**NEW YORK**

**FISH & AQUATIC INVERTEBRATE INVASIVENESS RANKING FORM**

Scientific name: Gambusia affinis
Common names: Western Mosquitofish
Native distribution: Southern USA and northern Mexico. Populations of G. affinis naturally occur in or near Mobile Bay and occupy drainages westward into Texas and Mexico (ISSG 2013)
Date assessed: 1/31/2013, 2/1/2013, 6/17/2013
Assessors: E. White
Reviewers:
Date Approved: Form version date: 3 January 2013

**New York Invasiveness Rank:** Very High (Relative Maximum Score >80.00)

<table>
<thead>
<tr>
<th>Status of this species in each PRISM:</th>
<th>Current Distribution</th>
<th>PRISM Invasiveness Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Adirondack Park Invasive Program</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>2 Capital/Mohawk</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>3 Catskill Regional Invasive Species Partnership</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>4 Finger Lakes</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>5 Long Island Invasive Species Management Area</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>6 Lower Hudson</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>7 Saint Lawrence/Eastern Lake Ontario</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>8 Western New York</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
</tbody>
</table>

**Invasiveness Ranking Summary**
(see details under appropriate sub-section)

<table>
<thead>
<tr>
<th>Invasiveness ranking summary</th>
<th>Total (Total Answered*) Possible</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ecological impact</td>
<td>30 (30)</td>
<td>24</td>
</tr>
<tr>
<td>2 Biological characteristic and dispersal ability</td>
<td>30 (28)</td>
<td>22</td>
</tr>
<tr>
<td>3 Ecological amplitude and distribution</td>
<td>30 (24)</td>
<td>22</td>
</tr>
<tr>
<td>4 Difficulty of control</td>
<td>10 (10)</td>
<td>6</td>
</tr>
<tr>
<td>Outcome score</td>
<td>100 (92)</td>
<td></td>
</tr>
<tr>
<td>Relative maximum score †</td>
<td>80.43</td>
<td></td>
</tr>
<tr>
<td>New York Invasiveness Rank §</td>
<td>Very High (Relative Maximum Score &gt;80.00)</td>
<td></td>
</tr>
</tbody>
</table>

* For questions answered “unknown” do not include point value in “Total Answered Points Possible.” If “Total Answered Points Possible” is less than 70.00 points, then the overall invasive rank should be listed as “Unknown.” †Calculated as 100(a/b) to two decimal places. §Very High >80.00; High 70.00–80.00; Moderate 50.00–69.99; Low 40.00–49.99; Insignificant <40.00

**A. DISTRIBUTION (KNOWN/POTENTIAL): Summarized from individual PRISM forms**

- Yes – continue to A1.2
- No – continue to A2.1; Yes NA; Yes USA

A1.2. In which PRISMS is it known (see inset map)?
- Adirondack Park Invasive Program
- Capital/Mohawk
- Catskill Regional Invasive Species Partnership
- Finger Lakes
- Long Island Invasive Species Management Area
# New York

## Fish & Aquatic Invertebrate Invasiveness Ranking Form

<table>
<thead>
<tr>
<th>Area</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Hudson</td>
<td>✓</td>
</tr>
<tr>
<td>Saint Lawrence/Eastern Lake Ontario</td>
<td></td>
</tr>
<tr>
<td>Western New York</td>
<td></td>
</tr>
</tbody>
</table>

Documentation:
Sources of information:
(U.S. Geological Survey 2013)

A2.0. Is this species listed on the Federal Injurious Fish and Wildlife list?
- Yes – the species will automatically be listed as Prohibited, no further assessment required.
- No – continue to A2.1

A2.1. What is the likelihood that this species will occur and persist given the climate in the following PRISMs? (obtain from PRISM invasiveness ranking form and/or Climatch score)
- Not Assessed Adirondack Park Invasive Program
- Not Assessed Capital/Mohawk
- Not Assessed Catskill Regional Invasive Species Partnership
- Not Assessed Finger Lakes
- Not Assessed Long Island Invasive Species Management Area
- Not Assessed Lower Hudson
- Not Assessed Saint Lawrence/Eastern Lake Ontario
- Not Assessed Western New York

Documentation:
Sources of information (e.g.: distribution models, literature, expert opinions):

If the species does not occur and is not likely to survive and reproduce within any of the PRISMs, then stop here as there is no need to assess the species.

A2.2. What is the current distribution of the species in each PRISM? (obtain rank from PRISM invasiveness ranking forms)

<table>
<thead>
<tr>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adirondack Park Invasive Program</td>
</tr>
<tr>
<td>Capital/Mohawk</td>
</tr>
<tr>
<td>Catskill Regional Invasive Species Partnership</td>
</tr>
<tr>
<td>Finger Lakes</td>
</tr>
<tr>
<td>Long Island Invasive Species Management Area</td>
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</tr>
<tr>
<td>Saint Lawrence/Eastern Lake Ontario</td>
</tr>
<tr>
<td>Western New York</td>
</tr>
</tbody>
</table>

Documentation:
Sources of information:

A2.3. Describe the potential or known suitable habitats within New York. Natural habitats include all habitats not under active human management. Managed habitats are indicated with an asterisk.

<table>
<thead>
<tr>
<th>Aquatic Habitats</th>
<th>Wetland Habitats</th>
<th>Upland Habitats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine</td>
<td>Salt/brackish marshes</td>
<td>Cultivated*</td>
</tr>
<tr>
<td>Salt/brackish waters</td>
<td>Freshwater marshes</td>
<td>Grasslands/old fields</td>
</tr>
<tr>
<td>Freshwater tidal</td>
<td>Peatlands</td>
<td>Shrublands</td>
</tr>
<tr>
<td>Rivers/streams</td>
<td>Shrub swamps</td>
<td>Forests/woodlands</td>
</tr>
<tr>
<td>Natural lakes and ponds</td>
<td>Forested wetlands/riparian</td>
<td>Alpine</td>
</tr>
<tr>
<td>Vernal pools</td>
<td>Ditches*</td>
<td>Roadsides*</td>
</tr>
<tr>
<td>Reservoirs/impoundments*</td>
<td>Beaches/or coastal dunes</td>
<td>Cultural*</td>
</tr>
</tbody>
</table>

Other potential or known suitable habitats within New York:

Documentation:
### Sources of information:

### B. INVASIVENESS RANKING

#### 1. ECOLOGICAL IMPACT

1.1. Impact on Ecosystem Processes and System-wide Parameters (e.g., water cycle, energy cycle, nutrient and mineral dynamics, light availability, or geomorphological changes (erosion and sedimentation rates).

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>A. No perceivable impact on ecosystem processes based on research studies, or the absence of impact information if a species is widespread (&gt;10 occurrences in minimally managed areas), has been well-studied (&gt;10 reports/publications), and has been present in the northeast for &gt;100 years.</td>
</tr>
<tr>
<td>3</td>
<td>B. Influences ecosystem processes to a minor degree, has a perceivable but mild influence</td>
</tr>
<tr>
<td>7</td>
<td>C. Significant alteration of ecosystem processes</td>
</tr>
<tr>
<td>10</td>
<td>D. Major, possibly irreversible, alteration or disruption of ecosystem processes</td>
</tr>
<tr>
<td>U</td>
<td>U. Unknown</td>
</tr>
</tbody>
</table>

**Documentation:**

Identify ecosystem processes impacted (or if applicable, justify choosing answer A in the absence of impact information)

Nagdali and Gupta (2002) suggested that removal of G. affinis from a case study lake in India would improve water quality due to subsequent impacts on abiotic and biotic conditions during a mass mortality event. Some studies found the introduction of this species to cause algal blooms (Nico et al. 2013). Hurlbert and Mulla (1981) found Gambusia caused higher pH and oxygen levels, presumably due to their effect on phytoplankton populations.

**Sources of information:**

1.2. Impact on Natural Habitat/ Community Composition

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>A. No perceived impact; causes no apparent change in native populations</td>
</tr>
<tr>
<td>3</td>
<td>B. Influences community composition (e.g., reduces the number of individuals of one or more native species in the community)</td>
</tr>
<tr>
<td>7</td>
<td>C. Significantly alters community composition (e.g., produces a significant reduction in the population size of one or more native species in the community)</td>
</tr>
<tr>
<td>10</td>
<td>D. Causes major alteration in community composition (e.g., results in the extirpation of one or several native species, reducing biodiversity or change the community composition towards species exotic to the natural community)</td>
</tr>
<tr>
<td>U</td>
<td>U. Unknown</td>
</tr>
</tbody>
</table>

**Documentation:**

Identify type of impact or alteration:

Studies show this species to have an impact on the decline and even endangerment in some cases of native amphibians, fish, and beneficial invertebrates, while actually increasing in mosquito numbers as they sometimes feed on the larger invertebrate predators of mosquito larvae (Baber and Babbitt 2004, Gambusia Control Network 2013, ISSG 2013, Nico et al. 2013). In addition to tadpoles and small insects, they are known to feed on zooplankton, small insects, and detritus, and are known for their high feeding capacity (Nico et al. 2013).

**Sources of information:**
(Baber and Babbitt 2004, Gambusia Control Network 2013, ISSG 2013, Nico et al. 2013)

1.3. Impact on other species or species groups, including cumulative impact of this
species on other organisms in the community it invades. (e.g., interferes with native predator/ prey dynamics; injurious components/ spines; reduction in spawning; hybridizes with a native species; hosts a non-native disease which impacts a native species)

A. Negligible perceived impact 0
B. Minor impact (e.g. impacts 1 species, <20% population decline, limited host damage) 3
C. Moderate impact (e.g. impacts 2-3 species and/ or 20-29% population decline of any 1 species, kills host in 2-5 years, ) 7
D. Severe impact on other species or species groups (e.g. impacts >3 species and/ or ≥30% population decline of any 1 species, kills host within 2 years, extirpation) 10
U. Unknown

Score 10

Documentation:
Identify type of impact or alteration:
Studies show this species to have an impact on the decline and even endangerment in some cases of native amphibians, fish, and beneficial invertebrates, while actually increasing in mosquito numbers as they sometimes feed on the larger invertebrate predators of mosquito larvae (Baber and Babitt 2004, Gambusia Control Network 2013, ISSG 2013, Nico et al. 2013). In addition to tadpoles and small insects, they are known to feed on zooplankton, small insects and detritus and are known for their high feeding capacity (Nico et al. 2013).

Sources of information:
(Baber and Babitt 2004, Gambusia Control Network 2013, ISSG 2013, Nico et al. 2013)

2. BIOLOGICAL CHARACTERISTICS AND DISPERSAL ABILITY
2.1. Mode and rate of reproduction (provisional thresholds, more investigation needed)
A. No reproduction (e.g. sterile with no sexual or asexual reproduction). 0
B. Limited reproduction (e.g., intrinsic rate of increase <10%, low fecundity, complete one life cycle) 1
C. Moderate reproduction (e.g., intrinsic rate of increase between 10-30%, moderate fecundity, complete 2-3 life cycles) 2
D. Abundant reproduction (e.g., intrinsic rate of increase >30%, parthenogenesis, large egg masses, complete > 3 life cycles) 4
U. Unknown

Score 2

Documentation:
Describe key reproductive characteristics:
G. affinis is a live-bearing fish and females have the ability to store sperm. Females bear young several times a year and an average of 60 young at a time.
Sources of information:
(ISSG 2013, Nico et al. 2013)

2.2. Migratory behavior
A. Always migratory in its native range 0
B. Non-migratory or facultative migrant in its native range 2
U. Unknown

Score 2
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2.3. Biological potential for colonization by long-distance dispersal/ movement (e.g., veligers, resting stage eggs, glochidia)

A. No long-distance dispersal/ movement mechanisms
   Score: 0

B. Adaptations exist for long-distance dispersal, but studies report that most individuals (90%) establish territories within 5 miles of natal origin or within a distance twice the home range of the typical individual, and tend not to cross major barriers such as dams and watershed divides
   Score: 1

C. Adaptations exist for long-distance dispersal, movement and evidence that offspring often disperse greater than 5 miles of natal origin or greater than twice the home range of typical individual and will cross major barriers such as dams and watershed divides
   Score: 2

U. Unknown

2.4. Practical potential to be spread by human activities, both directly and indirectly – possible vectors include: commercial bait sales, deliberate illegal stocking, aquaria releases, boat trailers, canals, ballast water exchange, live food trade, rehabilitation, pest control industry, aquaculture escapes, etc.)

A. Does not occur
   Score: 0

B. Low (human dispersal to new areas occurs almost exclusively by direct means and is infrequent or inefficient)
   Score: 1

C. Moderate (human dispersal to new areas occurs by direct and indirect means to a moderate extent)
   Score: 2

D. High (opportunities for human dispersal to new areas by direct and indirect means are numerous, frequent, and successful)
   Score: 4

U. Unknown

2.5. Non-living chemical and physical characteristics that increase competitive advantage (e.g., tolerance to various extremes, pH, DO, temperature, desiccation, fill vacant niche, charismatic species)

A. Possesses no characteristics that increase competitive advantage
   Score: 0

B. Possesses one characteristic that increases competitive advantage
   Score: 4

C. Possesses two or more characteristics that increase competitive advantage
   Score: 8

U. Unknown

Documentation:
Describe migratory behavior:
Sources of information:

Documentation:
Identify dispersal mechanisms:
Sources of information:
(Rehage and Sih 2004, Nico et al. 2013)

Documentation:
Identify dispersal mechanisms:
Introduced into areas as a method for mosquito control. This is described as an on-going, current occurrence.
Sources of information:
(ISSG 2013)
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Score 8

Documentation:
Evidence of competitive ability:
This species has morphological adaptations for inhabiting low oxygenated waters, is known to occur at temperatures between 12-29°C, has a well-known tolerance to temperature (Lewis 1970, Cherry et al. 1976, Masterson 2013), and can survive in water with some salinity and can tolerate saltwater and extreme changes in salinity for short periods (Chervinski 2006). Pyke (2005) recognized that mosquitofish can tolerate a wide range of environmental conditions and have the ability to adapt to changes.
Sources of information:

2.6. Biological characteristics that increase competitive advantage (e.g., high fecundity, generalist/ broad niche space, highly evolved defense mechanisms, behavioral adaptations, piscivorous, etc.)
A. Possesses no characteristics that increase competitive advantage 0
B. Possesses one characteristic that increases competitive advantage 4
C. Possesses two or more characteristics that increase competitive advantage 8
U. Unknown

Score 4

Documentation:
Evidence of competitive ability:
In addition to tadpoles and small insects, Gambusia affinis are known to feed on zooplankton, small insects, and detritus, and are known for their high feeding capacity (Nico et al. 2013). They have also been described as extremely aggressive and known from attacking other fish (ISSG 2013). Females have the ability to store sperm.
Sources of information:

2.7. Other species in the family and/ or genus invasive in New York or elsewhere?
A. No 0
B. Yes 2
U. Unknown

Score 2

Documentation:
Identify species:
Gambusia holbrooki. Gambusia geiseri and G. nobilis are also nonindigenous, and many other genera in the family Poeciliidae.

Total Possible 28
Section Two Total 22

3. ECOLOGICAL AMPLITUDE AND DISTRIBUTION
3.1. Current introduced distribution in the northern latitudes of USA and southern latitude of Canada (e.g., between 35 and 55 degrees).
A. Not known from the northern US or southern Canada. 0
B. Established as a non-native in 1 northern USA state and/or southern Canadian province. 1
C. Established as a non-native in 2 or 3 northern USA states and/or southern Canadian provinces. 2
D. Established as a non-native in 4 or more northern USA states and/or southern Canadian provinces, and/or categorized as a problem species (e.g., “Invasive”) in 1 northern state or
southern Canadian province.

U. Unknown  

Score 3

Documentation: 
Identify states and provinces: 
AK, AZ, CA, CO, CT, FL, IL, IN, ID, IN, IA, KS, KY, MN, MA, MI, MT, MO, NE, NV, NJ, NM, NY, NC, OH, OR, PA, UT, VA, WA, WV, WI, WY, and Puerto Rico and Hawaii and Canada (specific province not stated).
Sources of information: 
- See known introduced range at www.usda.gov, and update with information from states and Canadian provinces. 

3.2. Current introduced distribution of the species in natural areas in the eight New York State PRISMs (Partnerships for Regional Invasive Species Management)
A. Established in none of the PRISMs 0
B. Established in 1 PRISM 1
C. Established in 2 or 3 PRISMs 3
D. Established in 4 or more PRISMs 5
U. Unknown  

Score 3

Documentation: 
Describe distribution: 
This species is currently known from Long Island and the lower Hudson River; 2 NYS PRISMs.
Sources of information: 
(U.S. Geological Survey 2013)

3.3. Number of known, or potential (each individual possessed by a vendor or consumer), individual releases and/or release events
A. None 0
B. Few releases (e.g., <10 annually). 2
C. Regular, small scale releases (e.g., 10-99 annually). 4
D. Multiple, large scale (e.g., ≥100 annually). 6
U. Unknown  

Score U

Documentation: 
Describe known or potential releases: 
While the number of releases or stocking for mosquito control is not stated, this is expected to be an on-going, widespread, and current occurrence. 
Sources of information: 
(ISSG 2013, Nico et al. 2013)

3.4. Current introduced population density, or distance to known occurrence, in northern USA and/or southern Canada.
A. No known populations established. 0
B. Low to moderate population density (e.g., ≤1/4 to < 1/2 native population density) with few other invasives present and/or documented in 1 or more non-adjacent state/province and/or 1 unconnected waterbody. 1
C. High or irruptive population density (e.g., ≥1/2 native population density) with numerous 2
other invasives present and/or documented in 1 or more adjacent state/province and/or 1 connected waterbody.

**U. Unknown**

**Score 2**

**Documentation:**

Describe population density:
Currently known from over 30 states where it has been introduced. If adding in states in its native range, most of these states are adjacent.

**Sources of information:**
(U.S. Geological Survey 2013)

### 3.5. Number of habitats the species may invade

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Not known to invade any natural habitats given at A2.3.</td>
<td>0</td>
</tr>
<tr>
<td>B.</td>
<td>Known to occur in 2 or 3 of the habitats given at A2.3, with at least 1 or 2 natural habitat(s).</td>
<td>2</td>
</tr>
<tr>
<td>C.</td>
<td>Known to occur in 4 or more of the habitats given at A2.3, with at least 3 natural habitats.</td>
<td>3</td>
</tr>
<tr>
<td>U.</td>
<td>Unknown.</td>
<td></td>
</tr>
</tbody>
</table>

**Score 3**

**Documentation:**

Identify type of habitats where it occurs and degree/type of impacts:
This species is known to invade brackish marshes and other waters, tidal rivers, lakes/ponds and rivers/streams

**Sources of information:**

### 3.6. Role of anthropogenic (human related) and natural disturbance in establishment (e.g. water level management, man-made structures, high vehicle traffic, major storm events, etc.)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Requires anthropogenic disturbances to establish.</td>
<td>0</td>
</tr>
<tr>
<td>B.</td>
<td>May occasionally establish in undisturbed areas but can readily establish in areas with natural or anthropogenic disturbances.</td>
<td>2</td>
</tr>
<tr>
<td>C.</td>
<td>Can establish independent of any known natural or anthropogenic disturbances.</td>
<td>3</td>
</tr>
<tr>
<td>U.</td>
<td>Unknown.</td>
<td></td>
</tr>
</tbody>
</table>

**Score 3**

**Documentation:**

Identify type of disturbance:

**Sources of information:**

### 3.7. Climate in native range (e.g., med. to high, ≥5, Climatch score; within 35 to 55 degree latitude; etc.)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Native range does not include climates similar to New York (e.g., &lt;10%).</td>
<td>0</td>
</tr>
<tr>
<td>B.</td>
<td>Native range possibly includes climates similar to portions of New York (e.g., 10-29%).</td>
<td>4</td>
</tr>
<tr>
<td>C.</td>
<td>Native range includes climates similar to those in New York (e.g., ≥30%).</td>
<td>8</td>
</tr>
<tr>
<td>U.</td>
<td>Unknown.</td>
<td></td>
</tr>
</tbody>
</table>

**Score 8**

**Documentation:**

Describe known climate similarities:
72% of NY stations are ≥5 on Climatch

**Sources of information:**
(Australian Department of Agriculture, Fisheries, and Forestry (ADAFF) 2013)

**Total Possible 24**
4. DIFFICULTY OF CONTROL

4.1. Re-establishment potential, nearby propagule source, known vectors of re-introduction (e.g. biological supplies, pets, aquaria, aquaculture facilities, connecting waters/ corridors, mechanized transportation, live wells, etc.)

A. No known vectors/ propagule source for re-establishment following removal.  0
B. Possible re-establishment from 1 vector/ propagule source following removal and/ or viable <24 hours.  1
C. Likely to re-establish from 2-3 vectors/ propagule sources following removal and/ or viable 2-7 days.  2
D. Strong potential for re-establishment from 4 or more vectors/ propagule sources following removal and/or viable >7 days.  3
U. Unknown.  

Score 2

Documentation:
Identify source/ vectors:
Mosquito control agency stocking and connecting waters/corridors are potential re-introduction vectors.
Sources of information:
(Nico et al. 2013)

4.2. Status of monitoring and/ or management protocols for species

A. Standardized protocols appropriate to New York State are available.  0
B. Scientific protocols are available from other countries, regions or states.  1
C. No known protocols exist.  2
U. Unknown

Score 1

Documentation:
Describe protocols:
Management protocols are available for New Zealand, Hawaii, Peru, New South Wales, and Canada and may be applicable (ISSG 2013).
Sources of information:
(ISSG 2013)

4.3. Status of monitoring and/ or management resources (e.g. tools, manpower, travel, traps, lures, ID keys, taxonomic specialists, etc.)

A. Established resources are available including commercial and/ or research tools  0
B. Monitoring resources may be available (e.g. partnerships, NGOs, etc)  1
C. No known monitoring resources are available  2
U. Unknown

Score 0

Documentation:
Describe resources:
Management protocols are available for New Zealand, Hawaii, Peru, New South Wales, and Canada and may be applicable (ISSG 2013). Control methods may include piscicides or predatory fish, but research is still needed on effective native predatory fish to use for control and if there may be a species-specific parasite.
Sources of information:
(Gambusia Control Network 2013, ISSG 2013)

4.4. Level of effort required

A. Management is not required. (e.g., species does not persist without repeated human

Score 0
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mediated action.)

B. Management is relatively easy and inexpensive; invasive species can be maintained at low abundance causing little or no ecological harm. (e.g., 10 or fewer person-hours of manual effort can eradicate a local infestation in 1 year.)

C. Management requires a major short-term investment, and is logistically and politically challenging; eradication is difficult, but possible. (e.g., 100 or fewer person-hours/year of manual effort, or up to 10 person-hours/ year for 2-5 years to suppress a local infestation.)

D. Management requires a major investment and is logistically and politically difficult; eradication may be impossible. (e.g., more than 100 person-hours/ year of manual effort, or more than 10 person hours/year for more than 5 years to suppress a local infestation.)

U. Unknown

Score 3

Documentation:
Identify types of control methods and time required:
Antimycin, a piscicide, has been used on pest fish populations in Scotland (Clearwater et al. 2008). Large, predatory fish have been suggested as a use for controlling Gambusia populations (Gambusia Control Network 2013), but further research on both methods is needed. Disease agents (pathogens or parasites) have been suggested as a means to control the species, if a those specific to Gambusia hosts can be identified (Gambusia Control Network 2013). Rotenone is listed as a possible control for this species, but is an indiscriminate piscicide, so native fish may be affected and need to be removed (ISSG 2013). Returning habitats to ideal conditions for native fish (issues such as water quality, flow, fish passage, and snags) will improve native fishes ability to outcompete pest species (Department of Primary Industries 2013) and pond draining for confined waterbodies can minimize impacts to native species (ISSG 2013). Controlling further spread is advised, since they are difficult to remove once established (Nico and Fuller 2013).
Sources of information:

Total Possible 10
Section Four Total 6

Total for 4 sections Possible 92
Total for 4 sections 74

C. STATUS OF GENETIC VARIANTS AND HYBRIDS:

At the present time there is no protocol or criteria for assessing the invasiveness of genetic variants independent of the species to which they belong. Such a protocol is needed, and individuals with the appropriate expertise should address this issue in the future. Such a protocol will likely require data on cultivar fertility and identification in both experimental and natural settings.

Genetic variants of the species known to exist:

Hybrids (crosses between different parent species) should be assessed individually and separately from the parent species wherever taxonomically possible, since their invasiveness may differ from that of the parent species. An exception should be made if the taxonomy of the species and hybrids are uncertain, and species and hybrids can not be clearly distinguished in the field. In such cases it is not feasible to distinguish species and hybrids, and they can only be assessed as a single unit.

Hybrids of uncertain origin known to exist: Gambusia affinis x. G. holbrooki, G. affinis x G. heterochir
References for species assessment:


Citation: The New York Fish & Aquatic Invertebrate Invasiveness Ranking Form is an adaptation of the New York Plant Invasiveness Ranking Form. The original plant form may be cited as: Jordan, M.J., G. Moore and T.W. Weldy. 2008. Invasiveness ranking system for non-native plants of New York. Unpublished. The Nature
Acknowledgments: The New York Fish and Aquatic Invertebrate Invasiveness Ranking Form incorporates components and approaches used in several other systems, cited in the references below. Valuable contributions by members of the Invasive Species Council and Invasive Species Advisory Committee were incorporated in revisions of this form. Members of the Office of Invasive Species Coordination’s Four-tier Team, who coordinated the effort, included representatives of the New York State Department of Environmental Conservation* (Division of Fish, Wildlife and Marine Resources, Division of Lands and Forests, Division of Water); The Nature Conservancy; New York Natural Heritage Program; New York Sea Grant*; Lake Champlain Sea Grant*; New York State Department of Agriculture and Markets (Division of Plant Industry and Division of Animal Industry); Cornell University (Department of Natural Resources and Department of Entomology); New York State Nursery and Landscape Association; New York Farm Bureau; Brooklyn Botanic Garden; Pet Industry Joint Advisory Council*; Trout Unlimited*; United States Department of Agriculture Animal and Plant Health Inspection Service (Plant Protection and Quarantine and Wildlife Services); New York State Department of Transportation; State University of New York at Albany and Plattsburgh*; and Cary Institute of Ecosystem Studies. Those organizations listed with an asterisk comprised the Fish and Aquatic Invertebrate Working Group.

References for ranking form:


Natural Resources Board Order No. IS-34-06, Invasive Species Identification, Classification and Control. 2008. Wisconsin Department of Natural Resources, Madison Wisconsin.

New York
Fish & Aquatic Invertebrate Invasiveness Ranking Form

Standard Methodology to Assess the Risks From Non-native Species Considered Possible Problems to the Environment. 2005. DEFRA.
