGC;BR;SWB	BEN;COM;NER	2	90
<i>Pasiphaea americana</i>	Faxon, 1893	NGC;CGC;SGC;SWB	PEL;OCE;NER	150	1,000
<i>Pasiphaea pacifica</i>	Rathbun, 1902	NGC;CGC	PEL;OCE	75	730
<i>Periclimenes infraspinis</i>	(Rathbun, 1902)	NGC;CGC;SGC;BR	BEN;COM;NER	0	150
<i>Periclimenes lucasi</i>	Chace, 1937	NGC;CGC;SGC;BR	BEN;NER	0	90
<i>Plesionika beebei</i>	Chace, 1937	NGC;CGC;SGC;SWB	PEL;BEN;NER;OCE	73	914
<i>Pontonia longispina</i>	Holthuis, 1951	NGC;CGC	BEN;LIT	0	1
<i>Pontonia pinnae</i>	Lockington, 1878	NGC;CGC;SGC;BR	BEN;LIT	0	4
<i>Processa peruviana</i>	Wicksten, 1983	NGC;CGC;SGC;BR;SWB	BEN;NER	26	180
<i>Processa pippinnae</i>	Wicksten & Méndez, 1985	NGC;CGC	PEL;NER;OCE	150	644
<i>Sergestes halia</i>	Faxon, 1893	NGC;CGC;SGC;SWB	PEL;OCE	200	1,617
<i>Synalpheus digueti</i>	Coutière, 1909	NGC;CGC	BEN;LIT;COM	0	10
<i>Synalpheus goodie occidentalis</i>	Coutière, 1909	NGC;CGC;SGC	BEN;COM	20	40
<i>Synalpheus lockingtoni</i>	Coutière, 1909	NGC;CGC;SGC;BR;SWB	BEN;LIT;COM	0	8
<i>Synalpheus sanjosei</i>	Coutière, 1909	NGC;CGC;BR;SWB	BEN;LIT	0	20

TABLE 29-3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Synalpheus townsendi mexicanus</i>	Coutière, 1909	NGC;CGC;SGC	BEN;LIT;COM	0	35
<i>Thor algicola</i>	Wicksten, 1987	NGC;CGC;SGC;BR	BEN;LIT	0	25
<i>Typton serratus</i>	Holthuis, 1951	NGC;CGC	BEN;LIT;COM	1	5
PALINURA (SPINY LOBSTER AND SLIPPER LOBSTER)					
<i>Eubiacus princeps</i>	Smith, 1869	NGC;CGC;SGC;BR	BEN;NER	10	90
<i>Panulirus inflatus</i>	(Bouvier, 1895)	NGC;CGC;SGC	BEN;LIT	1	30
THALASSINIDEA (MUD SHRIMP AND GHOST SHRIMP)					
<i>Acanthabaxius caespitosa</i>	(Squires, 1979)	NGC;CGC;SGC	BEN;NER	72	200
<i>Axiopsis baronai</i>	Squires, 1977	NGC;BR	BEN;LIT	5	9
<i>Callianassa uncinata</i>	Milne-Edwards	NGC;CGC;SGC;BR	BEN;LIT	0	0
<i>Calocarides quinqueseriatus</i>	(Rathbun, 1902)	NGC;CGC;SGC	BEN	293	1,780
<i>Neaxius vivesi</i>	(Bouvier, 1895)	NGC;CGC;SGC;BR;SWB	BEN;LIT;COM	0	4
<i>Upogebia burkenroadi</i>	Williams, 1986	NGC	?	?	?
<i>Upogebia dawsoni</i>	Williams, 1986	NGC;CGC;SGC;BR	BEN;LACS;NER	0	2
<i>Upogebia jonesi</i>	Williams, 1986	NGC;BR	BEN;LIT;NER	0	72
<i>Upogebia thistlei</i>	Williams, 1986	NGC;CGC;SGC;BR	BEN;LIT;LACS	0	2
EUPHAUSIACEA (EUPHAUSIDS)					
<i>Euphausia lamelligera</i>	Hansen, 1911	NGC;CGC;SGC;SWB	PEL;OCE;NER	100	500
<i>Nematoscelis difficilis</i>	Hansen, 1911	NGC;CGC;SGC;SWB	PEL;OCE;NER	0	450
<i>Nyctiphanes simplex</i>	Hansen, 1911	NGC;CGC;SGC;BR;SWB	PEL;OCE;NER	0	300
PERACARIDA					
AMPHIPODA					
CAPRELLIDEA (SKELETON SHRIMP AND WHALE LICE)					
<i>Cyamus balaenopterae</i>	Barnard, 1931	NGC;CGC;SGC;SWB	COM	0	?
<i>Cyamus boopis</i>	Lütken, 1870	NGC;CGC;SGC;SWB	COM	0	?
<i>Cyamus catodontis</i>	Margolis, 1954	NGC;CGC;SGC;SWB	COM	0	?
<i>Cyamus erraticus</i>	Roussel de Vauzème, 1834	NGC;CGC;SGC;SWB	COM	0	?
<i>Cyamus orcini</i>	Leung, 1970	NGC;CGC;SGC;SWB	COM	0	?
<i>Cyamus ovalis</i>	Roussel de Vauzème, 1834	NGC;CGC;SGC;SWB	COM	0	?
<i>Isocyamus delphinii</i>	(Guérin-Méneville, 1837)	NGC;CGC;SGC;SWB	COM	0	?
<i>Neocyamus phyteteris</i>	(Pouchet, 1888)	NGC;CGC;SGC;SWB	COM	0	?
<i>Syncyamus chelipes</i>	(Costa, 1866)	NGC;CGC;SGC;SWB	COM	0	?
<i>Syncyamus pseudorcae</i>	(Bowman, 1955)	NGC;CGC;SGC;SWB	COM	0	?

TABLE 29-3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

GAMMARIDEA (COMMON AMPHIPODS)						
<i>Acutinodentopus periculosus</i>	Barnard, 1969		NGC;BR	BEN	0	38
<i>Ampelisca agassizi</i>	(Judd, 1896)		NGC;CGC	BEN	5	195
<i>Ampelisca cristata</i>	Holmes, 1908		NGC;CGC;SGC;BR	BEN	6	152
<i>Ampelisca bancrofti</i>	Barnard, 1954		NGC;CGC;SGC	BEN	9	157
<i>Ampelisca lobata</i>	Holmes, 1908		NGC;CGC;SGC	BEN	0	183
<i>Ampelisca mexicana</i>	Barnard, 1954		NGC;CGC;SGC	BEN	4	73
<i>Ampelisca milleri</i>	Barnard, 1954		NGC;CGC;SGC	BEN	15	187
<i>Ampelisca pugetica</i>	Stimpson, 1864		NGC;CGC;SGC;SWB	BEN	9	487
<i>Ampelisca romigi</i>	Barnard, 1954		NGC;CGC;SGC	BEN	1	504
<i>Ampelisca schellenbergi</i>	Shoemaker, 1933		NGC;CGC	BEN	0	46
<i>Amphidontopus oculatus</i>	Barnard, 1959		NGC	BEN	1	162
<i>Amphilocheus neapolitanus</i>	Della Valle, 1893		NGC	BEN	0	80
<i>Amphitoe plumulosa</i>	Shoemaker, 1938		NGC;CGC;SGC	BEN	0	18
<i>Amphitoe pollex</i>	Kunkel, 1910		NGC;CGC	BEN	0	2
<i>Amphitoe ramondi</i>	Audouin, 1826		NGC;CGC;SWB	BEN	0	2
<i>Amphitoe tea</i>	Barnard, 1965		NGC	BEN	0	67
<i>Anamixis yarrrega</i>	(Barnard, 1974)		NGC;CGC;BR	BEN	0	8
<i>Argissa hamatipes</i>	(Norman, 1869)		NGC	BEN	4	1,096
<i>Batea conductor</i>	(Barnard, 1969)		NGC	BEN	?	?
<i>Batea coyoa</i>	Barnard, 1969		NGC	BEN	9	37
<i>Batea rectangularata</i>	Shoemaker, 1925		NGC;CGC	BEN	0	40
<i>Batea susurrator</i>	Barnard, 1969		NGC;CGC	BEN	0	37
<i>Bemlos macromanus</i>	Shoemaker, 1925		NGC;CGC;SGC	BEN	0	9
<i>Bemlos tehuacos</i>	(Barnard, 1979)		NGC;CGC;SGC;BR	BEN	0	1
<i>Cornudilla cornuta</i>	(Barnard, 1969)		NGC	BEN	19	46
<i>Corophium baconi</i>	Shoemaker, 1934		NGC;CGC;SGC;BR	BEN	0	55
<i>Corophium uenoi</i>	Stephensen, 1932		NGC	BEN;LIT;LACS	0	24
<i>Dissimimassa dissimilis</i>	(Stout, 1913)		NGC;CGC;SGC;BR	BEN	0	73
<i>Elasmopus bampo</i>	Barnard, 1979		NGC;CGC;SGC;BR	BEN	0	2
<i>Elasmopus serricatus</i>	Barnard, 1979		NGC;CGC;SGC;BR	BEN	0	2
<i>Elasmopus tiburoni</i>	Barnard, 1979		NGC;CGC;BR	BEN	0	2
<i>Eobolus spinosus</i>	(Holmes, 1905)		NGC;CGC;BR	BEN	0	73
<i>Ericthonius brasiliensis</i>	(Dana, 1853)		NGC;CGC;SGC;BR	LIT; BEN	0	171

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Eudevenopus metagracilis</i>	(Barnard, 1964)	NGC	BEN	0	47
<i>Foxiphalus apache</i>	Barnard & Barnard, 1982	NGC	BEN	0	53
<i>Foxiphalus cognatus</i>	(Barnard, 1960)	NGC;CGC	BEN	0	325
<i>Foxiphalus golfensis</i>	Barnard & Barnard, 1982	NGC;CGC;SGC	BEN	0	91
<i>Gammaropsis thompsoni</i>	(Walker, 1898)	NGC;SWB	BEN	1	27
<i>Gammaropsis tonichi</i>	(Barnard, 1969)	NGC;CGC;SGC;BR	BEN	9	16
<i>Garosyrboe disjuncta</i>	Barnard, 1969	NGC	BEN	0	24
<i>Gitanopsis bacroa</i>	Barnard, 1979	NGC;CGC;SGC;BR	BEN	0	1
<i>Gitanopsis pusilloides</i>	Shoemaker, 1942	NGC;SWB	BEN	0	20
<i>Heterophoxus oculatus</i>	(Holmes, 1908)	NGC	BEN	2	1,785
<i>Hippomedon ?propinquus</i>	Sars, 1895	NGC	BEN	15	30
<i>Hyale californica</i>	Barnard, 1979	NGC	BEN	0	2
<i>Hyale yaqui</i>	Barnard, 1979	NGC;CGC;SGC;BR	BEN	0	7
<i>Jassa falcata</i>	(Montagu, 1808)	NGC	BEN	7	18
<i>Jassa slatteryi</i>	Conlan, 1990	NGC;BR	EPIF; BEN	0	40
<i>Leucothoe alata</i>	Barnard, 1959	NGC;CGC;SGC	BEN	0	24
<i>Liljeborgia marcinabrio</i>	Barnard, 1969	NGC	BEN	46	?
<i>Listriella melanica lazaris</i>	Barnard, 1969	NGC	BEN	2	44
<i>Macronassa macromerus</i>	(Shoemaker, 1916)	NGC;CGC;SGC	BEN	0	1
<i>Maera diffidentia</i>	(Barnard, 1969)	NGC	BEN	0	24
<i>Maera reishi</i>	Barnard, 1979	NGC;CGC	BEN	0	6
<i>Megaluropus falciformis</i>	Barnard, 1969	NGC	BEN	2	108
<i>Megaluropus visendus</i>	Barnard, 1969	NGC	BEN	2	17
<i>Melita sulca</i>	(Stout, 1913)	NGC;CGC;SGC;BR	BEN	0	101
<i>Microjassa macrocoxa</i>	Shoemaker, 1942	NGC;CGC;SGC;SWB	BEN	0	38
<i>Monoculodes hartmanae</i>	Barnard, 1962	NGC	BEN	2	146
<i>Monoculodes nyei</i>	Shoemaker, 1933	NGC;BR	BEN	0	1
<i>Nasagenia nasa</i>	(Barnard, 1969)	NGC;CGC;SGC;BR	BEN	0	1
<i>Neomegamphopus roosevelti</i>	Shoemaker, 1942	NGC;CGC;SGC;SWB	BEN	11	42
<i>Orchomene magdalenensis</i>	(Shoemaker, 1942)	NGC;SWB	BEN	2	46
<i>Pachynus barnardi</i>	Hurley, 1963	NGC	BEN	12	183
<i>Paramicrodentopus schmitti</i>	(Shoemaker, 1942)	NGC;CGC;SGC;SWB	BEN	0	221
<i>Parapleustes commensalis</i>	Shoemaker, 1952	NGC	BEN;PAR	9	?
<i>Pariphrinotus escabrosus</i>	(Barnard, 1969)	NGC;CGC;SGC;BR	BEN	0	16

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Photis bifurcata</i>	Barnard, 1962	NGC	BEN	11	93
<i>Photis brevipes</i>	Shoemaker, 1942	NGC;SWB	BEN	0	135
<i>Photis californica</i>	Stout, 1913	NGC	BEN	10	139
<i>Photis elephantis</i>	Barnard, 1962	NGC;CGC;SGC;BR	BEN	0	6
<i>Podocerus brasiliensis</i>	(Dana, 1853)	NGC;CGC;SGC	BEN	0	24
<i>Podocerus fulanus</i>	Barnard, 1962	NGC;CGC;SGC;BR	BEN	0	42
<i>Polycheria osborni</i>	Calman, 1898	NGC;CGC;SGC	BEN	0	1
<i>Posophotis seri</i>	Barnard, 1979	NGC;BR	BEN	0	6
<i>Rhachotropis luculenta</i>	Barnard, 1969	NGC	BEN	38	46
<i>Rhepoxynius epistomus</i>	(Shoemaker, 1938)	NGC;CGC;SGC	BEN	0	182
<i>Rhepoxynius gemmatus</i>	(Barnard, 1969)	NGC	BEN	2	9
<i>Rhepoxynius tridentatus</i>	(Barnard, 1954)	NGC	BEN	0	38
<i>Rildardanus tros</i>	Barnard, 1969	NGC	BEN	9	16
<i>Rudilembooides stenopropodus</i>	Barnard, 1959	NGC	BEN	0	68
<i>Synchelidium rectipalatum</i>	Mills, 1962	NGC	BEN	0	100
<i>Tiburonella viscana</i>	(Barnard, 1964)	NGC	BEN	0	27
<i>Uristes entalladurus</i>	Barnard, 1963	NGC	BEN	2	38
<i>Zoedentopus cimaloanus</i>	Barnard, 1979	NGC;CGC;BR	BEN	0	1
HYPERIIDEA (PELAGIC/HYPERIID AMPHIPODS)					
<i>Cranoecephalus scleroticus</i>	(Streets, 1878)	NGC	PEL	?	?
<i>Eupronoe armata</i>	Claus, 1879	NGC;CGC;SGC	PEL	25	350
<i>Eupronoe maculata</i>	Claus, 1879	NGC;CGC;SGC	PEL	0	550
<i>Eupronoe minuta</i>	Claus, 1879	NGC;CGC;SGC	PEL	0	2,900
<i>Euthamneus rostratus</i>	(Bovallius, 1887)	NGC;CGC;SGC	PEL	18	55
<i>Glossoccephalus milneedwardsi</i>	Bovallius, 1887	NGC;CGC;SGC;BR	PEL	25	75
<i>Hyperia leptura</i>	Bowman, 1973	NGC;SWB	PEL	?	?
<i>Hyperietta luzoni</i>	(Stebbing, 1888)	NGC;CGC;SGC	PEL	25	1,087
<i>Hyperietta stebbingi</i>	Bowman, 1973	NGC;CGC;SGC;SWB	PEL	25	2,400
<i>Hyperietta stephenseni</i>	Bowman, 1973	NGC;CGC;SGC	PEL	25	600
<i>Hyperietta vosseleri</i>	(Stebbing, 1904)	NGC;CGC;SGC;SWB	PEL	100	2,330
<i>Hyperoche medusarum</i>	(Kröyer, 1838)	NGC;CGC;SGC	PEL	?	?
<i>Lestrigonus bengalensis</i>	Giles, 1887	NGC;CGC;SGC;BR	PEL;NER	25	2,245
<i>Lestrigonus shoemakeri</i>	Bowman, 1973	NGC;CGC;SGC;BR	PEL	25	695
<i>Lycaea pulex</i>	Marion, 1874	NGC;CGC;SGC;BR	PEL	?	?

TABLE 29-3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Lycaea serrata</i>	Claus, 1879	NGC;CGC;SGC	PEL	?	?
<i>Oxycephalus clausi</i>	Bovallius 1887	NGC;CGC;SGC;BR	PEL	0	600
<i>Oxycephalus piscator</i>	H. Milne-Edwards, 1830	NGC;CGC;SGC	PEL	0	100
<i>Parascelus edwardsi</i>	Claus, 1879	NGC;CGC;SGC;BR	PEL	?	?
<i>Phronima dumbari</i>	Shih, 1991	NGC;CGC;SGC;SWB	PEL	?	?
<i>Platyscelus serratulus</i>	Stebbing, 1888	NGC;CGC;SGC	PEL	0	2,650
<i>Primno brevidens</i>	Bowman, 1978	NGC;CGC;SGC	PEL	140	2,400
<i>Rhabdosoma minor</i>	Fage, 1954	NGC;CGC;SGC	PEL	?	?
<i>Rhabdosoma whitei</i>	Bate, 1862	NGC;CGC;SGC	PEL	0	600
<i>Scina borealis</i>	(Sars, 1883)	NGC;CGC;SGC	PEL	50	3,000
<i>Simorhynchotus antennarius</i>	(Claus, 1871)	NGC;CGC;SGC;BR	PEL	25	50
<i>Streetsia challengerii</i>	Stebbing, 1888	NGC;CGC;SGC	PEL	0	2,340
<i>Tetrathyrus anafurae</i>	Stebbing, 1888	NGC;CGC;SGC	PEL	850	975
<i>Tetrathyrus forcipatus</i>	Claus, 1879	NGC;CGC;SGC	PEL	0	1,800
<i>Tetrathyrus pulchellus</i>	Barnard, 1930	NGC;CGC;SGC	PEL	?	?
<i>Vibilia wolterecki</i>	Behning, 1939	NGC;CGC;SGC;SWB	PEL	100	1,000
CUMACEA (CUMACEANS)					
<i>Campylaspis rubromaculata</i>	Lie, 1969	NGC	BEN	?	?
<i>Cyclaspis nubila</i>	Zimmer, 1936	NGC	BEN; LIT	0	80
<i>Diastylis calderoni</i>	Donath-Hernández, 1988	NGC;BR	?	?	?
<i>Leptocuma forsmanni</i>	Zimmer, 1943	NGC;BR;SWB	BEN; LIT	0	13
<i>Oxyrostylis pacifica</i>	Zimmer, 1936	NGC	BEN	3	170
<i>Oxyrostylis tertia</i>	Zimmer, 1943	NGC	BEN	8	?
ISOPODA (ISOPODS)					
ANTHURIDEA					
<i>Calisfimbura squamosissima</i>	(Menzies, 1951)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	142
<i>Colanibura bruscai</i>	Poore, 1984	NGC;BR	BEN;LIT	0	27
<i>Cortezura penascoensis</i>	Schultz, 1977	NGC;CGC;SGC;BR	BEN;LIT	0	45
<i>Mesanthura nubifera</i>	Wagele, 1984	NGC	BEN;LIT	0	?
<i>Mesanthura occidentalis</i>	Menzies & Barnard, 1959	NGC;CGC	BEN;LIT	0	55
<i>Paranthura elegans</i>	Menzies, 1951	NGC;CGC;SGC;BR	BEN;LIT	0	55
<i>Paranthura longuelsoni</i>	Wagele, 1984	NGC;CGC	BEN;LIT	0	3

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

ASELLOTA									
<i>Uromunna ubiquita</i>	(Menzies, 1952)	NGC;CGC;BR	?	0	35				
EPICARIDEA									
<i>Probopyrus pandalicola</i>	(Packard, 1879)	NGC	?	?	?				
<i>Schizobopyrina striata</i>	Nierstrasz & Brender à Brandis, 1929	NGC	BEN;LIT	0	?				
FLABELLIFERA									
<i>Ancinus granulatus</i>	Holmes & Gay, 1909	NGC;CGC;SGC;BR	?	0	29				
<i>Ceratothoa gilberti</i>	(Richardson, 1904)	NGC;CGC;SGC;BR	BEN;PAR	?	?				
<i>Cinolana neilbrucei</i>	Brusca, Wetzer, & France, 1995	NGC;CGC;SGC	BEN;LIT	0	36				
<i>Cinolana parva</i>	Hansen, 1890	NGC;CGC;SGC;BR	BEN;LIT	0	145				
<i>Cymothoa exigua</i>	Schioedte & Meinert, 1884	NGC;CGC;SGC;BR;SWB	BEN;PAR	2	120				
<i>Elthusa menziesi</i>	(Brusca, 1981)	NGC;CGC;SGC;SWB	BEN;LIT;PAR	0	457				
<i>Elthusa vulgaris</i>	(Stimpson, 1857)	NGC;CGC;SGC;BR;SWB	BEN;PAR	1	311				
<i>Eurydice caudata</i>	Richardson, 1899	NGC;CGC;SGC;BR;SWB	LIT;BEN;PEL	0	170				
<i>Excirrolana braziliensis</i>	Richardson, 1912	NGC;CGC;SGC;BR	LIT;CST;BEN	0	16				
<i>Excirrolana mayana</i>	(Ives, 1891)	NGC;CGC;SGC;BR;SWB	LIT;BEN	0	16				
<i>Excorallana bruscai</i>	Delaney, 1984	NGC;CGC;SGC;BR	LIT;BEN	0	55				
<i>Excorallana houstoni</i>	Delaney, 1984	NGC;CGC;SGC	BEN;LIT	0	18				
<i>Excorallana tricornis occidentalis</i>	Richardson, 1905	NGC;CGC;SGC;BR;SWB	BEN;LIT;COM	0	138				
<i>Excorallana truncata</i>	(Richardson, 1899)	NGC;CGC;BR	LIT;BEN	0	183				
<i>Heteroserolis carinata</i>	(Lockington, 1877)	NGC;CGC;SGC	BEN	0	114				
<i>Livoneca bowmani</i>	Brusca, 1981	NGC;CGC;SGC;BR;SWB	BEN;PAR	14	80				
<i>Natatolana californiensis</i>	(Schultz, 1966)	NGC;CGC;SGC	LIT;COM;BEN	40	2,000				
<i>Natatolana carlanae</i>	Brusca, Wetzer, & France, 1995	NGC;CGC;SGC;BR	BEN	15	1,168				
<i>Nerocila acuminata</i>	Schioedte & Meinert, 1881	NGC;CGC;SGC;BR;SWB	BEN;PAR;LACS	1	103				
<i>Paracerceis sculpta</i>	(Holmes, 1904)	NGC;CGC;SGC;BR;SWB	BEN;LIT;COM	0	68				
<i>Rocimela belliceps</i>	(Stimpson, 1864)	NGC;CGC;SGC	BEN;PAR	265	284				
<i>Rocimela signata</i>	Schioedte & Meinert, 1879	NGC;CGC;SGC;BR	BEN;PAR;LIT	0	73				
ONISCIDEA (TERRESTRIAL ISOPODS)									
<i>Ligia baudiniana</i>	Milne-Edwards, 1840	NGC;CGC;SGC	BEN;LIT	0	?				
<i>Tylos punctatus</i>	Holmes & Gay, 1909	NGC;CGC;SGC;SWB	BEN;LIT	0	?				
VALVIFERA									
<i>Cleantioides occidentalis</i>	(Richardson, 1899)	NGC;CGC;BR	BEN;LIT	0	50				

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Colidotea findleyi</i>	Brusca & Wallerstein, 1977	NGC;BR	BEN;LIT;EPIF	0	27
<i>Erichsonella cortezi</i>	Brusca & Wallerstein, 1977	NGC;BR	BEN;LIT;EPIF	0	?
<i>Eusymmerus antennatus</i>	Richardson, 1899	NGC;CGC;SGC;BR;SWB	BEN;LIT;LACS	0	20
<i>Idotea metallica</i>	Bosc, 1802	NGC;CGC;SGC	FLOT;NEUS;NER	ON FLOAT- ING ALGAE	
<i>Neostacilla californica</i>	(Boone, 1918)	NGC;CGC;SGC;BR	BEN;LIT	0	99
<i>Synidotea francesae</i>	Brusca, 1983	NGC;BR	BEN;LIT	0	?
TANAIDACEA (TANAIDS)					
<i>Parapseudes latifrons</i>	(Grube, 1864)	NGC;CGC;SGC	BEN	0	18
HOPLOCARIDA, STOMATOPODA (MANTIS SHRIMPS)					
<i>Alachosquilla digneti</i>	(Coutière, 1905)	NGC;CGC;SGC	BEN;LIT;COM;NER	0	54
<i>Eury squilla veleronis</i>	(Schmitt, 1940)	NGC;CGC;SGC	BEN;NER	29	91
<i>Hemisquilla ensigera californiensis</i>	Stephenson, 1967	NGC;CGC;SGC	BEN;NER	33	106
<i>Meiosquilla dawsoni</i>	Manning, 1970	NGC;BR	BEN;LIT	0	25
<i>Nannosquilla canica</i>	Manning & Reaka, 1979	NGC;CGC;SGC	BEN;LIT;NER	5	33
<i>Neogonodactylus stanschi</i>	(Schmitt, 1940)	NGC;CGC;SGC;SWB	BEN;LIT;NER	0	17
<i>Squilla bigelowi</i>	Schmitt, 1940	NGC;CGC;SGC;BR	BEN;NER	6	150
<i>Squilla tiburonensis</i>	Schmitt, 1940	NGC;CGC;SGC	BEN;NER	15	112
MAXILLOPODA					
CIRRIPEDIA, PEDUNCULATA (STALKED BARNACLES)					
<i>Arcoscappelum californicum</i>	(Pilsbry, 1907)	NGC;SWB	BEN	18	400
<i>Octolasmis californiana</i>	Newman, 1960	NGC, CGC, SGC	BEN;PAR	?	?
CIRRIPEDIA, SESSILIA (ACORN BARNACLES)					
<i>Arossia panamensis eyerdami</i>	(Henry, 1960)	NGC;CGC	BEN;COM;LIT	0	85
<i>Balanus improvisus</i>	Darwin, 1854	NGC;CGC;SGC;BR	BEN;COM;EPIF;LACS;LIT	0	36
<i>Balanus inexpectatus</i>	Pilsbry, 1916	NGC;CGC;SGC;BR;SWB	BEN;LACS;LIT	0	?
<i>Balanus parkeri</i>	Zullo, 1967	NGC;CGC	BEN;COM	25	36
<i>Balanus trigonus</i>	Darwin, 1854	NGC;CGC;SGC;SWB	BEN;COM;PEL	0	450
<i>Chelombia testudinaria</i>	(Linnaeus, 1757)	NGC;CGC;SGC	BEN;COM;PEL	?	?
<i>Chthamalus anisopoma</i>	Pilsbry, 1916	NGC;CGC;SGC	COM;BEN;LIT	0	?
<i>Conopea galeata</i>	(Linnaeus, 1771)	NGC;CGC;SGC;BR	BEN;COM	0	90
<i>Hexacrecusia durhami</i>	(Zullo, 1961)	NGC;CGC;SGC;BR	BEN;COM;CST	1	3
<i>Membranobalanus robinae</i>	Van Syoc, 1988	NGC;CGC	BEN;COM;LIT	?	?

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Paraconcavus mexicanus</i>	(Henry, 1941)	NGC;CGC;SGC;BR;SWB	BEN;LACS;LIT;COM	0	73
<i>Tetractita rubescens</i>	Darwin, 1854	NGC;CGC;SGC;SWB	BEN;LIT	0	?
<i>Tetractita stalactifera confinis</i>	Pilsbry, 1916	NGC;CGC;SGC	BEN;LIT	0	?
PYCNOGONIDA (SEA SPIDERS)					
<i>Annotobella spinifera</i>	Cole, 1904	NGC;CGC;SGC;BR	LIT;BEN;COM;NER	0	3
<i>Anoplodactylus erectus</i>	Cole, 1904	NGC;BR	BEN;NER	3	171
<i>Anoplodactylus robustus</i>	Hilton, 1939	NGC;BR	BEN;NER	18	45
<i>Anoplodactylus viridintestinalis</i>	(Cole, 1904)	NGC;BR	BEN;LIT;NER	0	999
<i>Nymphon lituus</i>	Child, 1979	NGC;CGC;BR	BEN;LIT;NER	0	9
<i>Nymphon pixellae</i>	Scott, 1942	NGC;CGC;BR	BEN;NER	18	330
<i>Nymphopsis duodorospinosa</i>	Hilton, 1942	NGC;CGC;BR	BEN;LIT;NER	0	45
<i>Pygogonum stearnsi</i>	Ives, 1892	NGC;CGC;BR	BEN;EPIF	0	999
<i>Tarastylum intermedium</i>	Cole, 1904	NGC;BR	BEN;COM;LIT;NER	0	9
<i>Tarastylum oculospinosum</i>	Hilton, 1942	NGC;CGC;SWB	BEN;LIT;NER	0	46
PHYLUM BRACHIOPODA (LAMP SHELLS)					
<i>Glottidia palmeri</i>	Dall, 1871	NGC;BR	BEN	15	15
<i>Glottidia</i> sp.		NGC;BR	BEN; LIT	0	?
PHYLUM ECTOPROCTA (BRYOZOA) (BRYOZOANS)					
GYMNOLEAEMATA					
CHEILOSTOMATA					
<i>Aetea anguina</i>	(Linnaeus, 1758)	NGC;CGC	BEN	0	40
<i>Aetea ligulata</i>	Busk, 1852	NGC;CGC;SGC;SWB	BEN	12	72
<i>Aetea recta</i>	Hincks, 1862	NGC;CGC	BEN	0	144
<i>Aimulosia palliolata</i>	(Canu & Bassler, 1928)	NGC;CGC;SGC	BEN	6	180
<i>Alderina smitti</i>	Osburn, 1950	NGC;CGC;SGC	BEN	0	108
<i>Anexechona ancorata</i>	Osburn, 1950	NGC;CGC;SGC;SWB	BEN	4	90
<i>Antropora claustracrassa</i>	(Canu & Bassler, 1930)	NGC;CGC;SGC	BEN	2	180
<i>Antropora tincta</i>	(Hastings, 1930)	NGC;CGC;SGC	BEN	0	140
<i>Aplousina flum</i>	(Jullien & Calvet, 1903)	NGC;CGC	BEN	18	118
<i>Atribopoma circinata</i>	(MacGillivray, 1869)	NGC;CGC	BEN	36	81
<i>Bellulopora bellula</i>	(Osburn, 1950)	NGC;CGC	BEN	25	108
<i>Bugula californica</i>	Robertson, 1905	NGC;CGC;SGC;BR	BEN	0	57
<i>Bugula longirostrata</i>	Robertson, 1905	NGC;CGC	BEN	18	208

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Bugula minima</i>	(Waters, 1909)	NGC	BEN	54	90
<i>Bugula neritina</i>	(Linnaeus, 1758)	NGC;CGC;SGC	BEN	1	72
<i>Celleporaria brunnea</i>	(Hincks, 1884)	NGC;CGC;SGC	BEN	0	83
<i>Celleporaria quadrispinosa</i>	(Canu & Bassler, 1930)	NGC;CGC;SGC	BEN	0	142
<i>Celleporella byalina</i>	(Linnaeus, 1758)	NGC	BEN	30	32
<i>Chaperiopsis condylata</i>	(Canu & Bassler, 1930)	NGC;CGC	BEN	1	180
<i>Chaperiopsis patula</i>	(Hincks, 1881)	NGC;CGC;SGC	BEN	5	90
<i>Cleidochasma contracta</i>	(Waters, 1899)	NGC;CGC;SGC	BEN	2	72
<i>Cleidochasma porcellana</i>	(Busk, 1860)	NGC;CGC;SGC	BEN	1	81
<i>Conopeum commensale</i>	Kirkpatrick & Metzelaar, 1922	NGC;CGC;BR;SWB	BEN	4	81
<i>Copidozoum protectum</i>	(Hincks, 1884)	NGC	BEN	0	54
<i>Copidozoum tenuirostre</i>	(Hincks, 1880)	NGC;CGC;SGC	BEN	0	126
<i>Crepidacantha poissoni</i>	(Audouin, 1826)	NGC;CGC;SGC	BEN	18	129
<i>Cribularia radiata</i>	(Moll, 1803)	NGC;CGC;SGC	BEN	1	244
<i>Cyclocopora longipora</i>	(MacGillivray, 1882)	NGC;CGC	BEN	72	108
<i>Cycloperrella rosacea</i>	Osburn, 1947	NGC;CGC;SGC	BEN	2	108
<i>Dakaria sertata</i>	Canu & Bassler, 1930	NGC;CGC;SGC	BEN	4	108
<i>Discoporella umbellata</i>	(Defrance, 1823)	NGC;CGC;SGC	BEN	13	180
<i>Electra crustulenta</i>	(Pallas, 1766)	NGC;CGC	BEN	9	81
<i>Escharella major</i>	(Hincks, 1884)	NGC;CGC	BEN	25	243
<i>Fenestrulina malusi</i>	(Audouin, 1826)	NGC;CGC	BEN	25	180
<i>Floridina antiqua</i>	(Smitt, 1873)	NGC;CGC;SGC	BEN	13	100
<i>Gemelliporida aculeata</i>	Canu & Bassler, 1928	NGC	BEN	30	34
<i>Hemismittoidea osburni</i>	Soule & Soule, 1973	NGC;CGC;SGC	BEN	30	72
<i>Hippaliosina rostrigera</i>	(Smitt, 1873)	NGC;CGC;SGC	BEN	18	72
<i>Hippodiplosia insculpta</i>	(Hincks, 1882)	NGC;CGC;SGC	BEN	4	230
<i>Hippomonaxella longirostrata</i>	(Hincks, 1883)	NGC	BEN	2	180
<i>Hippopetraliella magna</i>	(d'Orbigny, 1832)	NGC;CGC	BEN	18	54
<i>Hippopleurifera mucronata</i>	(Smitt, 1873)	NGC;CGC;SGC	BEN	0	239
<i>Hippopodina californica</i>	Osburn, 1952	NGC;CGC	BEN	21	235
<i>Hippoporella gorgonensis</i>	Hastings, 1930	NGC;CGC;SGC	BEN	0	147
<i>Hippothoa distans</i>	MacGillivray, 1869	NGC;CGC;SGC	BEN	2	72
<i>Hippothoa expansa</i>	Dawson, 1859	NGC;CGC	BEN	18	56
<i>Lagenicella lacunosa</i>	Bassler, 1934	NGC;CGC;SGC	BEN	0	180

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Lagenicella marginata</i>	(Canu & Bassler, 1930)	NGC	BEN	2	140
<i>Lagenicella mexicana</i>	(Osburn, 1952)	NGC;CGC;SGC	BEN	25	72
<i>Lagenicella punctulata</i>	(Gabb & Horn, 1862)	NGC;CGC;SGC	BEN	1	90
<i>Lagenicella spinulosa</i>	(Hincks, 1884)	NGC;CGC;SGC	BEN	2	8
<i>Mamilloporora cupula</i>	Smitt, 1873	NGC;CGC;SGC	BEN	18	109
<i>Membranipora savarti</i>	(Audouin, 1826)	NGC;CGC;SGC	BEN	13	76
<i>Membranipora tenuis</i>	Desor, 1848	NGC;CGC;SGC;BR	BEN	0	6
<i>Membranipora tuberculata</i>	(Bosc, 1802)	NGC;CGC;SGC	BEN	0	9
<i>Membraniporella aragoi pacifica</i>	Osburn, 1950	NGC;CGC;SGC	BEN	4	180
<i>Micropora coriacea inarmata</i>	Soule, 1959	NGC;CGC;SGC	BEN	2	81
<i>Microporella ciliata</i>	(Pallas, 1766)	NGC;CGC;SGC	BEN	0	72
<i>Microporella cribosa</i>	Osburn, 1952	NGC	BEN	36	72
<i>Microporella gibbosula</i>	Canu & Bassler, 1930	NGC;CGC;SGC	BEN	4	140
<i>Mollia patellaria</i>	(Moll, 1803)	NGC;BR	BEN	0	40
<i>Odontoporella adpressa</i>	(Busk, 1854)	NGC;CGC;SGC	BEN	1	72
<i>Parasmittina californica</i>	(Robertson, 1908)	NGC;CGC;SGC	BEN	23	270
<i>Parasmittina crosslandi</i>	(Hastings, 1930)	NGC;CGC;SGC	BEN	1	180
<i>Parasmittina fraseri</i>	Osburn, 1952	NGC;CGC;SGC	BEN	5	108
<i>Parasmittina triangularis</i>	Soule & Soule, 1973	NGC;CGC;SGC	BEN	1	80
<i>Parasmittina trispinosa</i>	(Johnston, 1825)	NGC;CGC;SGC	BEN	18	81
<i>Phidolopora labiata</i>	(Gabb & Horn, 1862)	NGC;CGC;SGC	BEN	25	90
<i>Porella porifera</i>	(Hincks, 1884)	NGC;CGC	BEN	1	180
<i>Porella rogickae</i>	Soule, 1961	NGC;CGC;SGC	BEN	12	72
<i>Reginella mucronata</i>	(Canu & Bassler, 1923)	NGC;CGC	BEN	2	217
<i>Reptadenella hymanae</i>	Soule, 1961	NGC;CGC;SGC	BEN	0	45
<i>Reptadenella violacea</i>	(Johnston, 1847)	NGC;CGC;SGC	BEN	2	225
<i>Reteporellina bilabiata</i>	Osburn, 1952	NGC;CGC;SGC;SWB	BEN	25	83
<i>Retevirgula lata</i>	Osburn, 1950	NGC;CGC	BEN	9	54
<i>Retevirgula tubulata</i>	(Hastings, 1930)	NGC;CGC;SGC	BEN	0	144
<i>Rhynchozoon grandicella</i>	Canu & Bassler, 1923	NGC;CGC	BEN	18	83
<i>Rhynchozoon rostratum</i>	(Busk, 1855)	NGC;CGC;SGC	BEN	1	72
<i>Schizomavella auriculata</i>	(Hassall, 1842)	NGC;CGC	BEN	4	72
<i>Schizoporella cornuta</i>	(Gabb & Horn, 1862)	NGC;CGC;SGC	BEN	4	180
<i>Schizoporella inarmata</i>	(Hincks, 1884)	NGC;CGC;SGC;BR	BEN	0	102

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Schizoporella trichotoma</i>	Waters, 1918	NGC;CGC	BEN	9	180
<i>Scrupocellaria bertholetti</i>	(Audouin, 1826)	NGC;CGC;SGC	BEN	0	180
<i>Scrupocellaria bertholetti tenuirostris</i>	Osburn, 1950	NGC;CGC;SGC	BEN	1	6
<i>Scrupocellaria mexicana</i>	Osburn, 1950	NGC;CGC;SGC;SWB	BEN	23	81
<i>Scrupocellaria varians</i>	Hincks, 1882	NGC;CGC	BEN	72	248
<i>Sessibugula translucens</i>	Osburn, 1950	NGC	BEN	9	108
<i>Smittina landsborovi</i>	(Johnston, 1847)	NGC;CGC	BEN	23	90
<i>Smittina maccullochae</i>	Osburn, 1952	NGC;CGC	BEN	4	90
<i>Smittoidea prolifica</i>	Osburn, 1952	NGC;CGC	BEN	28	81
<i>Stephanosella vitrea</i>	Osburn, 1952	NGC;CGC	BEN	9	97
<i>Stylopoma informata</i>	(Lonsdale, 1845)	NGC;CGC;SGC	BEN	0	72
<i>Stylopoma spongites</i>	(Pallas, 1766)	NGC;CGC;SGC	?	?	?
<i>Synnotum aegyptiacum</i>	(Audouin, 1826)	NGC;CGC;BR	BEN	0	81
<i>Thalamoporella californica</i>	(Levinsen, 1909)	NGC;CGC;BR	BEN	0	44
<i>Thalamoporella gothica</i>	(Busk, 1856)	NGC;CGC;SGC	BEN	0	10
<i>Trematoecia hexagonalis</i>	(Canu & Basslet, 1930)	NGC;CGC;SGC	BEN	2	135
<i>Tremogasterina granulata magnipora</i>	Soule, 1969	NGC;CGC;SGC	BEN	9	83
<i>Trypostega venusta</i>	(Norman, 1864)	NGC;CGC;SGC	BEN	4	180
<i>Uscia mexicana</i>	Banta, 1969	NGC	?	?	?
<i>Watersipora cucullata</i>	(Busk, 1854)	NGC;CGC;SGC	BEN	4	72
CTENOSTOMATA					
<i>Amathia distans</i>	Busk, 1886	NGC;CGC	BEN	22	72
<i>Buskia socialis</i>	(Hincks, 1877)	NGC;CGC;SWB	BEN	23	57
<i>Penetrantia densa</i>	Silén, 1946	NGC;CGC;SGC	BEN	0	33
<i>Walkeria tuberosa</i>	Heller, 1867	NGC;CGC	BEN	25	32
STENOLAEEMATA					
CYCLOSTOMATA					
<i>Aidanosagitta neglecta</i>	(Aida, 1897)	NGC;CGC;SGC;SWB	OCE;PEL;NER	0	200
<i>Crisia operculata</i>	Robertson, 1910	NGC;CGC;SGC	BEN	0	81
<i>Crisia serrulata</i>	Osburn, 1953	NGC	BEN	37	117
<i>Crisulipora occidentalis</i>	Robertson, 1910	NGC	BEN	0	54
<i>Disporella californica</i>	(d'Orbigny, 1853)	NGC;CGC;SGC;SWB	BEN	0	138
<i>Escharina vulgaris</i>	(Moll, 1803)	NGC;CGC	BEN	2	81
<i>Fasciculipora pacifica</i>	Osburn, 1953	NGC;CGC;SGC;BR	BEN	0	42

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Ferosagitta robusta</i>	(Doncaster, 1903)	NGC;CGC;SGC;SWB	OCE;PEL;NER	0	200
<i>Filicrisia franciscana</i>	(Robertson, 1910)	NGC;CGC	BEN	2	90
<i>Flaccisagitta enflata</i>	(Grassi, 1881)	NGC;CGC;SGC;SWB	OCE;NER;PEL	0	320
<i>Lichenopora buskiana</i>	Canu & Bassler, 1928	NGC;CGC;BR	BEN	0	14
<i>Lichenopora novae-zelandiae</i>	(Busk, 1875)	NGC;CGC;SGC	BEN	0	81
<i>Mesosagitta decipiens</i>	(Fowler, 1905)	NGC;CGC;SGC;SWB	OCE;PEL;NER	20	2,650
<i>Mesosagitta minima</i>	(Grassi, 1881)	NGC;CGC;SGC;SWB	OCE;PEL;NER	0	590
<i>Parasagitta eumeritica</i>	(Alvarado, 1961)	NGC;CGC;SGC;BR;SWB	OCE;PEL;NER	0	350
<i>Plagioecia sarniensis</i>	(Norman, 1864)	NGC	BEN	0	34
<i>Serratosagitta pacifica</i>	(Tokioaka, 1940)	NGC;CGC;SGC;SWB	OCE;PEL;NER	0	350
<i>Stomatopora granulata</i>	(Milne Edwards, 1838)	NGC;CGC;SGC	BEN	2	72
<i>Tubulipora flexuosa</i>	(Pourtales, 1867)	NGC;CGC	BEN	36	95
<i>Tubulipora pacifica</i>	Robertson, 1910	NGC;CGC	BEN	0	57
<i>Tubulipora tuba</i>	(Gabb & Horn, 1862)	NGC;BR	BEN	18	210
PHYLUM ECHINODERMATA (ECHINODERMS)					
ASTEROIDEA (SEASTARS)					
<i>Amphiasaster insignis</i>	Verrill, 1868	NGC;CGC;SGC;SWB	BEN;LIT	0	128
<i>Asterina miniata</i>	(Brandt, 1835)	NGC;CGC;SGC;SWB	BEN;LIT	0	302
<i>Asteropsis carinifera</i>	(Lamarck, 1816)	NGC;CGC	BEN;LIT	0	36
<i>Astrometis sertulifera</i>	(Xantus, 1860)	NGC;CGC;SGC;BR	BEN;LIT	0	156
<i>Astropecten armatus</i>	Gray, 1840	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	302
<i>Astropecten ornatissimus</i>	Fisher, 1906	NGC;CGC;SGC	BEN	9	366
<i>Astropecten verrilli</i>	de Loriol, 1899	NGC;CGC;SGC	BEN	2	488
<i>Echinaster parvispinus</i>	A.H. Clark, 1916	NGC;SWB	BEN	18	29
<i>Echinaster tenuispinus</i>	Verrill, 1871	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	73
<i>Heliaster kubiniji</i>	Xantus, 1860	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	10
<i>Henricia aspera</i>	Fisher, 1906	NGC	BEN	18	572
<i>Henricia clarki</i>	Fisher, 1910	NGC;CGC;SGC	BEN	27	1,503
<i>Leptychaster stellatus</i>	Ziesenhenné, 1942	NGC;CGC	BEN	40	86
<i>Linckia columbiae</i>	Gray, 1840	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	156
<i>Linckia guildingii</i>	Gray, 1840	NGC;CGC;SGC;SWB	BEN;LIT	0	20
<i>Luidia armata</i>	Ludwig, 1905	NGC;SWB	BEN	15	284
<i>Luidia bellona</i>	Lutken, 1864	NGC;CGC;SGC;SWB	BEN	4	201

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Luidia columbia</i>	(Gray, 1840)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	220
<i>Luidia foliolata</i>	Grube, 1865	NGC;CGC;SGC	BEN;LIT	0	476
<i>Luidia phragma</i>	H.L. Clark, 1910	NGC;CGC;BR;SWB	BEN;LIT	0	137
<i>Mithrodia bradleyi</i>	Verrill, 1867	NGC;CGC;SGC	BEN;LIT	0	50
<i>Narcissia gracilis gracilis</i>	A.H. Clark, 1916	NGC;CGC;SGC	BEN;LIT	0	128
<i>Nidorellia armata</i>	(Gray, 1840)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	73
<i>Odontaster crassus</i>	Fisher, 1905	NGC	BEN	27	595
<i>Pentacaster cumingi</i>	(Gray, 1840)	NGC;CGC;SGC;SWB	BEN;LIT	0	183
<i>Pharia pyramidata</i>	(Gray, 1840)	NGC;CGC;SGC;SWB	BEN;LIT	0	139
<i>Phataria unifascialis</i>	(Gray, 1840)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	50
<i>Pseudarchaster pusillus</i>	Fisher, 1905	NGC	BEN	99	1,326
<i>Sclerasterias heteropaes</i>	Fisher, 1924	NGC;CGC	BEN	18	457
<i>Tetrayaster canaliculatus</i>	(A.H. Clark, 1916)	NGC;CGC;SGC;BR	BEN	6	178
OPHUROIDEA (BRITTLESTARS)					
<i>Amphichondrius laevis</i>	Ziesenhenné, 1940	NGC;CGC;SGC	BEN	4	280
<i>Amphiodia occidentalis</i>	(Lyman, 1860)	NGC;CGC	BEN;LIT	0	367
<i>Amphiodia psara</i>	H.L. Clark, 1935	NGC	BEN	12	161
<i>Amphioplus strongyloplax</i>	(H.L. Clark, 1911)	NGC	BEN	4	1,408
<i>Amphipholis geminata</i>	(Le Conte, 1851)	NGC;CGC;BR	BEN;LIT	0	82
<i>Amphipholis perplexa</i>	(Nielsen, 1932)	NGC;CGC;SGC;SWB	BEN	0	143
<i>Amphipholis platydisca</i>	Nielsen, 1932	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	137
<i>Amphipholis puntarenae</i>	(Lutken, 1856)	NGC	BEN	0	508
<i>Amphipholis squamata</i>	(Delle Chiaje, 1828)	NGC;CGC;SWB	BEN	0	823
<i>Amphiura arcystata</i>	H.L. Clark, 1911	NGC;CGC;SGC	BEN	6	849
<i>Amphiura diomedae</i>	Lutken & Mortensen, 1899	NGC;CGC;SGC	BEN	44	3,017
<i>Asterocaneum spinosum</i>	(Lyman, 1875)	NGC;CGC;SGC;BR	BEN	4	183
<i>Diopederma danianum</i>	(Verrill, 1867)	NGC;CGC;SGC	BEN	7	137
<i>Dougoloplus amphacanthus</i>	(McClendon, 1909)	NGC;CGC	BEN	9	1,646
<i>Hemipholis gracilis</i>	Verrill, 1867	NGC;BR	BEN	?	?
<i>Ophiacantha phragma</i>	Ziesenhenné, 1940	NGC;CGC;SGC	BEN	13	644
<i>Ophiacantha quadrispina</i>	H.L. Clark, 1917	NGC;CGC;SGC	BEN	183	549
<i>Ophiactis savignyi</i>	(Muller & Troschel, 1842)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	128
<i>Ophiactis simplex</i>	(Le Conte, 1851)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	302
<i>Ophiocnida californica</i>	Ziesenhenné, 1940	NGC;CGC;SGC	BEN	6	302

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Ophiocnida hispidia</i>	(Le Conte, 1851)	NGC;CGC;SGC	BEN	0	794
<i>Ophiocoma aethiops</i>	Lutken, 1859	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	30
<i>Ophiocoma alexandri</i>	Lyman, 1860	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	70
<i>Ophioderma panamense</i>	Lutken, 1859	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	20
<i>Ophioderma teres</i>	(Lyman, 1860)	NGC;CGC;SGC;BR	BEN;LIT	0	54
<i>Ophioderma variegatum</i>	Lutken, 1856	NGC;CGC;SGC;SWB	BEN;LIT	0	110
<i>Ophiolepis crassa</i>	Nielsen, 1932	NGC;CGC;SGC;SWB	BEN	6	230
<i>Ophiolepis variegata</i>	Lutken, 1856	NGC;CGC;SGC;BR	BEN;LIT	0	110
<i>Ophionereis annulata</i>	(Le Conte, 1851)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	229
<i>Ophionereis eurybrachioplax</i>	H.L. Clark, 1911	NGC	BEN	0	457
<i>Ophionereis perplexa</i>	Ziesenhenné, 1940	NGC;CGC;BR	BEN;LIT	0	73
<i>Ophiopaepale diplax</i>	(Nielsen, 1932)	NGC;CGC;SGC;SWB	BEN;LIT	0	230
<i>Ophiopholis bakeri</i>	McClelland, 1909	NGC;CGC	BEN	9	1,006
<i>Ophiopholis longispina</i>	H.L. Clark, 1911	NGC	BEN	51	1,746
<i>Ophiophragnus marginatus</i>	(Lutken, 1859)	NGC;CGC;SGC;BR	BEN;LIT	0	134
<i>Ophiophragnus tabogensis</i>	Nielsen, 1932	NGC;CGC;SGC	BEN;LIT	0	128
<i>Ophiophthalmus normani</i>	(Lyman, 1879)	NGC;CGC;SGC	BEN	51	2,600
<i>Ophioplinthaca granifera</i>	(Lutken & Mortensen, 1899)	NGC;CGC;SGC	BEN	267	2,086
<i>Ophiopsila californica</i>	A.H. Clark, 1921	NGC;CGC;SGC	BEN	33	201
<i>Ophiostigma tenue</i>	Lutken, 1856	NGC;CGC;SGC;SWB	BEN	4	101
<i>Ophiothrix galapagensis</i>	Lutken & Mortensen, 1899	NGC;CGC;SGC	BEN;LIT	0	549
<i>Ophiothrix spiculata</i>	Le Conte, 1851	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	2,059
<i>Ophiura luetkeni</i>	(Lyman, 1860)	NGC;CGC;SGC	BEN	0	1,097
<i>Ophiuroconis bispinosa</i>	Ziesenhenné, 1937	NGC;CGC;SGC	BEN	4	143
ECHINOIDEA (SEA URCHINS, SAND DOLLARS, SEA BISQUITS)					
<i>Agassizia scrobiculata</i>	Valenciennes, 1846	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	220
<i>Allocentrotus fragilis</i>	(Jackson, 1912)	NGC;CGC;SGC	BEN	50	1,200
<i>Aporocidaris milleri</i>	(A. Agassiz, 1898)	NGC;CGC;SGC;SWB	BEN	300	3,937
<i>Arbacia incisa</i>	(A. Agassiz, 1863)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	52
<i>Astropyga pulvinata</i>	(Lamarck, 1816)	NGC;CGC;SGC;SWB	BEN;LIT	0	90
<i>Brisaster latifrons</i>	(A. Agassiz, 1898)	NGC;CGC;SGC;BR	BEN	9	2,817
<i>Brissopsis columbaris</i>	A. Agassiz, 1898	NGC;CGC;SGC	BEN	899	1,271
<i>Brissopsis pacifica</i>	(A. Agassiz, 1898)	NGC;CGC;SGC;SWB	BEN	9	2,379
<i>Brissus obesus</i>	Verrill, 1867	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	240

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Centrostephanus coronatus</i>	(Verrill, 1867)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	125
<i>Clypeaster europacificus</i>	H.L. Clark, 1914	NGC;CGC;SGC	BEN;LIT	0	402
<i>Clypeaster oebus</i>	H.L. Clark, 1914	NGC;CGC;SGC;BR	BEN;LIT	0	162
<i>Clypeaster rotundus</i>	(A. Agassiz, 1863)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	91
<i>Clypeaster speciosus</i>	Verrill, 1870	NGC;CGC;BR;SWB	BEN;LIT	0	128
<i>Diadema mexicanum</i>	A. Agassiz, 1863	NGC;CGC;SGC;BR	BEN;LIT	0	113
<i>Echinometra oblonga</i>	(Blainville, 1825)	NGC;CGC;SGC	BEN;LIT	0	34
<i>Echinometra vanbrunti</i>	A. Agassiz, 1863	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	106
<i>Encope grandis</i>	L. Agassiz, 1841	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	120
<i>Encope micropora</i>	L. Agassiz, 1841	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	82
<i>Encope perspectiva</i>	L. Agassiz, 1841	NGC;CGC;SGC	BEN	15	27
<i>Euclidaris thouarsii</i>	(Valenciennes, 1846)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	150
<i>Hesperocidaris asteriscus</i>	H.L. Clark, 1948	NGC;CGC;SGC	BEN	2	183
<i>Hesperocidaris perplexa</i>	(H.L. Clark, 1907)	NGC;CGC;SGC	BEN	13	1,500
<i>Lovenia cordiformis</i>	A. Agassiz, 1872	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	201
<i>Lytechinus pictus</i>	(Verrill, 1867)	NGC;CGC;SGC	BEN;LIT	0	300
<i>Mellita grantii</i>	Mortensen, 1948	NGC;CGC;SGC;BR	LIT;LACS	0	6
<i>Mellita longifissa</i>	Michelin, 1858	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	60
<i>Meoma grandis</i>	Gray, 1851	NGC;CGC;SGC;SWB	BEN;LIT	0	200
<i>Metalia nobilis</i>	Verrill, 1867	NGC;CGC;SGC;BR	BEN;LIT	0	18
<i>Moira atropos cloiho</i>	(Michelin, 1855)	NGC;CGC;SGC;BR	BEN;LIT	0	160
<i>Nacospatangus depressus</i>	H.L. Clark, 1917	NGC;CGC	BEN	5	302
<i>Plagiobrissus pacificus</i>	H.L. Clark, 1940	NGC;CGC;SGC	BEN	6	137
<i>Spatangus californicus</i>	H.L. Clark, 1917	NGC;CGC;SGC	BEN	10	644
<i>Strongylocentrotus purpuratus</i>	(Stimpson, 1857)	NGC;CGC	BEN;LIT	0	161
<i>Tripanistes depressus</i>	A. Agassiz, 1863	NGC;CGC;SGC	BEN;LIT	0	73
HOLOTHUROIDEA (SEA CUCUMBERS)					
<i>Apentamera lepra</i>	Deichmann, 1941	NGC;CGC	BEN	55	91
<i>Athyone glasselli</i>	(Deichmann, 1936)	NGC;CGC;BR	BEN;LIT	0	6
<i>Chiridota aponeocrita</i>	H.L. Clark, 1920	NGC;CGC;SGC;BR	LIT	0	?
<i>Cucumaria chilensis</i>	Ludwig, 1875	NGC	BEN	32	163
<i>Epitomapta tabogae</i>	Heding, 1928	NGC;CGC;SGC;BR	LIT	0	?
<i>Enapta godeffroyi</i>	(Semper, 1868)	NGC;CGC;SGC;BR	BEN;LIT	0	31
<i>Holothuria arenicola</i>	Semper, 1868	NGC;CGC;SGC;BR	BEN;LIT	0	9

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

<i>Holothuria difficilis</i>	Semper, 1868	NGC;CGC;SGC	BEN;LIT	0	70
<i>Holothuria gyrifer</i>	(Selenka, 1867)	NGC;CGC;SGC;SWB	BEN;LIT	0	7
<i>Holothuria impatiens</i>	(Forskaal, 1775)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	11
<i>Holothuria inbabilis</i>	Selenka, 1867	NGC;CGC;SGC	BEN;LIT	1	203
<i>Holothuria lubrica</i>	Selenka, 1867	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	55
<i>Holothuria paraprinceps</i>	Deichmann, 1937	NGC;CGC;SGC;BR	BEN;LIT	0	90
<i>Holothuria rigida</i>	(Selenka, 1867)	NGC;CGC;SGC;BR;SWB	BEN;LIT	0	18
<i>Holothuria theeli</i>	(Deichmann, 1938)	NGC;CGC	BEN;LIT	0	55
<i>Holothuria zacaе</i>	Deichmann, 1937	NGC;CGC;SGC	BEN;LIT	0	220
<i>Isostichopus fuscus</i>	(Ludwig, 1875)	NGC;CGC;SGC;BR	BEN;LIT	0	39
<i>Lissothuria bancoclei</i>	(Deichmann, 1941)	NGC;CGC	BEN	5	302
<i>Lissothuria ornata</i>	Verrill, 1867	NGC;CGC;SGC	BEN	0	36
<i>Neothyone gibbosa</i>	Deichmann, 1941	NGC;CGC;SGC;BR	BEN;LIT	0	6
<i>Neothyone panamensis</i>	(Ludwig, 1887)	NGC	BEN;LIT	0	3
<i>Parastichopus californicus</i>	(Stimpson, 1857)	NGC	BEN;LIT	0	180
<i>Parastichopus parvumensis</i>	(H.L. Clark, 1913)	NGC	BEN	36	?
<i>Pentamera chierchia</i>	(Ludwig, 1887)	NGC;CGC;BR	BEN;LIT	0	78
<i>Pseudocnus californicus</i>	(Semper, 1868)	NGC;CGC;SGC;SWB	BEN;LIT	0	190
<i>Psolus diomedeaе</i>	Ludwig, 1894	NGC;CGC	BEN	13	302
<i>Thyone parafusus</i>	Deichmann, 1941	NGC;CGC	BEN;LIT	0	70
<i>Thyonella mexicana</i>	(Deichmann, 1941)	NGC;CGC;SGC;BR	BEN	18	65
PHYLUM CHAETOGNATHA (ARROW WORMS)					
<i>Aidanosagitta neglecta</i>	(Aida, 1897)	NG;CG;SG;SWB	OCE;PEL;NER	0	200
<i>Ferosagitta robusta</i>	(Doncaster, 1903)	NG;CG;SG;SWB	OCE;PEL;NER	0	200
<i>Flaccisagitta enflata</i>	(Grassi, 1881)	NG;CG;SG;SWB	OCE;NER; PEL	0	320
<i>Mesosagitta decipiens</i>	(Fowler, 1905)	NG;CG;SG;SWB	OCE;PEL;NER	20	2650
<i>Mesosagitta minima</i>	(Grassi, 1881)	NG;CG;SG;SWB	OCE;PEL;NER	0	590
<i>Parasagitta euneritica</i>	(Alvarino, 1961)	NG;CG;SG;BR;SWB	OCE;PEL;NER	0	350
<i>Serratosagitta pacifica</i>	(Tokioka, 1940)	NG;CG;SG;SWB	OCE;PEL;NER	0	350
PHYLUM HEMICHORDATA					
ENTEROPNEUSTA (ACORN WORMS)					
<i>Saccoglossus</i> sp.		NGC	BEN;LIT	0	0

TABLE 29.3 (CONT'D.). Annotated list of macroinvertebrates known from the northern Gulf of California.

PHYLUM CHORDATA (CHORDATES)						
UROCHORDATA (TUNICATES)						
ASCIDIACEA (SEA SQUIRTS)						
<i>Archidistoma pacheae</i>	(Van Name, 1945)	NGC;CGC	?	?	?	?
<i>Ascidia ceratodes</i>	(Huntsman, 1912)	NGC	BEN;NER	18	54	54
<i>Ascidia sydneyensis protecta</i>	Van Name, 1945	NGC;CGC	BEN;COM	?	46	46
<i>Cystodytes dellechiaiei</i>	(Della Valle, 1877)	NGC;CGC	BEN;LIT;NER	0	720	720
<i>Didemnum carnulentum</i>	Ritter & Forsyth, 1917	NGC;CGC;SGC	BEN;LIT;NER	1	27	27
<i>Endistoma mexicanum</i>	Van Name, 1945	NGC	?	32	?	?
<i>Polyclinum laxum</i>	Van Name, 1945	NGC;CGC;BR	BEN;COM	?	?	?
<i>Polyclinum vasculosum</i>	Pizon, 1908	NGC;BR	BEN	?	?	?
CEPHALOCHORDATA (LANCELETS)						
<i>Branchiostoma californiense</i>		NGC;CGC, SGC	BEN	0	2	2

Notes: Species/subspecies names are followed by author and date of description (in parentheses if the species has been subsequently transferred to a genus different from the original assignment), distribution in gulf, general habitat, shallowest known occurrence, and deepest known occurrence (in meters). Higher taxa are in uppercase; species are listed alphabetically in their higher taxa.

The northern gulf extends from the Colorado River delta southward to (and includes) the Midriff Islands (the largest being *Islas Tiburón* and *Angel de la Guarda*). The central gulf ranges from the southern edge of the Midriff Islands to Guaymas (Sonora) and to Punta Coyote (Baja California Sur). The southern gulf extends southward to Cabo Corrientes, Jalisco, on the mainland, and to Cabo San Lucas on the Baja California peninsula.

Codes: NGC, Northern Gulf of California; CGC, Central Gulf of California; SGC, Southern Gulf of California; BR, Alto Golfo Biosphere Reserve, SWB, Southwest Baja California (Cabo San Lucas to the northern limit of Bahía Magdalena); BEN, benthic; LIT, fundamentally a littoral species (intertidal and in some cases extending into the subtidal); NER, neritic; OCE, oceanic; NEUS, neustonic; COM, commensal with another animal; PAR, parasitic; EPIF, epiphytic (living on algae or halophytic angiosperms); LACS, living in coastal lagoons and esteros; CST, coastal.

Dry Borders

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Richard Stephen Felger and Bill Broyles, editors



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