# *Pontogammarus maeoticus* (an amphipod, no common name)

## Ecological Risk Screening Summary

**U.S. Fish and Wildlife Service, October 2018**
**Revised, May 2019**
**Web Version, 3/7/2022**

Organism Type: Crustacean
Overall Risk Assessment Category: Uncertain

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# 1 Native Range and Status in the United States

## Native Range

From Kocataş et al. (2003):

"*Pontogammarus maeoticus* (Sowinsky, 1894) has a Ponto-Caspian distribution. The distribution area covers the Caspian, Azov, and Black Seas including the Dniester, Don, Bug, and Danube rivers (Barnard & Barnard, 1983; Stock et al., 1998)."

From Soldatova (1986):

"*Pontogammarus maeoticus* is distributed in the Caspian, Azov, and Black Seas and in associated brackish water lagoons and freshwater bodies of the Ukraine (Mordukhai-Boltovskoi, 1960; Ioffe, 1974) […]."

## Status in the United States

This species has not been reported as introduced or established in the United States. There is no indication that this species is in trade in the United States.

## Means of Introductions in the United States

This species has not been reported as introduced or established in the United States.

## Remarks

From Kocataş et al. (2003):

"The taxonomic status of *P. maeoticus* is relatively complicated. In previous studies (Carauşu, 1943; Carauşu et al., 1955), the generic name of the species was given as *Pontogammarus*. Later, Barnard & Barnard (1983) stated that the species is distinct from the genus *Pontogammarus*, because of the long endopod of its third uropod, and they placed it in the genus *Euxinia*. In the latest relevant study, Stock et al. (1998) accepted the name *Pontogammarus maeoticus* as valid. However, in our opinion the species shows large differences with respect to *Pontogammarus*, by the relatively long endopod of its third uropod and the characteristic mandibular palp, whence a taxonomic revision is urgently required."

The valid name, *Pontogammarus maeoticus*, and the synonym, *Euxinia maeoticus*, were used in searching for information for this report.

# 2 Biology and Ecology

## Taxonomic Hierarchy and Taxonomic Standing

From Horton et al. (2018):

"Animalia (Kingdom) > Arthropoda (Phylum) > Crustacea (Subphylum) > Multicrustacea (Superclass) > Malacostraca (Class) > Eumalacostraca (Subclass) > Peracarida (Superorder) > Amphipoda (Order) > Senticaudata (Suborder) > Gammarida (Infraorder) > Gammaridira (Parvorder) > Gammaroidea (Superfamily) > Pontogammaridae (Family) > *Pontogammarus* (Genus) > *Pontogammarus maeoticus* (Species)"

"Status accepted"

## Size, Weight, and Age Range

From Kocataş et al. (2003):

"When we compared the maximal body length of the present specimens with that given in Carauşu et al. (1955), we noticed that our specimens (15.8 mm max. in ♂) are slightly larger than those in Carauşu's (1955) samples (14 mm max. in ♂)."

"It was observed that the body length of the brackish water specimens is greater than that of freshwater specimens (Carauşu, 1943)."

From Kurina (2017):

"In the Kuybyshev and Saratov reservoirs, the onset of maturity in *P. maeoticus* females in summer is observed at a body length of 6.5 mm, and in males, 7.5–8.0 mm. The largest individuals were noted in early June—up to 11.4 mm in males and 11.0 mm in females."

## Environment

From Soldatova (1986):

"Experimentally established salinity preferences for *Pontogammarus maeoticus* in the Azov Sea agree with its distribution in this sea: 5-8-13.5‰S (Zakutsky et al., 1980). In the fresh water of Taganrog Bay (Azov Sea), *P. maeoticus* is scarce (Mordukhai-Boltovskoi, 1960). Salinity of 18‰ S is unfavourable both in the experiment and in nature (Cărăuşu, 1937; Mokievsky, 1949). Oligohalinity is most expressed in *P. maeoticus* from the Black Sea brackish lagoons, in the 0 to 9‰ S in the Dnestr brackish lagoon and also in the l to 5‰ S in the Dnepr-Bug brackish lagoon (Markovsky, 1953, 1954)."

"In the Caspian Sea, where this species originated, it is associated with the common salinity of 12‰ S (Zenkevich. 1963), attaining maximum numbers at 9 to 11‰ S (Israpov, 1981)."

From Pauli et al. (2018):

"[…] we conducted artificial selection experiments on Ponto-Caspian amphipod *Pontogammarus maeoticus* collected from 10 PSU to evaluate adaptation capacity of this species to different salinities […] Our results indicated that selection to lower salinity than that of the population's ambient salinity is possible within few generations due to a likely existence of standing polymorphic variation for selection to act on. In contrast, selection to higher salinity was unsuccessful because the phenotypic variation was mainly caused by environmental variance and therefore might depend on new mutations."

From Mirzajani et al. (2011):

"[…] *Pontogammarus maeoticus* […] live in brackish water with salinity of 7.1 ± 4.1 ppt, fine sandy shores, well oxygenated water, and weakly alkaline pH […]. According to Kasymov [1994], *P. maeoticus* migrates to a depth of two to three metres when temperatures fall below a certain limit. Ovigerous females begin to appear at 8.2°C in March and begin to move to

shallower water (one to two metres) when the temperatures reachd [sic] 17.8°C in October in the southern region of the Caspian Sea [Kasymov 1994]. In this study small *P. maeoticus* was observed from November to February when the temperature was below 12°C."

From Kurina (2017):

"*Pontogammarus maeoticus* in the Saratov Reservoir has assimilated both coastal and deep-water sandy biotopes, in contrast to its habitat in the Northern Caspian, where in summer the maxillopods are distributed on the littoral with clean quartz or shell sands (Guseinov, 2004)."

## Climate

From Reid and Orlova (2002):

"The Black Sea (~41–46°N) is located in southeast Europe in a semi-arid climate zone."

"The climate around the [Sea of Azov] basin is continental temperate […]"

"The Caspian Sea spans ~36–47°N and has arid to semiarid continental and Mediterranean climatic zones."

## Distribution Outside the United States

### Native

From Kocataş et al. (2003):

"*Pontogammarus maeoticus* (Sowinsky, 1894) has a Ponto-Caspian distribution. The distribution area covers the Caspian, Azov, and Black Seas including the Dniester, Don, Bug, and Danube rivers (Barnard & Barnard, 1983; Stock et al., 1998)."

From Soldatova (1986):

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### Introduced

Ketelaars (2004) reports nonnative occurrences of *P. maeoticus* in reservoirs, rivers, and canals of the Ponto-Caspian basin.

Grigorovich et al. (2002) report *P. maeoticus* with "definite" status from Kakhovka reservoir in Ukraine, with a more general description of the nonnative occurrences as "Reservoirs of Dnieper River basin; Crimea [Ukraine]."

Pligin et al. (2014) report *P. maeoticus* from the following Dnieper River basin reservoirs: Kanev, Kremenchug, Dneprodzerzhinsk, Dnieper (Zaporozhye), and Kakhovka.

Kurina (2017) reports *P. maeoticus* from the Kuybyshev and Saratov Reservoirs on the Volga River in Russia.

From Özbek (2011):

"KOCATAS et al. (2003) reported a pontogammarid amphipod *Pontogammarus maeoticus* (Sowinsky, 1894) as a new species for the Turkish fauna."

Özbek (2011) report the distribution of *P. maeoticus* in Turkey as the Black Sea. Because *P. maeoticus* is native to the Black Sea, it is unclear whether recent observation of this species in Turkey represents introduction outside the native range or lack of previous detection within the native range.

## Means of Introduction Outside the United States

From Pligin et al. (2014):

"In 1956–1957, 21.7 million specimens of Gammaridae and Corophiidae, 12 million specimens of Mysidae and Cumacea, 0.8 million specimens of Polychaeta, and 1.45 million specimens of Mollusca were introduced into the Kakhovka Reservoir from the Dnieper estuary, its delta, and from the Ingulets River. Among them, *Pontogammarus robustoides* (G. O. Sars), *Pontogammarus maeoticus* (Sowinskyi), and *Paramysis intermedia* (Cherniavsky) were most abundant."

From Takhteev et al. (2015):

"During the 1950s–1980s, large-scale intentional introductions of crustaceans were a major vector of amphipod invasions in inland waters of European Russia and Siberia. Enrichment of fish production was the principal motivation for the introductions. The largescale mass transportations of amphipods (even unknown species), conducted in the former U.S.S.R. during the second part of the last century, were often not documented, which made it difficult to determine the invasion routes."

From Baltazar-Soares et al. (2017):

"At a much smaller geographic scale, but most likely also facilitated by human intervention, the native Ponto-Caspian species *Pontogammarus maeoticus* and *Obesogammarus crassus* are expected to spread toward central and eastern Europe as examples of gradual invasions through rivers and canals (Bij de Vaate, Jazdzewski, Ketelaars, Gollasch, & Van der Velde, 2002; Cristescu et al., 2003; Pligin, Matchinskaya, Zheleznyak, & Linchuk, 2014; Semenchenko & Vezhnovetz, 2008)."

## Short Description

From Kocataş et al. (2003):

"The shape of the eye is variable, in most specimens reniform or elongated reniform. Antenna 1 with robust peduncle segments, 10-segmented flagellum, and 4-segmented accessory flagellum.

Flagellar segments with long setae in ventral section […]. Antenna 2 with a forward-pointing gland cone. Peduncle segments 3 to 5 and flagellum with numerous setae along the ventral side. On the same segments, some spine-like armament [sic] was also observed in the lateral and dorsal sections […]. Mandibular palp rather characteristic, with numerous long, plumose setae on ventral margins of second and third segments […]. The number of A and B setae is variable; C-setae are absent. Gnathopod 1 and 2 of ordinary type […]. Pereiopod 3 […] with rectangular, ventrally setose coxal plate. Posterior margin of segments with numerous long setae. The setae along the posterior margin of merus and carpus are ungrouped as in pereiopod 4 […]. Basis of pereiopod 7 […] with strongly produced and overhanging posterodistal corner; posterior margin with numerous short setae; many groups of setae in row on inner surface. Uropod 3 […] rather characteristic, with long endopodite (almost as long as half the length of the exopodite); both margins of exopodite with long plumose setae; setae on the outer margin of the endopod are simple. Telson lobes almost entirely cleft […]; each lobe with 3 distal spines and one dorsal subterminal seta in addition to 2 dorsal subterminal setules."

## Biology

From Mirzajani et al. (2011):

"On the Iranian coast of the Caspian Sea *Pontogammarus maeoticus* is the most abundant and widely distributed [amphipod; Mirzajani 2003]."

From Khodadadnia et al. (2016):

"The reproduction period in *P. maeoticus* from [the] Caspian Sea starts in mid spring, reaching its peak in late August. Considering temperature changes during autumn and winter, their spawning in the Caspian Sea occurs during these seasons. However, [the] ovulation process may last longer (Mirzajani 2003, 2004). Thus, the population of females reaches its peak in August."

From Kurina (2017):

"Reproduction of *P. maeoticus* maxillopods continues from May–June to September and yields two to three generations per year. The maximum individual fecundity (31 eggs) was observed in summer samples. A minimum of eggs (6 eggs) in the marsupial bags was noted in autumn. The fecundity of *R. maeoticus* [sic] females in the reservoirs of the Middle and Lower Volga is 1.7 times lower than in the Caspian Sea, where the breeding of amphipods occurs year-round and yields four generations (Guseinov, 2004)."

## Human Uses

No information available.

## Diseases

No information available.

## Threat to Humans

No information available.

# 3 Impacts of Introductions

From Alexandrov et al. (2007):

"Competition"

# 4 History of Invasiveness

*Pontogammarus maeoticus* has been introduced outside of its native range where it has established populations. Only a single record citing 'competition' as an impact of introduction was found, with no supporting information. Due to this lack of information regarding impacts of introduction, the history of invasiveness is classified as Data Deficient.

# 5 Global Distribution

**Figure 1**. Known global distribution of *Pontogammarus maeoticus*. Observations are reported from Iran and Russia. Map from GBIF Secretariat (2019). This map only shows occurrences of *P. maeoticus* in the Caspian Sea. Georeferenced occurrences were not available from GBIF Secretariat (2019) for the rest of the Ponto-Caspian distribution of *P. maeoticus*. Because the climate matching analysis (Section 7) is not valid for marine waters, no marine occurrences were used in the climate matching analysis.


**Figure 2.** Map of Ukraine showing locations of five reservoirs along the course of the Dnieper River. *P. maeoticus* is present in all five reservoirs (Pligin et al. 2014). Map: Іванко1. Public Domain. Available: https://commons.wikimedia.org/w/index.php?curid=32232109.

Additional observations in Turkey were given by Kocataş et al. (2003). Cristescu et al. (2003) gave observations in Romanian, Moldova, Ukraine, and Azerbaijan. Additional locations in Russia were given by Kurina (2017).

# 6 Distribution Within the United States

This species has not been reported as introduced or established in the United States.

# 7 Climate Matching

## Summary of Climate Matching Analysis

The climate match for *Pontogammarus maeoticus* was mainly medium to high for the contiguous United States. Areas of high match were found in the Great Lakes and western Rocky Mountain regions. Medium match covered much of the Great Plains region as well as most of California, the Cascade Mountains, and areas surrounding the Great Lakes and Finger Lakes. The climate match was low along the Atlantic Coast, throughout the southeastern United States, the southern Colorado River basin, and in lowland areas of the Pacific Northwest. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States

was 0.377, high. (Scores of 0.103 and greater are classified as high.) Half the States had high individual Climate 6 scores. Maryland, Maine, New Hampshire, Virginia, and West Virginia had medium individual scores. Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Kansas, Kentucky, Louisiana, Massachusetts, Mississippi, New Jersey, North Carolina, Oklahoma, Rhode Island, South Carolina, Tennessee, and Texas had low individual scores.

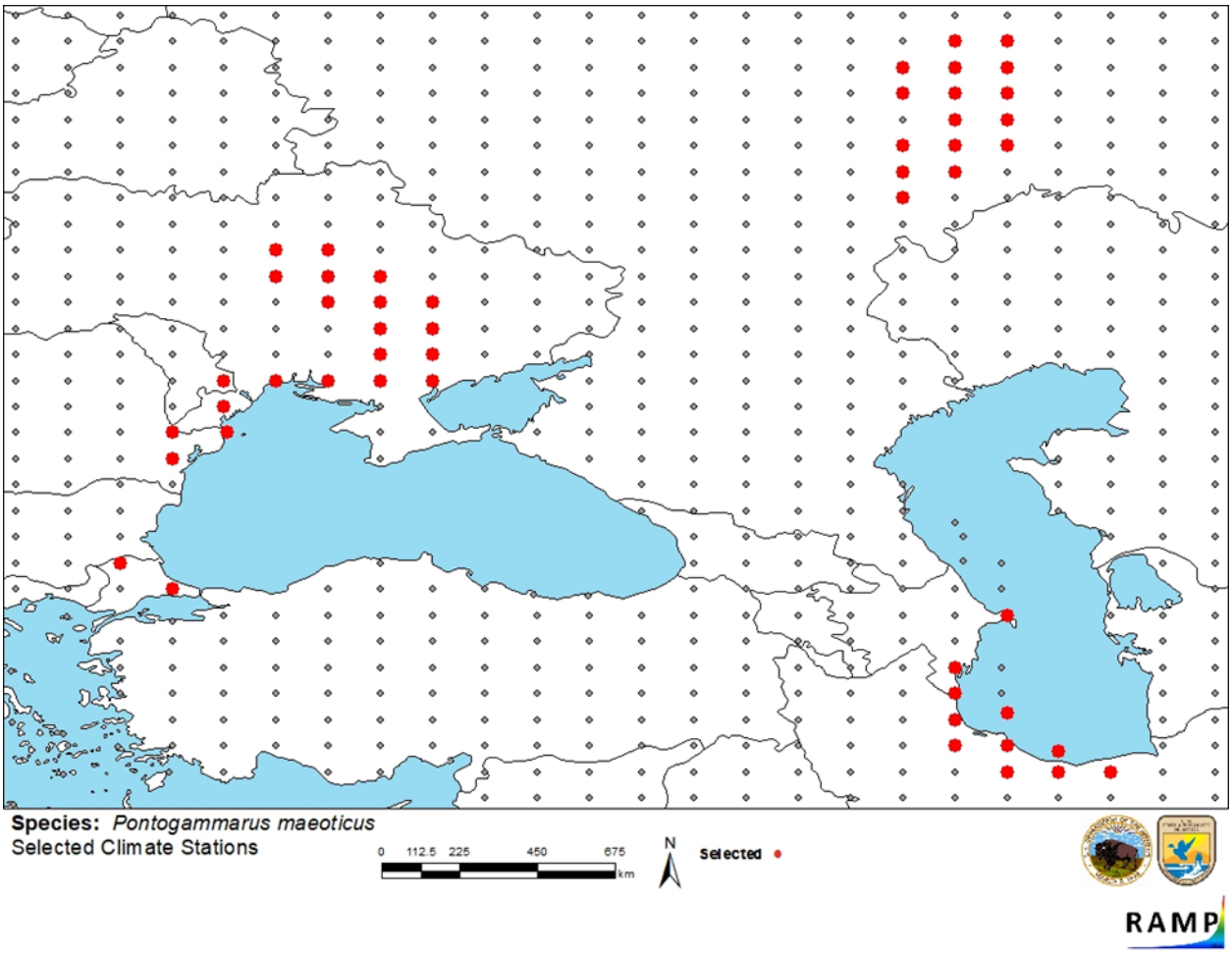


**Figure 3**. RAMP (Sanders et al. 2018) source map showing weather stations in Europe and Asia selected as source locations (red; Turkey, Romania, Moldova, Ukraine, Russia, Azerbaijan, Iran) and non-source locations (gray) for *Pontogammarus maeoticus* climate matching. Source locations from Kocataş et al. (2003), Cristescu et al. (2003), Pligin et al. (2014), Kurina (2017), and GBIF Secretariat (2019). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

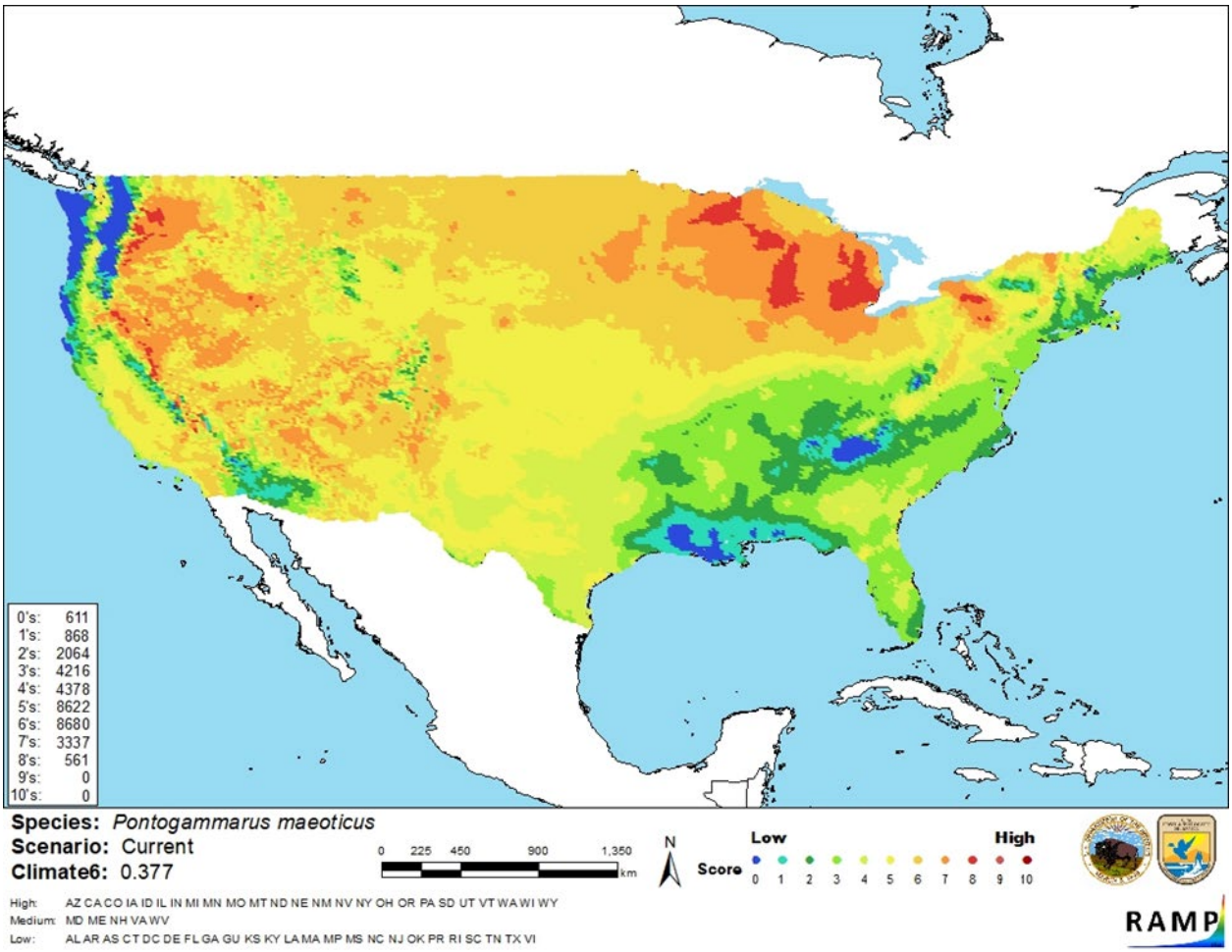


**Figure 4**. Map of RAMP (Sanders et al. 2018) climate matches for *Pontogammarus maeoticus* in the contiguous United States based on source locations reported by Kocataş et al. (2003), Cristescu et al. (2003), Pligin et al. (2014), Kurina (2017), and GBIF Secretariat (2019). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

| Climate 6:<br>(Count of target points with climate scores 6-10)/<br>(Count of all target points) | Overall<br>Climate Match<br>Category |
|---|---|
| 0.000≤X≤0.005 | Low |
| 0.005<X<0.103 | Medium |
| ≥0.103 | High |

# 8 Certainty of Assessment

There is adequate information available about the biology, ecology, and native distribution of *Pontogammarus maeoticus*. *P. maeoticus* has become established in locations outside its native range, but extremely limited information is available on impacts of introduction of this species. Certainty of this assessment is Low.

# 9 Risk Assessment

## Summary of Risk to the Contiguous United States

*Pontogammarus maeoticus* is an amphipod native to the Ponto-Caspian region. It is found in the Caspian, Black, and Azov Seas, tributaries of the Black Sea, and fresh and brackish waters of Ukraine. It has been reported as introduced in numerous reservoirs in Ukraine and Russia. Introduction of *P. maeoticus* into reservoirs was deliberate, but currently it is thought to be capable of spreading outside its native range in Europe by dispersal through rivers and canals. *P. maeoticus* has not been reported as introduced or established in the United States. Only a single statement of 'competition' was available regarding impacts of introduction. Therefore, the history of invasiveness is classified as Data Deficient. This species has a high overall climate match with the contiguous United States. Areas of high match occurred in the Great Lakes and Rocky Mountain regions. Because of a lack of information about the impacts of introductions of *P. maeoticus*, the certainty of this assessment is classified as Low. The overall risk assessment category is Uncertain.

## Assessment Elements

- **History of Invasiveness (Sec. 4): Data Deficient**
- **Overall Climate Match Category (Sec. 7): High**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks, Important additional information:** No additional remarks.
- **Overall Risk Assessment Category: Uncertain**

# 10 Literature Cited

**Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.**


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# 11 Literature Cited in Quoted Material

**Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.**

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